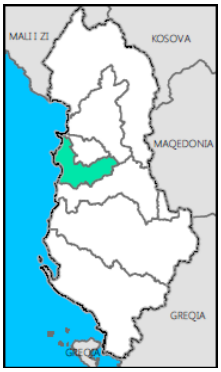
River Basin Management Plan for the Erzen River Basin 2024-2029

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
WRMA	WATER RESOURCES MANAGEMENT AGENCY
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 AKM	NATIONAL ENVIRONMENT AGENCY 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 *ERRU*	ALBANIA WATER REGULATORY AUTHORITY 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 VII*

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 (WRMA), 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 Erzen River Basin***, consisting of:

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

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 Erzen 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.

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 (2016-2021) and have started the third implementation cycle (2022-2027). 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 Water Basin Management Plan for the Erzen River will be implemented during a period as close as possible to the third cycle of the EU RBMPs.

General Director – WRMA

Gerta Lubonja

Executive Summary

The EUSIWM project was co-financed by the EU within the IPA 2016 Action Program for Albania to support the integrated management of water resources and the Austrian Cooperation Agency (ADC). According to Agreement No. 2017/393-187, signed between the European Commission and ADA on December 21, 2017, the body responsible for the implementation of the project was the Austrian Development Agency (ADA).

According to the agreement signed by the Albanian Government and ADA on November 14, 2018 (updated following the one-year extension of the existing project), the direct beneficiary of the EUSIWM project was WRMA. The overall goal of the project is to improve the implementation of the National Reform for the Water Sector in Albania in accordance with the requirements of EU legislation on water.

Closely related to technical work, the project aims to strengthen the role of WRMA and other Albanian institutions in the field of water resources, not only for the design of a RBMP, but also for the implementation of integrated management of water resources in general, according to the EU methodology. This work schedule has helped WRMA gradually fulfill its leadership role throughout the entire WBM process.

Objective of the River Basin Management Plan (RBMP) for the Erzen River

The drafting of the Erzen`s RBMP was made possible by the support of the EUSIWM project during the period 2019–2021. At the beginning of the program, the main aspects and activities of the WBM were realized thanks to the extensive support of the ADA/EUSIWM project team and national and international experts.

In 2021, based on the recommendations of the EUSIWM project team, an inter-institutional expert working group for WBM was established under the leadership of WRMA. The group consisted of representatives of various institutions for the management of water resources in the country, who were directly involved in all the preparatory stages of the RBMP, especially in the collection and evaluation of data.

The structure of the current RBMP for the Erzen River Basin is in full compliance with the requirements set forth in Annex VII of EU Directive 2000/60/EC[1]. Some adaptations have been made to the chapters and the content of the plan to better respond to the needs and national operational systems available for the management of water resources.

Working according to a clear methodology for the WBM, enabling the full training of the WRMA staff within the EUSIWM project, as well as the establishment of an inter-institutional dialogue at the technical level through the EG of the WBM, serves as a guarantee that in the future, the WBM planning process for the new 2024–2029 plans, followed by their implementation through the current Program of Measures (PoM) according to EU standards, will be carried out in a completely professional manner under the guidance of WRMA and in close cooperation with institutions in the field of water resources.

[1] https://eur-lex.europa.eu/resource.html?uri=cellar:5c835afb-2ec6-4577-bdf8-756d3d694eeb.0004.02/DOC_1&format=PDF

Challenges encountered

Drafting of the RBMP is a difficult and complex process, and considering the conditions in Albania, these difficulties increase. Although the preparation of the RBMP may be the responsibility of one or several institutions, drafting itself is a complex undertaking that requires the involvement of all stakeholders, such as experts from different fields. The integrated management of water resources is a "mandatory" process that must be implemented by the relevant institutions to better manage available resources. One of the main requirements for the proper implementation of the WBM process is the availability and (*where possible*) reliability of the data.

One of the biggest questions during the preparation of the RBMP for the Erzen River Basin was whether to wait for the completion of all data collection and to put in place a well-organized monitoring system, or to embrace the approach "to use what we have available" and to draw up the "roadmap" for solving problems and dealing with challenges.

Therefore, should the WRMA wait until all conditions are met and then proceed with the preparation of the RBMP, or should the fulfillment of these conditions be an integral part of the RBMP itself?

Contect of RBMP?

The EU WFD entered into force in 2000, thus creating a legal framework for the protection and improvement of aquatic ecosystems to prevent their deterioration and ensure the long-term and sustainable use of water resources within the EU. The objective was for all inland, transitional, and coastal water bodies to achieve good chemical and ecological status (or potential), and for groundwater to achieve good chemical and quantitative status.

It is essential that the water sources used for drinking are not under the pressure of organic, nutrient, or hazardous substances. However, this is not sufficient if the natural ecosystem, including its flora and fauna, has been significantly damaged. This is the reason why this comprehensive approach requires surface waters to enjoy "good ecological status": river beds must be well-structured, and sufficient water is needed to ensure migratory routes and natural habitats that enable the continuation of animal life and aquatic plants.

Identification of Important Water Management Issues (IWMI)

The preliminary stage was the identification of the main IWMIs in order to get a picture of the main issues and pressures of a certain WB. This submission report presents the current issues in the watershed and proposes the main topics and aspects to be addressed further by the RBMP in the search for solutions. Listed below are some of the most important issues:

1. Climate change and water resources
2. Hydrometeorological data and monitoring systems
3. Protected areas and aquatic ecosystems
4. Floods and droughts;
5. Morphology and continuity of the channels and flooded areas
6. Environmental Flows;
7. Water use, water extraction, and permits for water extraction
8. Water discharge, pollution, and discharge permits
9. Dams and hydropower plants
10. Use, protection, and monitoring of underground water
11. Quality of coastal waters and habitats

12. Water level on the coast; risks and floods; erosion

For each issue, the submission includes the following information.

- Importance of treatment
- Current situation;
- Complications and future needs
- Measures that can be implemented in the Water Basin Management Plan.

Towards the RBMP framework for the country

Based on the analysis of the situation and the problems that are proposed to be addressed in the form of IWMIs, the following important steps were agreed upon: defining an appropriate and useful structure for the RBMP, in full accordance with the requirements of Annex VII of the WFD of the EU, and taking into account the specifics and problems of water resources in Albania. This structure was prepared in 2020 mainly by EUSIWM's international expert, Mr. Brian Faulkner.

The draft RBMP contains 13 chapters, all in accordance with the provisions of Annex VII of the WFD; however, their order is slightly adjusted to the national context. The preparation required more time for Chapter 11 "Economic analysis of water use," which was conducted for the first time in Albania at the water basin level.
The first draft of the RBMP was finalized in April 2021. The RBMP will be finalized in the direction of WRMA with the support of the ADA-EUSWIM team and relevant international and national experts. The draft report and its content were fully consulted with stakeholders and relevant institutions through the WBM EG meetings.
The draft of RBMP was continuously updated, with the first preliminary version completed in December 2021, and distributed to all stakeholders at the National Water Conference.

Program of Measures

Based on the requirements of the DKU, the PoM will be prepared for each RBMP to achieve environmental objectives (DKU Article 11(1)[2]).
The measures identified by the RBMP for the Erzen River were drawn based on the assessment of the current status of the outlined water bodies, which was based on the analysis of the pressures and impacts affecting each water body. Therefore, every step of the planning process is important to ensure that the correct measures are implemented at the right location.
The measures are determined depending on the "Key Type Measures" (KTMs[3]) and the degree to which they would ensure the treatment of these pressures. KTMs are a group of measures identified by Member States that target the same pressure or goal. *KTMs can also include measures of national character, but there can usually be more than one national measure. The measures were designed based on an assessment of the current status of the water bodies, supplemented with information from the analysis of the pressures and impacts affecting the water bodies.*

[2] Article 11 (1). Each Member State ensures the drafting of the program of measures for each region of the river basin or for a part of the region of the river basin within its territory, taking into account the results of the analyses required by Article 5 to achieve the objectives defined in Article 4. These programs of measures may refer to measures derived from legislation adopted at the national level and cover the entire territory of the Member State. When deemed appropriate, the Member State may adopt measures applicable to all river basin regions and/or part of the international river basin regions that lie within its territory.
[3] Table 13-1 (Key Type Measures (KTMs) in accordance with the EU WISE adopted in this RBMP report).

This RBMP defines the PoM that will be implemented during the period 2024-2029 to achieve the "environmental objectives," as described in Chapter 3, in accordance with Article 4 of the DKU[4]. Annex 3 of the WISE 2016 also provides guidance on pressure and key indicators of measures, accompanied by examples. Specific measures (encountered within the framework of KTMs) should address specific pressures and Key Types of Pressures (KTPs[5]) encountered at the water body level. The most efficient way to ensure that the measure reflects the relevant pressure is to sum the individual elements that contribute to the overall status or potential of the water body.

Main measures defined:

- Reduction of pollution from organic matter

Despite the large investments that have been made in wastewater infrastructure, additional measures are needed in the future. The basin needs basic infrastructural development aimed at connecting to public sewage systems and, at least, to urban wastewater treatment systems. Albania, as a non-EU country, must make efforts to improve it significantly by building a series of sewage systems and wastewater treatment plants by 2029.

- Reduction of nutrient pollution

The measures for the implementation of the RBMP will significantly contribute to the reduction of nutrients entering surface and underground waters, but more effort is needed from various institutions involved in this process. Measures should be implemented for urban, industrial, and agricultural wastewater.

The use of phosphate-free detergents is considered a quick and efficient measure for reducing phosphate emissions in surface waters. The EU regulations on detergents must be implemented in all EU countries, but non-EU Member States must make similar efforts or are recommended to make similar efforts, among which Albania must also take concrete measures in this way.

Diffuse pollution plays a major role in the overall nutrient emissions; therefore, the implementation of land management measures is very important. Some of the best agricultural practices for reducing pollution and infiltration have been identified as appropriate management tools.

Furthermore, the implementation of good agricultural practices is either ensured by regulatory actions (cross-compatibility) or encouraged through economic initiatives (rural development programs) of the Common Agricultural Policy financial mechanism. Non-EU Member States are encouraged to implement similar agricultural best practices.

• Reduction of pollution from hazardous materials

The proper treatment of urban wastewater and the implementation of Best Available Techniques (BAT) in industrial plants and large agricultural farms are elementary measures that can significantly contribute to the mitigation of contamination from hazardous substances.

In EU Member States, efforts to develop and improve the wastewater sector and industrial technologies, as well as to implement best agricultural practices, will also have positive effects on the status of water related to pollution by substances. dangerous.

More effort is needed to identify priority substances or other chemicals present in significant quantities in the basin. Limited information is available on the sources of emissions that cause surface water contamination by hazardous substances. The inventory of discharges, emissions, and losses for the entire basin should be continued. To support these activities, more information is needed on the concentrations in watercourses and loads in the river through regular monitoring (with improved equipment for more frequent sampling) and specific sampling campaigns (e.g., waste and liquid after treatment from the same point source).

[4] Article 4: Environmental Objectives

[5] Table 10-1 (Key Type Measures (KTMs) in accordance with the EU WISE adopted in this RBMP report).

• Improvement of hydromorphological conditions

The assessment of hydromorphological modifications showed that the water bodies were in poor condition. The proposed measures include the facilitation/modification of the flow of fish and the removal of obstacles to achieve continuity of water flows along the rivers.

• Improving the status of underground water

Groundwater quality

Considering that nitrates are key factors in achieving a good chemical status of a significant percentage of GWBs for the entire basin, it is very important to eliminate or reduce the amount of nitrates entering water bodies. Prevention of the deterioration of groundwater quality should first be achieved through the implementation of the EU Nitrates Directive and the UWWTD.

The amount of underground water

Excessive water abstraction from GWBs should be avoided through efficient management of groundwater and surface water. Therefore, strict control of surface and underground freshwater use and inventory are needed. In addition, there is a request for prior authorization of water use. In accordance with WFD, it must be ensured that the average annual rate of water withdrawal in the long term is not greater than the available source of groundwater.

Public participation and consultation

WRMA expresses its commitment to active public participation in decision-making to provide broader support for policies and increase the efficiency of implementation efforts. Relevant stakeholders have been consulted since the beginning of the Erzen RBMP drafting period. In November 2019, the first consultative meeting was held, where the relevant institutions discussed, identified, and agreed on the important issues of water resource management.

Due to the Covid-19 pandemic, during 2020 only one consultation meeting (October 2020) was held with representatives of the WB of Ishem and Erzen. The final RBMP will be published on WRMA's official website to fulfill the requirements of Article 14 of the EU WFD for public participation and involvement.

The Directive itself does not include a gender perspective, but WRMA, with the full support of the EUSIWM team, has extensively considered the role of women in all preparatory stages of the plan.

1 Objectives, Administration and Coordination

1.1 Objectives

This document delivers the statutory requirements of the RBMP for the Erzen river basin, as set out in the Law on Integrated Water Resources Management (LIWRM) especially Articles 17 and 24[6]. 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 it's associated Directives[7].

The overall purpose of the EU WFD is primarily concerned with the quality of waters, broadly defined as '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 Erzen River Basin area. With respect to water governance, the RBMP shall contain:

- 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 summary of institutional relationships established to ensure co-ordination in international River Basin Districts;
- a register of abstractions and their permissions where those abstractions are likely to impact on waterbody status [8]

The defined period of the Plan is six years (2024-2029) in accordance with national legislation and the WFD, and represents the 3rd 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

[6] Government of Albania, Law 111/2012, amended by Law no 6/2018 on Integrated Water Resources Management

[7] 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

[8] European Commission, Directive 2000/60/EC – Article 11(3)

be legally binding on the designated competent authorities, operators or other stakeholders as appropriate.

1.2 Legal Status of the Competent Authority

The Erzen river basin is independently defined [9] (Map 1-1). For the purposes of this plan, AMBU acts as the competent authority for coordinating and controlling the work of local water resources management bodies, as provided for in Law No. 111/2012 (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 AMBU 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[10].

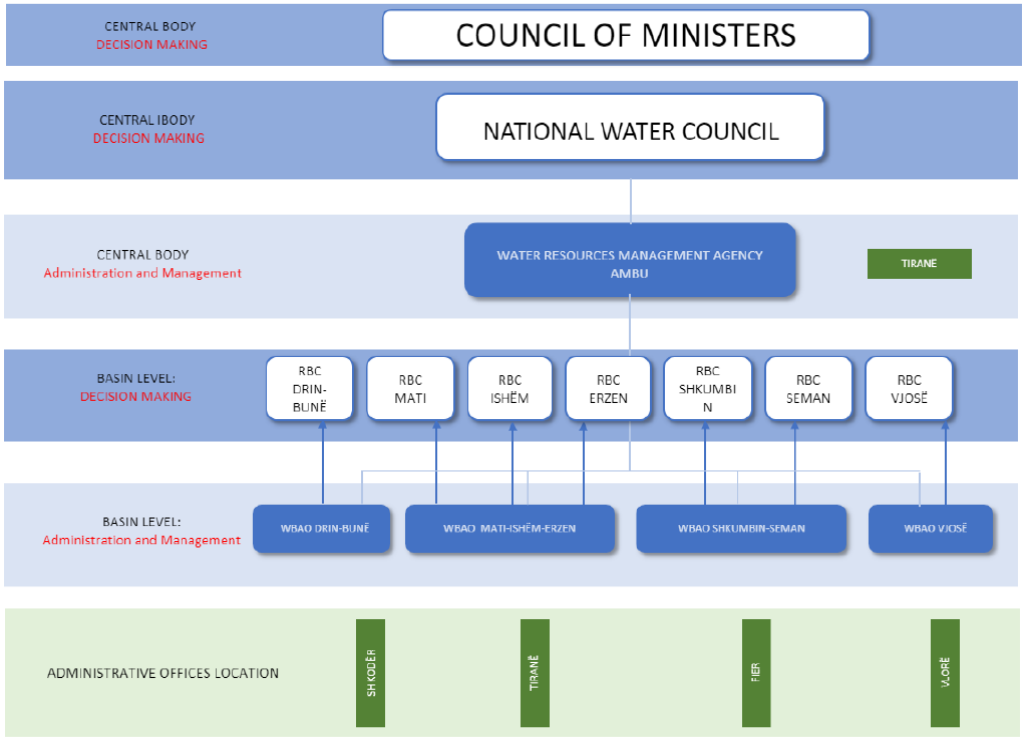
1.3 Administrative Arrangements

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).

Figure 1-1 – Administrative Arrangements for Water Governance



[9] 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

[10] European Commission, Directive 2000/60/EC – Article 3(2)

The Water Basin Administration Offices (WBAOs) are operational units of the 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

WRMA 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 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.

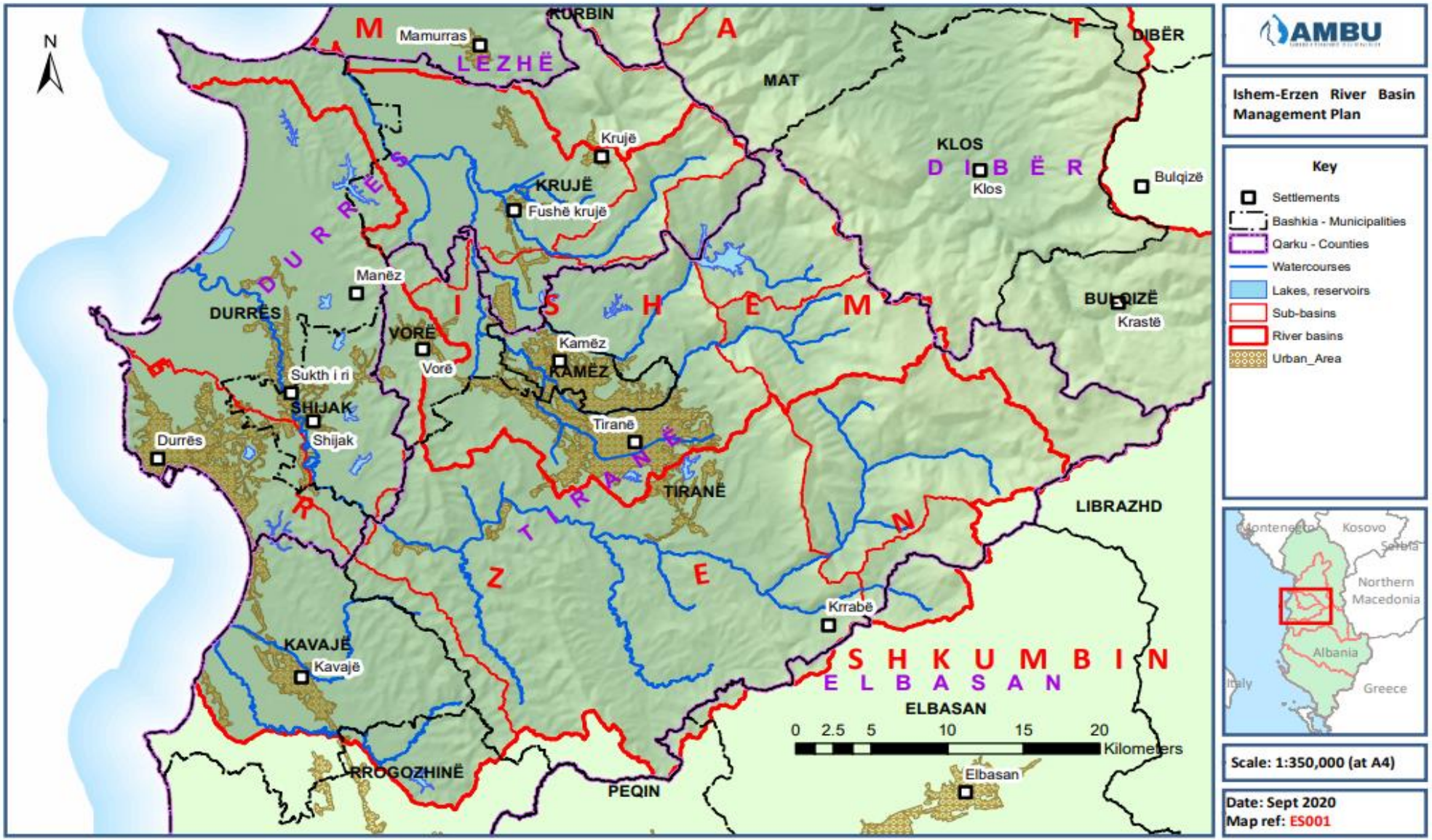
Table 1-1 – Register of Competent Authorities Relevant to the Plan

COMPETENT AUTHORITY & LEGAL AUTHORITY	MAIN ACTIVITIES CONTRIBUTING TO WFD	COORDINATION MECHANISMS WITH OTHER CAs
Water Resources Management Agency (WRMA) (Office of the Prime Minister) Law No. 111/2012 as amended by Law no. 6/2018 on ''Integrated water resources management'' DCM No. 221 dated 26.4.2018 on ''Establishment of WRMA'' DCM No. 221, dated 26.4.2018, "On the organization and operation of WRMA"	Implementation and coordination of the Law on Integrated Water Resources Management Implementation and coordination of the EU Water Framework Directive Preparation of River Basin Management Plans Preparation of Water Resource Management Plans Preparation of Flood Risk Management Plans Preparation of Drought Risk Management Plans Holder of the Register of Water Abstractions (in NWRC)	Publication of River Basin Management Plans and Subsidiary Plans Implementation of National IWRM Strategy Maintenance of the register of water resources operators Maintenance of the National Water Resources Cadastre
National Environmental Agency (NEA) Law No. 10431 date 9.6.2011 on '' Environmental Protection'' DCM No. 568 date 17.7.2019 on ''Establishment of NEA''	National Environmental Monitoring of River Waterbodies National Environmental Monitoring of Lake Waterbodies National Environmental Monitoring of Coastal Waterbodies Environmental Permits issued for all industrial activities in the country EIAs and SEA assessed regularly	Publication of the National Environmental Monitoring Programme (yearly exercise) Maintenance of Register of Environmental Permits Maintenance of the Register of Pollutant release and discharges
Department of Climate and Environment, Institute of Geosciences, Energy, Water and Environment (IGEWE) Law No. 8485 dated 12.5.1999 on ''Code of administrative procedures'' DCM No. 490 dated 6.7.2011 on ''Establishment of IGJEUM / IGEWE (merging previous existing different institutions).	Data collection, verification and distribution of meteorological data (precipitation monitoring) Data collection, verification and distribution of hydrological data (flow monitoring)	Publication of Climate Monthly Bulletin via website
National Agency for Protected Areas 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.	Management of Protected Areas Implementation of the EU Birds and Habitats Directives	Publication of management plans for protected areas, all types Maintenance of register for protected areas – GIS based Maintenance of the national Inventory of flora and fauna
National Coastline Agency (NCA) Law No. 93/2015 on ''Tourism'' DCM No. 569 dated 17.7.2019 on ''Establishment of national coastline agency''	Protection and development of sustainable environment in coast Monitoring and control of illegal touristic-based activities in coast (beaches)	Maintenance of national inventory of coastline Monitoring implementation of territorial planning instruments
National Territorial Planning Agency Law No. 107/2014 on ''Territorial development and planning''.	Preparation of territorial management plans in a coordinated manner – through local governments	Publication of National Development Plan Coordinate preparation of local governments territorial management plans

DCM No. 427 dated 8.6.2016 on ''Establishment of national agency for territorial planning''	Preparation of integrated plans thematic-wise (including infrastructure, floods, water, agriculture, urban development, etc).	Publication of Integrated Cross-Sectorial Coastline Plan – GIS based (https://geoportal.asig.gov.al/map/?fc_name=Bregdeti_5_Sistemi_ujor&auto=true) Publication of Integrated Cross-Sectorial Coastline Plan for Tirana-Durres Region – GIS based (including Tirana, Durrësi, Kamza, Vora, Shijaku and Kruja municipalities). Maintenance of an Integrated Planning Database.
Albanian Geological Survey (AGS) Law No. 111/2015 dated 15.10.2015 on ''Albanian geological survey''	Study and monitoring of groundwater, aquifers, geological layers, hydrogeology	Publication of reports on groundwater quality Maintenance of database – GIS based – on geology, hydrogeology and groundwater aquifers. Member of EuroGeoSurveys, since 2007
National Agency for Nature Resources (NANR/AKBN) Law No. 7/2017 on ''Use of renewable resources'' DCM No. 547 dated 9.8.2006 on ''Establishment of NANR) as amended in 2017	Maintenance of database – national – on Energy sector use / capacity Monitoring and inspection of energy sector + fuels, oils, and all other natural resources Preparation of national action plan on use of renewable resources for energy production – every 2 years Hydropower plants monitoring Analysis of minerals	Publication of Bulletin on hydropower potential / investments in the country Maintenance of GIS based system on energy
National Agency for Water Supply, Sewerage and Waste Infrastructure (AKUM) 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). DCM No. 431 dated 11.7.2018 ''on establishment of AKUM''	Implementation of policy and strategy on water supply and sewerage (Master plan for WSS and Waste) Wastewater treatment Planning infrastructure for waste Planning investment needs for water supply / wastewater and waste management	Maintenance of national GIS platform on water supply and sewerage assets Publication of reports / statistics on performance of water utilities
Regional Directorates for Irrigation and Drainage Law No. 24/2017 on ''Irrigation and drainage'' DCM No. 437 dated 17.5.2017 on ''Establishment of 4 regional directorates for irrigation and drainage''	4 Directorates established: in **Lezhe, Durres**, **Fier** and **Korçe**. Inventory of irrigation, drainage and flood protection infrastructure Planning needs / water demand for irrigation sector Planning rehabilitation interventions in irrigation, drainage and flood protection infrastructure	Maintenance of irrigation, drainage and flood protection infrastructure
National Forestry Agency (NFA) Law no. 5/2016 dated 04.02.2016 "On the announcement of the Moratorium on forests" DCM No. 570, dated 17.7.2019 "On the establishment of the NFA".	Prepare inventory of forestry Preparatory of GIS based maps Implementation of yearly monitoring programme for forestry, biodiversity, habitats, etc. Monitoring / control / inspection	Maintenance of integrated forest system (registry, database, GIS system). Establishes and maintains the National Register of the Forest Fund. Develops the methodology for forest inventory, organization and management of work at the national level.

Order no. 24, dated 03.02.2020 "On the approval of the structure and organizational chart of the National Forest Agency" Law no. 57/2020 "On Forests" dt.30 / 04/2020		Publication of forest status reports and other relevant data / information.
National Agency for Civil Protection **(former General Directorate for Civil Emergencies)** Law No. 45/2019 dated 18.7.2019 on ''Civil Protection''	Preparation of national strategy for remediation of risk from disasters Preparation of national plan for civil emergencies Interventions in infrastructure in the damaged areas	Maintenance of database of information on losses and damages Establishment of the Fund for Solidarity
State Authority for Geo-Spatial Information (ASIG) Law No. 72/2012 dated 28.6.2012 on ''organisation and functioning of the state infrastructure for geo-space information"	Implementation of INSPIRE Directive requirements Preparation of National Standards for geo-Spatial information Preparation of all thematic-wise maps, at GIS system	Publication of all typology / sector maps at local/region/country level Maintenance of National GIS system for all types of information Maintenance of the National Geo-Portal (website) with information thematic-wise and available for public
Public Health Institution District State Health Inspectorate LHCU-Local Health Care Units Law No. 10 138, dated 11.5.2009 "On public health" DCM no. 379, dated 25.5.2016 for the approval of the regulation "Drinking water quality"	Quality assessment of drinking water (analysis of surface water, groundwater and water treatment facilities) Monitoring drinking water quality The analysis of drinking water quality monitoring data was carried out by local healthcare units. Inspection of the implementation of the requirements of DCM no. 379, dated 25.5.2016 for the approval of the regulation "Drinking water quality."	Publication of reports on health issues / status Publication of health medical Journal Publication of Bulletin of Health via website Publication on the Annual Drinking Water Quality Report website

Map 1-1 – River Basin Districts in Albania and Extent of the Ishem and Erzen River Basins



1.5 Overall Structure of the RBMP Framework and Documentation

1.5.1 Core Components

Within the context of the 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[11]. 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[12]. 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.

However, they also require special plans and/or strategies that are important and complex from a technical perspective, 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
- 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.

[11] European Commission - https://ec.europa.eu/environment/water/water-framework/info/intro_en.htm
[12] The World Bank – Integrated River Basin Management – From Concepts to Good Practice, Briefing Notes 1-15, 2006.

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 WRMA, and not least the large body of supportive policies, evidence and procedures provided by the EU Common Implementation Strategy[13]. International best practice is also highly relevant.

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.

[13] https://ec.europa.eu/environment/water/water-framework/objectives/implementation_en.htm

Table 1-2 – Supportive Elements to the RBMP Framework

PRINCIPAL DIRECTIVES RELATED TO THE WATER FRAMEWORK DIRECTIVE	
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 substances in the Field of water policy
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 agriculture
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 environment
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
PRINCIPAL GUIDANCE DOCUMENTS OF THE WFD COMMON IMPLEMENTATION STRATEGY	
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 of ecological status and ecological potential
Guidance Document 19	Guidance on Surface Water Chemical Monitoring under the Water Framework Directive
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	Implementing water balance to support the implementation of the DKU. Final – Version 6.1 – 18/05/2015 Technical Report - 2015 - 090
Guidance Document 35	Water Framework Directive Reporting Guidance 2016 – 6.0.6

GOVERNMENT OF ALBANIA – LEGAL ACTS	
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	Albanian Geological Survey
Law no. 7/2017	On promoting the use of renewable energy sources
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 WRMA

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 NEA
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

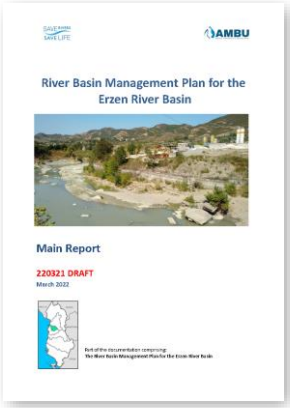
Figure 1-2 – Illustrative Layout of the RBMP Reporting Framework for Albania

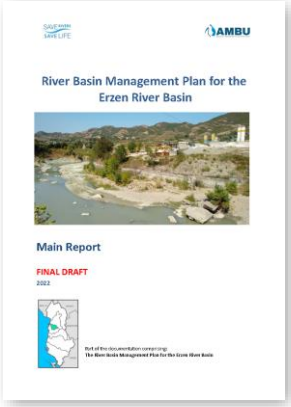
Initiation Phase and Consultation

Document Statement of Consultation

Document Overview of Significant Water Management Issues

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





Annexes
Annex I - Hydrology
Annex II – GIS
Annex III – Dataset
Annex IV – Pressure
Annex V – Hydrobiology
……
Annex XI – Programme of measures
Annex XII – Training and Public Consultation

Technical Mapping

Supporting Plans and Strategies

Document Economic Analysis

Document Environmental Impact Assessment

Document Water Resources and Abstraction Strategy

Document Flood Risk Strategy

Document Drought Risk Strategy

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 River Basin Management Plans[14].

2.1.1 Albania

General provisions and procedures with respect to public consultation on water management issues are transposed in the Law on Integrated Water Resources Management (LIWRM) [15] and the Law on Public Consultation (LPC)[16].

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[17]:

- 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 month 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.

2.2 Main Consultation Measures for the Erzen River Basin

2.2.1 Statement of Consultation

The Statement of Consultation for the Erzen RBMP was issued by the WRMA on October 2019, and posted for public dissemination via the Agency website[18]. Due to resource and capacity limitations, it was not possible to issue this Statement fully in accordance with the three-year rule (target January 2019).

[14] Water Framework Directive – Article 14, Annex VII (9)

[15] Government of Albania – Law on Integrated Water Resources Management, Chapter XVII, Article 91.

[16] Government of Albania – Law on Public Consultation, Article 15 and Article 17.

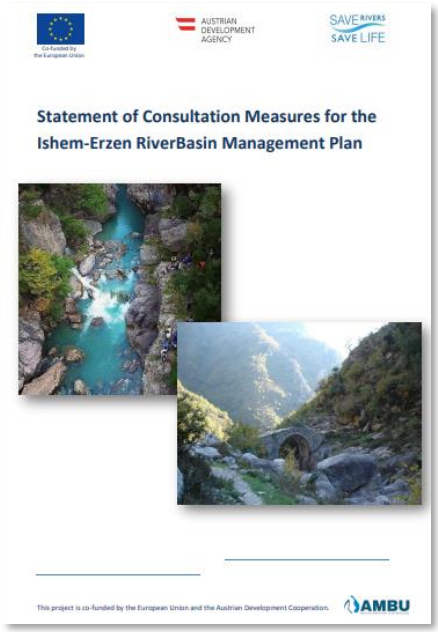
[17] European Commission – Better Regulation Guidelines, SWD (2017) 350, 2017

[18] http://www.WRMA.gov.al/wp-content/uploads/2019/10/190521-VS-Draft-Statement-of-Proposed-Consultation-Measures-for-the-Ishem.pdf

2.2.2 Overview of Significant Water Management Issues (OSWMI)

The OSWMI was published to the WRMA 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-year rule (target January 2020).

The OSWMI was formulated in two stages:



i) an outline draft was circulated for comment to a select list of key institutions ('the Expert Group'), in order to ensure that the OSWMI contents adequately represented the key issues for the river basin. The list of contributors is summarised in Technical Annex XII.

ii) The finalized OSWMI was published for for large-scale 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, the WRMA 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 – Annex XII.

2.2.3 Draft River Basin Management Plan

The RBMP Report (draft) was published to the WRMA website on June 2022. A six month consultation period ensued. The consultation responses and a summary of how these views have been considered in the RBMP Programme of Measures are provided under RBMP – Annex XII.

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:

- 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 WRMA, 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 March 1, 2021, for "Establishment and operation of inter-institutional working groups for the preparation of management plans for the Mat, Ishem, and Erzen water basins". In order to develop an open discussion on the steps followed and in function of the preparation of the management plans of the above-mentioned water basins and the continuation of the work up to the drafting of the project plans, WRMA, together with the national and international experts contracted by the project 'EU support for integrated water management in Albania', have held four (four) meetings with IWG representatives by 2021.
The meetings held with elected representatives from the institutions mentioned in point 4 of the Prime Minister's Order were organized and directed. The institutions represented in this working group are 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, Office of the Administration of the Ishem Water Basin, Erzen, Mat, and the Offices of the Regional Administrations of the Protected Areas of Tirana, Durres, and Lezha.
The meetings held throughout 2021 focused on the distribution of draft plan materials for the Mat, Ishem, and Erzen basins to group representatives to receive their comments and contributions to the discussed chapters. Materials were sent via e-mail, and the comments given by each representative were also collected.
Four meetings were held in total:

- The first meeting was held on August 28, 2021
- The second meeting was held on June 23, 2021
- The third meeting was held on July 23, 2021
- The fourth meeting was held on September 27, 2021

The meeting sessions were held in a hybrid format, with limited participation in the hall and 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 final RBMP is published at WRMA website on June 2022. The Programme of Measures defined in the RBMP (Chapter 13) is the principal deliverable intended to achieve the environmental objectives for the river basin set out under Chapter 3 of this document.
The PoMs should be delivered within the Plan period of 2024-2028, and under national legislation, the measures should be considered as legally binding on the designated authorities after approval of RBMP.
The second public consultation period ended in October 2022 and was accompanied by 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 were reflected in the final Watershed Management Plan for the Erzen River Basin.

