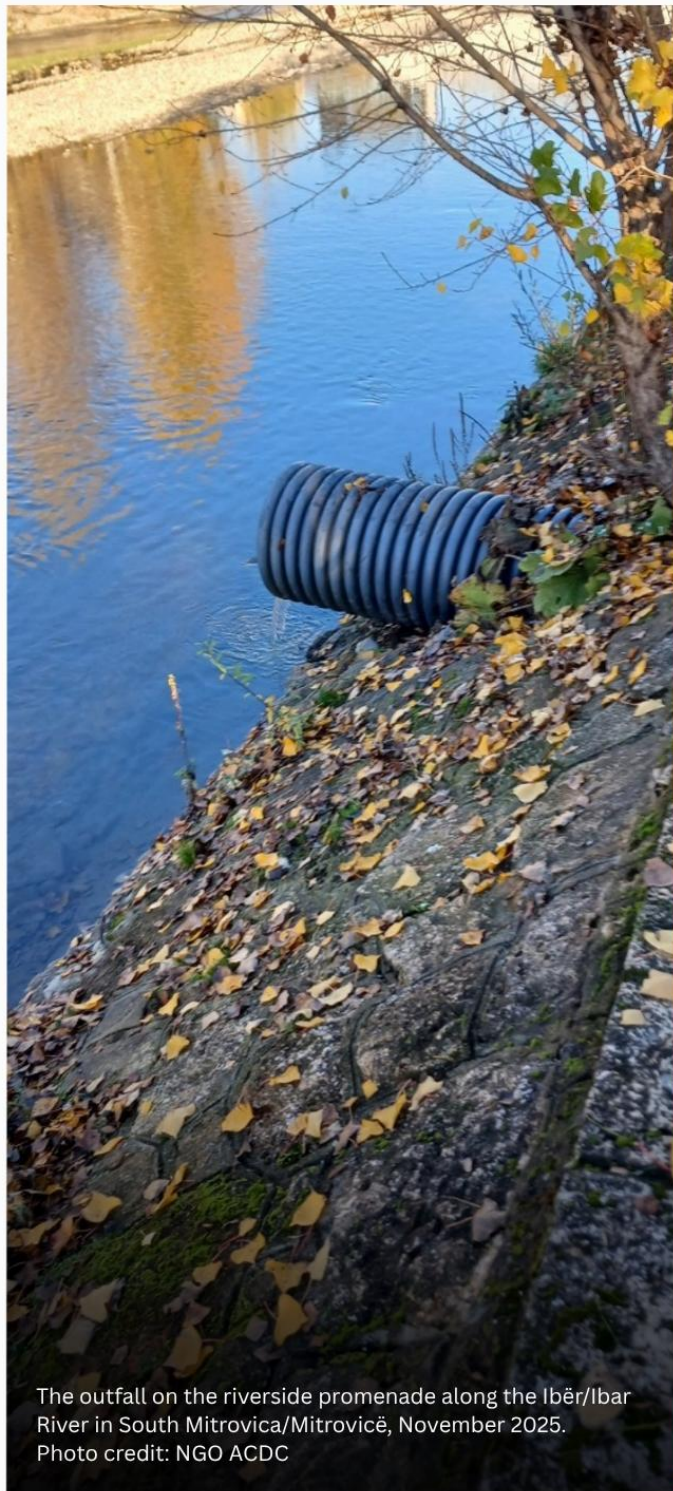




The outfall on the riverside promenade along the Ibër/Ibar River in South Mitrovica/Mitrovicë, November 2025.
Photo credit: NGO ACDC

Ibar/Ibër River Pollution Source Inventory: Technical Assessment, Field Observations and Project Pipeline for Integrated Water Resources Management

This paper presents a pollution cadaster and recommendations of mitigation measures to reduce the environmental impacts on the Ibar/Ibër River in the municipalities of Zubin Potok, North and South Mitrovica, Zvečan/Zveçan, and Leposavić/ Leposaviq.

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Republika e Kosovës
Republika Kosova-Republic of Kosovo
Qeveria-Vlada-Government

SKAT Partners for Impact



This document was prepared within the framework of the project *Together for Clean Rivers* implemented by the NGO ACDC - Advocacy Center for Democratic Culture and REC – Reconciliation Empowering Communities, within the IWRM-K program.

This document presents technical findings derived from outreach activities toward local institutions and identified affected communities and verified through visual field observations, spatial analysis and desk research. They do not constitute legal, regulatory or compliance assessments, nor should they be interpreted as determining responsibility or causality.

The views in this publication are those of the author(s) and do not necessarily reflect the views of the Integrated Water Resources Management in Kosovo (IWRM-K) – a Swiss Agency for Development and Cooperation (SDC) and the Government of Kosovo Program.