Table 2-1 – Summary of Significant Water Management Themes

MAJOR THEME	COMMENTARY ON MAIN PRESSURES, STATE OR IMPACTS
ENVIRONMENT	**POSSIBLE ISSUES**
Climate Change and Water Resources	• Expected -8% reduction in precipitation by 2025 • Expected -20% reduction in precipitation by 2050 • Substantial impacts expected on water availability for all uses
Hydro meteorological Data & Monitoring Systems	• Collapse of the surface water monitoring system since 2000 • No recent data for climate change or water resource analysis available for surface or groundwater
Protected Areas & Aquatic Ecosystems	• Drinking water sources not demarcated or protected • Natural protection areas are not respected and many potential Natura 2000 habitats not defined • Very limited data available; monitoring system not fit for the purpose
Floods and Droughts	• No Flood Risk Management Plans developed • No Drought Risk Management Plans developed
Channel and Floodplain Morphology & Continuity	• Illegal excavation of gravels and destroyed habitats • Barrages, weirs and hydropower installations acting as barriers to river continuity
Environmental Flows	• Environmental flows not properly defined for any rivers • Numerous aquatic ecosystems severely degraded in terms of species diversity
WATER USE	**POSSIBLE ISSUES**
Water Use, Water Abstraction and Abstraction Permitting	• Inefficient use of municipal water, with real losses at +60% in water supply systems • Lack of methodologies and guidelines for the full recovery of the costs of use and their environmental impacts regarding the use of water by operators.
Water Discharges, Water Pollution and Discharge Permitting	• Non-treatment of urban wastewater in Tirana, Kamëz, or areas with high population intensity and industrial activity. • Degradation and high pollution of the main rivers from untreated discharges and without obtaining a permit for these activities. • Possible failure to meet the required environmental quality standards from discharge permits.
Dams & Hydropower	• Interruption of ecosystem continuity and water flows from dams and dams.
Groundwater Use, Protection and Monitoring	• Uncontrolled excess groundwater abstraction. • Insufficient quality and quantity monitoring system. • Risk of coastal water intrusion into freshwater and groundwater as a result of overuse.
COASTLINE MANAGEMENT	**POSSIBLE ISSUES**
Coastal water quality, bathing waters, habitats	• Risks to human health due to upstream pollution • Degraded coastal habitats due to solid waste deposition
Coastal management, flood risk and erosion	• Projections of 0.2 – 0.3m sea level rise by 2050 may create significant sea floods risk and a reduction in the discharge capacity of the rivers in their deltas • Sea level rise may increase intrusion pressure to groundwater

3 Environmental Objectives for the River Basin

3.1 Overview

All RBMPs in the EU 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 Erzen river basin. However, the concepts and procedures set out below closely control the aquatic environment protection strategy for the Erzen basin through a) general environmental policies (Chapter 12) b) remedial or protective measures for specific waterbodies (Chapter 13).

3.1.1 Albania

The requirements of the LIWRM broadly follow the EU legislation. 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).

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 degration 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 degration 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, phytobenthos, benthic invertebrate fauna and fish). Supporting physico-chemical are oxygen condition, temperature, nutrients, transparency, salinity and river basin specific pollutants (RBSPs) and river basin specific pollutants. 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

European Union 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' [19] exceed the relevant environmental quality standards (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[20, 21]. 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 Q97 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 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:

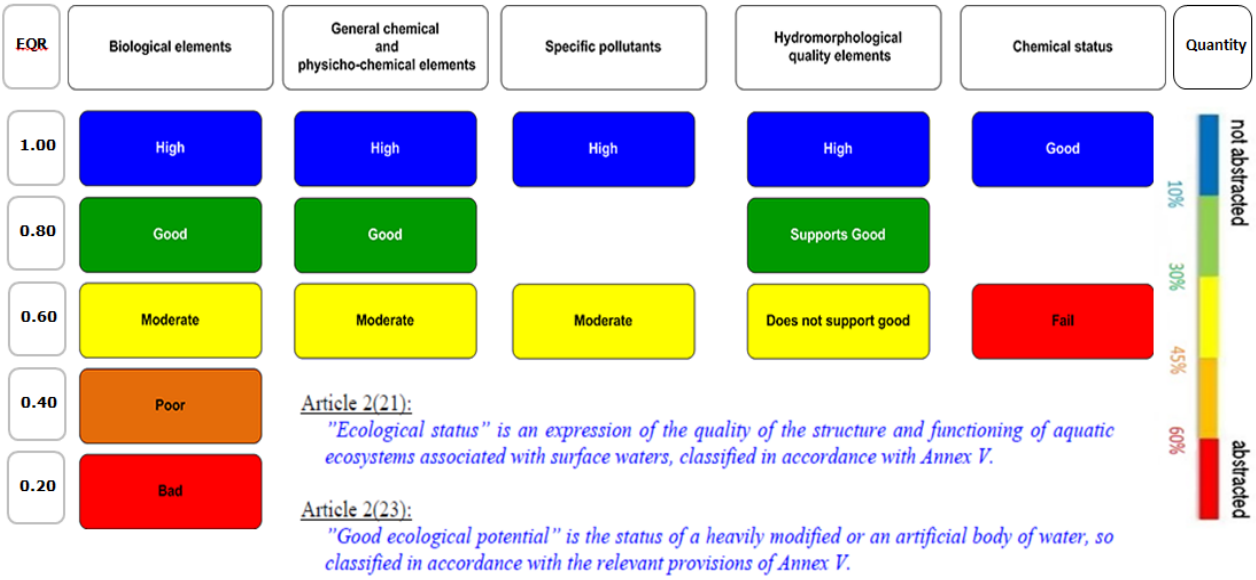
- High Status - No or very minor anthropogenic alterations to the biological quality, physico-chemical and hydromorphological elements of the waterbody
- Good Status - Slight levels of distortion of the composition and abundance of biological quality elements, with physico-chemical and hydromorphological conditions consistent with the achievement of good biological quality
- Moderate Status - Modest deviation of biological quality elements relative to High Status, with physico-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' –

[19] European Commission – Water Framework Directive, Article 16, and Annex X replaced by EQSD, Annex II.
[20] European Commission – CIS Guidance No 31 – Ecological Flows in the Implementation of the WFD
[21] European Commission - Environmental Flows as a Tool to Achieve WFD Objectives - Discussion Paper, 2012

Figure 3-1 – Quality Elements in Waterbody Ecological Status



Source: CIS Guidance - amended

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)[22]. 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[23]. Due to the importance of flow regime generally, it is probable that the ecological status of the waterbody would also be classed as Moderate.

[22] European Commission – Water Framework Directive, Annex V, 1.4.1

[23] European Commission – CIS Guidance No 31 – Ecological Flows in the Implementation of the WFD

3.3 Environmental Objectives for Surface Waterbodies

In order to progress the determination, the status of individual waterbodies, the 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 physico-chemical conditions should be established representing the values of the elements specified for that surface water body type at high ecological status[24]. '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[25].

3.3.1 Reference Conditions for Biological Quality Elements

Numerous approaches have been used in Europe 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 waterbody 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 Ecological Quality Ration (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 Physico-Chemical Quality Elements

As explained in previous sections: the general physico-chemical quality elements are *supporting* the hydrobiological quality elements. The concept of – type-specific – reference conditions applies also to the general physico-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 physico-chemical quality elements, because of:

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

[24] European Commission – Water Framework Directive, Annex II, 1.3

[25] 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 physico-chemical parameters in rivers [26]

Parameter	Unit	High	Good	Moderate	Poor	Bad
Dissolved oxygen	mg/l	>7	>6	>5	>4	<3
BOD_5	mg/l	<2	<3.5	<7	<18	>18
pH (acid)	-	-	>6.5	>6	-	-
pH (alkaline)	-	-	<8.5	<9	-	-
NH_4	mg N/l	<0.05	<0.3	<0.6	<1.5	>1.5
NO_2	mg N/l	<0.01	<0.06	<0.12	<0.3	>0.3
NO_3	mg N/l	<0.8	<2	<4	<10	>10
PO_4	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

BOD_5: biochemical oxygen demand (five days); NH_4: ammonium; NO_2: nitrite; NO_3: nitrate; PO_4: orthophosphate; P-total: total phosphorus.

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 – reference conditions 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 physico-chemical quality elements'. A list with 'Other specific pollutants' has not yet been compiled for the Albanian basins. Only BOD_5 and COD_{Cr} are routinely monitored by NEA. These data are not suitable though for establishing – type-specific – reference conditions for BOD_5 and COD_{Cr}.

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. National legislation, 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.

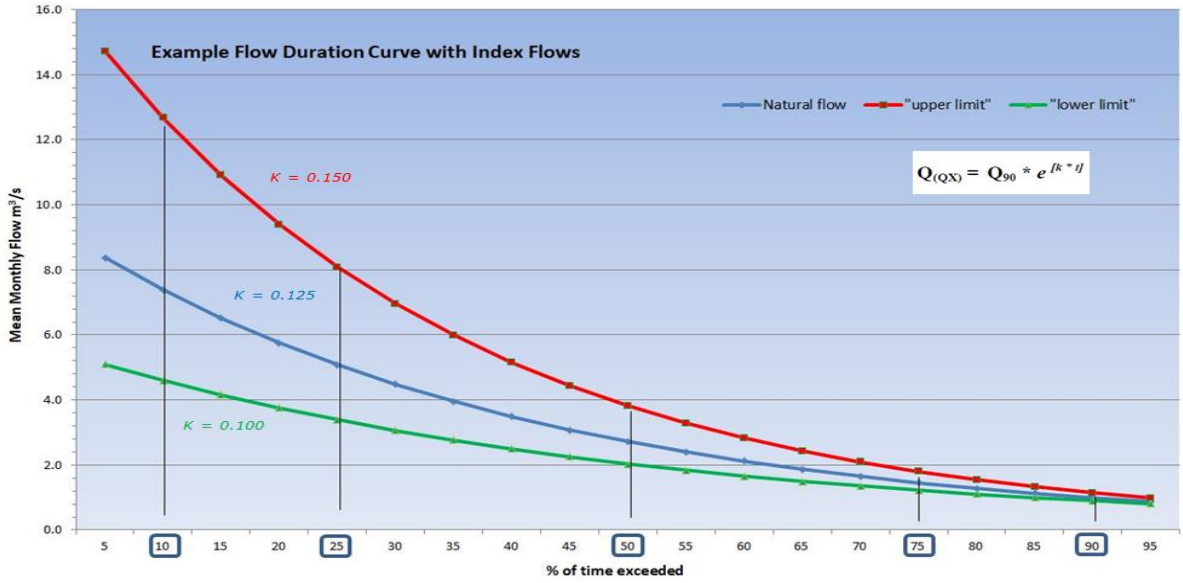
[26] In: State of the Environment Report 2015, Regulated Annex.docx; http://www.akm.gov.al/assets/rgjm-2015per-botim.rar

As Figure 3-2 illustrates, 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. Q50), 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_{10}, Q_{25}, Q_{50}, Q_{75} and Q_{90} 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. Q10, 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. Q90, 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 $Q_{(QX)}$ = the environmental flow value at FDC X; Q_{90} is the naturalised baseflow value from the FDC

e = base of natural logarithms; k = growth constant; t = number of 5% FDC steps from Q90

3.3.6 Reference Conditions for Flow Regime

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[27].

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

[27] European Standard EN 15843 - Water quality - Guidance standard on determining the degree of modification of river hydromorphology

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 physico-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 are therefore 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.

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[28] ,[29].

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[30] , 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 Heavily Modified Waterbody (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 [31] (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).

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[28] CSO-Help - Identification of water related conflicts linked to hydro power projects in Albania, 2017

[29] Western Balkans Hydropower - Who pays, Who profits?, CEE Bankwatch & WWF, 2019

[30] EU Common Implementation Strategy – Guidance Document 31 - Ecological Flows in the Implementation of the Water Framework Directive, Technical Report 2016-086

[31] EU Common Implementation Strategy – Guidance Document 4 - Identification and Designation of Heavily Modified and Artificial Water Bodies

All hydropower engineers know (and, as documented in EN 15843), persistent changes to flow regime alone potentially have a catastrophic impact on ecosystem sustainability[32]. Diversion of 75%+ of river flow during critical dry periods is typical for many HPPs in Albania, as is the tendency to build diversion systems that create a change in natural flow in the water body for segments of many kilometers. Usually, no river flows through these segments during the 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 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 utilised 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 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.

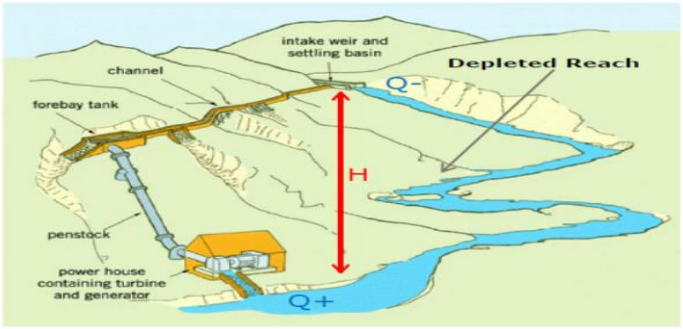
The length of the depleted reach for offline HPP systems is a critical factor in ecosystem impacts. A depleted reach is defined as the length of the river waterbody between the point of abstraction and the point of flow discharge (Figure 3-3 3-3). Long depleted reaches arise when the hydropower Operator 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



[32] EU Common Implementation Strategy - WFD and Hydromorphological Pressures Technical Report, 2006.

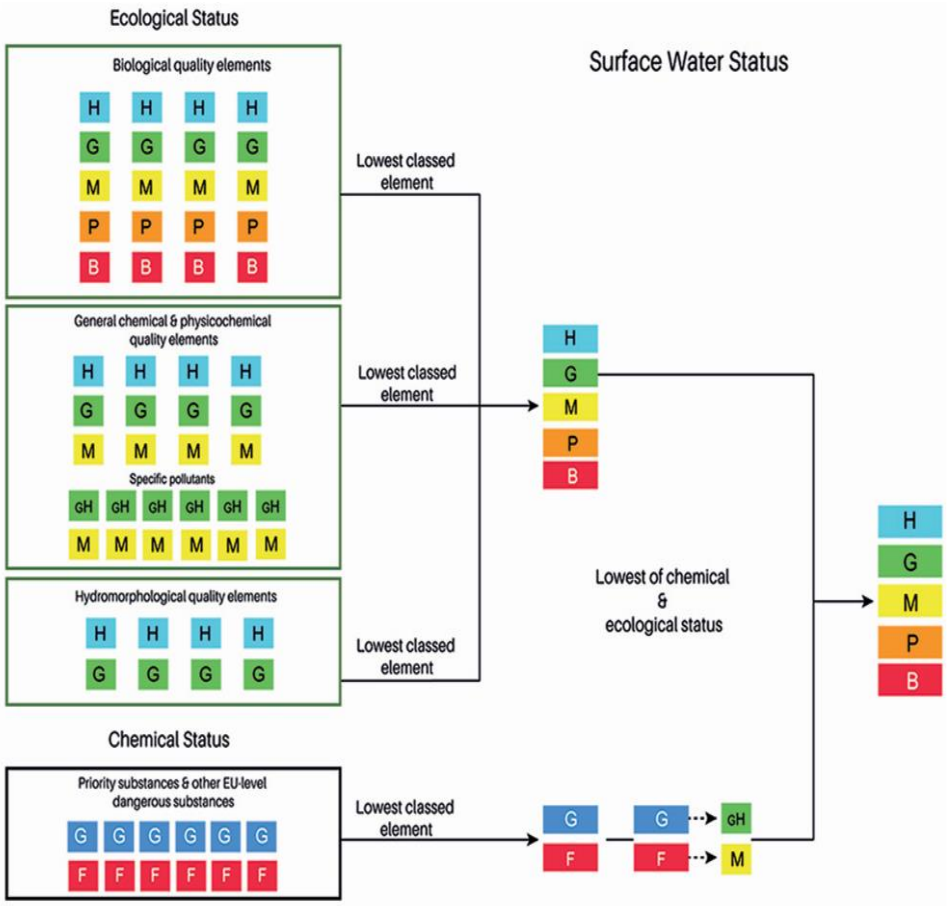
3.3.9 Other Forms of HMWBs and AWBs

Other more conventional forms of HMWBs are applicable in the Erzen 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[33], 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



Source: Groundwater Quantity Reference Conditions

3.4 Environmental Objectives for Groundwater Bodies

The WFD requires Member States 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. [34] Primarily through Directive 2006/118/EC [35], a management regime should be established which sets groundwater quality standards and introduces measures to prevent

[33] European Commission – CIS Guidance 13 - Overall approach to the classification of ecological status and ecological potential

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

[35] European Commission – Directive 2006/118/EC - on the protection of groundwater against pollution and deterioration

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[36].

3.4.1 Reference Conditions for Groundwater Quantity

Groundwater level is typically used 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 is a 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. It may be noted, however, because surface water and groundwater are almost always connected, that the amount of recharge may be increased if groundwater abstraction induces leakage from rivers into underlying aquifers. This does not alter the total resource but it does modify the relative availability of surface and groundwater.

Determination of annual groundwater recharge rate is technically challenging, requiring widespread and accurate monitoring networks of groundwater level. However, as a very approximate indicator, the naturalised Base flow Index (BFI) of the river basin is widely accepted as a good indicator of annual groundwater discharge to the surface water system.[37] [38] The BFI is determined from the appropriate Flow Duration Curve as the ratio Q_{90} / Q_{50}. In the long-term, assuming the river basin to be in hydrodynamic equilibrium, total groundwater discharge (base flow plus abstraction) must equal groundwater recharge.

The current groundwater monitoring network in the Erzen basins 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 the terrestrial ecosystems are heavily dependent 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 reverse flow gradients such that rivers discharges into the groundwater, also known as 'induced recharge' (Figure3-5). [39]

Precise impacts of groundwater – surface water interactions are typically localised but highly technical, requiring modelling assessments. Though a very general approximation, it is often assumed can be stated that e.g. a 10% reduction in the groundwater resource (e.g. due to consumption) will result in close to a comparable 10% reduction in groundwater discharge somewhere in the surface water system on a mean annual basis.

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 the aquatic ecosystem.[40]

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[36] European Commission – Groundwater legislative framework https://ec.europa.eu/environment/water/water-framework/groundwater/framework.htm

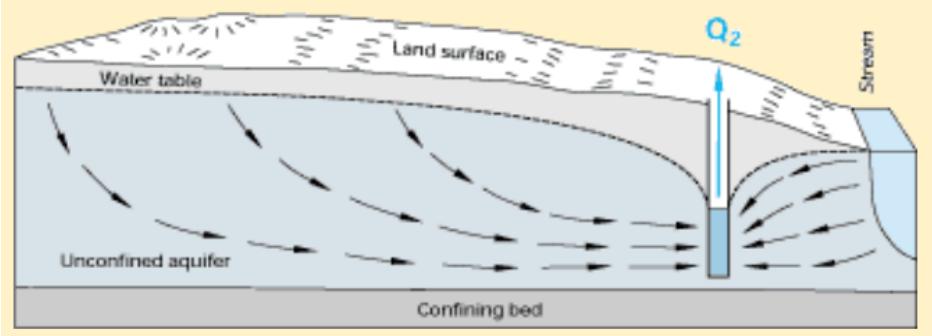
[37] UK Institute of Hydrology - Low Flow Studies Report no.1 Research Report, NERC, 1980.

[38] "Naturalised Flow" = Recent Actual Flow + (Abstractions + Exports) – (Returns + Imports)

[39] United States Geological Survey – Ground Water and Surface Water – A Single Resource – USGS Circular 1139, 1997.

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

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, which are unique to each 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 intrusion, indicated mainly through the parameter of electrical conductivity.
- EQS for general physico-chemical parameters primarily dissolved oxygen, pH, conductivity, nitrate, chloride and ammonium, pesticides and other main pollutants, as stipulated by the GWD Annex I.
- Degree to which groundwater chemical status adequately supports the ecological status of surface waters.

EQS 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).

Drinking water standards are most frequently used as the basis of chemical status threshold values, either as laid down in the DWD (EU) 2020/2184, WHO international standards or priority substances objectives set out in the Directive 2013/39/EU[41].

It should be noted that under the GWD, chemical status provisions do not apply to high naturally-occurring levels of substances, ions or their 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. The GWD also requires establishing Threshold Values, which are set at concentrations below the water quality standards as described in Chapter 10, and determine the trigger points for corrective action before standards are exceeded.

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. [42]

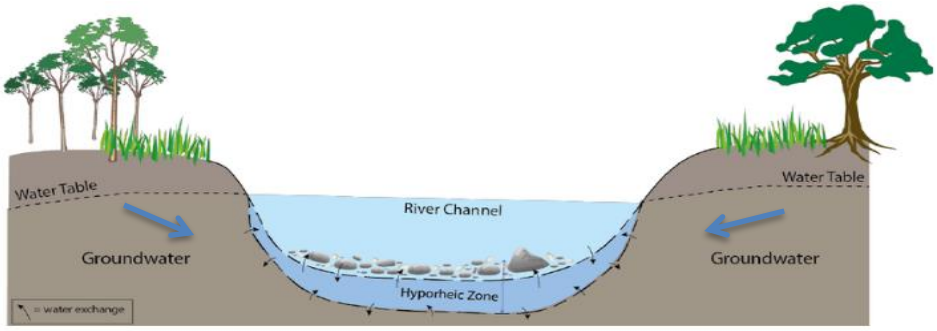
GWDTEs are part of the status assessment for groundwater. Therefore, they are relevant in characterisation and risk assessment of GWBs. (see Figure 3-7). The relevance of GWDTEs with respect to groundwater waterbody status is that in addition to the basic tests of groundwater quantity (3.4.1) and quality (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.

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

[42] European Commission – CIS - Technical Report on Groundwater Dependent Terrestrial Ecosystems, Technical Report 6, 2011

Many surface water aquatic ecosystems are highly adapted to and dependent on groundwater discharge, usually in the form of 'base flow' as part of the total flow in the river. This is because, by definition, base flow (perennial) is usually present throughout an entire hydrological year, whereas surface runoff is intermittent with 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



Source: Biddulph, M. Environmental Science 2015.

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[43]. 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 base flow Index (BFI) of the river 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 base flow 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 severe shortage of reliable recent actual flow data since 1992+ in the majority of rivers in Albania, together with a significant absence of monitored and reported abstraction and discharge data from operators means that naturalised[44] flows and hence naturalised Q_{50}s and Q_{90}s make difficult this evaluation for GDTEs.

3.4.4 Step-wise Tests for Groundwater Quantity and Quality Status

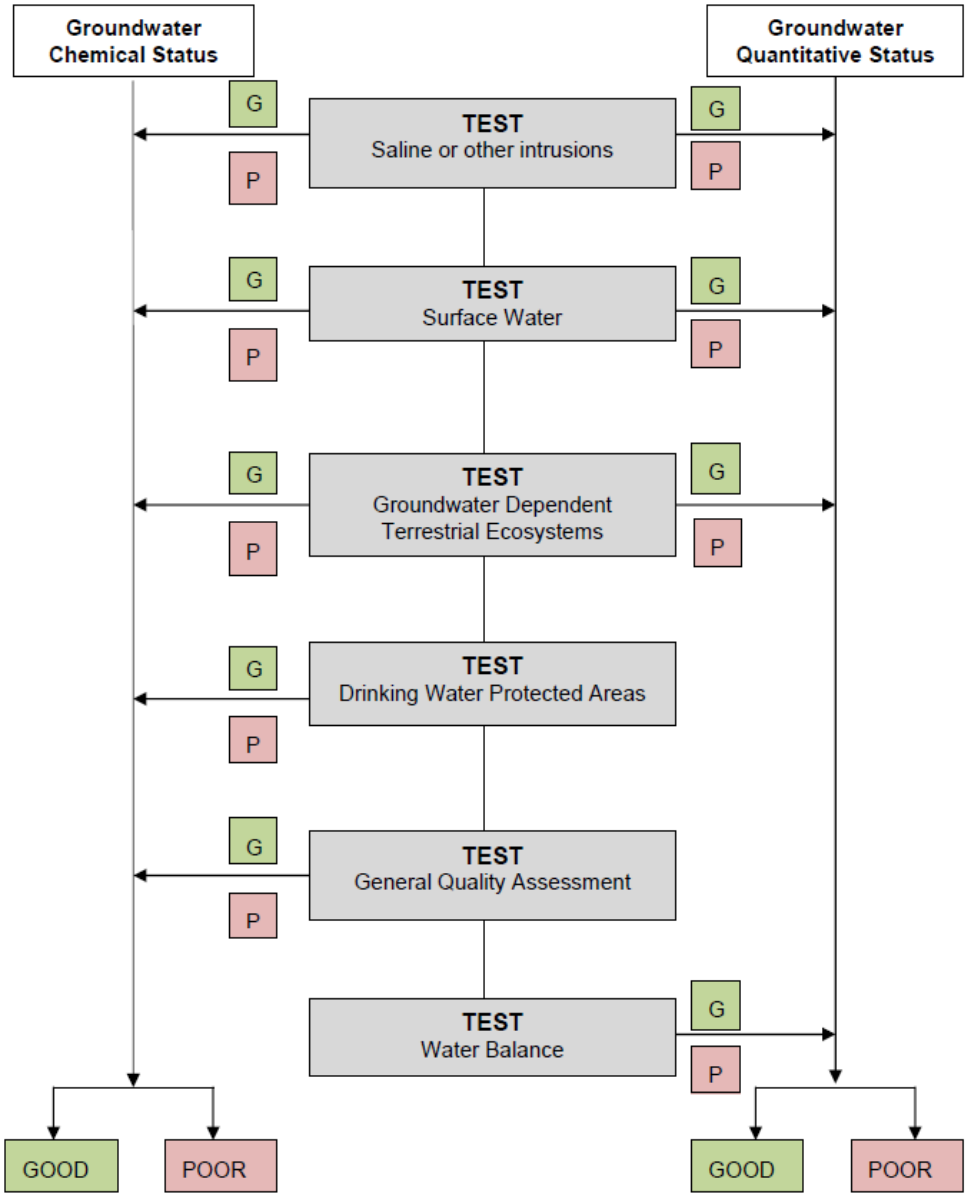
The formal procedure for Groundwater status determination adopted in Erzen Basin follows the standard CIS guidance, as per Figure 3-7. [45]

[43] European Commission – CIS Guidance 18 - Guidance on Groundwater Status and Trends Assessment.

[44] 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 Q90 and Q50 cannot be used to infer natural conditions unless influences are near zero.

[45] European Commission – CIS Guidance Document 18 - Guidance on Groundwater Status and Trend Assessment

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



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 resources'. 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 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 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);
- 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 2006/7/EC); and
- Nutrient sensitive areas (PA under Nitrates Directive 91/676/EEC; Urban Wastewater Treatment Directive 91/271/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.

The Erzeni RBMP PA register should include:

- A register of areas important for the protection of habitats and/or species that are protected under the relevant international conventions;
- A register of areas important for the protection of habitats and/or species protected by national legislation;
- A preliminary register of areas used for the abstraction of drinking water - groundwater.

To characterise river basin districts in terms of pressures, impacts and economics of water uses, including a register of protected areas lying within the river basin district.

3.5.1 Areas Designated for Drinking Water Abstraction

The relevant EU legislation for the protection areas of hygienic-sanitary 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 Water Framework Directive 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 Protected Areas 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 Directive 2000/60/EC. 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:

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

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 zones fall under Directive 91/676/EEC and areas designated as sensitive areas under Directive 91/271/EEC.
Council Directive 91/271/EEC 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 are used to first identify potentially eutrophic water bodies which can then be controlled under UWWTD or ND standards.
If discharges from qualifying Wastewater Treatment Works (WWTWs) – (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 excess total phosphorous level (i.e. > 2.0 mg/l P), excess total nitrogen levels (i.e. > 15 mg/l N) [46], or > 50 Mg/l NO_3 in drinking water supplies, the receiving water bodies are identified as sensitive, and a further level of treatment than 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 Nitrates Directive 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.[47] At the EU level, through the Birds and the Habitats Directives, the Natura 2000 network is under establishing. Its purpose is primarily to ensure the conservation of targeted species and habitats of European interest.[48] 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.[49]
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

[46] Total Nitrogen (TN) = Σ (inorganic nitrogen + organic nitrogen). Inorganic nitrogen = ammonium (NH_4) + nitrate (NO_3) + nitrite (NO_2)
[47] https://www.iucn.org/theme/protected-areas/about/protected-area-categories
[48] European Commission - https://ec.europa.eu/environment/nature/natura2000/index_en.htm
[49] Council of Europe - https://www.coe.int/en/web/bern-convention/emerald-network

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 VI). If the protected area is also a 'water body', or forms part of a 'water body', the deadline for restoration to favourable 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. 50 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 Erzen river basin (Table 3-2).

The National Agency for Protected Areas (NAPA) is the competent authority for managing the national system of protected areas in Albania. Only recently the work has commenced on managing Natura 2000 sites.[51] 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.

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

SITE CODE	SITE NAME	EXISTING PA	HABITAT MAP
AL0000007	Dajt	Yes	No
AL0000015	Bize-Brosh-Berdhet	Yes	No
AL0000024	Rrushkull-Bisht Palle	Yes	No

[50] EU - Strengthening National Capacity in Nature Protection – Preparation for Natura 2000 Network, March 2019

[51] EU - Strengthening National Capacity in Nature Protection – Preparation for Natura 2000 Network, March 2019

4 River Basin Overview

The purpose of the 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 [52] 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
- 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.

[52] 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

4.2.1 Climate and Meteorology – Erzen River Basin

The area-weighted annual precipitation for the entire Erzen river basin of 893 km² is 1248 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 Erzen, with significant tributaries formed by the rivers.

The annual meteorological regime across the basin is summarised in Figure 4-6 on Technical Annex I for three representative Stations at varying altitude.[53] The wettest year in the WMO standard climate period 1991-2020 [54] is reported as 1991 with an annual total of 1993 mm at Station Dajt [55]. 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 – Erzen 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 [56]	145	135	111	93	87	60	35	41	72	107	166	155	1207
EVAPOTRANSPIRATION [57]	22	32	62	92	122	150	23	31	60	64	35	23	716

4.2.2 Hydrology – Erzen River Basin

The area of the River Basin is 1370 km² and the river has a length of 109 km. The main branches of this river are the Zalli stream, Zhullima stream and Peza stream, which have drainage basin areas of 79.8 km², 132 km² and 74.3 km² respectively.

The evaluation of the annual flow regime of Erzen River is based on the observations at hydrometric stations, where the water levels and the flow measurements are recorded and the flow-level relationship is built up. According to these relationships, the daily, monthly and annually flows are calculated for the whole period with the available hydrometric data.

At the most downstream flow gauging station of the river basin (River Erzen at Sallmonaj) mean annual flow (MAF) in the period up to 1960-2008 is 18.3 m³/s (reported as 18.0 m³/s in Hydrology of Albania 1984). Factored to the entire river basin area (893/755 km²), this gives an approximate river basin discharge rate in the river mouth Q_{50} is evaluated to be 20.24 m³/s. Some flow hydrographs for three representative river regimes are presented in the study for the period 1960-1992.

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_{10}, Q_{25}, Q_{50}, Q_{75} and Q_{90}. Q_{50} is the more reliable measure of most probable flow (by suppressing extreme values from the record), and this value should 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 of groundwater discharge as part of measured total stream-flow, the so-called 'Base flow 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 ≥ 0.35+) should at least equal or exceed Q_{90}.

Comparison of meteorological profiles 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 base flow.

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[53] Data are taken from the summaries of RBMP – Annex 4. Institute of GeoSciences, Energy, Water and Environment (IGEWE) for the period 1991-2018.

[54] World Meteorological Organisation – Technical Regulations – "Climatological Standard Normals"

[55] Reported as calendar years, (not hydrological years commencing in October).

[56] At Tirana. Data not provided by IGEWE, based instead on internet sources.

[57] Defined as Actual Evapotranspiration ET_A. Source is Laska, A. et al. "Evapotranspiration and Its Evaluation in Albania", BALWOIS 2010. Utilising Thornthwaite at Durres.

Flow Duration Curves for the same three flow gauging stations (Perroi i Zallit Ibe, Erzen Ibe, Erzen Ndroq and Erzen Sallmonaj) are tabulated in Table 4-2. Since 1992, there has been a complete lack of reliable stream data, which significantly 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 surface water chemical load components have been updated since 2008.

Table 4-2 – Flow Duration Curves for Erzen River Basin Flow Gauging Stations [58]

FLOW GAUGING STATION	RIVER	LATITUDE WGS84 [59]	LONGITUDE WGS84	Q10	Q25	MAF	Q50	Q75	Q90	Q95
Perroi i Zallit Ibë	Murdhari River	41.234829°	19.927278°	3.50	2.91	2.32	2.20	1.69	1.28	1.09
Erzen Ibë	Erzen	41.235583°	19.921694°	12.48	10.23	8.13	7.95	6.10	5.11	4.42
Erzen Ndroq	Erzen	41.264193°	19.667252°	21.32	16.98	14.85	13.95	11.23	9.41	8.62
Erzen Sallmonaj	Erzen	41.360940°	19.549336°	26.33	21.36	18.31	17.11	13.95	11.42	10.21
Perroi i Zallit Ibë	Murdhari River	41.234829°	19.927278°	3.50	2.91	2.32	2.20	1.69	1.28	1.09

4.2.3 Summary Water Balance of the Erzen River Basin

It is difficult to determine a reliable water balance for a given basin, which requires 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 absolutely 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 [60] 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 connected with each other[61]. 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,[62] 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.[63] 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.

[58] Hydrometric (flow) data for the river basin are not available post-1995. These data are therefore totally outdated and cannot be used to infer current hydrological conditions. Coordinates provided by IGEWE are generally unreliable.
[59] WGS84 coordinate system. Gauging Station coordinates supplied by IGEWE have not been field-verified and may not be accurate.
[60] 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
[61] Ground Water and Surface Water - A Single Resource, U.S. Geological Survey Circular 1139, 1998
[62] Consumption – defined hydrologically as: (Abstractions + Exports) – (Returns + Imports).
[63] Consumption in this context complies with the UN SEEAW definition whereby: Total Abstraction = Total Returns + Water Consumption

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.[64]

4.2.4 Global Climate Change Evaluation and Impacts

Specific to Albania, three national communications [65] have been prepared under the United Nations Framework Convention on Climate Change implemented by the Ministry of Tourism and Environment and the United Nations Development Program.

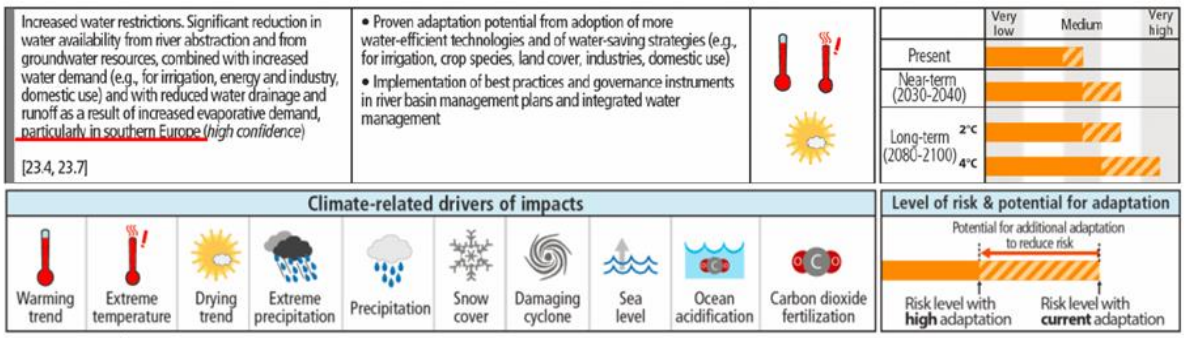
As indicated by Figure 4-1 – Figure 4-3 and Table 4-3 - Table 4-4, based on the Inter-governmental Panel on Climate Change (IPCC) precipitation changes for a 'worst-case' scenario (Representative Concentration Pathway (RCP) 8.5), south-east Europe is likely to be particularly impacted by significant increases in temperature and reductions in precipitation. [66] 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, [67] droughts, [68] water resources [69] and agriculture across all river basins in Albania. Detailed analyses of these impacts are left to the specific sub-strategy Reports covering water resources, flood and drought supporting elements of the RBMP.

With respect to the objectives of this RBMP Report, 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 4-1 - Indications of Climate Change Impacts for Southern Europe



Source: IPCC 5th 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 4-2 indicates possible inundation areas on a 10% annual probability basis for the Erzen coastline based on an RCP 8.5 scenario within 30 years. [70]

[64] EUROSTAT – Water Exploitation Index - https://ec.europa.eu/eurostat/web/products-datasets/-/t2020_rd220
[65] 1st (2002), 2nd (2009), 3rd (2016) National Communication of the Republic of Albania on Climate Change
[66] IPCC – Assessment Report 5 (AR5) - Climate Change 2014: Impacts, Adaptation, and Vulnerability, WGII, IPCC 2014.
[67] BioScience, 2019, Vol. XX No. X, "World Scientists' Warning of a Climate Emergency"
[68] IPPC – Special Report – Global Warming of 1.5°C, IPCC 2018
[69] World Bank – 'Quality Unknown – The Invisible Water Crisis', WB Group 2019
[70] Climate Central - FLOODED FUTURE: Global Vulnerability to Sea Level Rise Worse than Previously Understood, 2019

Figure 4-2 - Projected 10 Year Coastal Flood Inundation Zones by 2050

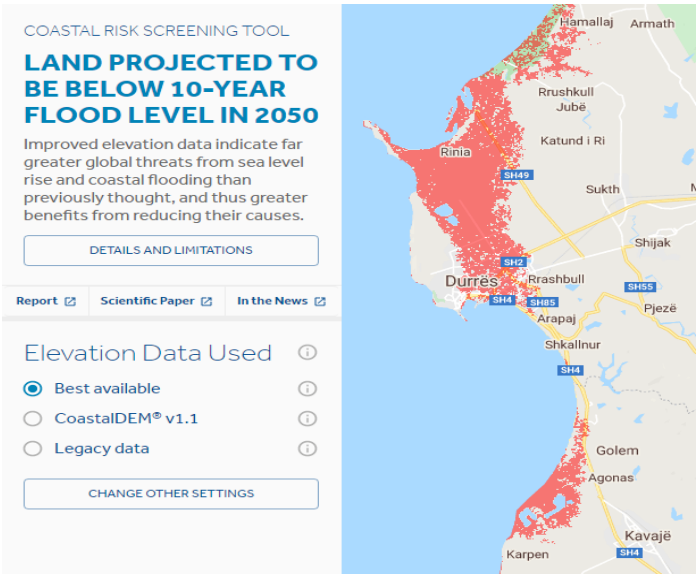


Figure 4-3 – IPCC Multi-model Global Precipitation Changes – RCP8.5 [43]

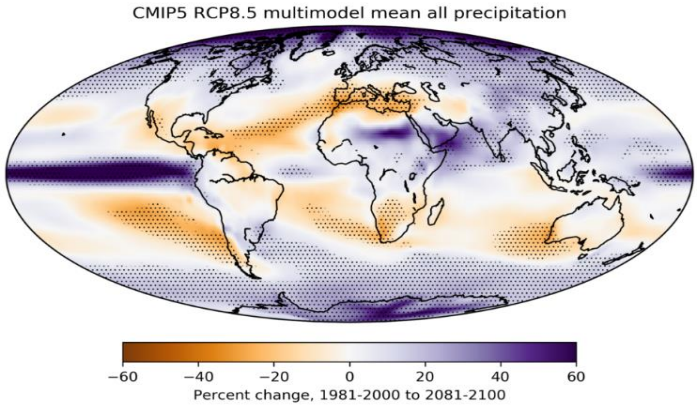


Table 4-3 – Indicative % Changes to Global Temperature – IPCC – Base 1990

Years	2030	2050	2080	2100
Annual	1.0 (0.7 to 1.2)	1.7 (13 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 – Erzen Basin

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 [71] is carried out for the two long-term means (Table 4-5). A P value ≤ to the confidence level (α) 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 differences between the arithmetic averages of precipitation is directly related to the change in available water resources, as precipitation is the "feeder" 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 **α (5%)**	t-STAT	P(T≤t) (1-tail)	P (T≤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 of an effective surface water flow monitoring system since 1992, the WRMA is not currently able to quantify accurately any water resource availability changes in the Erzen basin for the period 1991 – 2020. [72] 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 to the project covers entirely different period 1991-2018, and consequently since the two datasets do not match completely and create difficulty for the calculation of the water balances that is representative of current conditions.

[71] EXCEL – t-Test: Paired Two Sample for Means

[72] Data requested for the climate change significance test could not be provided by the competent authority IGEWE.

Table 4-6 – General Water Balance of the Erzen Basin

WATER BALANCE (ACTUAL FLOWS)	DATA PERIOD: 1991-2008	WATER BALANCE OF THE ISHEM BASIN (all units are Million m³)											SUB-BASIN: SEASON: Annual
NATURAL INFLOWS BY SOURCE	Transboundary Surface Inflows 0	Direct Precipitation to the River Basin 1269.8											Transboundary Groundwater Inflows [73]
RECHARGE ANNUAL GROSS INFLOW	Annual Recharge of Surface Water 1269.38						Annual Recharge of Groundwater						
NATURAL LOSSES	Actual Evapotranspiration (ET_A) [74] 574.45						Outflows to Transboundary Groundwater						
ANNUAL RENEWABLE RESOURCE (A)	Annual Renewable Resource (ARR: SW) 695.35						Annual Renewable Resource (ARR: GW)						
PRIMARY ECONOMIC WATER USE SECTORS	IMPORTS	MUNICIPAL	INDUSTRY	AGRICULTURE	ENERGY	EXPORTS	IMPORTS	MUNICIPAL	INDUSTRY	AGRICULTURE	ENERGY	EXPORTS	
WATER SUPPLIED TO SECTOR [75]	Detailed Annual Consumption of Surface Water by sectors						Detailed Annual Consumption of Groundwater by sectors						
CONSUMPTION BY SECTOR [76]													
SURFACE RETURNS TO GROUNDWATER [77]	(Evaluated 63.83 million m³)												
GROUNDWATER RETURNS TO SURFACE													
NET CONSUMPTION BY SECTOR													
NET CONSUMPTION TOTALS BY SOURCE (B)	Annual Consumption of Surface Water 63.83						Annual Consumption of Groundwater						
ANNUAL NET OUTFLOW (A – B)	Surface Net Discharge (including base flow) 638.28						Groundwater Net Discharge (as base flow) [78] 67.8						
WATER EXPLOITATION INDICES	Surface Water Exploitation Index ($SWEI^+$) 9.18 %						Groundwater Exploitation Index ($GWEI^+$)						

[73] Trans-boundary groundwater transfers into the basin across the surface watershed boundary

[74] Actual evapotranspiration (ET_A) from all land surfaces, excluding the net difference attributable to agriculture

[75] Water supplied for economic use is assumed to equal abstraction + supply-side losses

[76] Water supplied to the sector and NOT returned to either surface water or groundwater. Same for groundwater

[77] Water supplied from surface sources but returned to groundwater. Vice-versa for water supplied from groundwater

[78] 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 of Albania.[79] Seven principal hydrogeological types were identified, derived principally from the aquifer productivity potential. The aquifers are further classified by their lithology, typically into unconsolidated rock (sands, gravel, clay formations) and consolidated rock, in the form of sedimentary rocks (sandstone, conglomerates, shale, limestone, flysch and dolomite occurring most prevalently), and magmatic and metamorphic rocks (basic and ultrabasic, volcanic and metamorphosed conglomerates and sandstones). In terms of hydrogeological formations, the Albania classification system is not fully aligned with the EU WISE reporting system [80], but approximations between these systems have been summarised in Table 4-9.

4.3.2 Geological Formations and Properties – Erzen Basin

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

- Extensive formations of the 'Type 1' alluvial aquifers exist beneath the floodplain of the Erzen River. This aquifer does not support major municipal abstractions but probably provides for the needs of small communities located along the course of the river. 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 shallow groundwater extensively exploited by the local water supply systems and the agricultural sector, although abstraction quantities have proved impossible to establish as many wells are without Permits. Agricultural practices may result in nitrate contamination in the aquifer.
- Flanking both sides of the Erzen alluvial body, and extending beneath Durres City, are extensive areas of non-aquifer, the western arm of which extends south to isolate a minor alluvial aquifer to the west of Kavajes from the rest of the basin.
- A special feature of the basin is an extensive confined aquifer formed of sandstone, conglomerate and mudstone (referred to as molasse) of the Rrogozhina Formation underlies much of the western part of the basin, including almost the entire Erzen alluvium and the cities of Durres and Kavaje.
- The majority of the middle catchment is underlain by sandstones and conglomerates of low productivity ('Type 5' aquifers) that can support local supply needs.
- A significant feature of the upper catchment is the distinctive karst outcrops ('Type 4' aquifers) running on a SE-NW axis, some of produce numerous high yielding springs, which have been tapped for local and regional use such as the Pellumbas, Gura e Malit and Shen Meria springs, the last of which supplies over 1,000 l/s via an interbasin transfer to Tirana.

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.

4.3.3 Geological Formations and Properties – Erzen Basin

An essential feature of the Erzen Basin is that there are major exports and imports of groundwater:

1. An average of 1,100 l/s (34.7 MCM/a) is diverted from the Shen Meria Spring in the Mali me Gropa massif at the head of the catchment to Tirana City, thus depleting the flow of the Erzen river, especially during the dry season.
2. An average of 700 l/s (22.1 MCM/a) is extracted from the Fushe Kuqe wellfield in the Mati Catchment and pumped to Durres City, surrounding areas and points along the route.

[79] Hydrogeological map of Albania, Ministry of Energy & Industry, Albanian Geological Survey, 2015
[80] WISE 2016, EU CIS Guidance 2016 Reporting schema element: <GeologicalFormation>

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

HYDRO-GEOLOGICAL DESCRIPTION [81] [82] PREVALENT LITHOLOGY	ALBANIA TYPE CODE	EU TYPE CODE	AREA (km²)	AREA %	TRANSMISSIVITY (T) (m²/DAY) [83]	GROUNDWATER POTENTIAL [84]
Inter-granular porosity. Extensive aquifers, with very high to medium productivity. Sand + gravel, sand + gravel + mud/silt	1	1	74	8.3%	$> 10^3$	Porous – Highly productive
Inter-granular porosity. Extensive aquifers, with very high to medium productivity. Clay + sand + silt + gravel	2	2	35	3.9%	$10^2 – 10^{-1}$	Porous - Moderately productive
Porous/fissured porosity. Extensive aquifers, with medium to very low productivity. Sandstones, claystones, conglomerates.	3	2	-		10^2 - 10	Porous - Moderately productive
Fissured/karstified porosity. Extensive aquifers, strongly alternating, with very high productivity. Limestones, dolomites.	4	3A	65.5	7.3%	$10^4 – 10^{-1}$	Fissured - Highly productive
Fissured porosity. Extensive aquifers, alternating, with medium to low productivity. Basic rocks, ultrabasic	5	4B	602	67%	$10^2 – 10^{-1}$	Fractured - Moderately productive
Practically non-aquiferous rocks. Clay formations, flysch, evaporite	6	5			$< 10^{-1}$	Insignificant aquifers. Limited groundwater
Porous/fissured porosity. Localised aquifers, with low to very low productivity. Sandstones, siltstones.	7	5			$< 10 – 10^{-1}$	Insignificant aquifers. Limited groundwater

[81] Derived from Legend of Hydrogeological map of Albania, Ministry of Energy & Industry, Albanian Geological Service, 2015.
[82] AGS Type Codes are not consistent between the published 1:200 000 map and the supplied .shp files. In Table 4-7, Albania Type Code corresponds to the GIS .shp file categories
[83] 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^2/day
[84] Corresponds to the EU CIS Guidance 2016 Reporting schema element: <*GeologicalFormation*>

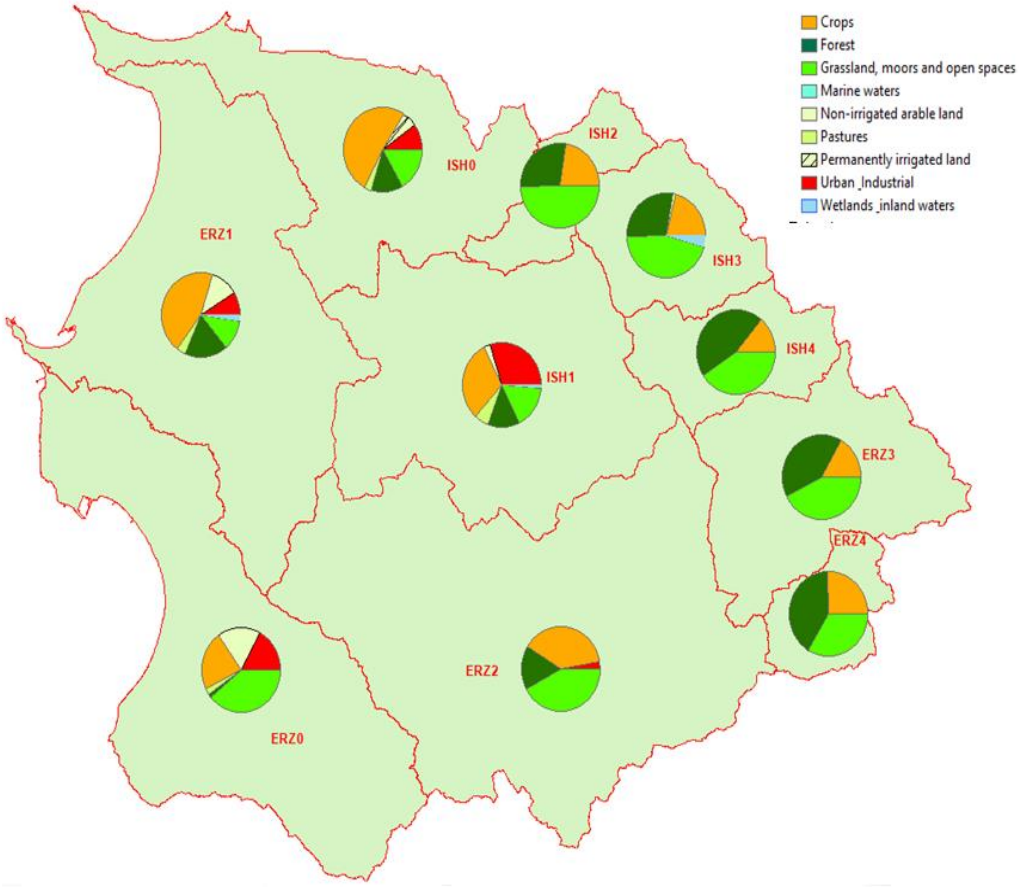
4.4 Topography and Land-use

4.4.1 Erzen River Basin

Figure 4-4and Map 4-3 summarises the principal sub-basins and land uses in the Erzen river basin, derived from the EU CORINE land-cover database (2018). [85] The rationale for the sub-basin delineation has been described in the Overview of Significant Water Management Issues report.

Table 4-9 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[86], and a % breakdown of principal land-use types according to the CORINE Land Cover Dataset (2018). [87] [88] The irrigated areas have not been verified with the terrain, and it is thought that the figures are much lower than the actual irrigated surface.

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



4.5 Municipal Districts and Population Distribution

4.5.1 Municipal Administrative Units and Population – Erzen Basin

Figure 4-5 and Map 4-4 show the administration districts and main agglomerations of the river basin. An approximation of population distribution is provided in Table 4-9. Predictably, 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.

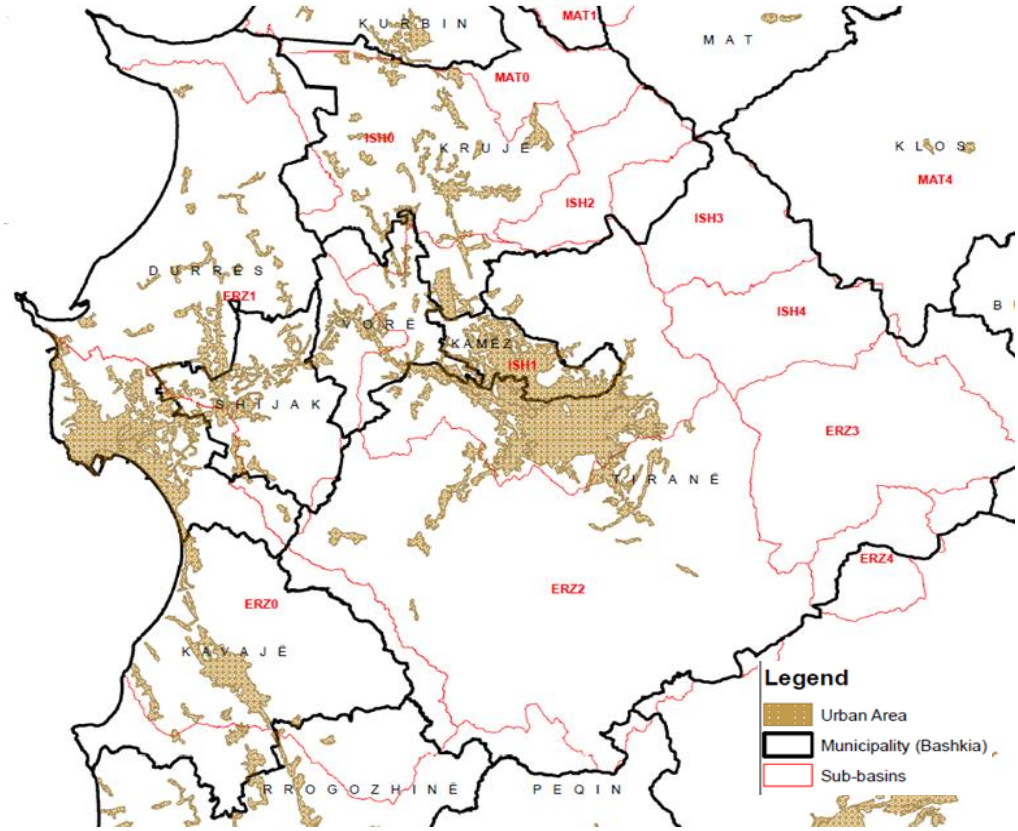
[85] https://land.copernicus.eu/pan-european/corine-land-cover

[86] 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.

[87] https://www.eea.europa.eu/publications/COR0-landcover

[88] https://www.eea.europa.eu/data-and-maps/data/copernicus-land-monitoring-service-corine

Figure 4-5 – 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 are listed in Table 4-10.

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. Simply put, consumption is the volume permanently lost from the water 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, Erzen Basin

SECTORAL DATA	SURFACE ABSTRACTED [89] (million m³)	GROUNDWATER ABSTRACTED [90] (million m³)	RETURNED TO SURFACE [91]	RETURNED TO GROUNDWATER [92]	Σ RETURN (MCM)	CONSUMPTION (MCM) [93]	EXPLOITATION INDEX WEI (%) [94]	WATER SERVICE UNITS [95]	GVA € M
HOUSEHOLDS [96]	0	4.81						Population	
INSTITUTIONAL	-							Units	
COMMERCIAL	-							Megawatt Hours	
INDUSTRIAL [97]	0	0.003						Units	
AGRICULTURE [98]	54.67							Hectares	
HYDROPOWER	15.32							MWh	
OTHER		0.0013							
TOTAL	69.99	4.82							

Table 4-9 – Summary Key Statistics for the Erzen Sub-basins

ERZEN	Area (km²)	Annual P (mm)	Q50	Q90	Population [99]	Urban Area	Arable Area	Irrigated Area	Permanent Crops	Pasture	Forests	Natural Areas	Water Bodies	Marine Waters
ERZ0	328	1069	4.83	1.39	176,012	16.83	17.40	0.00	22.85	2.03	1.50	38.48	0.73	0.17
ERZ1	341	1309	20.24	13.51	102,819	8.77	11.55	0.00	44.22	3.77	17.75	11.39	2.41	0.12
ERZ2	485	1525	16.41	10.95	152,322	3.04	0.28	0.00	37.54	0.45	16.39	42.07	0.23	0.00
ERZ3	166	1579	5.42	3.61	501	0.09	0.00	0.00	16.71	0.19	40.58	42.43	0.00	0.00
ERZ4	50.6	1278	1.39	0.81	294	0.00	0.00	0.00	25.61	0.00	40.59	33.80	0.00	0.00
Total	1370	1248			431,947									

[89] 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)
[90] 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)
[91] 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.
[92] Defined as the total water quantity (whether from surface water and/or groundwater) that is lost, returned or imported to the groundwater system.
[93] Defined as the difference (Σ water abstracted – Σ water returned) and conforms to UN SEEAW definition that "Total abstraction = Total returns + Consumption"
[94] Defined as Water Exploitation Index (WEI+) = [(Abstractions + Exports) – (Returns + Imports)] / Annual renewable water resource
[95] Defined as the number of service units supplied with water: population, population equivalent, irrigated hectares, megawatt hours
[96] Based on published water utility data for Tirana, Kruje water utilities - Water Regulatory Authority (WRA), Water Balance Report of Companies UK 2018.
[97] Defined as major activity generally utilising own sources of water
[98] Agricultural consumption includes transmission losses by evaporation and evapotranspiration demands of irrigated crops
[99] Based on Census 2011 data and INSTAT 2019 forecast at Municipality level, and GIS derived weighted approximation of urban v rural populations within sub-basin.

4.6.3 Infrastructure or Operations Related to Drinking Water Abstraction

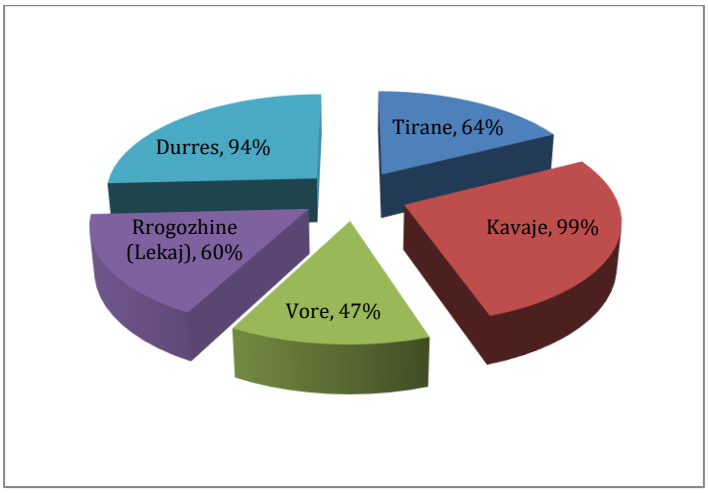
The water supply is one of the sectors of a particular importance and high sensitivity, as it directly affects the quality of life of the citizens.

In Erzeni River Basin currently operate 5 public water utility companies providing water supply services to only a part of the population living in the basin. Only one water utility (U.K. Durres) fully operates within the river basin territory; the others four utilities (U.K. Tirana, U.K. Vora, U.K Kavaja and U.K Rrogozhine) operate partly in the Erzeni river basin territory and partly in the Ishem RB and Shkumbini RB territory. In particular for Kavaja, only a minority of its customers (about 10%) are situated outside the Erzeni RB, the rest are within its territory. Similarly, only a small share of customers of Tirana are located inside Erzen RB since the major customers belong to Ishem RB. While for the case of Rrogozhine the majority of customers are located in Shkumbin RB having only a small percentage included in Erzen RB.

These water utilities are subject to monitoring by 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 approximately 89% 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 4-6 – The percentage of population served with drinking water, at Municipal level, for Erzen 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 the water supply was monitored by local healthcare units (LHCU). The PHI tests residual chlorine at various points of use as well as tests for the presence of fecal coliform bacteria.

The tables below provide data on the water supply system and related companies operating in Erzen River Basin Area.

Table 4-10 – Water supply in Erzeni River Basin District[100]

County	Municipality	Administrative Unit	Urban/ Rural	Population	Population served with water supply	Water supply Connections	Service Coverage	Continuity of Water Supply Service (hours/day)	Water Utility
TIRANE	**Tirane**	Shengjergj, Kerrabe, Berzhite, Petrele, Baldushk, Farke, Vaqar, Peze, Ndroq	**R**	45,653	29,004	**6 613**	64%	5.5	Sh.a U.K Tirane
	Vore	Vore	**U+R**	24,485	11,402	**2 679**	47%	8.0	Sh.a U.K Vore
	Kavaje	Kavaje, Synej, Golem, Helmes, Luz i vogel	**U+R**	83,573	83,189	**25 398**	99.5%	10.0	Sh.a U.K Kavaje
	Rrogozhine	Lekaj	**R**	9,943	5,980	**992**	**60%**	8.0	Sh.a U.K Rrogozhine
DURRES	**Durres**	Durres,Rrashbull, Manez, Katund i Ri, Sukth , Ishem	**U+R**	353,488	331,333	**89 129**	94%	9.0	Sh.a U.K Durres

Drinking water supply system for households, companies and institutions includes:

- Abstraction
- Storage
- Treatment
- Distribution

The only used source of water both for household and industrial uses is groundwater (captured at springs or pumped from wells). The only exception to this practice is the U.K. Tirana, which uses surface water from Bovilla Lake. The water is treated at the Water Treatment Plant, with a capacity of 5000-6000 l/s and then supplied to 30 000 residents.

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

4.6.4 Infrastructure or Operations Related to Wastewater Treatment

At present most of the water utilities which supply water to customers in the Erzeni-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 more restricted than the coverage of the water supply network. Part of the population of the Erzen BU is connected to the sewage system.
In urban areas, wastewater is mostly collected by public sewers. Sewer systems are combined ones, hence collecting together wastewater and storm water. With exception of Kavaja, Durres and Gjiri i Lalezit area, sewer pipes discharge directly in the closest water body without treatment. In rural areas,

[100] Source: Water Regulatory Authority (Performance Report of Water Supply and Sewerage Companies for 2019 and 2020)

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.
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 Erzeni river basin area

Region	Municipality	Administrative Unit	Comment
TIRANA	Kavaje	Synej	The partial sewerage system is collected to the Kavaje WWTP.
	Kavaje	Golem	The sewerage system is collected to the Kavaje WWTP.
	Kavaje	Kavaje	The existing wastewater collection system is a combined sewerage system for the drainage of mixed domestic wastewater and storm water. Wastewater are collected to the WWTP (E 19^{0}30′57″ ; N 41^0 12′ 12″) and discharged to the sea after treatment.
	Kavaje	Luz i vogel	No sewerage connection.
	Kavaje	Helmas	No sewerage connection.
	Tirane	Ndroq	No sewerage connection.
	Tirane	Peze	No sewerage connection.
	Tirane	Vaqarr	No sewerage connection.
	Tirane	Baldushk	No sewerage connection.
	Tirane	Petrele	No sewerage connection.
	Tirane	Farke	The partial sewerage system
	Tirane	Berzhite	No sewerage connection.
	Tirane	Kerrabe	The partial sewerage system
	Tirane	Shengjergj	No sewerage connection.
	Vore	Vore	Partial sewerage connection. The existing wastewater collection system is a combined sewerage system for the drainage of mixed domestic wastewater and storm water and then discharged in the river Tirana without treatment.
DURRES	Shijak	Xhafzotaj	No sewerage connection.
	Shijak	Xhafzotaj	No sewerage connection.
	Shijak	Gjepalaj	No sewerage connection.
	Shijak	Shijak	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 Erzeni.
	Shijak	Maminas	No sewerage connection.
	Durres	Rrashbull	The partial sewerage system is collected to the Kavaja WWTP
	Durres	Durres	The existing wastewater collection system is a combined sewerage system for the drainage of mixed domestic wastewater and storm water. Wastewater are collected to the WWTP and discharged to the sea after treatment.
	Durres	Sukth	No sewerage connection.
	Durres	Katund i Ri	No sewerage connection.
	Durres	Manez	
	Durres	Ishem	The partial sewerage system is collected to the Gjiri Lalezit WWTP and discarged to the sea after treatment.

V.O. The information is based on available documentation and reports. But, it requires cross-checking and update with relevant utilities. Also, the administrative units belonging to the river basin need to be identified.

Wastewater Treatment Plants

For wastewater treatment, in the entire Erzeni river basin we have at present time three wastewater treatment plant in operation in Kavaja, in Durres and in Gjiri i Lalzit a capacity (PE) of over 2,000 resident.

The WWTP-s are equipped with the biological system of Trickling filter and continuous inflow comparable with European standards.

WWTP of Kavaja

The wastewater treatment plant is situated in Kavaja and was financed in two phases respectively by the German Government (first phase 2003-2007) and the EU Delegation (second phase 2012-2015).

The Plant, consisting of a system of trickling filter, is situated north west of the Kavaja city, near Qerreti village. It treats sewage water for 75 000 residents. It has an average flow of 13 500 m^3 / day and occupies a total area of about 13 ha. The Plant currently serves the urban area of the Kavaja city, Golemi Beach and villages around.

It runs properly without problems since first phase and with sufficient results, even with the worse conditions that only a few hours per day the water supply is in operation.

WWTP of Durres

The wastewater treatment plant is situated in Durres and was financed by the Word Bank (11.5 milion Euro). The Plant, consisting of a system of trickling filter with biogas production, is situated north west of the Durres city, near Shen Vlashi village (Porto Romano).

It has an average flow of 60 000 m^3 / day and occupies a total area of about 70 ha. The Plant currently serves the urban area of the Durres city and Arapaj, Shen Vlash, Shkallnur, Rashbull Village areas. This plant is designed to treats sewage water for 250 000 residents. The WWTP of Durres is equipped with the biological system of Trickling filter and continuous inflow comparable with European standards. The technology is with "active sludge" and advanced treatment for nitrogen and phosphorus reduction. The gas obtained from the digestion of sludge is used to produce electricity in such quantities as to cover the needs of the plant itself.

Figure 4-7 - The WWTP of Durres

WWTP of Gjiri i Lalezit

The wastewater treatment plant consisting of a system of trickling filter, is situated in Gjiri i Lalezit and was financed in two phases.

At this stage (first phase 10 milion Euro), treatment plant has a modern technology and treated sewage water for 15,000 residents. In the second phase, the Treatment Plant treats sewage water for 30 000 residents. The Plant currently serves the tourist area of the Gjiri i Lalezit and Hamallaj Village areas.

The Table 4-12 provides a snapshot of the current performance based on selected KPI-s in relation to wastewater collection and treatment for the Kavaje and Durres utilities.

Table 4-12 – Current performance of Kavaja and Durres Utilities

Utilities	Coverage with service of wastewater treatment plant (%)	Coverage with sewage treatment plant (%)	Coverage with wastewater treatment plant between septic tanks (%)	Production of sludge from wastewater treatment plant (kg / DS / p.e)	Percentage of water treated by the wastewater treatment plant (%)	Power consumption for wastewater treatment plant (kwh / p.e)	Energy Benefited as% of Cost of Wastewater Treatment Plant (%)	Monthly Average Income of Equivalent Population Wastewater Treatment Plant (ALL / p.e)	Total Operating Cost for Equivalent Population (ALL / p.e)	Percentage of NBO5 Tests that Meet the Standard (%)	Percentage of Tests for NKOs that Meet the Standard (%)	Percentage of TSS Tests that Meet the Standard (%)	Percentage of Tests for PT that comply with the standard (%)	Percentage of NT Tests that Meet the Standard (%)
Kavaje UK Sh.A	69.03	94.65	5.35	0	10.02	0	0	0	0	100	100	100	0	0
Durres UK Sh.A	54.18	100	0	0	100	0	0	0	0	100	99.38	100	100	100

4.6.5 Infrastructure Related to Irrigation

The total area of agricultural land in Albania is 657,000 ha[101], 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 500 mm, making irrigation necessary for efficient cultivation of agricultural crops. On the other hand, drainage is important during winter, to alleviate flooding, erosion and water logging.

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 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 24/2017 "On Irrigation and Drainage Administration". The OPU is a legal entity, self- financing, for non-profitable purposes.

Till now, according to the above-mentioned law, no water user's associations 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.

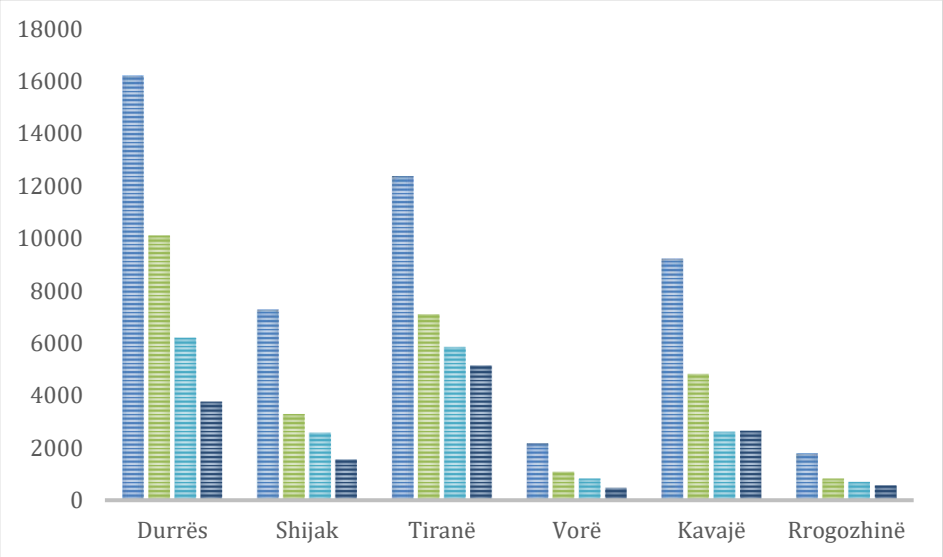
In the Erzen River basin area, irrigation management is performed by 6 municipalities (Durres, Shijak, Vore, Kavaja, Rrogozhine and Tirana), where some of them are entirely located within the territory of the basin, while the rest only partly, because they do not fall fully within the given river basin. The Directorate of Irrigation and Drainage of Durres operates in the Erzeni River Basin, with one main canal under its management.

The agriculture land in Erzeni river basin, according to the MARD is about 49,000 ha.

The area where farmers have access to irrigation is approximately 19,000 ha, compared to a potential irrigation area of approximately 27,000 ha. In 2020 the area of irrigated land in this basin was approximately 6000 ha.

At River Basin level, approximately 54% of agriculture land is irrigation potential area and 31% of agriculture land is irrigated land (23% in 2020). Figure 4-8 shows the situation for each municipality in the Erzeni River Basin.

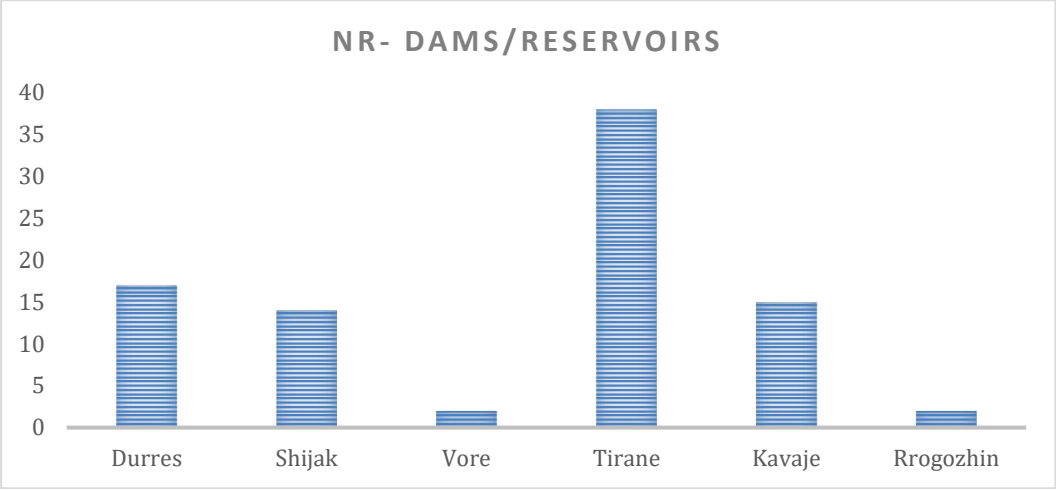
Figure 4-8 - Total of arable land, Irrigation potential and Irrigated land in 2020 for each municipality in the Erzeni River Basin



[101] Source: MARD, 2021

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 method of irrigation in the country and in Erzeni River Basin is through open canals or furrow irrigation, which distributes water thorough a secondary and tertiary network.
In Erzeni River Basin there are about 675 km main irrigation canals (488 km primary canals and 187 km secondary).
Large scale irrigation is mainly practiced in the flat and coastal areas. One major irrigation scheme exists in the western part of the Erzeni basin, respectively: Hardhisht - Xhafzotaj - Shijak - Sukth - Rrushbull, with a length of 59.2 km for about 7 860 ha irrigated area. Most of the irrigation scheme is currently amortized. There are many minor irrigation schemes in the higher parts of the Erzeni basin, but most of them are currently not operational. In general surface water is used as source for irrigation, with the Erzeni River as major source. Upstream of the Erzeni basin several reservoirs have been constructed for irrigation purposes in order to meet the demand.
There is a total of 88 irrigation dams (reservoirs) in Erzeni River Basin and the location of the irrigation dams with their locations are presented in figure 4-9.