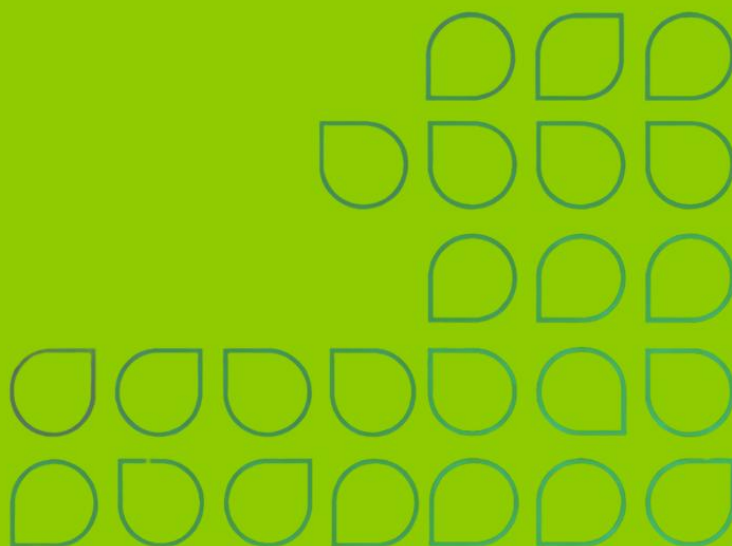


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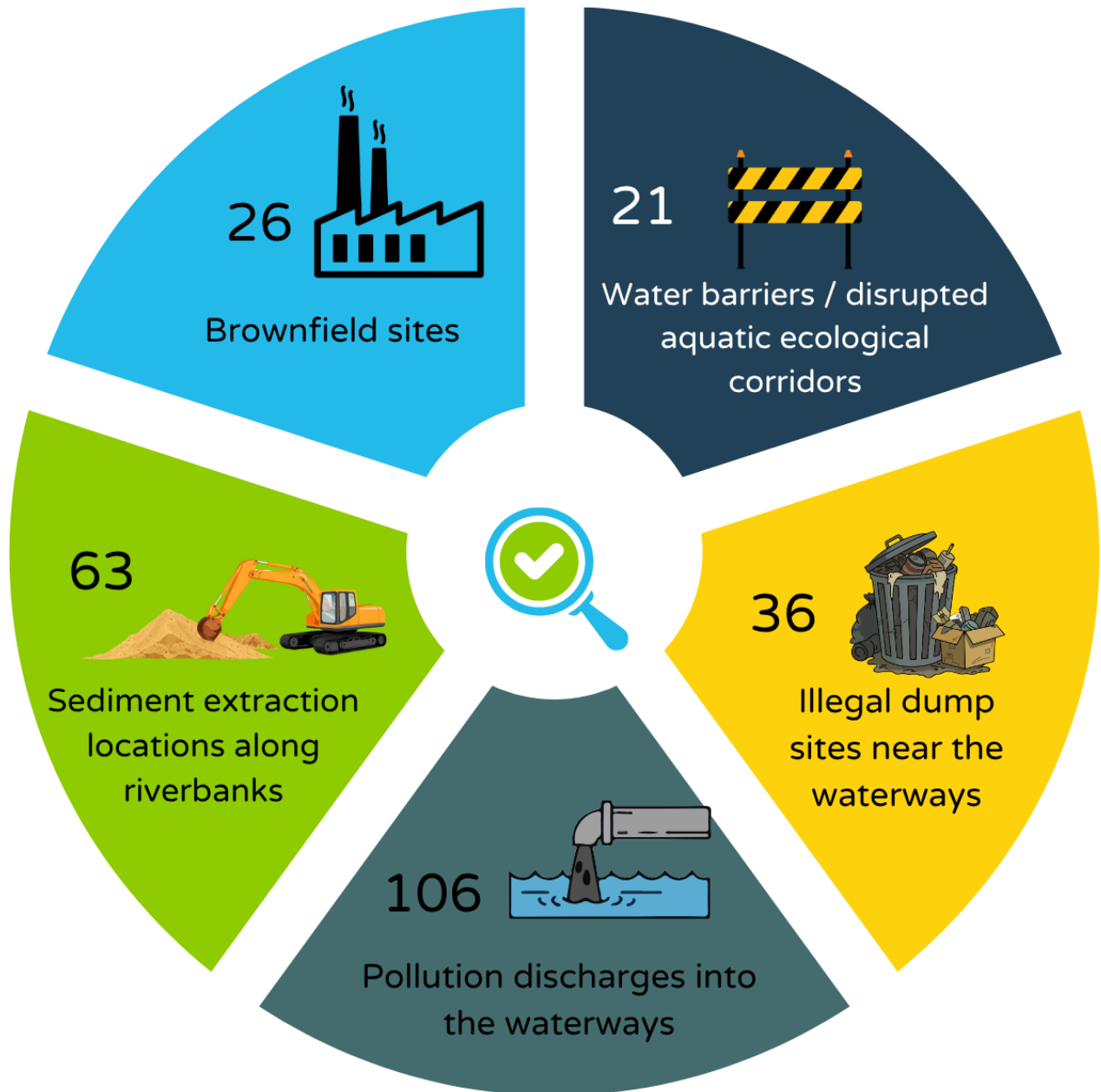