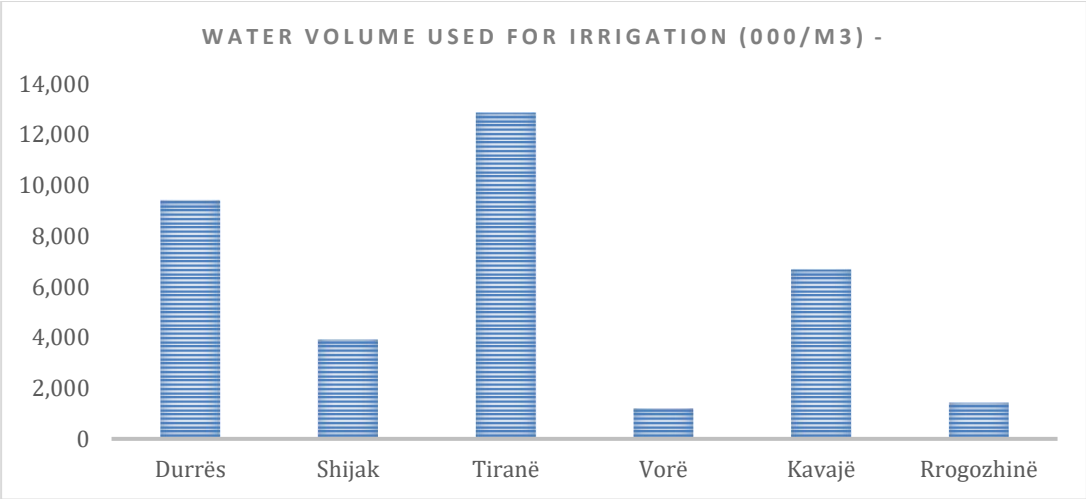
Figure 4-9 - Irrigation dams for each municipality in the Erzeni River Basin



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^3 of water available for about 182 000 ha irrigated area. [102]

While in the Erzeni River Basin the total water volume used for irrigation is approximately 35.5 million m^3 for about 14,000 ha irrigated area. Figure 4-10 below shows the situation for each municipality in the Erzeni River Basin.

Figure 4-10 - Water volume used for irrigation in 2020 for each municipality in the Erzeni River Basin



[102] Source: MARD, 2021

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 Erzeni River Basin there are about 1200 km main drainage canals and about 37,750 ha of drainage network system. Drainage Pumping Stations (Hidrovor) are used for drainage purposes, and are distributed on coast area. A part of them are now at the end of their lifespan due to damage, high electricity costs and poor maintenance. For the tertiary canals it has been assessed as being heavily silted and in need of considerable financial support for the silt to be removed. This situation creates over saturation of agriculture plots and premises for flooding on rainy conditions. In the Erzeni River Basin there are 2 Drainage pumping operational stations, one in Hamallaj (Durres) and one in Synej (Kavaja).
Based on the water resources and irrigation infrastructure in the Erzen 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 or Operations Related to Hydropower

There are 3 hydropower plants in the Erzen river basin, which 3 of them are in operation. The total set power is 5.524 MW. The installed flow is 6.3 m^3/sec. The mean annual flow is 6.94 m3/sec. (see Table 10-8 at Technical Annex III for more information).

4.6.7 Infrastructure or Operations Related to Installations IED Directive [103] (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.

[103] 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)

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 Erzen river basin. In addition, data on pollutant discharges from these installations into surface or groundwater are missing.

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 Erzen 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.[104] [105] 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.[106]

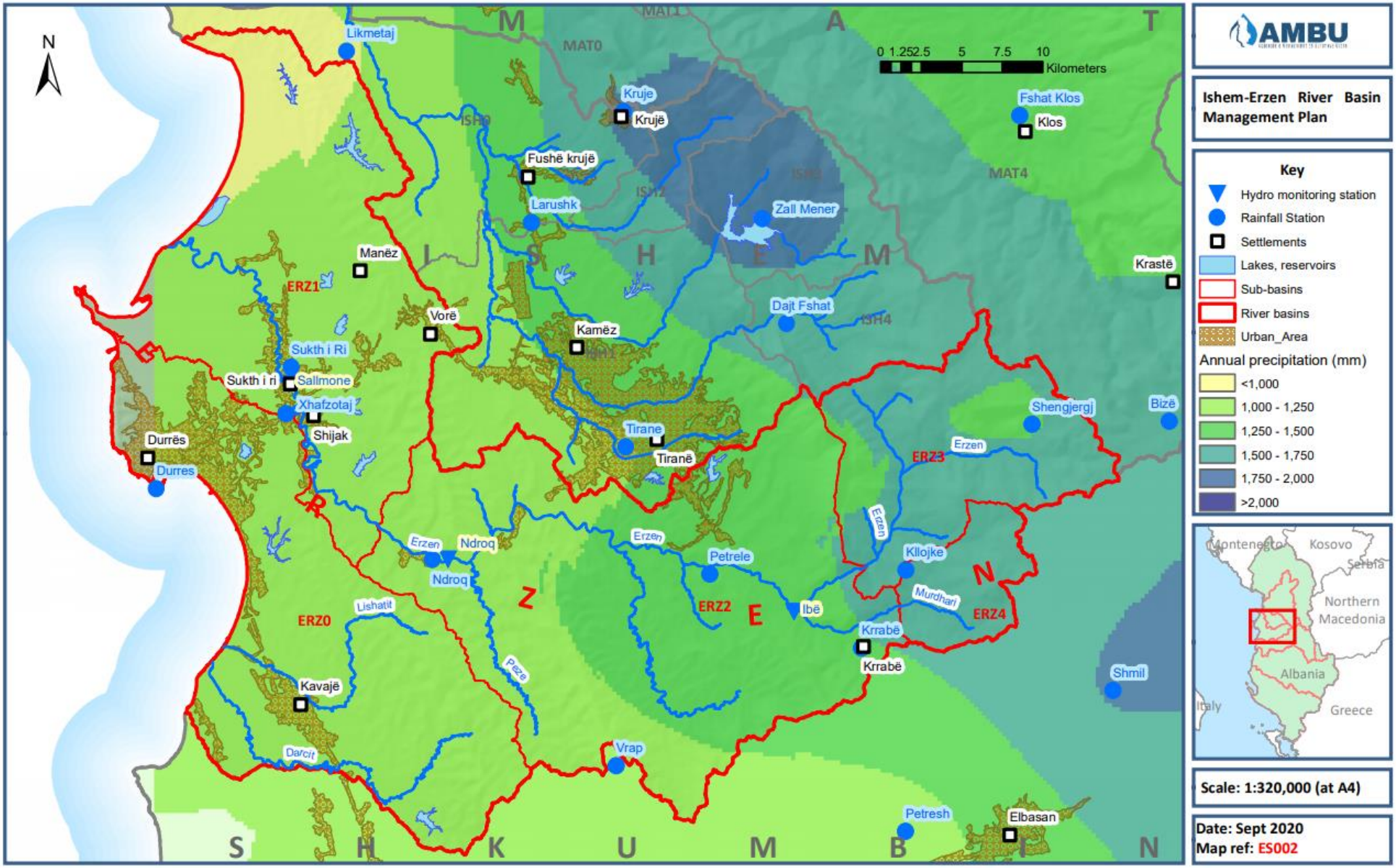
The European commencement code for the Erzen river basin has been determined from GIS analysis to be **3516**. Referring to Technical Annex II is the map for Mediterranean Elements of the CCM European Basin Coding System (Figure 4-14)

[104] https://ec.europa.eu/jrc/en/publication/reference-reports/pan-european-river-and-catchment-database

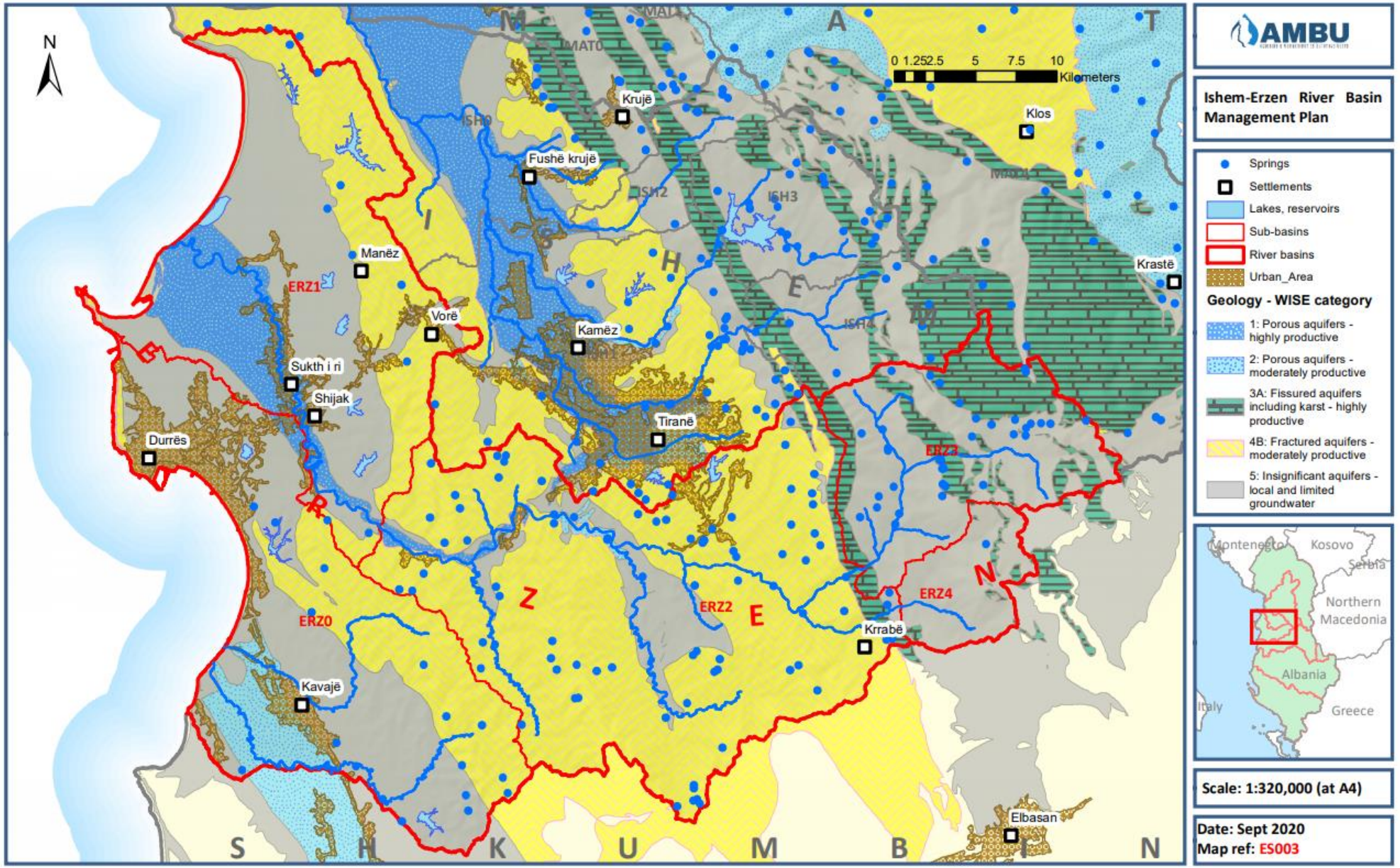
[105] European Commission - A pan-European River and Catchment Database, JRC 2007

[106] 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



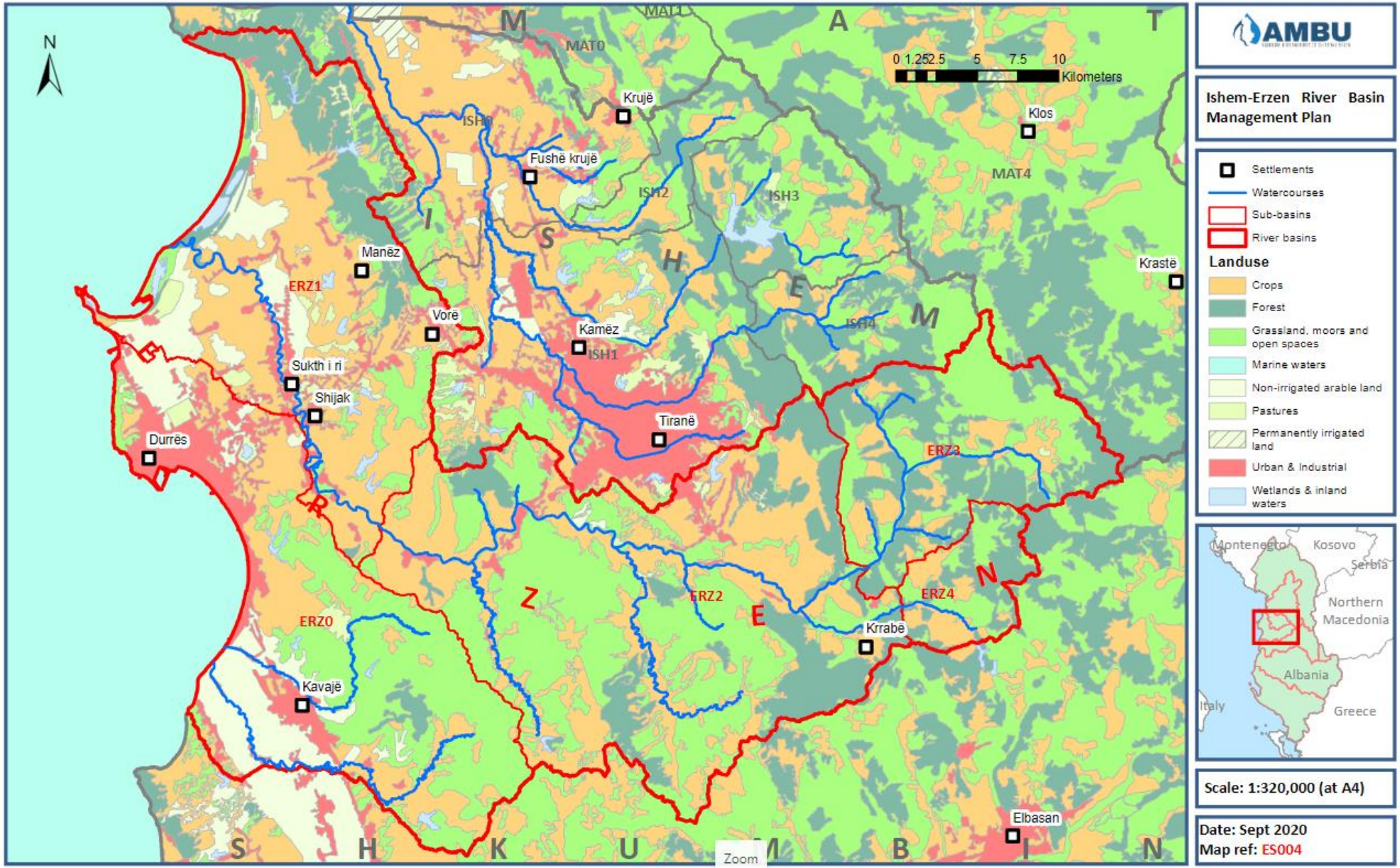
AMBU

Ishem-Erzen River Basin Management Plan

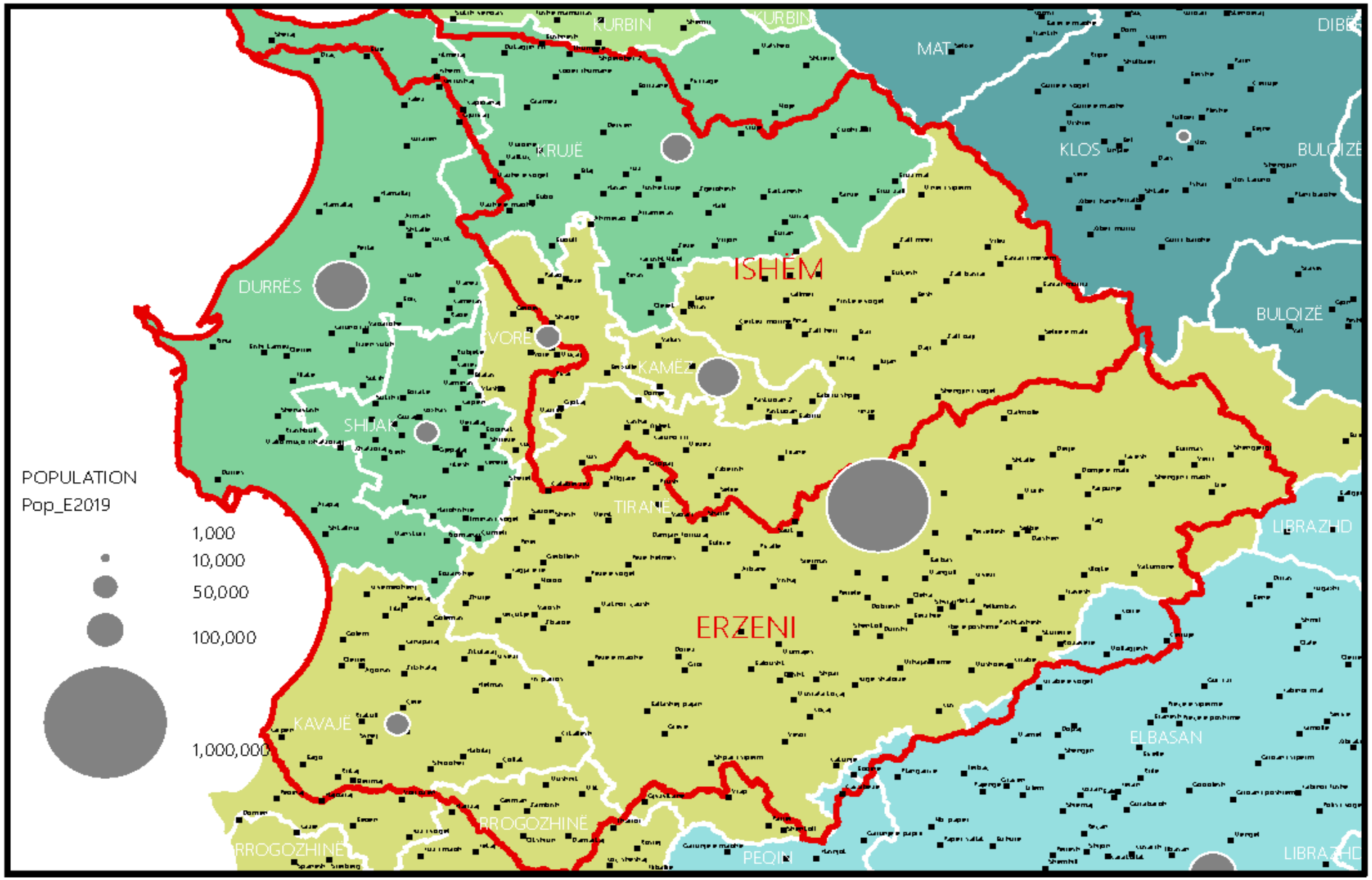
Scale: 1:320,000 (at A4)

Date: Sept 2020
Map ref: ES003

Map 4-3 – Sub-basins and Land Use



Map 4-4 – 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.[107] 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[108]. 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 [109]. 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).

[107] European Commission – CIS Guidance Document No 2 - Identification of Water Bodies

[108] European Commission – Directive 2000/60/EC – Annex II

[109] 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' (completely natural conditions) for that waterbody type. Fundamentally, different TYPES of waterbodies even within the same CATEGORY (e.g. rivers) will have different reference conditions. The greater the deviation of the waterbody condition from the reference condition, the greater is the impact on the status of the corresponding water body.

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 contributing 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 physic-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 inter calibration types and has therefore been adopted within the remit of this RBMP[110].

The summary for the typology descriptors and codes for European rivers and lakes can be found on Technical Annex X

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.

[110] 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

5.2.3 Surface Waterbody Typology Affecting Delineation

Waterbody delineation (determination of precise geographic divisions within rivers, lakes, groundwater 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 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 an otherwise 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). In simple terms, 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, 1.1.v, the typology differentiation for artificial water bodies (AWBs) and highly modified water bodies (HMWBs) should be carried out in accordance with the descriptors for which the category of natural surface water is more similar to the TUA or TUTM in question.

5.2.4 Surface Waterbody Pressures and Impacts Affecting Delineation

Sufficient delineation must take place so as to result in 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.

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.

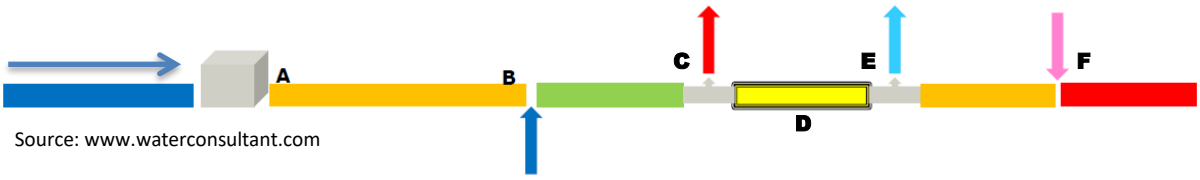
These point or diffuse pressures may mean that the currently aggregated waterbody has to be disaggregated into several smaller waterbodies in the future so that the status of each is still correctly identified. For reasons of efficient database management and avoidance of reassignment of the unique waterbody codes (*EU Surface Water Body Code*)[111] it is preferable in some cases not to over-simplify 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 2024-2029 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.

[111] European Commission - WISE GIS Guidance on the Reporting of Spatial Data to WISE, Version 6.0.6, 2016

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**), 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 due to Pressures



Source: www.waterconsultant.com

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 Erzen Basin

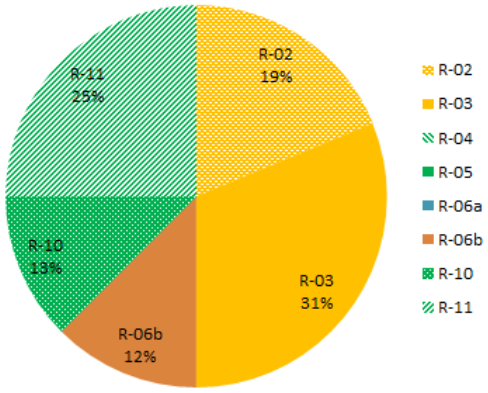
5.4.1 River Waterbodies

As for all waterbodies, the rivers in the Erzen basin must be first sub-divided to varying type and then to discrete and significant elements such that the status of that waterbody is accurately described. All River and Lake Waterbodies in Albania lie within Ecoregion 6 (Hellenic Western Balkan).

16 River waterbodies (RWs) and three Transitional waterbodies (TW) have been determined for the Erzen 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.[112]

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

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	200-800	Medium-Large	Calcareous/mixed
R-11	200-800	Small	Calcareous/mixed



[112] 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 (WRMA, 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 WRMA 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

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.[113] The median flow describes 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.[114] 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 (LW) in the Erzen 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 km² (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 Erzen RBMP, four waterbodies of < 0.5 km² have been included for completeness. These will require a sampling/monitoring review in the period 2024-2029 to determine if they have any special ecological characteristics; otherwise they can be discarded from the waterbody register.

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

11 river water bodies (RWB) have been defined in the Erzen Basin. The public water reservoir "Manskurisa" (otherwise known as Lake Durres), which is used by the Kavaja water utility, is included here. The characterisation of these waterbodies is given in Table 5-2 and Map 5-1.

Usually, the lakes/reservoirs of the Erzen basin located in the lower sub-basins ERZ0 and ERZ1 are very small or small (< 1 km²), mostly siliceous in character, and mostly used for irrigation.

Virtually all of the LWs in the Erzen basin are ungauged and unmonitored so the inflow regime is not known.

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 within RBMPs, and no specific reference condition currently exists. In the Erzen 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).

Three Transitional waterbodies have been determined for the Erzen 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.

[113] 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.

[114] Science Academy of Albania, Institute of Hydro-meteorology – "The Hydrology of Albania", Tirana, 1984

5.4.4 Coastal Waterbodies

When assigning a stretch of coastal water to a River Basin District, the objective 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 Erzen 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).

Six Coastal waterbodies have been determined for the Erzen 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). AWBs are artificial waterbodies created by human activity e.g. diversion channels, irrigation canals. Instead of 'good ecological status', the environmental objective for HMWBs and AWBs is 'good ecological potential' (GEP). Conventionally, 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. [115]

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.

Seven AWB or HMWB waterbodies have been determined for the Erzen river basin. The characterisation of these waterbodies follows System A of the WFD Annex II, and is given in Table 5-5 and 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).

[115] European Commission – CIS Guidance Document 4 - Identification and Designation of Heavily Modified Waterbodies (3.1.2)

Table 5-1 – Waterbody Characterisation – Category RIVERS

RIVER NAME	LOCAL SUB-BASIN	WATERBODY EU CODE (RW)	ALTITUDE mASL	AREA km²	GEOLOGY TYPE	TYPOLOGY EU CODE	RIVER FORM	LENGTH km	WIDTH m	ACTUAL FLOW REGIME [116]			
										Q10	**Q50**	**Q90**	**BFI**
Erzen	ERZ1	351611	<200	893	Org + Sil	R-06b	Trans	2.8	34	31.14	20.24	13.51	0.67
Erzen	ERZ1	351613	<200	857	Org + Sil	R-06b	Natural	25.0	22	29.89	19.42	12.96	0.67
Erzen	ERZ1/ERZ2	351615	<200	724	Sil	R-02	Natural	13.6	55	25.25	16.41	10.95	0.67
Pezë	ERZ2	35162	<200	75.5	Sil	R-03	Natural	20.9	15	2.48	1.62	1.09	0.67
Erzen	ERZ2	35163	<200	586	Sil	R-02	Natural	20.6	56	18.84	12.33	8.32	0.67
Erzen	ERZ2	35164	<200	131	Sil	R-03	Natural	26.0	23	4.21	2.76	1.86	0.67
Erzen	ERZ2	35165	<200	383.1	Sil	R-02	Natural	21.8	66	12.32	8.06	5.44	0.67
Përroi Zallit	ERZ2	351661	>200 <800	79.7	Cal + Mix	R-11	HMWB	8.3	13	3.50	2.20	1.28	0.58
Përroi Zallit	ERZ4	351663	>200 <800	50.4	Cal + Mix	R-11	Natural	5.6	77	2.21	1.39	0.81	0.58
Erzen	ERZ2	351671	>200 <800	175.9	Cal + Mix	R-10	Natural	5.6	53	8.98	5.75	3.83	0.67
Erzen	ERZ3	351673	>200 <800	165.9	Cal + Mix	R-10	Natural	14.6	94	8.47	5.42	3.61	0.67
	ERZ3	35168	>200 <800	33.7	Cal + Mix	R-11	Natural	10.3	59	1.72	1.10	0.73	0.67
Erzen	ERZ3	35169	>200 <800	87.9	Cal + Mix	R-11	Natural	12.3	38	4.49	2.87	1.91	0.67
Darcit	ERZ0	351711	<200	124.2	Org + Sil	R-06b	Trans	1.4	8	4.32	2.81	0.81	0.29
Darcit	ERZ0	351713	<200	122.6	Org + Sil	R-06b	HMWB	33.6	11	4.28	2.78	0.80	0.29
Darcit	ERZ0	351715	<200	80.3	Sil	R-03	Natural	17.4	14	2.80	1.82	0.52	0.29
Lishatit	ERZ0	351721	<200	88.9	Org + Sil	R-06b	Trans	1.9	12	3.10	2.02	0.58	0.29
Lishatit	ERZ0	351723	<200	78.4	Sil	R-03	HMWB	23.9	4	2.73	1.78	0.51	0.29
Lishatit	ERZ0	351725	<200	56.7	Sil	R-03	Natural	18.4	4	1.98	1.28	0.37	0.29

Table 5-2 - Waterbody Characterisation – Category LAKES

LAKE NAME	LOCAL SUB-BASIN	WATERBODY EU CODE	ALTITUDE mASL	AREA km²	GEOLOGY TYPE	TYPOLOGY EU CODE	DEPTH m	LENGTH km	Δ LEVEL m	ACTUAL INFLOW REGIME			
										Q10	**Q50**	**Q90**	**BFI**
Topanas	ERZ1	LW351601		0.399	Siliceous	L-15				0.23	0.15	0.04	0.29
Taranit	ERZ1	LW351602	50	1.571	Siliceous	L-13				0.73	0.48	0.14	0.29

[116] Due to lack of reliable hydrometric data, flow regimes for individual waterbodies cannot be calculated.

Manzës	ERZ1	LW351603	19	0.501	Siliceous	L-13	0.29	0.19	0.05	0.29
Rubjekes	ERZ1	LW351604	27	0.515	Siliceous	L-13	0.23	0.15	0.04	0.29
Metallës	ERZ1	LW351605	51	0.433	Siliceous	L-15	0.15	0.09	0.03	0.29
Callikut	ERZ1	LW351606	51	0.677	Siliceous	L-13	0.35	0.23	0.07	0.29
Farkës	ERZ2	LW351607	189	0.723	Siliceous	L-13	0.15	0.09	0.03	0.29
Okshtunit	ERZ0	LW351608	72	0.713	Siliceous	L-13	0.38	0.25	0.07	0.29
Manskurisë	ERZ0	LW351609	35	0.712	Siliceous	L-13	0.42	0.27	0.08	0.29
<unnamed>	ERZ0	LW351610	21	0.401	Siliceous	L-15	0.15	0.09	0.03	0.29
Bishtarakës	ERZ1	LW351611	0	1.410	Siliceous	L-13				

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	
Erzen	ERZ1	TW351611	River	7.2						
Darcit	ERZ0	TW351711	River	1.4						
Lishatit	ERZ0	TW351721	River	1.9						

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	
Cape Rodoni	ISH0	CW351402	Coast	15.0						
Lales Bay	ERZ1	CW351602	Coast	8.80						
Rinia	ERZ1	CW351605	Coast	16.70						
Hamallaj	ERZ1	CW351606	Lagoon	16.70						
Durres	ERZ0	CW351608	Coast	29.10						
Lumi	ERZ0	CW351611	Coast	4.90						

Table 5-5 - Waterbody Characterisation – Category HEAVILY MODIFIED WATERBODIES (HMWB) and ARTIFICIAL (AWB)

AWB or HMWB NAME	LOCAL SUB-BASIN	WATERBODY EU CODE	ECOSTATUS CATEGORY	FORM	TYPOLOGY EU CODE	LENGTH km AREA km²	HMWB/AWB ALTERATION	HMWB/AWB USE
Përroi Zallit	ERZ2	RW351661	RW	HMWB	R-11	8.3	Flow regime	Energy – hydropower
Përroi Zallit	ERZ4	RW351663	LW	HMWB	R-11	<0.5	Weirs – Dams – Reservoir	Energy – hydropower
Darcit	ERZ0	TW351711	TW	HMWB	R-06b	1.4	Channelisation - Reinforcement	Agriculture - irrigation
Darcit	ERZ0	RW351713	RW	HMWB	R-06b	33.6	Channelisation - Reinforcement	Agriculture - irrigation
Lishatit	ERZ0	RW351721	TW	HMWB	R-03	1.9	Channelisation - Reinforcement	Agriculture - irrigation
Ujëmb. I Topanas	ERZ1	LW351601	LW	HMWB	L-15	0.399	Weirs – Dams – Reservoir	Agriculture - irrigation
Ujëmb. i Tarinit	ERZ1	LW351602	LW	HMWB	L-13	1.571	Weirs – Dams – Reservoir	Agriculture - irrigation
Ujëmb. i Manzës	ERZ1	LW351603	LW	AWB	L-13	0.501	Weirs – Dams – Reservoir	Agriculture - irrigation
Rubjekes	ERZ1	LW351604	LW	AWB	L-13	0.515	Weirs – Dams – Reservoir	Agriculture - irrigation
Metallës	ERZ1	LW351605	LW	AWB	L-15	0.433	Weirs – Dams – Reservoir	Agriculture - irrigation
Callikut	ERZ2	LW351606	LW	AWB	L-13	0.677	Weirs – Dams – Reservoir	Agriculture - irrigation
Liqeni I Farkës	ERZ0	LW351607	LW	HMWB	L-13	0.723	Weirs – Dams – Reservoir	Agriculture - irrigation
Okshtunit	ERZ0	LW351608	LW	HMWB	L-13	0.713	Weirs – Dams – Reservoir	Agriculture - irrigation
Manskurisë	ERZ0	LW351609	LW	AWB	L-13	0.712	Weirs – Dams – Reservoir	Agriculture - irrigation
Rrashbull	ERZ1	LW351610	LW	AWB	L-15	0.401	Weirs – Dams – Reservoir	Agriculture - irrigation
Bishtarakës	ERZ1	LW351611	LW	AWB	L-13	1.410	Weirs – Dams – Reservoir	Agriculture - irrigation

Notes:

1. Ecostatus Category means the waterbody category which the AWB or HMWB most closely resembles for ecological potential assessment
2. Alteration is from WISE 2016 GIS schema SWB: <HMWBPhysicalAlteration>
3. Use is from WISE 2016 GIS schema SWB: <HMWBWaterUse>
4. Exemption Type is from WISE 2016 GIS schema SWB: Annex 8g
5. Exemption Types are INDICATIVE only. Justification must be confirmed in the Economic Analysis or Chapter 12.
6. If Exemption Type is listed as Article 4(7) New Modification, Date of new modification must be provided, and justification must be confirmed in the Economic Analysis or Chapter 12.

Map 5-1 - Surface Waterbody Categories 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 reporting), and the WRMA (via Permitting and distribution of water 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. [117] [118] This Directive establishes 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^3/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^2, 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.

[117] European Commission – Directive 2006/118/EC - On the protection of groundwater against pollution and deterioration – and as amended by Directive 2014/80/EU

[118] 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

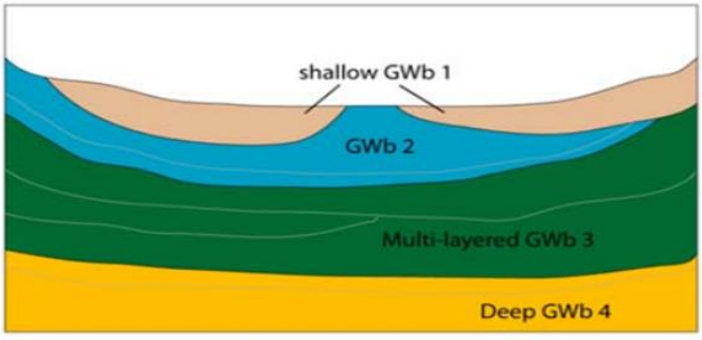
ALBANIA CODE	ALBANIA REPORTING GEOLOGICAL FORMATION [119]	EQUIVALENT WISE REPORTING GEOLOGICAL FORMATION [120]
1	Porous – high productivity	Porous – highly productive
2	Porous –medium productivity	Porous - moderately productive
3	Porous –low productivity	Porous - moderately productive
4	Fractured – high productivity	Fissured aquifers including karst – highly productive
5	Fractured – medium productivity	Fissured aquifers – moderately productive
6	Fractured – low productivity	Fissured aquifers – moderately productive
7	non-aquifer	Insignificant aquifers – limited groundwater
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



[119] 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 .shape files. The GIS shapefiles Type definitions have been used as the delineation type.

[120] 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.

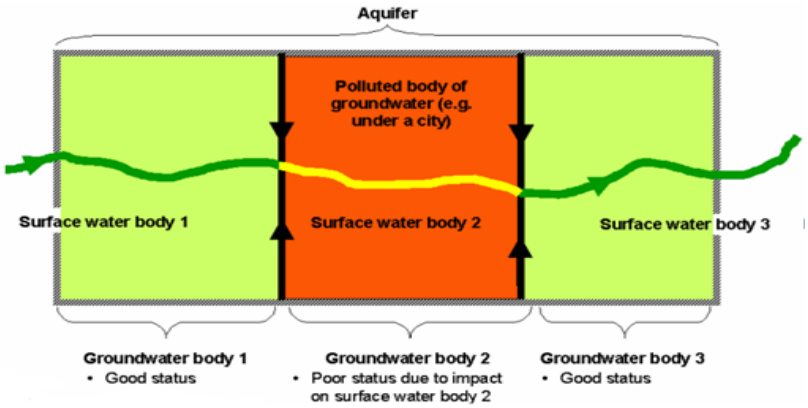
6.2.4 Delineation Influenced by Groundwater Body Pressures and Impacts

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.[121] 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.

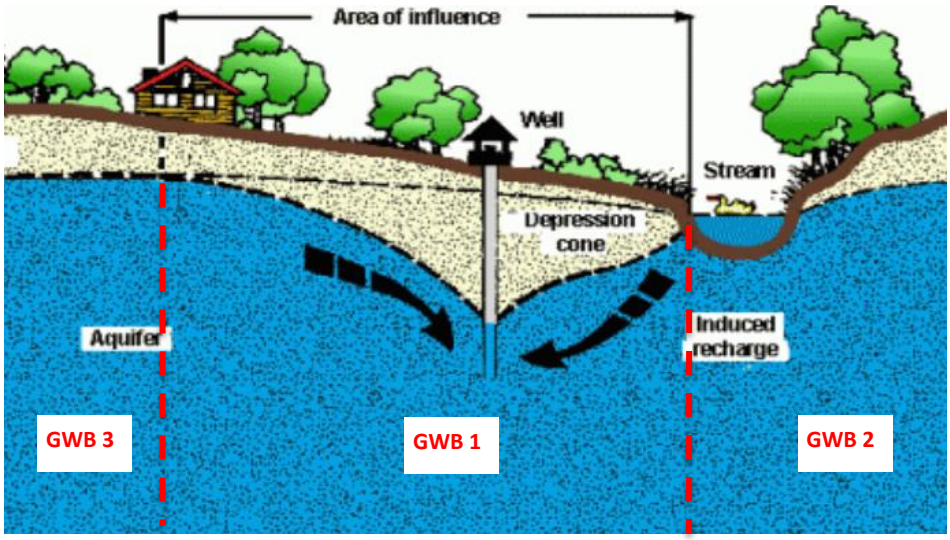
Therefore, the final stage of waterbody delineation is an iterative process, in which the anthropogenic pressures and impacts also need to be assessed across single aquifers in order to distinguish differing degrees of status within the aquifer.

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



Source: European Commission – CIS Guidance 2004

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



Source: Oregon State University – Well Water Program

[121] 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 Erzen basins.

Table 6-2 – National Summary of Hydrogeological Formations [122]

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 aquifers		10	< 300

6.3.2 Preliminary Identification of Groundwater Bodies in Albania

Preliminary work on aquifer characterisation and groundwater body delineation was carried out by the AGS and international experts in 2008. [123] 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:

a) 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.

b) 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).

c) 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.

d) 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.

[122] Albanian Geological Service - Inventory of Groundwater Resources and their Utilisation Patterns – CEMSA Project, 2008

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 previous studies. [124] 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 Erzen Basins

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 and Erzen basin adopts the same general approach as for Rivers, Lakes and Coastal waters (identified by the appropriate WISE category prefix)[125], 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 3516 04 09 represents the ninth discrete groundwater body of Type 4 in the Erzen basin (3516). 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.

Groundwater bodies are assigned to horizons. By default the first aquifer is defined as Horizon 1. In Erzen, one groundwater body is assigned to Horizon-2.

6.4.2 Delineated Groundwater Bodies in the Erzen Basin

10 discrete groundwater bodies have been established in the Erzen 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.

In the Erzen Basin, it is required to define one groundwater body (GW35160517) in a second horizon (or Layer-2) for the confined Rrogozhina sandstone aquifer, defined as a groundwater body by CEMSA, that is found beneath Durres town and extends beneath and along both sides of the Erzen alluvial groundwater body (GW35160101).

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. Two reporting groups (A and B) have been defined for the extensive low-productivity sandstones and conglomerate (Type 5) that underlie most of the middle catchment, and 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. However, there is uncertainty surrounding the significance of these impacts due to shortage of data. Although, baseflow from the Erzen alluvium may not have

[124] Water Framework Directive Reporting Guidance - http://cdr.eionet.europa.eu/help/WFD/WFD_521_2016

[125] WFD – WISE GIS Reporting Guidance 2016 – schema GWB – schema element – *SurfaceWaterBodyCategory – RW, LW, TW, CW*

reduced greatly, baseflow from karst aquifers to sustain dry season discharge and wetlands will have been significantly reduced by spring capture in the upper catchment.

A short description of the defined groundwater bodies and groups follows, with full descriptions provided in Technical Annex 3.

Alluvial Aquifers: Bodies GW35160101 (Sukth) and GW35160103 (Kavajë) are not defined as a reporting group but are in hydraulic continuity with each other and the alluvium of the Mati catchment. The aquifer horizons are formed of gravel and coarse sand up to a few tens of metres thick.

Karstic Limestone Aquifers: As a result of the regional geological structure, the Ishem Basin is cut by a series of sub-parallel limestone and dolomite escarpments:

- GW35160407 (Domje e Malit)
- GW35160409 (Selite I Malit) forms part of the high limestone massif known as Mali mi Gropa (the 'holey' mountain, an area of extreme karstification that feeds, amongst others, the Shen Meria spring.
- GW35160411 (Pellumbas)

Sandstone – Conglomerate Aquifers: Geographically, these are the most important aquifers in the basin, however, in terms of abstraction and economic impact *per unit area*, the importance is less. They are important in supporting local domestic needs. There are five GWB's and are divided into two groups for reporting purposes.

Group A, *Berzez - Shkafane* comprises:

- GW35160507 (Berzez)
- GW35160509 (Shkafane)

Group B, Gurre - Dorez comprises:

- GW35160511 (Gurre)
- GW35160513 (Zikularaj)
- GW35160515 (Dorez)

One groundwater body, GW35160517 (Durres), is a confined aquifer, assigned to Horizon-2, because it not only underlies large areas of non-aquifer, as at Durres, but also underlies the major alluvial groundwater body GW35160101 (Sukth).

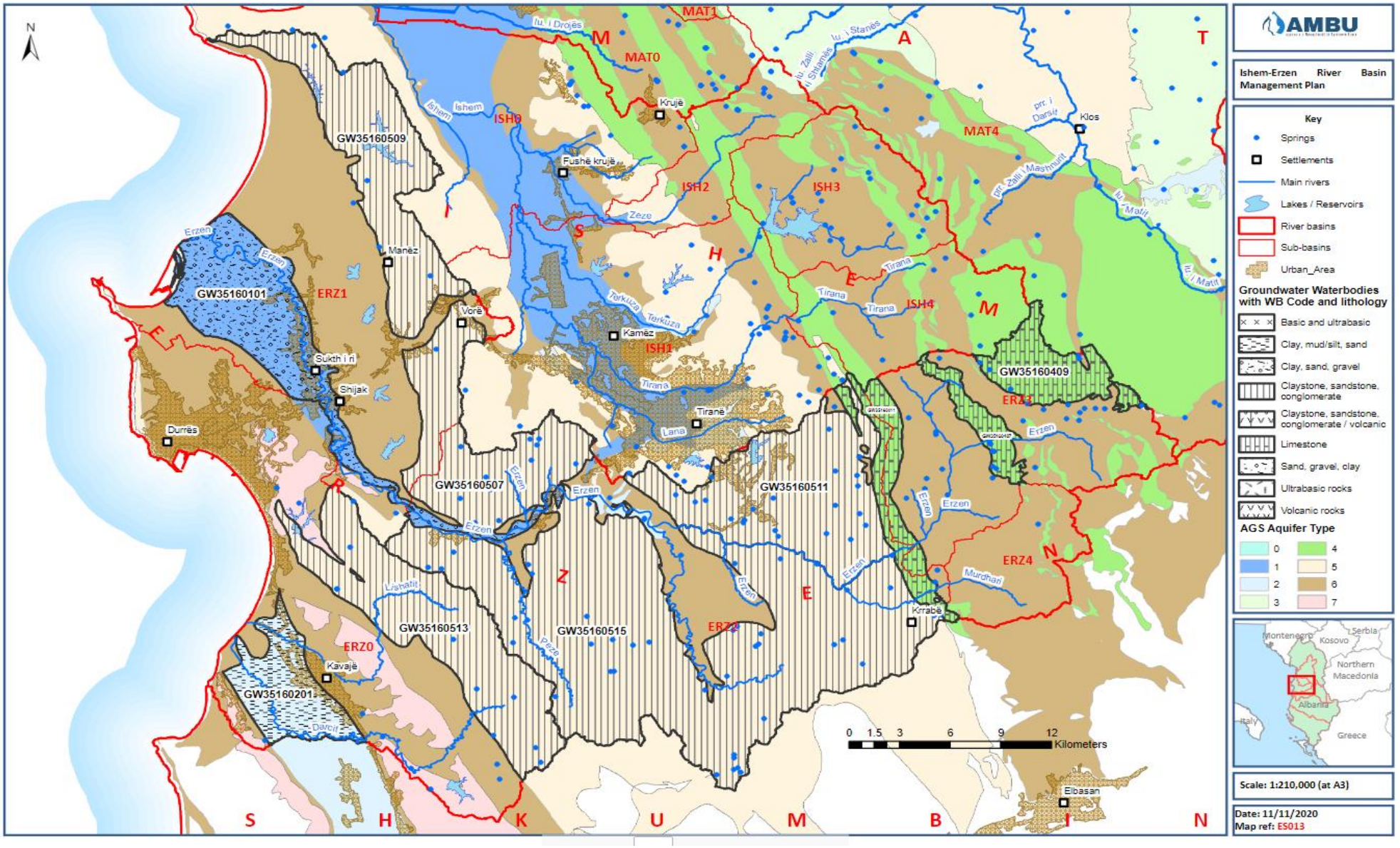
Table 6-3 –Groundwater Body Reporting Groups in the Erzen Basin

Group	Group Name	TYPE OF AQUIFER	LITHOLOGY	GEOMETRY	GWB CODE	GWB NAME	AREA Km²
A	Berzez - Shkafpane	T5. Porous / fractured-porous aquifers, extensive and medium – very low production	Sandstone & conglomerate	Contiguous	GW35160507	Berzez	72
					GW35160509	Shkafane	78
B	Gurre-Dorez	T5. Porous / fractured-porous aquifers, extensive and medium – very low production	Sandstone & conglomerate	Contiguous	GW35160511	Gurre	92
					GW35160513	Zikularaj	90
					GW35160515	Dorez	271

Table 6-4 – Characterisation and Delineation of Groundwater Bodies in the Erzen Basin

EU CODE	Reprting Group	LITHOLOGY	AQUIFER TYPE & PRODUCTIVITY	OVERLYING STRATA	CONFINED	HORIZON	AREA km²	DEPTH m	H SY %	H K m/d	H T m²/d	TRANS-BOUNDARY	DEPENDENT ECOSYSTEM
GW35160101	-	Alluvium, coarse	Type 1		N	1	74				> 10	N	
GW35160201		Alluvium, fine	Type 2		N	1	35					N	
GW35160407		Limestone (karst)	Type 4		N	1	12.7				$10^{4} – 10^{-1}$	N	
GW35160409		Limestone (karst)			N	1	27.9					N	
GW35160411		Limestone (karst)	Type 4		N	1	25				$10^{4} – 10^{-1}$	N	
GW35160507	A	Sandstone & conglomerate	Type 5		N	1	72				10^{2} - 10^{1}	N	
GW35160509		Sandstone & conglomerate	Type 5		N	1	78				> 10	N	
GW35160511	B	Sandstone & conglomerate	Type 5		N	1	92				10^{2} - 10^{1}	N	
GW35160513		Sandstone & conglomerate	Type 5		N	1	90				10^{2} - 10	N	
GW35160515		Sandstone & conglomerate	Type 5		N	1	271				10^{2} - 10	N	
GW35160517		Sandstone & conglomerate	Type 5	Molasse (non-aquifer)	Y	2	?				10^{2} - 10	N	

Map 6-1 – Groundwater Body Categories 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 a 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)[126] all bodies of water that supply > 10 m^3/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. [127] 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. In the case of groundwater abstraction underlying agricultural areas, the entire area of the DWPA may be declared a Nitrate Vulnerable Zone (NVZ) [128] (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).

[126] European Commission – Directive (EU) 2020/2184 on the quality of water intended for human consumption
[127] European Commission – CIS Guidance Document 16 - Guidance on Groundwater in Drinking Water Protected Areas
[128] European Commission – Directive 91/676/EEC concerning the protection of waters against pollution caused by nitrates from agricultural sources

These identify the minimum travel time for a hazardous substance to reach the source. Inner Zone 1 is generally a security area around the well-head or abstraction point.

7.2.2 Drinking Water Protection Areas in Erzen

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. Very few areas of hygienic-sanitary protection have been identified, especially underground water 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. In the first phase of the RBMP development for Erzen 2024-2029, it may be sufficient for most DWPAs to demarcate a simple boundary defining the source catchment or an arbitrary buffer zone of e.g. 500 m around all groundwater sources (see Technical Annex XIII). 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 7-2. A Map overview of either legally identified or provisionally identified DWPAs is shown in Map 7-1.

An urgent priority for the WRMA as part of the Programme of Measures is to identify, register and enforce all Permits of such abstractions and delineate and publish areas of hygienic-sanitary protection. 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 Erzen

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
Farke	*Cyprinid*	Imperative pass
Korre	*Cyprinid*	Imperative pass
Lane	*Cyprinid*	Guideline fail
Murdhar	*Cyprinid*	Imperative pass
Zhëllimë	*Cyprinid*	Imperative pass
Shtermen	*Cyprinid*	Imperative pass
Erzen delta	*Cyprinid, Salmonid*	Guideline pass
Erzen	*Cyprinid, Salmonid*	Guideline 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

The relevant authority on Recreational and Bathing Water areas designation are Ministry of Tourism and Environment, Ministry of Infrastructure and Energy, National Coastal Agency, National Environment Agency, National Tourism Agency and National Agency for Territory Planning. The areas for Recreational and Bathing Water will be defined in the map of Integrated Cross-sectorial Plan for the Coast.

According to the hygiene-sanitary regulation "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 these areas of intervention, covering the economic, abiotic/biotic and social systems.[129]

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 Erzen

There are many different types of recreational usage of water environments. These include, for example, sunbathing, wading, swimming, diving, boating, fishing and sail boarding. Within the socio-economic context of recreational water use, the importance of tourism is considerable — in terms of its size, impacts on socio-economic and environmental spheres and the responsibility and means to intervene that it has at its disposal.

The purpose of the objective is not to deter recreational water use but, instead, to ensure that recreational water areas are operated as safely as possible in order that the largest possible population gets the maximum possible benefit.

Recreational and bathing water areas exist in the Protected Areas of the Erzen River Basine are recreational and bathing water areas.

Important habitats: The Rrushkull Managed Nature Reserve IUCN Category IV in the Erzen Estuary is an important point for Bird Areas.

Important Habitat:

- Erzeni river estuary
- Coastal lagoons (Godulla, Bishtaraka)
- Coastal dunes forests with *Pinus halepensis, P. pinea, P. Pinaster*
- Mixed aluvial or riverine forests of *Quercus robur, Ulmus minor, Alnus glutinosa, Fraxinus angustifolia*, etc.

Important species as *Quercus robur; Pinus halepensis; Ulmus minor; Phragmites australis; Lutra lutra; Ardea purpurta; Emys orbicularis.*

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

[129] World Health Organization.Guidelines for safe recreational water environments.Volume 1, Coastal and fresh waters.

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 m/l, under the Nitrates Directive.[130] These should be declared as 'nitrate vulnerable zones' (NVZs) with appropriate land-management practices applied.
- Areas designated under the Urban Waste Water Directive (UWWD) [131] 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 (UWWD, 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 Erzen

Identification of Nutrient Sensitive Areas in Erzen 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 NVZ 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.

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 Erzen

The National Agency for Protected Areas (NAPA) is the competent authority for managing the national system of protected areas in Albania.

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[130] European Commission – Directive 91/676/EEC - concerning the protection of waters against pollution caused by nitrates from agricultural sources

[131] European Commission – Directive 91/271/EEC - concerning urban waste-water treatment

Three protected areas assigned in accordance with Albanian law are located along the borders of the Erzeni River Basin in Albanian territory. 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.

Only recently the work has commenced on managing Natura 2000 sites.[132] 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 sites of community interest in Erzeni 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 Erzeni River Basin have their own management plans. Of the three PAs listed, two of them have management plans which are used by the staff of RAPA Tirana and RAPA Durres and guide the work for their protection and management. PA of the Rrushkull Protected Nature Reserve has not a management plan. Management Plan documents are available at NAPA and RAPA Tirana and RAPA Durres. Within these plans, programs of measures are proposed, within which there are relevant measures for monitoring and evaluation of the situation of water resources and water biodiversity related to them.

A summary information on each protected area is included under the Technical Annex VIII.

[132] EU - Strengthening National Capacity in Nature Protection – Preparation for Natura 2000 Network, March 2019

Table 7-2 – 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

Table 7-3 - 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
Managed Nature Reserve Rrushkull (Hamallaj)	ERZ1	DWPA	Order IM no.2, dated 26.12.1995	Law no. 81/2017 on Protected Areas	Directive 2000/60/EC Directive 91/676/EEC	Managed Nature Reserve Rrushkull (Hamallaj)	ERZ1	DWPA

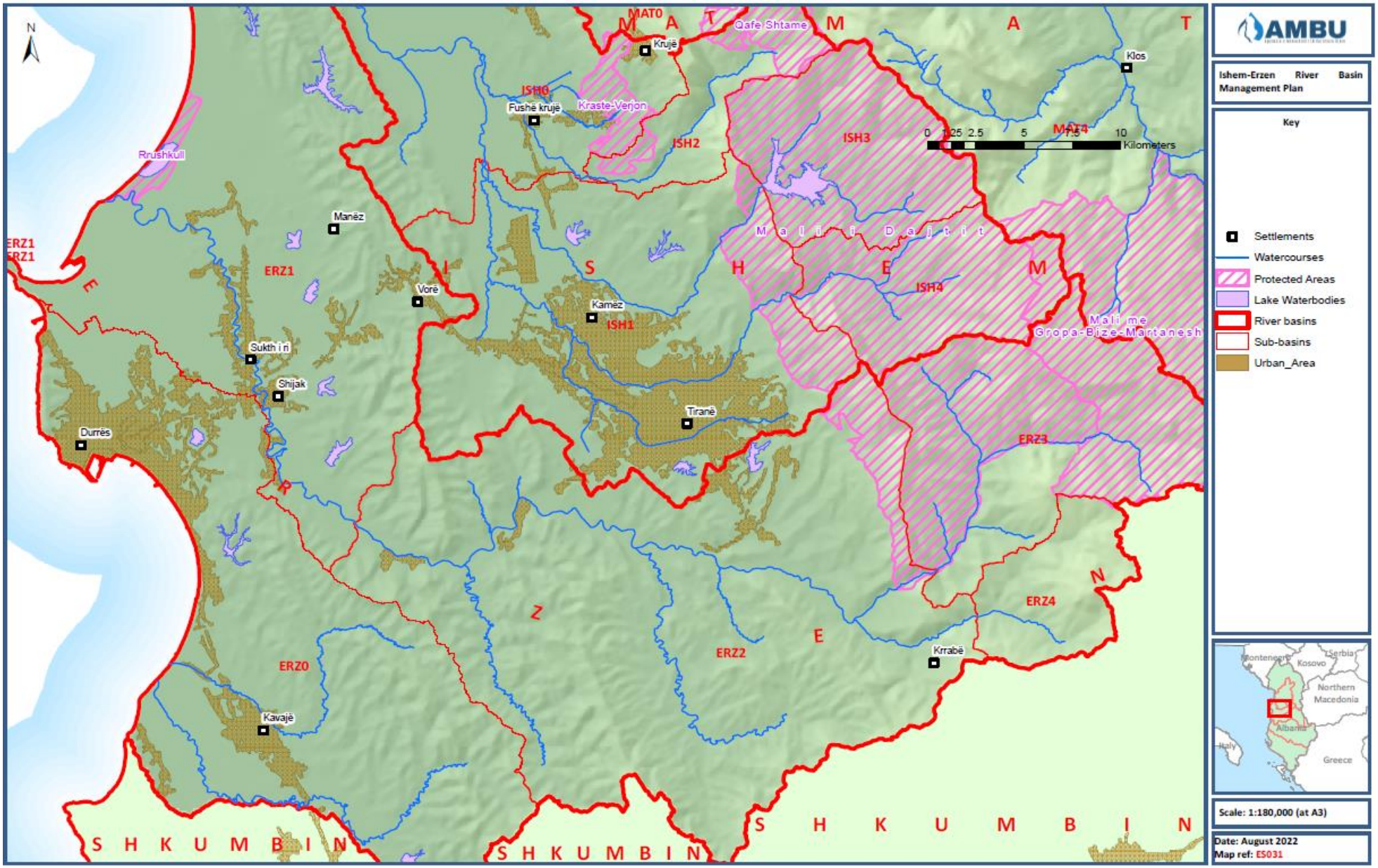
Table 7-4 - Register of Protected Areas – Category RECREATIONAL AND BATHING WATER

NAME OF PROTECTED AREA	SUB-BASINS	FUNCTION	DATE ESTABLISHED	NATIONAL LEGISLATION RELEVANT	EU LEGISLATION RELEVANT	RELEVANT WATERBODIES	CURRENT STATUS	BOUNDARIES PUBLISHED
Managed Nature Reserve Rrushkull (Plazhi Gjiri i Lalzit)	ERZ1	RBPA	Order IM no.2, dated 26.12.1995	Law no. 81/2017 on Protected Areas	Directive 2006/7/EC			None

Table 7-5 - 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
Managed Nature Reserve Rrushkull	ERZ1	RBPA	Order no.2, dated 26.12.1995	Law no. 81/2017 on Protected Areas	Directive 91/676/EEC Directive 91/272/EEC			Boundaries are presented in the Management plan of PA
National Park of Mali i Dajtit	ERZ2	RBPA	DCM nr.402, date 21.06.2006	Law no. 81/2017 on Protected Areas	Directive 91/676/EEC Directive 91/272/EEC			Boundaries are presented in the Management plan of PA
Natural Park Mali me Gropa-Bize-Martanesh	ERZ3	RBPA	DCM nr.10, date 28.12.2020	Law no. 81/2017 on Protected Areas	Directive 91/676/EEC Directive 91/272/EEC			Boundaries are presented in the Management plan of PA

Map 7-1 – Overview Map of All Protected Areas – Erzen



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"[133] [134]. 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".

WRMA 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. WRMA 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[135].

Key aspects of monitoring programmes include:

- the monitoring types and objectives (monitoring,[136] surveillance, operational and investigative);
- the choice of monitoring sites (designed so as to provide a coherent and comprehensive overview of chemical status within each river basin);
- the quality elements (QEs) to be monitored, and the required monitoring frequencies.

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 (IGEO). 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.[137] 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.

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[133] 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

[134] 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

[135] Water Framework Directive, Annex V

[136] 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 physico-chemical conditions where the national monitoring programme is insufficient, in order to derive a first approximation of likely waterbody status

[137] On the Establishment of Institutional and Regulatory Platform for Governance and Functioning of the National Water Resources Cadastre. World Bank/SIDA – May 2020

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

The country has historically (1960-1992) had an efficient and reliable national hydrometric network. 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 Erzen river basins, and the associated sampling programmes, is under the competent authority of the National Environmental Agency (NEA) of the Ministry of Tourism and Environment[138]. NEA publishes annually the National Environmental Monitoring Program, which sets out the intended monitoring sites and the target parameters[139].

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 ecological and chemical 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 physic-chemical parameters: pH, conductivity, alkalinity, suspended solids, chemical oxygen demand, biochemical oxygen demand, nitrite, nitrate, and ammonium, Orto–phosphorous and total phosphorous.

Priority substances (being those which present a significant risk to the aquatic environment) [140] 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 Erzen River Basin.

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[138] Government of Albania - DCM No 1189 - "On the rules and procedures for implementation of the National Monitoring Program", 2009

[139] National Environmental Agency - http://www.akm.gov.al/cil%c3%absia-e-mjedisit.html#raporte_publikime

[140] European Commission – Directive 2013/39/EU – The Environmental Priority Substances Directive

The surface water quality monitoring network and selected results from the monitoring network are shown for the parameters of BOD_5, total P and NH_4 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 physico-chemical data from the NEA monitoring programmes 2014 – 2019 is provided in Technical Annex IX.

8.3.4 Rapid Reconnaissance Monitoring During 2019

It is evident from Map 8-1 that the number of Stations in the current national monitoring programme is not widespread, and does not represent the majority of waterbodies delineated in the river basins. Thus 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 Erzen basin in September 2019.
The September 2019 survey was conducted at 28 sites throughout the Erzen basin, with 11 physico-chemical parameters analysed. The wider survey allowed a more quantitative assessment of potential status of all waterbodies in the river basins. Location of the Rapid Reconnaissance Surface Water Survey Sites Map in Technical Annex IX summarises these locations and gives values for two of the most important physico-chemical indicators of anthropogenic pollution and potential impact on biological quality elements (BQEs), BOD_5 and NH_4 (mg/l). Complete data sets are provided in Technical Annex IX.
The BOD_5 concentrations vary between <2 – 6 mg/l, values varying between associated 'high' and 'moderate' status ranges. The NH_4 concentrations were between 0.02 and 1.45 mg N/l, values associated with 'high' to 'poor' ranges.
Full physico-chemical data from the reconnaissance monitoring in 2019 is provided in Technical Annex IX.

8.3.5 Hydro-morphological assessments

Under the WFD, the hydro-morphological quality elements are considered as supporting the biological quality elements. This acknowledges that the hydrobiological 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. Nevertheless, a preliminary attempt has been made to assess the hydro-morphological status of the surface waterbodies delineated in the Erzen River Basin. Details about the approach and methodology are included in Technical Annex VI.

8.4 Groundwater Monitoring Programme

8.4.1 Competent Authority

The monitoring network of groundwater in the Erzen river basin lies under the competent authority of the National Environment Agency (NEA) of the Ministry of Tourism and Environment, and the collection of groundwater quality samples and 'hydro-dynamic' monitoring (groundwater level) is sub-contracted to the Albanian Geological Service (AGS). However, there is currently no active groundwater monitoring network in the Erzen Basin, although previously AGS monitored some wells up to at least 2006.

8.4.2 Relevance of the Groundwater Quantity Monitoring Network

A 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.

8.4.3 Status of the Groundwater Quantity Monitoring Network and Data

No recent or historical monitoring of groundwater levels has been identified at any location in the Erzen Basin.

Some measurements of springs discharges exist for the Shenmaria and Pelumbasi springs and if maintained will provide good indicators of the quantitative status of GWB's GW35160409 and GW35160411. These springs are reported to have mean discharges of 1,100 and 500 l/s respectively.

8.4.4 Status of the Groundwater Quality Monitoring Network and Data

No monitoring of groundwater quality in wells is currently conducted. Records of sampling of 128 wells by AGS between 1981 and 2006 have been collected and presented in Technical Annex III; of which 71 are from the confined Durres GWB (GW35160517) and the location of a further 22 samples could not be identified. These records cannot be used directly to assess the current chemical status but do serve as a valuable baseline against which future monitoring can be judged,

Some measurements of water quality at the Shenmaria, Gura e Malit and Pelumbasi springs are available up to 2015 and indicate excellent water quality up to that time. It is possible that monitoring of the Shenmaria spring is conducted by UK Tirana but no data could be obtained.

8.4.5 Rapid Reconnaissance Monitoring During 2019

It is evident from Map 8-3 and Table 8-5 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. Thus the current NEA programme does not fulfil the compliance requirements of WFD Annex V 2.2 and 2.4. In order to obtain a better quantification of potential waterbody status, it will be necessary in future to conduct a more comprehensive 'reconnaissance monitoring' throughout the Erzen basin. This was not possible during the 2019-2020 period due to the COVID-19 pandemic.

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 River Basin Management Plan. These are:

- Areas designated for drinking water;
- Areas designated for the protection of economically significant aquatic species;
- Areas designated as recreational waters, including bathing waters under 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[141].

Coordination is required across several competent authorities, specifically:

- Regulation of water abstraction falls under the permit system of WRMA. 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 WRMA 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 physico-chemical monitoring programmes for their respective sources, as well as at (selected) taps;
- Local Health Care Units (LHCUs) carry out routine physicochemical and pathogen sampling at all drinking water extraction points (post-treatment phase) in Albania for public health purposes. As this sampling data are considered part of the drinking water supply network, this program is not directly related to the watershed's environmental objectives[142].
- 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.

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

[141] European Commission – Natura 2000 - https://ec.europa.eu/environment/nature/natura2000/index_en.htm
[142] European Commission – Directive 2006/7/EC - concerning the management of bathing water quality and repealing Directive 76/160/EEC

- 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)
- Estimation of future trends in water quality.

Albania is – besides Switzerland – the only none-EU country reporting the annual bathing water quality to the European Environmental Agency[143]. 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). [144]

8.5.3 Operational Status of the Protected Areas Monitoring Networks

The protected areas in the country today account for about 21.4 % of the territory of Albania. In the case of the Erzen river basin, it is the Tirana AdZM for the Dajt Mountain National Park and the "Mali me Gropa - Bize - Martanesh" Nature Park and the Durres AdZM for the Rrushkull Managed Nature Reserve. A draft management plan was drawn up for the "Malit i Dajti" National Park, and its approval is expected soon. The "Mali me Gropa - Bize - Martanesh" Nature Park has a Management Plan in force with the terms 2014 - 2024. The project plan for the Management of the Dajti Mountain National Park is in an advanced stage, consultations with stakeholders have been completed, and approval is expected soon. Regarding the Protected Landscape of Kraste-Verjon, the Management Plan has not yet been developed.

The District-level Protected Area Management Committee is another central institution involved in the management of each protected area.

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.

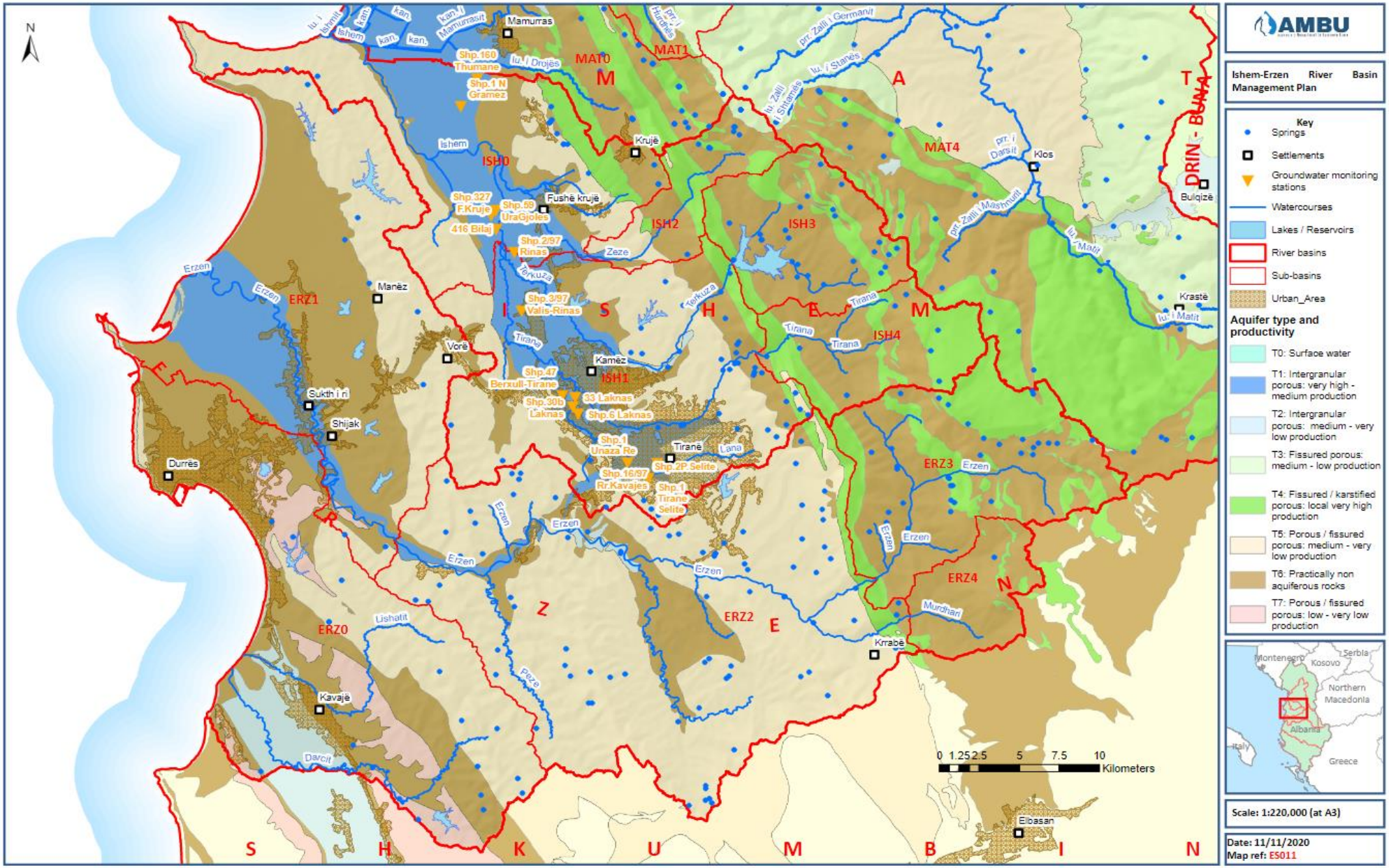
Wild fauna in environmentally protected areas, is included under chapter "NATURE CONSERVATION" (see for more information and tables 8-4, 8-5, 8-6 and 8-7 on Technical Annex VIII).

[143] 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

[144] Visit for example: https://cdr.eionet.europa.eu/al/eea/wise_soe/wise6/envx_ilxq

Map 8-1 – Location of NEA Surface Water Quality Monitoring Sites - Ishem and Erzen

Map 8-2 – Location of NEA 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 combines 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", WRMA has established a National Water Cadaster 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".
- **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 channeling 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)**

ICSPs 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. ICSPs 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 (ICSP) 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 Erzen river basin. Municipalities of Tirana, Vora 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 recognised explicitly within the WFD e.g. FD or implicitly by way of European Commission policy such as that for water scarcity and droughts.[145]

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.[146]

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

[145] European Commission, Water Framework Directive – Article 13(5)
[146] European Commission, Water Framework Directive – Article 4(7).

identification of environmental flow requirements and protection measures. The EU WFD Common Implementation Strategy (CIS) has only more recently recognised these elements as important ancillary activities[147,148].

It is now recognised that the flow regime in all rivers plays the primary role in the structure and functioning of aquatic ecosystems [9] 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 major management topic within most river basins[149]. Sustainable management of water resources requires that the focus not be narrowed to ecosystem water needs, but requires resource and resource efficient policies, as well as an assessment and planning of interactions with other resources, especially food and energy security. Measures to strengthen the efficiency of water resources have different impacts, either positive or negative, in other sectors, especially agriculture and hydropower[150].

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 [151] and the EU Flood Risk Management Programme [152], identifying flood risk areas and developing, at the scale of the 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 Floods Directive (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. [153,154]. It is particularly emphasised that a stronger focus on quantity issues is required in national policies of WFD implementation[155].

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[147] European Commission - Guidance document 31 - Ecological flows in the implementation of the Water Framework Directive, Technical Report 2015-086, 2015

[148] European Commission - Guidance document 34 - On the application of water balances for supporting the implementation of the WFD, Technical Report 2015-090, 2015

[149] European Environment Agency, Climate change and water adaptation issues, EEA Technical Report No 2/2007, 2007

[150] European Environment Agency, Towards efficient use of water resources in Europe, EEA Report No 1/2012, 2012

[151] European Commission - Directive 2007/60/EC - on the assessment and management of flood risks – "the Floods Directive"

[152] https://ec.europa.eu/environment/water/flood_risk/flood_risk.htm

[153] European Commission - Addressing the challenge of water scarcity and droughts – COM(2007)414,

[154] European Commission – The Blueprint to Safeguard Europe's Water Resources – COM(2012)673

[155] European Commission - Report on the Review of the European Water Scarcity and Droughts Policy - COM(2012)672

In the absence of a specific Directive or framework for water scarcity management, best international practice [156] 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 drinking water supply or in agriculture.

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 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".

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 the Erzen Basin

9.2.1 Competent Authority and Coordination Measures

The competent authority to develop and implement the water resources strategy is the WRMA. The Register of Abstractions is held centrally by the WRMA 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. Erzen river basin forms part of the Erzen RBCs, with 15 members. RBCs issues authorizations and permits when the activity befalls within the boundaries of a single basin.

WRMA, 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

[156] Global Water Partnership - Guidelines for preparation of the Drought Management Plans - Development and implementation in the context of the EU Water Framework Directive, 2015.

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. WRMA accepts and reviews applications for issuing a permit/authorization for water resource use, which is currently carried out online through the E-albania Portal.

In regional level, Erzen 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 Erzen 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 summarises 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. The Program of Measures should also include mitigating measures or justifications for not achieving or maintaining good status (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
Murdhari (Perroi Zallit)	ERZ2	351611	HMWB	Bad	Flow regime impacted by Murdhari Stream
Murdhari (Perroi Zallit)	ERZ4	351663	Natural	Good	

9.3 Flood Risk Management in the Erzen Basin

9.3.1 Competent Authority and Coordination Measures

The National Water Council (NWC) is the main institutional body responsible for drafting policies and plans for integrated water resource management.

WRMA 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, WRMA:

- 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.

In cooperation with the ministry responsible for civil protection, WRMA contributes to disaster risk assessment and prevention. 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 National Civil Protection Agency (NACP) coordinates and co-ordinates the work to draft the national plan for civil emergencies, which should be coordinated with the flood risk management plans.

9.3.2 Summary of Historic Floods

Albania is ranked as one of the countries with the greatest economic consequences on a global scale, caused by a variety of natural disasters. Its annual average losses account for about 2.5% of Gross Domestic Product (GDP). In addition to exposure to natural hazards, there are several additional risk factors (uncontrolled urbanization, environmental degradation) which, by becoming part of the Albanian transition to an open market economy, are also contributing to the strengthening of the effects of natural disasters.

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 expanded urban constructions in these areas, increasing the risk of flood damage. In Erzen, 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 Shijak city. Some of the most risked areas are located in Erzen, Barometa and Sukth Katund i ri.
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 15 years, and after the 1980s these investments focused mainly on maintaining flood protection infrastructure. For 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.
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.
Referring to Annex XX there are table 9-2 and table 9-3 that 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 Erzen river basin.

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, organizations, administrations and businesses.
WRMA, 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 Ishëm, Erzen, river basins;
- Identified areas where there is a potential risk of floods or floods are likely to occur for Erzen 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 Erzen basin.

Currently, there is no flood management plan for Erzen 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 9-2 summarises 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 Programme of Measures (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[157].

Table 9-2 – Waterbodies Potentially Impacted by Flood Management Operations

WATERBODY NAME	SUB-BASIN	WATERBODY EU CODE	CURRENT FORM	CURRENT STATUS	POTENTIAL IMPACT
Erzen	ERZ1	TW351611	Transitional	Moderate	Very high
Erzen	ERZ1	351613	Natural	Moderate	Very high

[157] The material generated by the ProNews project: Development of flood hazard maps in accordance with EU Floods Directive subsequent IPA Floods Guidelines

9.4 Drought Risk Management in the Erzen 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 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 cubic meters in a year out of which about 65% are generated within Albania and the remaining from upstream neighbouring 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 totalling 5.60 billion cubic meters 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 of Albania. About 97% of the total electricity production is generated from hydropower plants mostly on the 3 rivers. Also agricultural sector 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 Erzen basin will reach most of the current Q95 flow.
The comparison between water extraction and water availability shows that the Erzeni river basin are projected to have severe water shortages in the summer of 2050, even in the most optimistic scenario (CESR, 2011).
Table 9-3 summarises 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 PoMs (Chapter 12).

Table 9-3 – 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 9-4 summarises 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 Chapter 4. Mitigation measures or justification of failure to maintain or achieve good status will have to be provided in the Programme of Measures (Chapter 13).

Durrës Municipality is 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[158].

[158] Integrated Cross-sectoral Plan for the Coast – AKPT http://planifikimi.gov.al/

Table 9-4 – Waterbodies Potentially Impacted by Coastal Management Operations

WATERBODY NAME	SUB-BASIN	WATERBODY EU CODE	CURRENT FORM	CURRENT STATUS	POTENTIAL IMPACT
Erzen	ERZ1	TW351611	Transitional	Moderate	Salinity level and Flood from the coast
Darcit	ERZ0	TW351711	Transitional	Moderate	
Lishatit	ERZ0	TW351721	Transitional	Moderate	
Cape Rodoni	ISH0	CW351402	Coast		
Lales Bay	ERZ1	CW351602	Coast		
Rinia	ERZ1	CW351605	Coast		
Hamallaj	ERZ1	CW351606	Lagoon		
Durres	ERZ0	CW351608	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.159 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;
- 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.

[159] 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'

9.6.2 Main Elements of the Strategic Environmental Assessment

The SEA can be understood as "a systematic and anticipatory process, undertaken to analyse 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 9-5):

- 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 9-5 – 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.	*Law 91/2013*
Scoping and statutory consultation	Scope and level of detail to be considered in the environmental assessment, and list of key stakeholders and coordination measures	*Completed by 01.10.2022*
Environmental assessment report and public 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.	*Completed by 01.11.2022*
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.	*Published on 23.03.2023*

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:

- preparation of an environmental report
- carrying out of consultations
- taking into account of (i) and (ii) in decision making
- 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 River Basin Management Plan 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, WFD Article (5) [160]. '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[161]. 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 Erzen basin.

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 'pressure indicator', derived from WISE 2016 guidance and reproduced in full in Technical Annex IV. [162,163].

[160] European Commission – CIS Guidance Document 3 - Analysis of Pressures and Impacts, EC 2003

[161] European Commission – CIS Guidance 2 – Analysis of Pressures and Impacts

[162] 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.

[163] Water Information System for Europe – WISE GIS Guidance – on the reporting of spatial data to WISE, v 6.0.6, 2016.

Pressure 'types' are the principal forms of anthropogenic influence that may impact on waterbody status: e.g. untreated urban wastewater e.g. 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. BOD_5 load in the receiving watercourse e.g. flow or time reduction required of HPP running time.
The pressure enumeration list codes are shown as part of the Pressures – Status summary (See Technical Annex XI) and should also form part of the attribute list of the Waterbody feature class of the NWRC.

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 waterbody status is already challenging while comparing against provisional standards on the basis of a single analytical sample. Assessment of pressures [164] 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 municipalities 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 quantities of pressure related objects, 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 National Water Resources Cadastre (NWRC), 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.

[164] 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 [165]	TYPE A GENERAL INDICATOR [166]	TYPE B PRECISE INDICATOR [167]
	1	**POINT POLLUTION PRESSURES**	
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 - IED PLANTS	1.3	NO. OF SITES FAILING OBJECTIVES	BOD/NH_4/PS LOAD REDUCTION (t/year)
INDUSTRY – NON IED	1.4	NO. OF SITES FAILING OBJECTIVES	BOD/NH_4/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/NH4/PO_4 LOAD REDUCTION (t/year)
OTHER NOT SPECIFIED	1.9		
	2	**DIFFUSE POLLUTION PRESSURES**	
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_2/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_2 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/NH4/PO_4 LOAD REDUCTION (t/year)
OTHER NOT SPECIFIED	2.10		
	3	**FLOW ABSTRACTION/DIVERSION PRESSURES**	
AGRICULTURE	3.1	NO. OF ABSTRACTION POINTS	VOLUME TO BE REDUCED (Mm^3/year)
PUBLIC WATER SUPPLY	3.2	NO. OF ABSTRACTION POINTS	VOLUME TO BE REDUCED (Mm^3/year)
INDUSTRY + HYDROPOWER	3.3	NO. OF ABSTRACTION POINTS	VOLUME TO BE REDUCED (Mm^3/year)
ENERGY COOLING WATER	3.4	NO. OF ABSTRACTION POINTS	VOLUME TO BE REDUCED (Mm^3/year)
AQUACULTURE FISH FARMS	3.5	NO. OF ABSTRACTION POINTS	VOLUME TO BE REDUCED (Mm^3/year)
RECREATION / OTHER	3.6	NO. OF ABSTRACTION POINTS	VOLUME TO BE REDUCED (Mm^3/year)

[165] Classification based on WISE 2016 GIS Reporting Schema element – *SW Significant Pressure Types; GW Significant Pressure Types*

[166] 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.

[167] Precise Indicators should be interpreted as the quantity reduction required to achieve the environmental objective(s), usually tonnes/year, Mm^3/year, hours/year.

Table 10-2 – Standard Pressure Types and Indicators, Types 4 to 8

SECTORAL PRESSURE	CODE [168]	TYPE A GENERAL INDICATOR	TYPE B PRECISE INDICATOR
	4	**MORPHOLOGICAL PRESSURES**	
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	KM OF STRUCTURES FAILING OBJECTIVES
FLOOD STRUCTURES	4.2.2	KM OF WATERBODY FAILING OBJECTIVES	KM OF STRUCTURES FAILING OBJECTIVES
MUNICIPAL STRUCTURES	4.2.3	KM OF WATERBODY FAILING OBJECTIVES	KM OF 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
	4	**HYDROMORPHOLOGICAL PRESSURES**	
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^2 OF HABITAT LOSS
OTHER MODIFICATIONS	4.5		
	5	**AQUACULTURE & INTRODUCED PRESSURES**	
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
	6	**GROUNDWATER PRESSURES**	
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
	7-8	**MISCELLANEOUS & CHEMICAL PRESSURES**	
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) BOD/NH_4/SP (t/vit)

[168] Classification based on WISE 2016 GIS Reporting Schema element – *SWSignficantPressureTypes; GWSignficantPressureTypes*

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[169]. Identifying the pressure(s) applying to waterbodies, it should 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 WRMA "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 WRMA.

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).

[169] WISE 2016 GIS Reporting Schema element: *<SWSignficantImpactTypes>, <GWSignficantImpactTypes>*

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

Tables in Technical Annex IV summarise the status determination for all surface waterbodies in the Erzen basin. The general procedure has been set out under section 3.3.

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 Erzen 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)[170] .

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[171]. 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:

a. *'**Not at Risk**' (data or professional judgement supports the waterbody is very unlikely to be at risk); Status can only be 1 or 2.*
b. *'**Possibly at Risk**' (data or professional judgement suggests that the WB is borderline I.e. allocate status 2 or 3.*
c. *'**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.*
d. *'**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.*

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.[172]

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[171] WISE GIS Guidance 2016 – Schema: SWB; schema element <*SWEcologicalConfidence*>

[172] European Commission – CIS Guidance Document 20 – Exemptions to the Environmental Objectives

10.5 Surface Water Pressures and Status Main Summary

10.5.1 Overview

Pressures and Status Assessment Tables in Technical Annex IV present one of the central outputs of the RBMP for the Erzen 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.

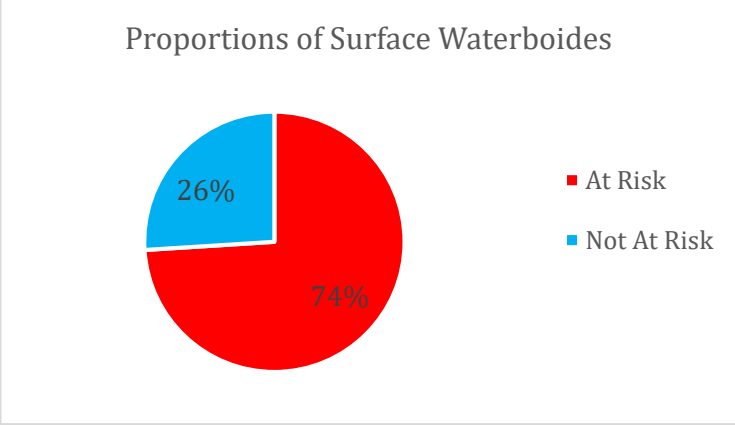
In arriving at the status determination, numerous activities converge. Namely, general drivers outlined in Chapter 4, characterisation and delineation (Chapters 5, 6, 7), monitoring and data outputs (Chapter 8), and potential impacts from associated strategies (Chapter 9).

For simplicity, Pressures and Status Assessment Table for RIVERS, AWBs, HMWBs, TRANSITIONAL (see Technical Annex XI) also 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. 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 Erzen basin, the proportions of waterbodies allocated to varying levels of status are shown in Figure 10-1. 74% 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 83% if the waterbody length is the unit of measurement, with only 17% of waterbody total length being in Good status or above. The total length of River and Transitional waterbodies in the Erzen basin is 289 km.

Figure 10-1 – Percentage of water bodies delineated according to status level[173]



Waterbody status by length should be the preferred unit of measurement, as this reflects more accurately the overall ecological impact arising from pressures.

The bulk of the waterbody status classification is dominated by waterbodies in 'Moderate' status. This arises from the significant lack of data for many waterbodies, where there is insufficient evidence for example to allocate a Bad or Poor status, but where the pressure analysis of Pressures and Status Assessment Table for RIVERS, AWBs, HMWBs, TRANSITIONAL (see Technical Annex IV) suggests that the status is likely to be 'less than Good'. Increased monitoring and assessment of these Moderate status waterbodies will therefore be required in the period 2024-2029 in order to more accurately determine these status allocations.

[173] Proportions of waterbody are based on number (first graph) and by length (km) (second graph).

Pressures and Status Assessment Table for RIVERS, AWBs, HMWBs, TRANSITIONAL (see Technical Annex IV) indicates that there is one waterbody of 'Bad' status determined for the Erzen basin; this is the lower part of the Murdhari Stream downstream of the Murdhari Dam. The Bad status arises from the hydro morphological impacts of the hydropower plants operating on waterbody 351661, whereby the storage dam intercepts all upstream flow which is than diverted to the HPP turbines. The Murdhari Stream is therefore severely depleted of flow over a length of 7.5 km approximately, with significant impacts on the waterbody ecosystem likely.

Waterbody 35165 in the lower part of the basin has been allocated a deficient 'Poor' status partially on the basis of physico-chemical elements, but also due to the presence of significant abstraction pressure for irrigation. It is likely in summer months that river flows and levels are severely depleted downstream, impacting on aquatic habitat, but also increasing physico-chemical concentrations due to reduced dilution capacity.

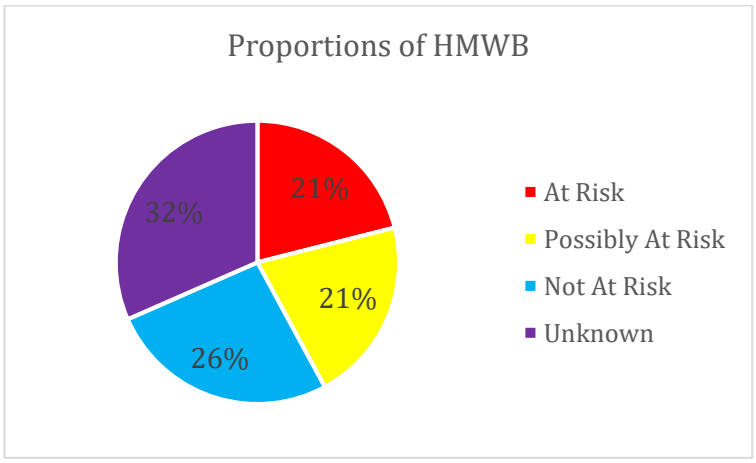
For the category 'Lakes' there are no data available in terms of activities/potential pressures to the water bodies and water quality monitoring. NEA does not monitor lakes. Future monitoring requirements for Lakes and Coastal waters are discussed under 10.7.2.

For Coastal waterbodies interpretation cannot be carried out at this time. Although the NEA takes water quality samples near the shoreline at a 10-metre distance from wastewater outlets in Durrës, and the samples are analysed for physico-chemical parameters, e.g., chemical oxygen demand (COD), BOD_5 and P-Total, these assessments are confined to the sampling zones and cannot be extrapolated to the state of coastal waters – the 12 nautical miles territorial zone.

A main task of the environmental policies and Programme of Measures outlined in Chapter 12 and 13 is to specifically identify targets for status improvement based on the current (2021) determinations. The Programme of Measures should identify clearly defined, objectively verifiable indicators and targets. For example, a target of e.g. reduction of Moderate Status waterbodies from 58% to e.g. 30% and associated increase in Good Status waterbodies from 16% to 25% is a quantifiable target to indicate the performance outcome of the River Basin Management Plan by 2029.

The proportions of waterbodies for Erzen River Basin allocated to varying levels of status are shown in Figure 10-1. There are identified 4 surface waterbodies "At Risk" within Erzen River Basin; these waterbodies appear to have failed environmental objectives (status less than Good) in the 'Rivers, HMWB, Transitional' category; while there are 4 surface waterbodies identified as "Possibly at Risk", 5 waterbodies as "Not at Risk" and 6 surface waterbodies as "Unknown" due to the lack of data.

Figure 10-2 – Proportions of HMWB



Related to 'Lakes' category there no data in terms of activities impacting the water quality and related to water quality monitoring; Lakes are not monitored by NEA.

Lack of data has not allowed the assessment of the lake waterbodies status; therefore, all the waterbodies have been classified under the Risk Level category "Unknown" (Pressures and Status Assessment Table for LAKES, see Technical Annex IV).

For Coastal waterbodies interpretation cannot be carried out at this time. Although the NEA takes water quality samples near the shoreline at a 10-metre distance from wastewater outlets in Durrës, and the samples are analysed for physico-chemical parameters, e.g. chemical oxygen demand (COD),

BOD_5 and P-Total, these assessments are confined to the sampling zones and cannot be extrapolated to the state of coastal waters – the 12 nautical miles territorial zone.
However, taking into consideration the limited data on point and diffuse pressures within the coastal waterbodies area, all the coastal waterbodies within Erzen River Basin are classified under Category "Possibly at Risk" (Pressures and Status Assessment Table for COASTAL, see Technical Annex IV).

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 19 river waterbodies in the basin, 11 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 (**351611, 35163, 35162, 35163, 35164, 351711, 351713, 351715, 351721, 351723, 351725**), 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.
The waterbodies in the southern part of the river basin (the Darci and Lishati rivers, commencement code 3517) drain independently from the Erzen to the coast in the Kavajë region. In some previous legislative assessments and maps this region has been excluded from the Erzen river basin. GIS analysis however confirms that it is more correctly a sub-unit of that basin. There are clear hydro morphological pressures in the upper reaches with several small irrigation reservoirs, and the lower reached are dominated with intensive farming. However, these waterbodies are not routinely sampled and have not been investigated as part of this study, and will require further operational monitoring in the period 2024-2029.
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 also **Error! Reference source not found.**).
River waterbody **351661** – the lower reach of the Perroi I Zallit (aka Murdhari Stream) above the confluence with the main river of the Erzen at Pellumbas – post-2010 this river was completely dammed to provide reservoir storage for two linked offline HPPs located 3 and 7 km downstream of the dam. There appears to have been no provision for environmental flows, and virtually all of the impounded water is diverted via canal and pipeline offline to the HPPs, leaving the Murdhari Stream completely devoid of the majority of its flow as far as the confluence with the Erzen; the dam has also formed a major barrier to migratory species; hence the waterbody has been allocated to 'bad' status (class 5) (significant pressure 3.1, 4.3.1, 4.3.6).
It is also possible that the waterbody upstream of the dam (**351663**) has been severely impacted by this physical obstruction in terms of its hydro-biological elements, but there is no data to support this. Physico-chemically the waterbody appears to be in 'good statuses.
River waterbody **35165** – the reach of the Erzen main river between Pellumbas and Vishaj – this waterbody experiences a range of pressures, including possible hydropeaking from the effects of the Murdhari HPPs upstream and some degree of untreated urban wastewater; however the most significant pressure is likely to arise from the hydro morphological impacts of the numerous gravel workings distributed along the river; the assumed status is currently 'poor' (significant pressure 4.1.4).
River waterbody **351615** - the reach of the Erzen main river between Ndroq and Pjezë – a range of pressures are evident, including untreated urban wastewater and some gravel extraction. The reach also passes through intensive farmland, where some abstraction of groundwater may be present, very likely to be impacting on stream flows. However, the principal pressure is assumed to arise from the

major irrigation offtake and canal system sited on the north bank of the river and extending westwards for at least 10km as far as Pjezë. The canal is served by a major barrage across the river, which also forms a significant migratory barrier.
There is no data available on the timing, magnitude or impact of these irrigation abstractions but it is assumed from the size of the barrage and canal system that abstraction quantities, especially in summer, will be large enough to significantly disrupt the natural flow regime of the river, quite possibly as far as the coast (assumed status 'poor', significant pressures 3.1, 3.1, 4.3.1).
River waterbody **351613** – the final reach of the Erzen before the transitional waterbody to the coast from Pjezë to Jubë, passing through the urbanised areas of Shijak and Sukth i Ri – although this is reported as assumed 'moderate' status, this is because there is no flow or quality element data available. The 2019 rapid reconnaissance survey (See Technical Annex II) indicates relatively low levels of BOD_5 (< 4 mg/l) even downstream of the urbanised areas, suggesting significant levels of dilution from the upstream river basin.
However, it is anecdotally reported that there are likely numerous irrigation abstractions in this reach from both surface water and groundwater. There are seven irrigation reservoirs of significant size on the eastern edges of sub-basin which will have historically intercepted surface water runoff to the main river. It is likely that that the surface water regime is in close relationship with the groundwater regime in this area. It is likely that over-abstraction of groundwater in this region is probably the most single dominant pressure on the surface water regime also (significant pressures 3.1, 4.3.1).

10.5.3 Implications and Requirements for the Surface Water Monitoring Programme

In order to assess the magnitude of the pressure Member States should monitor for those quality elements which are indicative of the pressures to which the delineated water bodies are subjected. 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.

Pressures and Status Assessment Tables in Technical Annex XI identify the assumed key reasons for failure to achieve environmental objectives quality pressures, (including priority substances and river basin specific pollutants), quantity pressures (including abstraction and flow regime), and morphology 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 will be 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 hydro biological 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 Assessment – RIVERS, AWBs, HMWBs, TRANSITIONAL

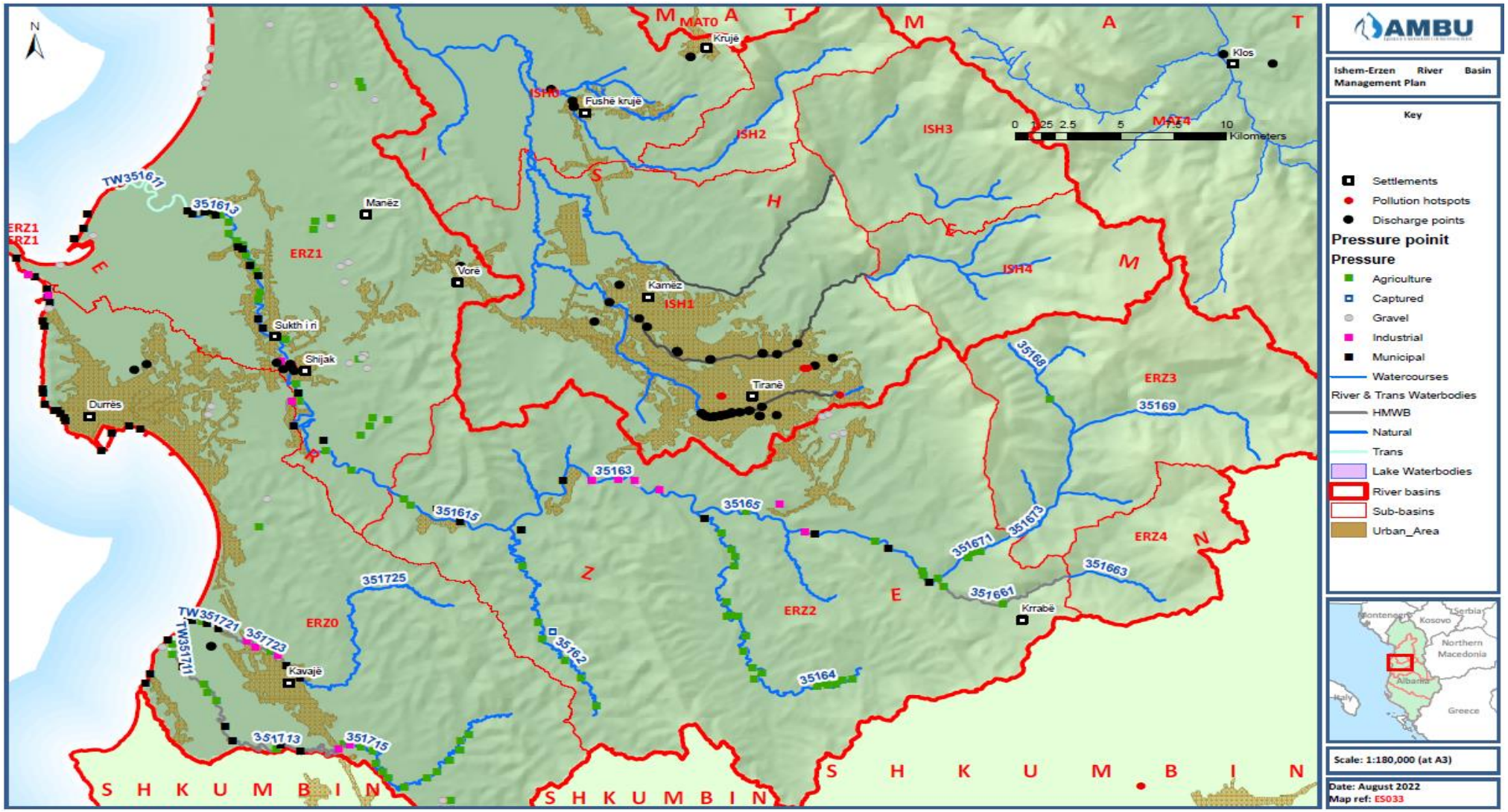
IDENTIFICATION			PRESSURE ANALYSIS [174]								STATUS AND OVERALL STATUS or POTENTIAL						RISK ASSESSMENT	
WATERBODY NAME	WATERBODY EU CODE	FORM	POINT PRESSURE 1	POINT PRESSURE 2	DIFFUSE PRESSURE 1	DIFFUSE PRESSURE 2	ABSTRACTION PRESSURE 1	ABSTRACTION PRESSURE 2	MORPHOLOGY PRESSURE	HYDROLOGY PRESSURE	BQES EQR[175]	P-CHEM [176]	H-MORPH [177]	ANNEX X PSs [178]	ANNEX VIII RBSP	OVERALL STATUS	RISK LEVEL [179]	CL [180]
Erzen	351611	Transitional	1.1	-	2.2	-	-	-	-	-	-	-	2	-	-	3	Possibly	0
Erzen	351613	Natural	1.1; 1.2; 1.4; 1.3	1.6; 1.8	2.2	-	3.1	-	4.5; 5.3	4.3.1; 4.3.6	-	2	2	-	-	3	Possibly	2
Erzen	351615	Natural	1.1; 1.4; 1.3	-	2.2	2.8	3.1	-	4.1.2; 4.1.4; 4.5	4.3.1; 4.3.6	-	2	2	-	-	4	At Risk	1
Peze	35162	Natural	1.1; 1.4	7	2.2	-	3.1	-	4.1.3; 4.5	4.3.6	-	3	2	-	-	3	Possibly	1
Erzen	35163	Natural	1.1; 1.2; 1.4; 1.3	1.6	2.2	2.8; 2.10	-	-	4.2.8-4.1.4	4.3.6; 4.5; 5.3	-	3	2	-	-	3	At Risk	2
	35164	Natural	1.1; 1.3	-	2.2	2.8	-	-	4.2.8; 4.1.4	4.3.6; 5.3	-	3	2	-	-	3	Possibly	1
Erzen	35165	Natural	1.1; 1.4; 1.3	-	2.2	-	-	-	4.1.4; 4.2.8	4.3.6; 4.5; 5.3	-	3	3	-	-	4	At Risk	1
Murdhari	351661	HMWB	-	-	2.2	-	3.3	-	4.2.1	4.3.3; 4.3.2; 5.3	-	1	3	-	-	5	At Risk	1
Murdhari	351663	Natural	-	-	-	2.2	-	-	4.2.1	4.3.6	-	1	1	-	-	2	Not at Risk	1
Erzen	351671	Natural	-	-	2.2	-	3.1	-		4.3.1; 4.3.6	-	2	2	-	-	2	Not at Risk	2
Erzen	351673	Natural	-	-	2.2	2.8	-	-	4.2.1	4.3.6	-	-	1	-	-	2	Not at Risk	1
	35168	Natural	-		2.2	-	-	-		-	-	1	1	-	-	1	Not at Risk	2
Erzen	35169	Natural	-	1.8	2.2	-	-	-	4.2.8	-	-	1	2	-	-	1	Not at Risk	1
Darci	351711	Transitional	1.1	1.8	2.2	-	-	-	-	-	-	-	2	-	-	3	Unknown	0
Darci	351713	HMWB	1.1	-	2.2	-	-	-	-	-	-	-	3	-	-	3	Unknown	0
Darci	351715	Natural		1.3	2.2	-	3.1	-	-	4.5	-	-	2	-	-	3	Unknown	0
Lishati	351721	Transitional	1.1	1.3	2.2	-	-	-	-	-	-	-	4	-	-	3	Unknown	0

[174] Pressure Types align with WISE GIS Reporting Guidance 2016 – Annex 1a
[175] Comment on BQE method
[176] Comment on P-CHEM data
[177] Comment on H-MORPH methodology
[178] Priority Substances if monitored
[179] Enumeration List for Risk = Not at Risk; At Risk; Possibly at Risk; Unknown;
[180] 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.

Lishati	351723	HMWB	1.1; 1.3; 1.4	1.6	2.2	-	-	-	-	-	-	-	3	-	-	3	Unknown	0
Lishati	351725	Natural	-	-	2.2	2.8	3.1	-	-	4.3.1	-	-	2	-	-	3	Unknown	0

Map 10-1 – Final Status Determination for Surface Waterbodies

Map 10-2 – Map of Wastewater Discharge and Diffuse Pollution Pressures



10.6 Groundwater Body Pressures and Status Assessment Overview

10.6.1 Pressures Assessment at Sub-basin Level

The WFD objectives for groundwater 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 show the general and precise pressures on each groundwater body within the constraints of available data. Because there is no compiled inventory of pollution hazards at their origin, the assessment uses the GIS-database compiled by WRMA 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).

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[181] land-use spatial database, and are tabulated in the Groundwater 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^3/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 springs to groundwater bodies in because the point of collection is located just beyond the boundary of the geological unit[182]. 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.

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.

[181] The Corrine database includes information on urban & industrial land, irrigated and non-irrigated land, pastures, forest, grassland, wetlands, and inland and marine waters.

[182] 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.

The Threshold Values adopted for the Erzen Basin RBMP are identical to those derived for the adjacent Ishem Basin and are listed in Table 10-5.

Table 10-5 – Proposed Threshold Values

Parameter	Units	GW Quality Standard	Threshold Values (TV)
Nitrate	mg/L	50	37.5
Pesticides	µg/L	0.1 0.5 (total)	0.075 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. [183] 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.

Therefore, the assessment that follows is based on the conceptualisation of the water bodies, isolated historical data on water quality, and present understanding of pressures. Almost all water bodies are assigned 0 or 1 confidence ratings. The principal limitation is the absence groundwater quality, level or abstraction records from within the last five years, and so it is clearly conceivable that acquisition of new data could warrant downgrading of the statuses assigned.

10.7 Groundwater Pressures and Status Main Summary

10.7.1 Overview

Table 10-6 summarises the principal identified pressures on the Erzen groundwater bodies. Map 10-4 shows the principal pollution and abstraction pressures. Map 10-4 summarises the final status determination of groundwater bodies in the Erzen basin.

[183] WISE GIS Guidance 2016 – Schema: SWB; schema element <*SW Ecological Confidence*>

Groundwater body **35160101** (Sukth) – The 20 historical analyses from 1983 to 2006 indicate that the water quality was almost everywhere good but perhaps a few pockets of anthropogenic pollution. With two exceptions in Sukth, baseline nitrate concentrations were very low. There is great uncertainty about the trends of groundwater levels but, due to the very limited abstraction, are unlikely to fail the water balance test. Based on land-use, there will be pressures from agricultural nitrate and pesticides[184], untreated or inadequately treated sewage, and point sources such as petroleum filling stations. Significant change is not anticipated and so Good quantitative and qualitative statuses are assigned but with very low confidence, and is judged to be Not at Risk of failing objectives in the next planning period.

Groundwater body **35160201** (Kavaje) – There are no water quality, water level or abstraction records from this groundwater body. Where abstractions exist they are likely to be of very low yield and not significantly affect the overall resource. Groundwater levels are expected to lie close to or above stream river levels for much of the year and thus contribute a small amount of base flow. Based on land-use, there will be some pressures from agricultural nitrate and pesticides, untreated or inadequately treated sewage, and point sources such as petroleum storage. It is not anticipated that there will have been significant change at water body level, so Good status is assigned but with very low confidence, and is judged to be Not at Risk of failing objectives in the next planning period.

Three groundwater bodies are formed by karst limestone massifs (35160407/09/11). All are presumed to provide base flow to downgradient streams. All are characterised by an absence of pumped abstractions and so combined with the available water quality monitoring and negligible pollution pressures, both the quantitative and chemical status are assessed to be good. In the absence testing for pesticides, this determination is assigned only a low to medium degree of confidence, and the water bodies are judged to be Not at Risk.

Groundwater body Reporting **Group A: Durres** (35160507/09/11/13/15). The sandstones and conglomerates of the Rrogozhina Formation are considered to hold naturally good quality groundwater. There are a few historical analyses from the Berzez and Shkafane GWB's but none show failures of standards or cause for concern. There is no information on groundwater levels, however, the apparently low level of abstraction should ensure the GWB remains in Good Quantitative status. Based on land-use, there will be some pressures from agricultural nitrate and pesticides, untreated or inadequately treated sewage, and point sources such as petroleum storage. It is judged probable that the GWB is in Good Qualitative status, albeit with a very low level of confidence, and is considered to be not at risk of failing objectives.

Groundwater body GW35140517 (Durres) – As noted above, the Rrogozhina 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. Although not quantified, there is, or at was a probably significant amount of abstraction in the Durres City – Porto Romano area. However, since the large-scale import of water from Fushe-Kuqe commenced, this is likely to have reduced. Nevertheless, at least some private abstractions are likely to continue. The aquifer is likely to be subject to significant pollution pressure at the land surface, although the chances of this reaching the aquifer are much reduced by the intervening confining layers. Historical analyses suggest that localised pollution, perhaps flowing along poorly sealed boreholes, has occurred, and also there is some evidence for saline intrusion in the Porto Romano area. 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 apparently significant groundwater pollution a former lindane (hexachlorocyclohexane or HCH) factory near Durres as reported by Marini et al. (2012)[185]. Therefore, this groundwater body is inferred, but with very low confidence, to be of Good Status but also to be At Risk of failing environmental objectives. Table 10-6 summarises the principal identified pressures on the Erzen groundwater bodies.

[184] Although no

[185] Marini et al. 2012. Marine poll. Bull.; 64(3):472-8)

10.7.2 Implications for the Groundwater Monitoring Network

At present the only existing monitoring is believed to be that of the discharge and quality of the (> 1,000/s) Shenmaria spring that is diverted by UK Tirana. If this monitoring continues and is shared, it will provide adequate monitoring of the important Selitë I Malit (GW35160409) water body. Elsewhere, groundwater monitoring in the Erzen Basin is entirely absent and requires establishment of a network that is proportionate with the importance of groundwater and the pressures operating in the basin.

Considering the present situation and likely logistical constraints, a new comprehensive monitoring network should be established in stages considering the geologically and geographically distinct regions, notably the alluvial, limestone and sandstone-conglomerate aquifers.

In the first stage, AGS should reactivate water quality monitoring at selected operational well that it monitored up to 2006. These results should be compared with historical records and used as the starting point for upgrading (relative to Technical Annex III) conceptual models of each groundwater body, including collaborating with WRMA, ZABU and municipalities to improve characterisation of pressures. Based on this assessment, a network of dedicated monitoring wells (piezometers) should be designed and installed in each of the alluvial and sandstone-conglomerate groundwater bodies. Each piezometer should be equipped with data loggers and telemetry for recording water levels and, in wells close to the coast, EC as an indicator of saline intrusion.

In the karst limestone (Type 4) aquifers, there is no urgency to install monitoring wells. Here, it will be most effective to focus resources on monitoring discharge and water quality at large springs which drain large volumes of aquifer and provide the most practical assessment of their status

The suite of chemical parameters measured needs to be expanded to include heavy metals and synthetic organics chemicals as required by the WFD and GWD. The frequency of such measurements may be adjusted according to the analysis of pressures.

To facilitate the monitoring of groundwater abstraction at municipal, industrial and irrigation wells and springs, WRMA and AGS should work together to require, and verify, abstractions through the conditions of the permitting (licensing) process. Implementation of this process should be prioritised according to the magnitude of abstraction, and larger abstractors should be required to include data loggers and telemetry.

Table 10-6 – Summary of General Pressures Assessment at Groundwater Body– Erzen

ERZEN			QUALITY POINT PRESSURES		QUALITY DIFFUSE PRESSURES				ABSTRACTION PRESSURES	HYDROMORPHOLOGICAL PRESSURES					AQUACULTURE PRESSURES	GROUNDWATER PRESSURES	
Group	GWB name and code		1.1/1.2	1.3/1.4	2.2	2.6	2.8	2.9	3.1	4.1	4.2	4.3	4.5	4.7	5.3	6.1	6.2
-	Sukth	GW35160101	5														Sp 0; dw 25;
-	Kavaje	GW35160201															Sp 0; dw 2;
-	Domje e malit	GW35160407															Sp 7; dw 0;
- -	Selite I Malit	GW35160409															Sp 4; dw 0;
	Pellumbas	GW35160411															Sp 1; dw 1;
A	Berzez-Shkafpane	GW35160507/09															Sp 12; dw 2;
B	Gurre-Zikkularaj–Dorez	GW35160511/ 13/15															Sp 76; dw 27;
-	Durres	GW35160517														<700 l/s	Sp ; dw ;

Notes. (1) Excepting Groundwater pressures, the numbers in each cell correspond to the number of occurrences, of each general category, of a discharge entering a river within the groundwater body. (2) Sp. – springs; DW – dug wells. (3) Pressure types 1.1 and 1.2 are urban wastewater; types 1.3 and 1.4 are industrial; and type 2.2 is from agriculture.

Table 10-7–Status Assessment – Category GROUNDWATER - Erzen

IDENTIFICATION			CHEMICAL STATUS TEST (and Confidence Level)					QUANTITATIVE STATUS TEST (and Confidence Level)				OVERALL STATUS		
Group	GWB NAME(S)	EU CODE(S)	Saline / Other Intrusion	Surface Water	GWDTE	DWPA	General Quality	Saline / Other Intrusion	Surface Water	GWDTE	Water Balance	Status	Confidence	Risk
-	Sukth	GW35160101	G (1)	G (0)	G (0)	G (0)	G (0)	G (0)	G (0)	G (0)	G (0)	Good	1	At risk
-	Kavajë	GW35160201	G (0)	G (0)	G (0)	G (0)	G (0)	G (0)	G (0)	G (0)	G (0)	Good	1	At risk
-	Domje e malit	GW35160407	G (3)	G (1)	G (0)	G (0)	G (0)	G (3)	G (1)	G (1)	G (1)	Good	2	Not at risk
-	Selitë I Malit	GW35160409	G (3)	G (1)	G (2)	G (0)	G (2)	G (3)	G (1)	G (0)	G (1)	Good	2	Not at risk
-	Pellumbas	GW35160411	G (3)	G (1)	G (0)	G (0)	G (1)	G (3)	G (1)	G (0)	G (2)	Good	2	Not at risk
A	Berzez-Shkafpane	GW35160507/09	G (0)	G (3)	G (3)	G (2)	G (2)	G (0)	G (1)	G (1)	G (2)	Good	3	Not at risk
B	Gurre-Zikkularaj–Dorëz	GW35160511/13/15	G (3)	G (3)	G (3)	G (2)	G (2)	G (3)	G (1)	G (1)	G (2)	Good	3	Not at risk
	Durres	GW35160517	G (1)	G (1)	G (1)	G (0)	G (1)	G (0)	G (1)	G (1)	G (0)	Good	1	At risk

Notes:
1. G- Good status, P – Poor status
2. Confidence levels: 0 – no information; 1 -poor; 2 – medium; 3 – good

Table 10-8– Pressures and Status Assessment Summary – Category GROUNDWATER - Erzen

IDENTIFICATION			PRESSURE ANALYSIS [186]						STATUS ASSESSMENT			RISK ASSESSMENT	
GROUP	GROUNDWATER BODY NAME	WATERBODY EU CODE(S)	POINT PRESSURE 1	POINT PRESSURE 2	DIFFUSE PRESSURE 1	DIFFUSE PRESSURE 2	ABSTRACTION / FLOW PRESSURE	GROUNDWATER PRESSURE	QUANTITATIVE	CHEMICAL [187]	OVERALL STATUS	RISK LEVEL	CL
-	Sukth	GW35160101	1.1 / 1.2	2.1/2.2							1		
-	Kavajë	GW35160201	1.1 / 1.2	2.1/2.2							1		
-	Domje e malit	GW35160407									1		
-	Selitë I Malit	GW35160409					3.2	6.2			1		
-	Pellumbas	GW35160411					3.2	6.2			1		
A	Berzez-Shkafpane	GW35160507/09	1.1 / 1.2	2.1							1		
B	Gurre-Zikkularaj–Dorëz	GW35160511/13/15	1.1 / 1.2	2.1									
-	Durres	GW35160517	1.1 / 1.2	1.3/1.4				6.1 / 6.2			1		

[186] Pressure Types align with WISE GIS Reporting Guidance 2016 – Annex 1a.

[187] Indicates basic physico-chemical status of the waterbody as determined principally by level of nitrate, chloride and/or electrical conductivity

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 Erzeni 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 Erzeni RB and can be found in the Annex X.

11.2 The Erzeni basin: a short overview

The Erzeni has a catchment area of 1,370 km2 and flows into the Adriatic Sea between Durres and the Lalzi bay. It is separated by low hills from the Ishëm river basin district. It covers an important part of the urban area of Tirana as well as the town of Durres, so this catchment is densely populated in it´s lower parts and with important economic activities (and accordingly pressures).
Since the Erzeni river basin is socio-economically very interlinked with Ishëm RB (which at a general level holds also from a hydrological perspective), the economic analysis (as found in Annex X) for these in general is conducted 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 Ishëm-Erzeni RBs shows a good congruence between the combined RBs-area (2.191 km^2) and the area of the 7 municipalities falling within the boundaries of these RBs (2.213 km^2). So, the analysis at this level of disaggregation can be considered reliable. Regarding specifically the Erzeni 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 Erzeni RB separately as far as possible, the following 4 municipalities are fully allocated to the Erzeni (based on expert judgement):

- Shijak (100% in the Erzeni);
- Durres (mostly in the Erzeni);

- Kavaje (mostly in the Erzeni);
- Vore (while approx. half of the area of the municipality is in the Ishëm, a majority of the population/urban areas/economic activity is the Erzeni; thus, it is fully "allocated" to the Erzeni RB for the economic analysis).

It needs to be noted here that the analysis based on the Erzeni only has to be considered with caution due to the (above mentioned) difficulty of actually "dividing" the Erzeni from the Ishëm regarding socio-economics/management. The allocation of municipalities as above shows that the municipalities discussed under the Erzeni cover 721 km^2, while the actual area of the Erzeni RB is 1.370 km^2 (for the Ishëm, the 3 municipalities allocated there – Tirana, Kamez, Kruje- cover 1.492 km^2, while the actual size of the Ishëm RB is 721 km^2).

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 Ishëm-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.

Table 11-1 – Historical Population Ishëm-Erzeni RBs (2017-2020)[188]

	% in the RBs	2017	2018	2019	2020
Albania		2.876.591	2.870.324	2.862.427	2.845.955
Ishem-Erzeni RB		**1.147.184**	**1.173.624**	**1.185.286**	**1.196.863**
Prefecture Tiranë	100%	862.361	883.996	895.160	906.166
Prefecture Durrës	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 Ishëm-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

[188] INSTAT

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[189]

Regarding the GDP, the Ishëm-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 Ishëm-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. In Ishëm-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 Ishëm-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 quantity. Therefore, this chapter presents the overall information regarding the structure of agriculture, but also separately the information available regarding irrigation. For the Ishëm-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 Ishëm-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 though 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 Erzeni 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 (7%) is higher than its share of Albania (5%). Regarding the crop types (in 2020), the importance of the Ishëm RB is similar to the one of the whole Ishëm-Erzeni RBs, except it´s higher relative importance for cereals-wheat and barley and it´s low importance for soya (100% of the Ishëm-Erzeni RBs production located in the Ishëm).

Regarding livestock data show that Ishëm-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

[189] 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.

(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 Erzeni RB separately, the importance of livestock as compared to the whole of Albania is confirmed only partly (only for poultry and to a lesser degree for cattle), both regarding number of heads as well as tons/pieces produced. Thus, the main livestock production of the IE-RBs takes place in Ishëm and not in the Erzeni.

Regarding the crucial issue of irrigated agriculture (having significant water management implications), for the whole of Albania, the available information shows that 55% of the agricultural area could theoretically be irrigated, 37% has irrigation infrastructure in place, but the actually irrigated area is only 28% (due mostly to a lack of investments/maintenance of the irrigation infrastructure). The overall water consumption for irrigation is 473,5 Mio m3/year, while information regarding losses from the irrigation infrastructure is not available.

The available information for the I-E RBs shows that approx. 12% of the agricultural areas could and actually are irrigated, a larger percentage than the relative size of the basin (but similar to the percentage of agriculture in general as compared to the whole of the country). So, irrigation is more prominent in I-E as compared to the whole of Albania based on the basin size, but has the same importance for the agriculture in the basin as for the whole of Albania. The water volume used for irrigation amounts to 52,5 Mio m3/year.

Yet, the numbers from the official AMBU database show that out of the 8 permits of the whole of the country for "irrigation water use", only two of them are in the I-E RBs; the quantity unit is hectares irrigated (so, no metering etc. required), and the permit is for just 1,2 hectares. Obviously, almost all irrigation water use in Albania (and the I-E) does not have the required water use permit.

Regarding irrigation and the Erzeni RB separately, the analysis for the Ishëm-Erzeni RBs overall holds also here (6% of the agricultural areas could and actually are irrigated, a larger percentage than the relative size of the basin (5%)). The water volume used for irrigation amounts to 25,3 Mio m^3/year, which is 6% of the overall water used for irrigation in Albania.

Table 11-2 – Irrigation: potential and actual irrigated areas, Ishëm-Erzeni RBs & Erzeni RB, 2020

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Agriculture	RB	Total land area for agriculture	Potential - area that could be irrigated	Actual - area with irrigation infrastructure	Irrigated area
Albania		657.481	357.245	244.950	181.704
Ishem-Erzeni RB		78.110	42.681	27.435	20.991
Erzeni RB		41.710	22.997	14.583	10.135
Prefecture Tiranë					
Municipality of Tiranë	*Ishem*	*20.638*	*11.841*	*9.726*	8.572
Municipality of Vorë	*Erzeni*	*4.858*	*2.438*	*1.852*	1.061
Municipality of Kamëz	*Ishem*	*589*	*380*	*331*	392
Municipality of Kavajë	*Erzeni*	*11.540*	*6.026*	*3.276*	3.334
Prefecture Durrës					
Municipality of Durrës	*Erzeni*	*18.028*	*11.235*	*6.883*	4.175
Municipality of Krujë	*Ishem*	*15.174*	*7.463*	*2.795*	1.892
Municipality of Shijak	*Erzeni*	*7.284*	*3.298*	*2.572*	1.565
IE % as compared to Albania		12%	12%	11%	12%
Erzeni % as compared to Albania		6%	6%	6%	6%
Erzeni % as compared to IE		53%	54%	53%	48%

11.3.2.2 Industry

For the Ishëm-Erzeni RBs and based on the water use permit database[190] 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^3/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 Erzeni RB, this number seems low; yet there is no other source in order to cross-check this information. Regarding discharge, only one permit issued in the Erzeni RB. Regarding information on the public water supply for industry/enterprises as well as discharge into the public sewer systems, this information is included below in this chapter.

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 Ishëm-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 the achievement of good ecological status of water bodies) as compared to the situation in other RBs.

2 hydropower plants are situated in the Erzeni RB. These represent approx. 1/4 of the hydropower production as compared to the Ishëm-Erzeni RBs; the assessment that hydropower is not so significant as compared to the whole of Albania holds also for the Erzeni RB (while the RB represents 5% of the size of Albania, hydropower production here is 0,65 to 1,02% as compared to the whole country).

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 Ishëm-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 Ishëm-Erzeni RBs).

For Erzeni 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 Ishëm-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". Based on an AMBU field report from July 2021 34 gravel extraction sites/companies in Ishëm-Erzeni RBs exist that are not permitted. Of these, 14 are located in the Erzeni RB.

[190] AMBU register of water users

11.3.2.6 Tourism

Unfortunately, no disaggregated data are available for tourism, for Ishëm-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 Ishëm-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).

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 Ishëm-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 Ishëm-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.)

11.3.2.9 Main gaps regarding the characteristics and economic importance of water uses

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 hight 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 and cost recovery[191]

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 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 Erzeni RB as compared to the economic analysis done for the combined Ishëm-Erzeni RBs (Annex X). This is based on the full allocation of 4 municipalities (Shijak, Durres, Kavaje, Vore) and corresponding 3 water utilities (Durres, Kavaje, Vore) to the Erzeni 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 Ishëm-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 ERRU.

11.4.1.1 Population and Public Water Supply coverage

6 water utilities are considered in the Ishëm-Erzeni RBs, which cover 7 municipality areas (Durres UK serving both the Durres and Shjiak 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[192]), due to the above-average urban setting as compared to the whole of Albania.

Regarding the Erzeni RB, the 3 water service companies considered (Durres, Kavaje, Vore, covering 4 municipalities) are larger as compared to the whole of Albania (5% of utilities covering 13% of the serviced population), yet the difference is not as big as for the combined I-E RBs (mainly due the Tirana utility being allocated to the Ishëm RB).

Regarding the changes of connection rates in the recent 3 years, there are rather small changes to be observed, both for the Ishëm-Erzeni RBs and also for the whole of Albania. This indicates that the focus

[191] Data available through ERRU Reports.

[192] Note: the overall population within the jurisdictional area used by the municipalities (and also ERRU 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.

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 Ishëm-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 Ishëm-Erzeni RBs (33%). For the Erzeni RB, the number is only 23%. In addition, a significant amount of water is billed without metering. 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 Ishëm-Erzeni RBs and Erzeni RB, 2020

Water Service Companies	Volume of water produced	*Out of which Metered*	Volume of water billed	*Out of which Metered*	Water Losses in %
Albania	**309.887.138**	*177.452.816*	**107.097.811**	*80.799.421*	65%
Ishem-Erzeni RB	**153.940.589**	*121.419.917*	**51.153.082**	*43.682.060*	67%
Erzeni RB	**50.533.549**	*48.805.549*	**11.625.802**	*9.736.662*	77%
Prefecture Tiranë					
Tiranë UK (Ishem)	93.218.337	*62.425.665*	35.941.521	*31.337.081*	61%
Vorë UK (Erzeni)	1.814.000	*86.000*	614.000	*344.000*	66%
Kamëz UK (Ishem)	7.682.400	*7.682.400*	2.777.830	*2.014.030*	64%
Kavajë UK (Erzeni)	6.073.000	*6.073.000*	2.283.000	*1.569.500*	62%
Prefecture Durrës					
Durrës UK (Erzeni)	42.646.549	*42.646.549*	8.728.802	*7.823.162*	80%
Krujë UK (Ishem)	2.506.303	*2.506.303*	807.929	*594.287*	68%
IE % as compared to Albania	50%	68%	48%	54%	
Erzeni % as compared to Albania	16%	28%	11%	12%	
Erzeni % as compared to IE	33%	40%	23%	22%	

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 Ishëm-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 Erzeni RB, one utility has no drinking water abstraction permit (Vore), while the other 2 have part of their abstraction points included in permits (Kavaje, Durres).

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 Erzeni River basin there are 3 operational WWTP (two in Durres and one in Kavaje). Beyond these, all sewer pipes discharge directly into the closest water body without treatment. Regarding wastewater volumes discharged into the environment through the public utilities, only very limited information can be found in the AMBU-permit database.

For Ishëm-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 Erzeni RB, for the Kavaje utility, no fixed 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 Ishëm-Erzeni RBs this rate ranges between 70% (for Kavaje) and 21%.

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 Billon 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 5% (with only 2 utilities - one of them in the I-E RBs/the Ishëm RB, that is Tirana - covering their total costs.

At the level of the Ishëm-Erzeni RBs and Erzeni RB (Table 11-4), the total cost recovery rate is considerably higher than for the whole of Albania with 95% for the I-E and 78% for the Erzeni (as compared to 75%). Here again and for the I-E RBs, 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% (again due to the influence of Tirana (150%), while for and the Erzeni this rate is lower than the average of Albania with 90%.

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 as well as for the Erzeni. 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 as well as for the Ezeni), 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 Erzeni 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, Ishëm-Erzeni RBs & Erzeni RB, 2020

					in '000 ALL		in %
Water Service Companies	Revenues from the activity	Total Costs	Total Direct Operational & Maintenance	Subsidies	Financial Result 2020	Cost Recovery of Total Costs	Cost Recovery of Direct Operational & Maintenance Costs
Albania	**9.850.414**	**13.149.117**	**9.542.489**	**720.000**	**-3.298.699**	**75%**	**103%**
Ishem-Erzeni RB	5.877.491	6.180.050	4.758.199	78.689	-302.559	**95%**	124%
Erzeni RB	1.531.524	1.971.264	1.702.847	57.218	-439.740	**78%**	90%
Prefecture Tiranë							
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%*
Prefecture Durrës							
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%		
Erzeni % as compared to Albania	16%	15%	18%	8%	13%		
Erzeni % as compared to IE	26%	32%	36%	73%	145%		

11.4.3.2 Current financial cost recovery levels of public water supply and sewage collection/treatment

For the Ishëm-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 11-5). For the Erzeni RB, cost recovery rates for sewage disposal are at 139%.

Looking at the utility level at the Ishëm-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 Erzeni, the range is from 29% for Kavaje to 81% in Vore). For sewage disposal, the range for I-E 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). For the Erzeni RB, the range is from 111% for Kavaje to 457% for Vore. Also here, Vore does not allocate any "other costs" to sewage disposal, leading to this high cost recovery rate.

Regarding wastewater treatment, in the Erzeni the total cost recovery rate ranges from just 1% in Kavaje to 281% in Durres.

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, Ishëm-Erzeni RBs & Erzeni RB, 2020

									in '000 ALL	in %	in %	in %
Water Service Companies	REVENUES Water	REVENUES Sewerage	REVENUES Wastewater TP	Direct COSTS Water	Direct COSTS Sewerage	Direct COSTS Wastewater TP	Other COSTS Water	Other COSTS Sewerage	Other COSTS Wastewater TP	Total Cost Recovery Rate Water	Total Cost Recovery Rate Sewerage	Total Cost Recovery Rate Wastewater TP
Albania	**8.390.079**	**1.233.044**	**227.290**	**8.729.978**	**682.456**	**130.056**	**2.832.484**	**601.403**	**172.741**	**73%**	**96%**	**75%**
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%
Erzeni RB	1.044.173	260.060	227.290	1.492.189	143.172	67.485	184.670	44.152	39.596	62%	139%	212%
Prefecture Tiranë												
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%*
Prefecture Durrës												
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%			
Erzeni % as compared to Albania	12%	21%	100%	17%	21%	52%	7%	7%	23%			
Erzeni % as compared to IE	21%	36%	100%	34%	57%	100%	15%	30%	100%			

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, measing 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.

11.4.4 Main gaps regarding water services and cost recovery

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 Ishëm-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 is 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[193] 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.

11.5.1 Main gaps regarding the baseline scenario

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.).

[193] 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

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.

12 Environmental Policies at River Basin Level

12.1 Environmental Policies for Waterbodies – Erzen

This Chapter summarises the broad policy and strategic approach within the 2022-2027 RBMP envisaged by the WRMA (the competent authority) to meet the environmental objectives 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 Programme of Measures (PoM, 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 Water Framework Directive (WFD Preamble (26) that where good water status exists it should be maintained, and consequently this broad objective logically falls outside the Programme of Measures.

The purpose of this Chapter therefore is to set out in broad terms the policy and/or strategic approach that will be implemented by the competent authority (WRMA) 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 environmental quality standards (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 Programme of Measures, 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 WRMA 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 WRMA 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.

12.1.2 Policy or Strategic Interventions for Adequate Surface Water Quantity Monitoring

A reliable and continuous river flow hydrometric network has not existed in the Erzen 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 IGEWE (Institute of GeoSciences, Energy, Water and Environment - 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. [194] The

[194] 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.

majority of international standard flow measuring stations for routine surveillance of river flows has collapsed in the Erzen 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 physico-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

Whilst WRMA is not the competent authority in this matter, there is an urgent strategic requirement to coordinate with IGEWE and to explain to Government at high level the very serious long-term consequences of a failure of the national flow monitoring network.
It is a strategic proposal by WRMA that at least two flow monitoring stations in the Erzen river basin should be rehabilitated in the period 2024-2029, such that these stations provide long-term timely and reliable data to all relevant stakeholders.
The latest EC 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 NSIWRM 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 NSIWRM, WRMA *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 WRMA*, this assistance will benefit other institutions such as NEA, IGEWE, 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)
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, hydrometric).
1.3c: Number of notifications and enforcement actions reported, on a yearly basis (NEA, AGS, and IPH)

12.1.3 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.

12.1.4 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.

12.1.5 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).

12.1.6 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. WRMA 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, WRMA 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 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, WRMA 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.

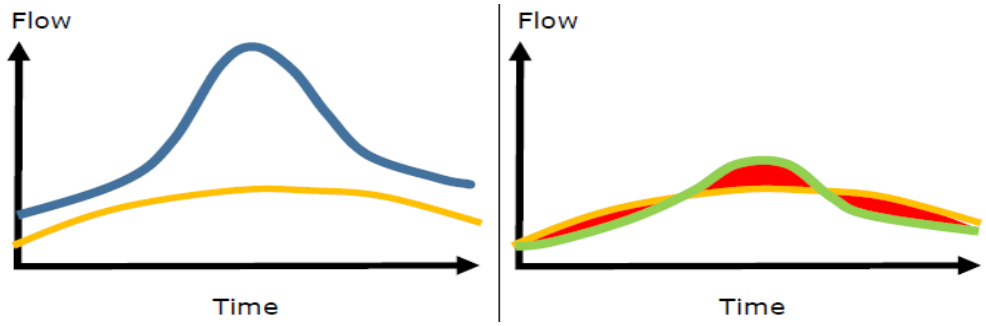
12.1.8 Policy or Strategic Interventions for Environmental Flow Compliance

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.

12.1.9 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 WRMA (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.

12.1.10 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 "On the administration of the quality of washing water" (DCM no. 797, dated 29.9.2010). 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 discharge into the environment, specific rules of their environmental treatment, as well as the obligations of entities that discharge wastewater, 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.

12.1.11 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 WRMA 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 WRMA. 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.

12.1.12 Policy or Strategic Interventions for Nutrient Discharge and Diffuse Pollution 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.

12.1.13 Policy or Strategic Interventions for River 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 2024-2029

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
MUNICIPAL WATER SUPPLY SURFACE WATER	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
MUNICIPAL WATER SUPPLY GROUNDWATER	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
MUNICIPAL WASTEWATER	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

INDUSTRIAL WATER SUPPLY SURFACE WATER	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	Yes (21) DCM no.550,dt 15.07.2020 Law on EIA 128/2020
INDUSTRIAL WATER SUPPLY GROUNDWATER	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
INDUSTRIAL WASTEWATER	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
AGRICULTURE SURFACE WATER	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)
AGRICULTURE GROUNDWATER	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)

HYDROPOWER SURFACE WATER	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
MINING OPERATIONS SURFACE WATER	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
FLOOD RISK MANAGEMENT	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
DROUGHT RISK MANAGEMENT	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
TRANSBOUNDARY AGREEMENTS	n/a	n/a	n/a DCM Tariffs	n/a	n/a	n/a	n/a	n/a	n/a

13 The Programme of Measures for the Erzen Basin

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 Erzen 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 formerly 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 Environmental Objectives (EO) for the Erzen 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 EO 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 Erzen basin comprises 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 PoMs 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.[195] 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. [196]

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

[195] 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 "*NewKeyTypeMeasure*". In Table 13-1 KTM is an Albania specific measure.

[196] European Commission, WISE Reporting Guidance 2016, Chapter 10. Schema "RBMP PoMs"

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.

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 PKSU[197]	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 (e.g. establishing fish passes, demolishing old dams).	*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.*	
		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 (e.g. 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 Erzeni river.	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

[197] These are the measures proposed by Albanian National Sectoral Water Program. http://WRMA.gov.al/public/PROGRAMI%20KOMB%C3%8BTAR%20SEKTORIAL%20I%20UJIT%202018-2030.pdf

KTM	KTM DESCRIPTION	PROGRAM OF PROPOSED MEASURES BASED ON PKSU[197]	SOFT/HARD MEASURE
		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
		2.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	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.	1. Industry regulations	Soft
		2. 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 Erzen river.	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
24	Adaptation to climate change.	1. Apply nature base solutions for climate change resiliance	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

KTM	KTM DESCRIPTION	PROGRAM OF PROPOSED MEASURES BASED ON PKSU[197]	SOFT/HARD MEASURE
26	Control of excessive abstraction quantities through Water Permit conditions and enforcement	1. Registration and permitting of all abstractions	Soft
		2. Time-limited permits to include efficiency and resource available criteria	Soft
27	Controlling the Environmental impact of activities allowed nearby the river flow (raw intake, oil deposits controlling)	Reducing the environmental impacts of each activity	Soft
28	Create riparian buffers on urban areas or nearby the city	These fringes of grass, shrubs, and trees planted along stream banks are one of the best ways to protect a water source. Buffers improve water quality by filtering sediment and pollutants from soil runoff and providing shade to keep water cool. They combat erosion by stabilizing banks and regulating stream flow, and they offer habitats to many plant and wildlife species	Hard

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. [198]

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) repealed by the EU Directive (98/83/EC).
- 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)
- Groundwater Directive (2006/118/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 Key Type of Measure, 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
- 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 appropriate, such as:

[198] European Commission – Directive 2000/60/EC – Annex VI

- 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

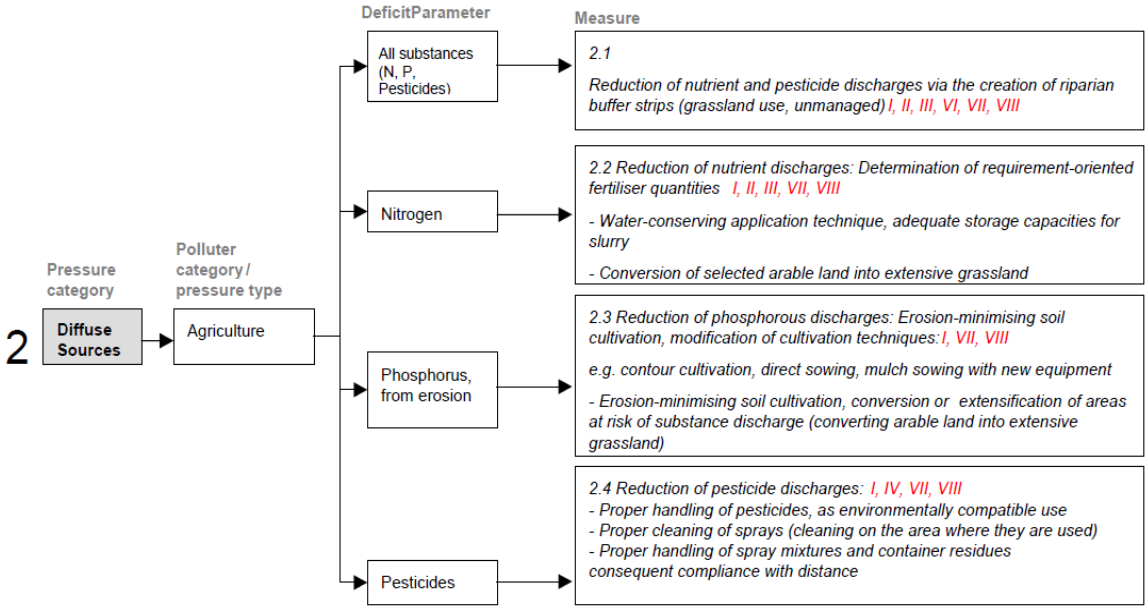
The new RBMP framework approach in Albania adopts good practice in terms of following a well-defined 'pathway process' in reaching appropriate measures for given pressures. [199] Evidently, all waterbodies are to some extent unique, with specific and complex combinations of characteristics, location 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.

[199] 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.

Figure 13-1 – Example Measures Pathway for Pressure Category "Diffuse Sources"



Source: 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 [200]:

- 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 is being achieved. WRMA, 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. [201] 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.

[200] European Commission Water Framework Directive 2000/60/EC – Article 11(5)

[201] European Commission, WISE Reporting Guidance 2016, Chapter 10. Schema "RBMPPoM", Schema element: *MeasureCode*

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. [202] 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 (Annex 3) and this reporting model is broadly followed in the Albania RBMP reporting procedures. A definitive list of Key Types of Measures and Measure 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[203]) 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 legislation, 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_5, annual volume of water taken by sector % 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.

[202] European Environment Agency - Digest of EEA indicators 2014 – Technical Report 8/2014.

[203] 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[204]

Key Type Of Measure	Code	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
Hydro morphological 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 (Cadastre)	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

[204] Classification based on WISE 2016 GIS Reporting Schema element – *Key Type Measure*

13.8 Finalised Templates for Measures Reporting

As summarised under Standard Template for Measures Reporting Tables (see Technical Annex XI), reporting of measures in the Erzen 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, 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 Technical 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 Standard Template for Measures Reporting Tables (see Technical Annex XI), 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 (MS) should report one high level standard 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), 67 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_5 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 Key Type of Measure (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 2023.

For example, as set out in Table 13-4, 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_5 < 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 either 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 (CAs) *b)* different pressures. Although two CA 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 Technical Annex XI, Standard Template for Measures Reporting Tables) aligns 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 measure addressing a single pressure influencing multiple contiguous waterbodies
- Multiple specific measures applied to multiple pressures influencing a 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)	EXAMPLE INDICATORS FOR MEASURE(S)
GENERAL MEASURES **Applies at basin or sub-basin level or multiple waterbodies** **CODE SYSTEM** BM or SM + Basin ID + Sequential Number e.g. BM-3514-01	EU Directives as relevant, especially: • The Management of Bathing Water Quality (2006/7/EC) • Drinking Water Directive(EU) (2020/2184) • Urban Waste Water Treatment Directive (91/271/EEC) • Nitrates Directive (91/676/EEC) • Habitats Directive (92/43/EEC) • Integrated Pollution Prevention Control Directive (96/61/EC) • Plant Protection Products Directive (91/414/EEC)	• Charges/financial incentives • Cooperation arrangements • Advisory approaches • Statutory instruments • Measures do not take account of time-pressure or seasonality	• Number of wastewater outfalls without treatment • Annual tonnage of NPK applied • Number of waterbodies with morphological discontinuity • Annual pesticide load above EQS • Number of hydropower plants • Groundwater abstraction volume	• Population equivalent to be treated by WWTPs • Total number of new/retrospective Permits • Agricultural area subject to NPK restrictions • Reduction % in sectoral water abstraction or consumption • Basin Water Exploitation Index • Basin Environmental Flow Index
SPECIFIC MEASURES **Applies at single waterbody level OR contiguous waterbodies** **CODE SYSTEM** BM or SM + Waterbody ID + Sequential Number e.g. SM-GW35140409-01	EU Directives as relevant, especially: • The Management of Bathing Water Quality (2006/7/EC) • Drinking Water Directive (EU) (2020/2184) • Urban Waste Water Treatment Directive (91/271/EEC) • Nitrates Directive (91/676/EEC) • Habitats Directive (92/43/EEC) • Integrated Pollution Prevention Control Directive (96/61/EC) • Plant Protection Products Directive (91/414/EEC)	• Permit conditions take account of waterbody specific requirements e.g. emission limit values (ELVs), environmental flow, protected areas, groundwater dependent ecosystems, abstraction points etc. • Measures will take account of time-pressure or seasonality	• Status of individual elements for waterbody status - Biological quality elements - Physico-chemical elements - Hydro morphological elements - Annex X Priority substances - Annex VIII RBSPs • Length of depleted reach • % time disruption to waterbody • % flow disruption to waterbody • Groundwater observed level	• Waterbody Ecological Quality ratio • Waterbody Environmental Flow Index • Seasonal BOD load g/m^3 • Seasonal RBSP load g/m^3 • Operator Permit issued with seasonal constraints (time/flow) • Industrial installations with on-site treatment

Table 13-4 - Standard Template for Summary Pressures & Measures Reporting – River Basin Level

Basin code	WB category	Significant pressures	Pressure Indicator	Pressure MS Indicator Baseline 2023[205] [206]	Pressures National indicator Baseline 2023[207]	Applicable KTM	KTM indicator	Indicator value Baseline 2023[208]	Indicator value Target 2029[209]
3516	SW	Type 1 – Point pollution (urban wastewater)	*Length of waterbodies affected (km)*	55%	50 km	KTM 1	*Population requiring WWTPs (p.e.)*	365,000	498,895
	GW	Type 1 – Point pollution (urban wastewater)	*Area of GWBs with average nitrate concentration above Threshold Value (km²)*	55%	55%	KTM 1	*Population requiring WWTPs (p.e.)*	365,000	498,895
	GW	Type 1.5 – Contaminated industrial sites	*Number of Sites potentially requiring remediation (N)*	No.	No.	KTM 4	*Repair sites (N)*	6	0
	SW/GW	Type 1.6 – Solid waste disposal sites	*Number of sites potentially requiring repair (N)*	3	3	KTM 21	*Number of unsanitary landfills to be closed (N)*	3	3
	GW	Type 1 & 2 – Point and diffuse pollution	*Public Water Supply wells without defined protection zones (N)*	55%	No.	KTM 13	*Number of protection zones requiring definition (N)*		

[205]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 a % of the total length of the water bodies in the river basin) OR as a % of the total area of underground water bodies in the case of UNs. Where

[206]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

[207]The national indicator is expressed as an absolute value to indicate the degree or amount of pressure specific to the river basin

[208]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

[209]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 pressures	Pressure Indicator	Pressure MS Indicator Baseline 2023[205] [206]	Pressures National indicator Baseline 2023[207]	Applicable KTM	KTM indicator	Indicator value Baseline 2023[208]	Indicator value Target 2029[209]
	SW/GW	Type 2 – Diffuse pollution (agriculture)	*Length of waterbodies affected (km)*	80%	80%	KTM 2	*Length of waterbodies targeted (km)*		
	GW	Type 2 – Diffuse pollution (agriculture)	*GWB areas with average nitrate concentration above Threshold Value (km²)*	%	%	KTM 2 & 3	*Area of groundwater bodies requiring reduction of NO3-N below Threshold Value (km²)*		
	SW	Type 3.1 – Abstraction or diversion due to agriculture	*Volume of water being over-abstracted beyond efficient use (Mm³/year)*	N/A	Mm³	KTM 8 & 26	*Reduction in water abstraction required to achieve objectives (Mm³ OR %)*		
	SW	Type 3.2 – Abstraction or diversion due to public water supply	*Volume of water being over-abstracted beyond efficient use (Mm³/year)*		Mm³	KTM 8 & 26	*Reduction in water abstraction required to achieve objectives (Mm³ OR %)*		
	SW	Type 3.5 – Abstraction or diversion due to hydropower	*Volume of water being over-abstracted beyond efficient use (Mm³/year)*	Mm³/year	Mm³/year	KTM 8 & 26	*Reduction in water abstraction required to achieve objectives (Mm³ OR %)*	XX Mm³	XXMm³
	SW	Type 4.1 – Channel morphology	*Length or number of water bodies affected by the physical alternation of the channel (km)*	35%	87 km	KTM 6	*Length or number of waterbodies requiring remediation (km)*		
	SW	Type 4.2 – Dams & Barriers	*Number of structures disrupting the*	No.	No.	KTM 5	*Number of structures to be improved (N)*	16	10

Basin code	WB category	Significant pressures	Pressure Indicator	Pressure MS Indicator Baseline 2023[205] [206]	Pressures National indicator Baseline 2023[207]	Applicable KTM	KTM indicator	Indicator value Baseline 2023[208]	Indicator value Target 2029[209]
			river continuity (N)						
	SW	Type 4.3 – Hydrological Change	*Length of water bodies affected by the disrupted flow regime (%)*	25%	64 km	KTM 7 & 8	*Length or number of waterbodies where environmental flow regime should be re-established (km)*	64 km	
	SW/GW	Type 5.3 – Urban solid waste fly-tipping	*Number of sites failing objectives (N)*	No.	No.	KTM 21	*Number of waterbodies requiring remediation (N)*	5	5
	GW	Type 6.1 – Groundwater recharge (runoff / infiltration)	*New urban development preventing GW recharge (km²)*	%	%	KTM 27	*New developments or areas required to incorporate sustainable drainage or recharge activities (km²)*		
	GW	Type 6.2 – Groundwater abstraction	*Area of GWs being over-abstracted (km²)*	%	%	KTM 14 & 26	*Number of groundwater abstractions requiring Permits (N)*		

13.9 Summary of Surfacewater Bodies at Risk of Failing Environmental Objectives

Based on the characterisation and assessment of water bodies as analysed in Chapter 10 "Water Body Pressures, Status and Impact Assessment", 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 Failing Environmental Objectives

Based on the characterisation and assessment of water bodies as analysed in Chapter 10 "Water Body Pressures, Status and Impact Assessment", the summary of all waterbodies considered to be at risk of failing the specified environmental objectives is presented in Table 13-6. Three groundwater bodies are designated to be at risk of failure. The primary, but not necessarily greatest reason, for these designations is lack of information.

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. 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 WATERBODY GROUP	NAME	FORM	OVERALL STATUS	FAILURE OF QUALITY?	FAILURE OF QUANTITY?	FAILURE OF MORPHOLOGY?	ANY MEASURES PROPOSED?	BASIC INSTRUMENTS	SUPPLEMENTARY INSTRUMENTS
351615	Erzen	Natural	4	Possibly	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
35165	Erzen	Natural	4	Possibly	Possibly	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
351661	Murdhari	HMWB	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
351663	Murdhari	Natural	2	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
351613	Erzen	Natural	3	Yes	Yes	Yes	Yes	EU 2000/60/EC Environmental Impact Assessment Directive (85/337/EEC) Habitats Directive (92/43/EEC) 91/271/EEC (Urban Waste Water Treatment Directive)	Law 111/2012 Law no.10431/2011

Table 13-6 – Summary of Groundwater Bodies at Risk of Failing Environmental Objectives

GROUNDWATER BODY	NAME	AQUIFER TYPE	OVERALL STATUS	FAILURE OF QUALITY?	FAILURE OF RECHARGE?	FAILURE OF ABSTRACTION?	ANY MEASURES PROPOSED?	BASIC INSTRUMENTS	SUPPLEMENTARY INSTRUMENTS
Sukth	GW35160101	T5	G (1)	Yes	No	Yes	Yes	EU 2000/60/EC EU 2006/118/EC	Law 111/2012
Kavajë	GW35160201	T5	G ()	Yes	No	Yes	Yes	EU 2000/60/EC EU 2006/118/EC	Law 111/2012
Durres	GW35160517	T5 confined (Horizon-2)	G (1)	Yes	No	Yes	Yes	EU 2000/60/EC EU 2006/118/EC	Law 111/2012

Notes:

1. G – Good; P – Poor
2. Confidence levels: 0 – no information; 1 – poor; 2 – medium; 3 -good

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 until the end of the first cycle of applicability of this plan. 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, they have been identified which fail to meet the environmental objectives. 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 Key Types of Measure. 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.

Measure Tables for Waterbodies (see Technical Annex XI) will be listed concrete examples of how measures have been selected for the 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 Waterbodies 351661; 351663, 35165

Waterbodies **351661, 351663 and 35165**– the middle and the lower reaches of the Murdhari River. Consequently, the environmental flow regime of this river possibly as far, 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).

The Bad status arises from the hydro morphological impacts of the hydropower plants operating on waterbody 351661, whereby the storage dam intercepts all upstream flow which is than diverted to

the HPP turbines. The Murdhari Stream is therefore severely depleted of flow over a length of 7.5 km approximately, with significant impacts on the waterbody ecosystem likely.
It is likely that to restore the correct flow regime, a quota of water will have to be released from Murdhari Reservoir. A combination of insufficient flow regime together with high levels of reported BOD_5 due to untreated urban wastewater and various other pressures place this waterbody in 'bad status'.
The most relevant Key Types of Measures (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 gravel 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 take gravel in 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.

13.11.2 Waterbodies 35165; 351615; 351613

Waterbodies **35165, 351615** and **351613** in the city centre. Although natural in form, untreated urban wastewater is creating excessive levels of BOD_5 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 wastewater treatment plants (WWTPs) (a Basic Measure under EU Urban Waste Water Treatment Directive (91/271/EEC), Key Type Measure number 1).
Waterbody 35165 in the lower part of the basin has been allocated a deficient 'Poor' status partially on the basis of physic-chemical elements, but also due to the presence of significant abstraction pressure for irrigation. It is likely in summer months that river flows and levels are severely depleted downstream, impacting on aquatic habitat, but also increasing physic-chemical concentrations due to reduced dilution capacity.
To reduce the amount of organic pollution from urban wastewater downstream of the Erzen River, it is proposed to build an urban wastewater treatment plant for the area of 3 villages (including the tourist area where there is a hotel, one of the identified pressures). Construction of WWTP on Municipality of Durres, for provision of local WWTPs at 3 villages (p.e. 12,550), treated flow to achieve ELV < 25 mg/l BOD by 2029 in the water body 351615.
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. Single Measure for Waterbody Group Table (see Technical Annex XI) is the summary of all measures for these waterbodies.

13.12 Definitions and Reporting of Costs and Sources of Funding

13.12.1 Overview of Costs

Table 13-11 (Refer to Annex XI) 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 period within the year 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 Table 13-11 different potential costs attributable to different agencies or operators should be itemised on separate rows in a single Table.

The layout of Table 13-11 (showing both costs and funds)

In compliance with recommended good practice[210], 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 13-11 for surface water.

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.

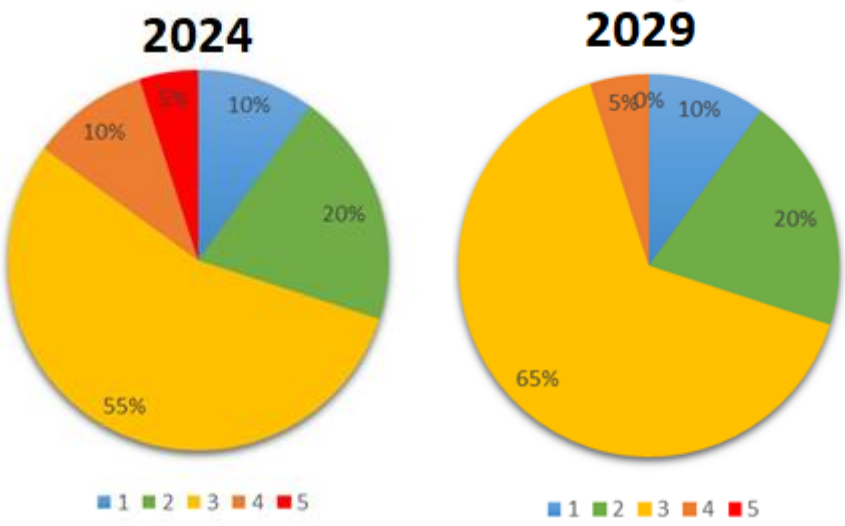
[210] Comparative study of pressures and measures in the major river basin management plans in the EU - Task 4 b: Costs & Benefits of WFD Implementation, ACT*eon* 2012.

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 Erzen basins.

- It is expected that 2 waterbodies currently in 'good status' will remain in good status
- It is expected that 11 waterbodies currently in 'moderate status' remain in 'moderate status'
- It is expected that 1 waterbodies currently in 'poor status' will increase to 'moderate status'
- It is expected that 1 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.

Proposed water categories

The WFD distinguishes four main categories:

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).

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).

Hydrobiological 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-a in lakes/reservoirs.

Other specific pollutants (ANNEX VIII RBSP)

BOD_5 and COD_{Cr} can be considered as part of the 'Other specific pollutants'. They are routinely analysed by NEA and applicable to both rivers and lakes/reservoirs.

Hydro-morphological quality elements

RIVERS: FLOW

IGEO[211] monitors river water levels at five stations (subsection 0); 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

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 **Error! Reference source not found.**).

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.

RIVERS: FLOWS

The present Hydrological monitoring stations are listed in **Error! Reference source not found.** 3).

RIVERS: MORPHOLOGICAL QUALITY ELEMENTS

The profiles are primarily situated in areas with (intensive) gravel/sand abstractions.

LAKES: P-CHEM, chlorophyll-a

These lake/reservoirs are not routinely monitored by NEA, but were sampled during the EUSIWM "Sampling Campaign Lakes, June and July 2021".

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.

Monitoring frequencies

The proposed monitoring frequencies are shown in Table below (see also Annex IX).

Table 13-7 - Proposed monitoring frequencies [once per mentioned interval]

	RIVERS Surveillance	**Operational & Baseline**	LAKES Surveillance	**Operational & Baseline**
Biological quality elements				
benthic invertebrate fauna	1 year *	1 year *	-	-
chlorophyll-a	-	-	1 month	3 months
Hydromorphological quality elements				
hydrology	daily	daily	-	-
morphology	6 years	3 years	-	-
Physico-chemical quality elements				
general physico-chemical quality elements	1 month	3 months	1 month	3 months
other specific pollutants (BOD_5, COD_{Cr})	1 month	3 months	1 month	3 months

Once during the (early) spring season, tentatively March – May.

[211] *The Q_h rating curves (required for calculating the flow from the water level) have not been updated since 15 or more years.*

Table 13-8 – Summary of Programme of Measures by Surface Waterbody

No.	Measure Code[212]	Water Body Code or RB Code[213]	Significant pressure[214]	KTM[215]	Measure type[216]	Measure Name[217]	Implementing Authority[218]	KTM indicator[219]	Indicator value 2024[220]	Indicator value 2029[221]
1	BMRW3516-01	RW351611 RW 351613 RW 351615 RW 35162 RW 35163 RW 35164 RW 35165 RW 351711 RW 351713 RW 371721 RW 351723	1.1 – Point pollution of urban wastewater	1	*Basic*	*Upgrade of wastewater treatment plants* WWTP Durres - 250 000 pe WWTP Kavaja - 100 000 pe WWTP Gjiri Lalzit - 15,000 pe	*AKUM/Municipalities*	*Population equivalent (pe) Number of WWTP requiring to be constructed or upgraded*	3	3
3	SMSW3516-01	RBSW3516	1.3 - Point IED plants	16	*Supplementary*	*Improving policies for the formalization of current water users*	*AMBU /MIE*	*Number of revised permit required to achieve objectives*	0	2
4	SMSW3516-02	RBSW3516	3 – Abstraction or flow diversion	8 and 26	*Supplementary*	*Monitor the implementation of permit conditions (both for environmental permits and for water resource permits).*	*AMBU / NEA*	*Number of revised permit required to achieve objectives*		

[212]Scheme: RBMPPoM/KTM <MSMeasureCode> - This is the unique Member State code for the measure. There must be a single measure defined for every single pressure.
[213] Scheme: SWB/SWCharacterization<MSSurfaceWaterBodyCode> - If the measure is water body specific, indicate the affected water body code or water body group. If the measure is general, use only the river basin code.
[214]Schema: SWB/SWPressuresandImpacts <SWSignificantPressureTypes> - Gives the significant pressure type code, taken from WISE annex 1a - Enumeration list: List of pressure types
[215]Scheme: RBMPPoM/KTM <KeyTypeMeasure> -
[216]Schema: RBMPPoM/KTM<MeasureType> - This defines whether the measure is of the basic type (in accordance with the Directive, Article 11(3)(a) or Article 11(3)(b)) or supplementary type (non-Directives, Article 11.4)
[217]Schema: RBMPPoM/KTM <MeasureName> - The measure name is a short descriptive name that reflects the pressure e.g. point pollution from sewage discharge points – Use WISE Annex 1a
[218]There is currently no scheme element defined for the Implementing Authority.
[219]Schema: RBMPPoM/KTM <KeyTypeMeasureIndicator> - The indicator should be taken from the WISE annex 3 enumeration list e.g. Population equivalent required to be treated by the new WWTP
[220]Scheme: RBMPPoM/KTM <KeyTypeMeasureIndicatorValue2022> - The indicator must have a baseline value at the beginning of the RBMP period, which indicates the degree of the required measure
[221]Scheme: RBMPPoM/KTM <KeyTypeMeasureIndicatorValue2022> - The indicator should have a target value at the end of the RBMP period, which indicates the extent of the measure still required

No.	Measure Code[212]	Water Body Code or RB Code[213]	Significant pressure[214]	KTM[215]	Measure type[216]	Measure Name[217]	Implementing Authority[218]	KTM indicator[219]	Indicator value 2024[220]	Indicator value 2029[221]
5	SMSW3516-03	RBSW3516	1.1 – Point pollution of urban wastewater *1.2 – Point Storm overflows*	1	*Supplementary*	*Reduction of untreated direct discharges from sewer outfalls by diversion to new collector systems.*	*AKUM/ Municipalities*	*Number of drainage systems required to achieve objectives*		
6	SMRW3516-04	RBSW3516	2.2 – Diffuse Agricultural	7 and 12	*Supplementary*	*1. Implementation of environmental best practices related to agricultural practices (new)* *2. Maintenance and cleaning of the agricultural drainage system.*	*MARD/ Municipalities*	*Irrigated area required to be covered by measures to achieve objectives*		
7	SMSW3516-06	RBSW3516	2.2 – Diffuse Agricultural	2 and 3	*Supplementary*	*Implementation of restrictions to reduce the pollution load from chemical fertilizers, pesticides on agricultural lands.*	*MARD/Municipalities*	*Area of agricultural land covered by measures (km2) to reduce pesticide pollution and nutrients in agriculture to achieve objectives*		
8	SMSW3516-07	RBSW3516	1.6 – Landfill/waste disposal	21	*Supplementary*	*Removal/clean-up of illegal solid waste dump sites*	*MTE/ Municipalities*	*Number of illegal waste/dump sites identified for removal*		
9	SMSW3516-08	RBSW3516	3 – *Flow Abstraction/Diversion Pressures*	26	*Supplementary*	*Update the registration of unauthorised abstractions from surface water.*	*AMBU*	*Number of abstraction points*		
10	SMSW3516-09	RBSW3516	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*		
11	SMRW351661-01	RW351661 RW351663	3.3 – Abstraction or flow diversion from HPPs	7 and 8 and 26	*Supplementary*	*Improvement in environmental flow on Murdhari stream.* *Allow a certain amount of water to be discharged from the Murdhari stream*	*AMBU /MIE/ Subjects*	*Quantity of water to be recovered (Mm³/Year)* *or* *Reduction (%) in water consumption required to achieve*		

No.	Measure Code[212]	Water Body Code or RB Code[213]	Significant pressure[214]	KTM[215]	Measure type[216]	Measure Name[217]	Implementing Authority[218]	KTM indicator[219]	Indicator value 2024[220]	Indicator value 2029[221]
						during the dry summer period, to maintain the entry of water into the water body.		*objectives*		
12	SMRW3516-10	RW35163 RW 35164 RW 35165 RW 351661 RW 351663 RW 351673 RW 35169	4.1.4 - Physical alteration of channel/bed/riparian area/shore - Other	5	*Supplementary*	*Allow the passage of aquatic fauna in the modified body with unnatural structure of its bed by modifying the current thresholds.*	*AMBU /MTE/ Municipalities*	*Length of remaindering of straightened river channels required for the achievement of objectives*		
13	SMRW3516-11	RBSW3516	4.1.4 - Physical alteration of channel/bed/riparian area/shore - Other	5	*Supplementary*	*Replace the damaged protective embankment with a new embankment (where they may conform to NBS nature-based measures/measures).*	*AMBU/MTE/MIE/Municipalities*	*Length of remaindering of straightened river channels required for the achievement of objectives*		
14	SMSW3516-12	RW351615 RW 35162 RW 35163 RW 35164 RW 35165	4.4 – Hydro morphological alteration, physical loss of whole or part of the water body	6	*Supplementary*	*Determining the length and water bodies that should reduce sediment discharges from rivers in order to achieve environmental objectives. Control over the obligations arising from the implementation of the conditions of the permits to the subjects for the rehabilitation of the area, by closing the access roads after the end of the permit, creating protection systems against river erosion in the agricultural lands.*	*AMBU / MTE*	*Length (km) or area (km^2) of the river network that will be affected by the measures necessary to achieve the objectives*		

13.16 Measures for Groundwater Bodies at Risk

The programme of Basic and/or Supplementary measures targets specific groundwater bodies 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). Precise measures should be identified, together with the expected change in status, the responsible competent authority, target dates and costs of the measure(s). Specific measures are targeted at individual waterbodies, or groups of waterbodies, that are at risk.

The WFD/GWD includes two distinct but complementary types of measure, first those that aim to restore groundwater bodies that are currently failing their objectives, and second a suite of that fall under the title of 'prevent and limit'. The latter concern all groundwater bodies. The WFD strongly emphasises the importance of preventing significant groundwater pollution because it recognises European and global experience that once polluted, clean-up of groundwater is difficult, slow and expensive whereas protection measures are relatively simple, quick and inexpensive.

WFD Article 11(3) requires a 'combined approach' to protecting groundwater which combines controlling pollution at source with setting environmental quality standards; and Article 7 requires the safeguarding of water quality to reduce the level of treatment of drinking water. Cases of localised pollution do not necessarily affect the overall status of the GWB provided that they are investigated, and if necessary remediated, as prevent and limit measures.

Based on the analysis of pressures in Chapter 10, a mapping of all measures for groundwater bodies is given in Technical Annex VII.

13.16.1 Prevent and limit Measures for Groundwater

The WFD and GWD place special emphasis on preventing and limiting the direct and indirect input of pollutants to groundwater over entire groundwater bodies. The difference between direct and indirect inputs is explained in the following diagram which focuses on whether the pollution source rests above or below the water table. A more detailed explanation of Prevent and Limit measures is presented in Technical Annex VII.

Prevent and limit measures are the first line of defence in preventing pollution of groundwater and involve such regulatory measures as permitting and codes of conduct. For identified pollution risks, the WFD expresses these protective objectives by specifying ELV's and Compliance Values (CV) which apply at Points of Compliance (POC) and are more stringent than Threshold Values.

A Compliance Value is the concentration (and associated compliance regime) that, when not exceeded at a POC, will prevent pollution. This differs from a Limit Value in that the latter applies at the source (i.e. POC-0). Preventing pollution requires taking all measures that are 'necessary and reasonable', where reasonable means technically feasible without involving disproportionate cost. The design of prevent and limit monitoring is described in WFD CIS Document 17.

Measures to regulate inputs from point sources typically comprise prohibitions, authorisations and general binding rules, including reference to the UWWTD. The control of diffuse sources is similar and may be achieved through prior regulation, prior authorisation, general binding rules and statutory Codes of Practice, including reference to the Nitrates and the Plant Protection Products Directives. Overriding earlier directives, the WFD prohibits all direct inputs to groundwater.

13.16.2 Prevent and Limit Measures Applying to All Groundwater Waterbodies

- Upgrade Groundwater Monitoring Network and Programme

Following a reanalysis of as many of the wells remaining from the old network, the status of, and pressures on, groundwater bodies should be reconsidered in order to design a new or reactivated network. Piezometers nests should be installed and monitored across the alluvial and sandstone-conglomerate GWB's. 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

Knowledge of groundwater abstraction is a core part of monitoring and assessment, and in the fure abstraction controls may be required. At present, there is no prospect of implementing such measures 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 inventive-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 Groundwater Body GW35160101

Good quantitative qualitative status were assigned, with very low confidence, on the basis of the absence of evidence of failure, and an At Risk status assigned because of the absence of evidence of safety.

The essential tasks are (i) to establish routine monitoring of water levels and water quality at wells of suitable design in areas of higher water stress with regard to abstraction, pollution pressure, saline intrusion and surface-water interaction. GIS-based inventories of (a) pollution hazards and (b) community, commercial and irrigation abstractions should be prepared.

13.16.4 Prevent and Limit Measures for Groundwater Body GW35160201

Good quantitative and qualitative status were assigned, with very low confidence, on the basis of the absence of evidence of failure, and an At Risk status assigned because of the absence of evidence of safety.

The essential tasks are (i) to establish routine monitoring of water levels and water quality at wells of suitable design in areas of higher water stress with regard to abstraction, pollution pressure, saline intrusion and surface-water interaction. GIS-based inventories of (a) pollution hazards and (b) community, commercial and irrigation abstractions should be prepared.

13.16.5 Prevent and Limit Measures for Groundwater Body GW35160517

Good quantitative and qualitative status were assigned, with low confidence, on the basis of minor evidence of failure in historical monitoring data (up to 2006). It should be noted that the assessment of this GWB is different from all others in Erzen because it is apparently strongly confined. Thus, although there is abundant evidence of pollution hazards at the ground surface, it is anticipated that the overlying strata provide protection except where short-circuited by faulty well-sealing, and the and the large number of historical water quality analyses show only slight evidence of anthropogenic pollution. Thus an overall Good but At Risk status assigned because there is absence of evidence of safety.

A particular risk that requires focused action is the risk of saline intrusion which is mentioned in the literature (Eftimi 2003) and supported by a number of high salinity analyses in the historical monitoring data, mostly in the Porto Romano area. A dedicated study of saline intrusion in the Durres – Porto Romano should be undertaken and include installation of a bespoke monitoring network to track and predict its progression. Monitoring should include installation of data loggers connected to EC probes as well as pressure transducers.

In addition, routine monitoring of water levels and water quality should be established in wells across the aquifer.

Specific investigations should be conducted where ground-surface pollution hot-spots such as the former lindane pesticide factory have been identified. These investigations should be integrated assessments of risks to soil, groundwater and surface water.

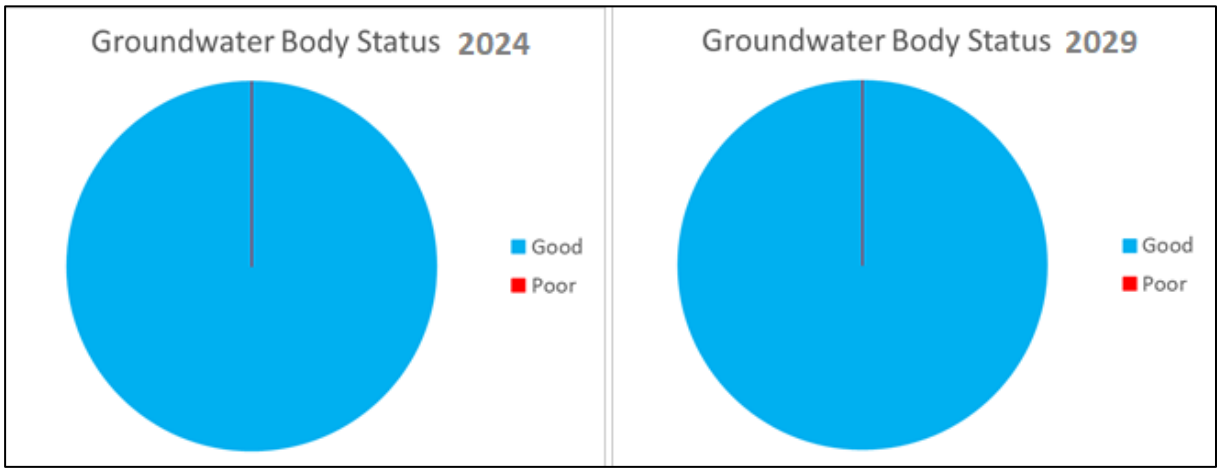
13.17 Summary Costings for Groundwater Measures

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 13-3 summarises the expected outcomes of the 2024-2029 RBMP for the status of groundwater bodies in the Erzen basins.

Figure 13-3 – Current and Projected Proportions of Groundwater Body Status



13.19 Plan Monitoring and Evaluation Procedures

Prevent and limit measures are the first line of defence in preventing pollution of groundwater and involve such regulatory measures as permitting and codes of conduct. For identified pollution risks, the WFD expresses these protective objectives by specifying Limit Values (LV's) and Compliance Values (CV) which apply at Points of Compliance (POC) and are more stringent than Threshold Values. Four points of compliance (POC-0 to POC-3) may be defined as indicated in Figure D-2. These points represent a progression along a pathway from the points where a contaminant (1) enters the subsurface, (2) reaches the water table, (3) an intermediate location within the aquifer and (4) the end of the flow system. Compliance points may be actual monitoring points or theoretical points used to calculate an acceptable input.

Table 13-9 – 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	BMRB3516	RBGW3516	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*		
2	BMRB3516	RBGW3516	1.1 – Point pollution of polluted urban waters	1	*Basic*	*Improving / increasing the capacity of urban wastewater treatment plants 1.WWTP Kavaje* *2.WWTP Durrës* *3.WWTP Gjri i Lalzi*	*AKUM/AMBU*	*WWTP number that requires to be built or improved*		
3	SMRB3516	RBGW3516	*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*		
4	SMRB3516	RBGW3516	2-2 Agriculture (distributed)	2,3,12	*Supplementary*	*Reduction and improvement of agricultural practices in the use of fertilizers and pesticides*	*MARD/AMBU*			
5	SMRB3516	RBGW3516	1.5- Polluted points or	4	*Supplementary*	*Investigation / closure of contaminated sites*	*MTE/MIE/AMBU*	*Number of contaminated sites remediated*		

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
			abandoned industrial areas							
6	SMRB3516	RBGW3516	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*		

Table 13-10 - Summary tables of costs and funds for surface and groundwater measurements

A - Measure BMRV3514-01 Relevant Ministry, Implementing Authority or Operator	Directive or relevant Instrument	Capital or installation costs	Operation and maintenance costs	Administration Expenses	Resource Costs	Other costs	Σ of Costs€M	Sources of Funds	External grant or loan	Central or agency budget	The budget of the Municipality	Funded by the Operator	State Water Fees or Taxes	Other funds	Σ of funds €M
Improvement and expansion of urban wastewater treatment plants *WWTP Durres - 250,000 pe* *WS Kavaje - 100,000 pe* *WWTP Gjiri Lalzit - 15,000 pe* **AKUM/MIE/Municipalities**	EU 91/271/EECU Urban wastewater EU 2000/60/EC Law 111/2012	WTP Durres[222]:1,000,000,000 ALL WWTP Kavaja[223]: 153,589,733,000 ALL WWTP Lalez[224]:1,000,000,000 ALL													
Construction of plants for the treatment of industrial wastewater, requiring that every industrial installation has effluent treatment on site, in accordance with the legislation **AMBU /NEA/ Private entity**	EU 91/271/EECU Urban wastewater Integrated Pollution Prevention Control Directive (96/61/EC) EU 2000/60/EC Law 111/2012	24,200,000.00 ALL													

[222]Approximate value comparing it with the same model in cases where we have improved conditions and expansion of the plant
[223]I get the value from the public tender documents referred to the Municipality of Kavaja
[224]Approximate value comparing it with the same model in cases where we have improved conditions and expansion of the plant

Reduction of untreated direct discharges from sewer spills by diversion to new collector systems. **AKUM/MIE /Municipalities** Some of the investments:[225] 1. "Construction of the main waste water collector and UWTP, in the tourist area Lalzi Bay, Durres" 2. Supervision of works for the facility: Construction of The main collector of polluted water and UWTP, in the tourist area Gjiri i Lalzi, Durres. 3. Construction of the water supply network and sewerage system in the village Luz, Kavajë" 4. Supervision of works for the object: "Construction of the network of water supply and sewerage system in the village of Luz, Kavaje"		[226]1. 1,319,216,000 ALL 2. 9,660,000 ALL 3,354,445,000 ALL 4.1,837,000 ALL 5. 98,802,0000 ALL 6. 1,785,0000 ALL												

[225]Estimated investments in the National Strategy of the Water Supply and Sewerage Sector, 2020-2030
[226]Estimated investments in the National Strategy of the Water Supply and Sewerage Sector, 2020-2030

5.Hamallaj tourist area, phase I" Administrative unit Sukth, Durres Municipality 6. Supervision of works for the object: "The system of sewage of polluted waters of the tourist area Hamallaj, phase I" Sukth administrative unit, Durres municipality															
Removal/cleaning of illegal solid waste dumps **AKUM/MTE/Municipalities**		Durres municipality has identified 4 storage sites that do not meet the criteria The total value of the intervention for the Durres municipality is **81,525,723 ALL** The municipality of Tirana has identified 19 storage sites that do not meet the criteria. The total value of the intervention for the municipality of Tirana is **47,911,441 ALL** The municipality of Vore has identified 1 storage site that does not meet the criteria. The total value of the intervention for the municipality of Vorë is													

		8,536,988 ALL The municipality of Kavaje has identified 2 storage sites that do not meet the criteria and 1 for removal. The total value of the intervention for the municipality of Kavaje is **6,261,153 ALL** The municipality of Rrogozhin has identified 6 storage sites that do not meet the criteria. The total value of the intervention for the municipality of Rrogozhin is **17,477,472 ALL**													
Allowing aquatic fauna to pass through the modified body with unnatural bed structure by modifying the current rapids. **AMBU /MIE/Municipalities**	Habitats Directive (92/43/EEC) Environmental Impact Assessment Directive (85/337/EEC) EU 2000/60/EC Law 111/2012 Law 10 431 dated 9.6.2011 "On	1 threshold modified Price for a threshold (demolition and reconstruction): 10,000 ALL Estimated 9,000,000.00 ALL													

	Environmental Protection"														
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). **AMBU /MIE/Municipalities**	Habitats Directive (92/43/EEC) Environmental Impact Assessment Directive (85/337/EEC) EU 2000/60/EC Law 111/2012 Law 10 431 dated 9.6.2011 "On Environmental Protection"	Excavation and transport for 1 m3 - 400 ALL 1m/l = 400*30=12000 ALL/ml (30m3/l) 36,000,000 ALL is expected													
Rehabilitation and maintenance of the irrigation and drainage system of agricultural lands. **MARD/Municipalities**	Common Agricultural Policy of the EU Law 10 431 dated 9.6.2011 "On Environmental Protection"	10 million euros													
Total costs and funds															

B - Measure BMRV3514-02 & SMRV3514-01 & SMRV3514-02 & SMRV3514-03 Relevant Ministry, Implementing Authority or Operator	Directive or relevant Instrument	Capital or installation costs	Operation and maintenance costs	Administration Expenses	Resource Costs	Other costs	Σ of Costs€M	Sources of Funds	External grant or loan	Central or agency budget	The budget of the Municipality	Funded by the Operator	State Water Fees or Taxes	Other funds	Σ of funds €M
Implementation of restrictions to reduce the pollution load from chemical fertilizers, pesticides in agricultural lands. **MARD/Municipalities**	Common Agricultural Policy of the EU Law 10 431 dated 9.6.2011 "On Environmental Protection"	0.1 million euros													
Improving policies for the formalization and promotion of current water users. **AMBU /NTDI/NEA/AGS/Municipalities**	Law 111/2012 Law 10 431 dated 9.6.2011 "On Environmental Protection"	0.1 million euros													
Rehabilitation of water bodies, control of sediments applying the NBS (nature-based choices) approach, to achieve environmental objectives. **AMBU /MIE**	Law 111/2012 Law 10 431 dated 9.6.2011 "On Environmental Protection"	0.2 million euros													
Total costs and funds															

C - Measure SMRV3514-04 Relevant Ministry, Implementing Authority or Operator	Directive or relevant Instrument	Capital or installation costs	Operation and maintenance costs	Administration Expenses	Resource Costs	Other costs	Σ of Costs€M	Sources of	External grant or loan	Central or agency budget	The budget of the Municipality	Funded by the Operator	State Water Fees or Taxes	Other funds	Σ of funds €M

Improvement of environmental flow in Murdhari stream. Allowing a certain amount of water to be discharged from the Murdhari stream during the dry summer period, to maintain the inflow of water into the water body. ***AMBU* / Entities/ NEA/MIE**	Habitats Directive (92/43/EEC) Environmental Impact Assessment Directive (85/337/EEC) EU 2000/60/EC Law 111/2012	0.1 million euros													
Preparation of a study on water bodies threatened by flow changes **AMBU /IGJEO**	Law 111/2012	0.1 million euros													
Implementation of best environmental practices in relation to (new) agricultural practices **MARD/Municipalities**	Common Agricultural Policy of the EU Law 10 431 dated 9.6.2011 "On Environmental Protection"	0.3 million euros													
Improving / increasing the capacity of urban wastewater treatment plants 1.WWTP Kavaje	EU 91/271/EECU Urban wastewater EU	WTP Durrës[227]:1,000,000,000 ALL													

[227]Approximate value comparing it with the same model in cases where we have improved conditions and expansion of the plant

2.WTP Durrës *3.WWTP Gjri i Lalzi* **AKUM/ AMBU**	2000/60/EC Law 111/2012	WWTP Kavaja[228]: 153,589,733,000 ALL WWTP Lalez[229]:1,000,000,000 ALL													
Designation of protection zones (in boreholes and GW sites) related to the control of urban development **AGS/ AMBU/Municipalities**		242,000,000 ALL													
Reduction and improvement of agricultural practices in the use of fertilizers and pesticides ***MARD/AMBU***	Common Agricultural Policy of the EU Law 10 431 dated 9.6.2011 "On Environmental Protection"	242,000,000 ALL													
Investigation / closure of contaminated sites **MTE/AMBU**		242,000,000 ALL													
Control over the permits granted and the identification of each location **MTE/AMBU**		24,200,000 ALL													

[228]I get the value from the public tender documents referred to the Municipality of Kavaja

[229]Approximate value comparing it with the same model in cases where we have improved conditions and expansion of the plant

Improvement and Construction of septic tanks and sewers. **AKUM /AMBU**		[230]1. 1,319,216,000 ALL 2. 9,660,000 ALL 3,354,445,000 ALL 4.1,837,000 ALL 5. 98,802,0000 ALL 6. 1,785,0000 ALL													
Total costs and funds															
Total of all costs and funds		159,378,410,765 ALL													

[230]Estimated investments in the National Strategy of the Water Supply and Sewerage Sector, 2020-2030