Acronyms

ACDC	Advocacy Center for Democratic Culture
ASK	Kosovo Agency of Statistic
EAA	Environmental Agency Austria
GIS	Geographic Information System
GLAD	Global Land Analysis and Discovery
GoK	Government of Kosovo
GPS	Geographic Positioning System
ICPDR	International Commission for the Protection of the Danube River
IUCN	International Union for Conservation of Nature
INTERREG	European Territorial Cooperation Programme
IPA	Instrument for Pre-Accession Assistance
NBS	Nature-Based Solutions
IWRM-K	Integrated Water Resources Management in Kosovo
MESP	Ministry of Environment and Spatial Planning
OECD	Organisation for Economic Co-operation and Development
PPP	Public-Private Partnership
REC	Reconciliation Empowering Communities
RESTORIVER	River Ecosystem Restoration
SDC	Swiss Agency for Development and Cooperation
SKAT	SKAT Consulting Ltd
UNEP	United Nations Environment Programme
WB	World Bank



Key findings



Executive Summary

This report presents the results of a technical inventory of observed pollution point sources, field observations, spatial analysis and desk research conducted along the Ibar/Ibër River corridor in the municipalities of Zubin Potok, North Mitrovica, South Mitrovica, Zvečan/Zveçan and Leposavić/Leposaviq. Prepared within the *Together for Clean Rivers* project, the report provides an overview of the main environmental pressures affecting the river system and is intended to inform municipalities, relevant institutions and the wider public about identified pollution sources while proposing practical measures for their mitigation. The assessment is based on visual field observations and available spatial data and should be regarded as a baseline inventory rather than a legal or regulatory assessment.

The findings indicate that untreated or insufficiently controlled wastewater discharges, illegal waste disposal sites, legacy industrial and mining locations, riverbank alterations, sand extraction and increasing urban development represent the most significant observed pressures on water quality and river ecosystems within the project area. Many of these pollution sources are concentrated along the Ibar/Ibër River and its tributaries, particularly in and around the municipalities of North Mitrovica, South Mitrovica and Zvečan/Zveçan, while historical mining and industrial sites throughout the basin continue to require long-term environmental monitoring because of their proximity to surface water and groundwater resources. The assessment also highlights the cumulative impacts of land-use change, infrastructure development and forest cover loss, which may increase erosion, alter hydrological processes and reduce the resilience of freshwater ecosystems.

Based on these findings, the report recommends prioritising investments in wastewater collection and treatment infrastructure, the development of harmonised municipal sewer network inventories, comprehensive mapping of wastewater discharge points, and strengthened environmental monitoring supported by GIS technologies and improved municipal capacities. Additional priority interventions include the rehabilitation of degraded riverbanks, remediation of illegal dumping sites, restoration of environmentally sensitive areas, protection of riparian vegetation and forests, and the implementation of nature-based solutions that contribute to improved watershed resilience. The report further recommends enhancing cooperation among municipalities and relevant institutions through standardised environmental data collection and integrated planning approaches that support more effective water resource management.

By identifying pollution hotspots and presenting evidence-based recommendations for mitigation measures, this inventory provides municipalities and other stakeholders with a practical technical reference for future environmental initiatives and investment planning. It contributes to the implementation of Integrated Water Resources Management principles by strengthening the knowledge base for coordinated decision-making, promoting more systematic monitoring of pollution sources, encouraging cross-municipal cooperation and supporting the integration of water protection measures into local environmental and spatial planning processes. The report is also intended to serve as a communication tool that raises public awareness of the environmental challenges affecting the Ibar/Ibër River and encourages informed dialogue on future restoration and conservation efforts.



Total number of identified locations of specific type of impact exceeds the 250 individual locations. Pollution type breakdown list is as follows:

Pollution discharges into the waterways:	<i>106 locations</i>
Sediment extraction locations in river riparian areas:	<i>63 locations</i>
Illegal dump sites in near proximity to the waterways:	<i>36 locations</i>
Brownfield sites (industrial facilities/heritage idling or operational):	<i>26 locations</i>
Water barriers/ disrupted aquatic ecological corridors:	<i>21 locations</i>

The inventory of pollution produced by this analysis is only a baseline work with the purpose to identify the location, relevance and pinpoint the designated authority and adequate policy measures.

Under the project terms, the recommendations measures were produced to develop project pipeline algorithm and target institutions for the assets allocation for the local institutions. Collaborative aspect and coordination with the central institutions is imperative to attain results. However, in most critical aspects of the environmental degradation GoK would have a prime responsibility as it is in case of industrial legacy (brownfield sites). This aspect should be analyzed individually from local and national aspects of the waterway's pollution prevention.

Brownfield sites and industrial heritage have a significant capacity to produce the collaborative effect in the Ibar Basin waterway system and it could have a capacity to produce cooperation beyond the division lines in West Balkan. Cross border cooperation on transboundary water system through the support and guidance of the international mechanisms (for example ICPDR) could potentially bring the region into a realm of collaboration aspect rather than the control that is contemporary doctrine in environmental management.

Paper produced recommendation to the local institution in development information base, producing the monitoring measures and in conservation and restoration activities individually and they have been addressed to the local representatives and designated authorities for the consideration. Local representatives presented a great interest and commitment in continuing cooperation under the IWRM-K on water quality and environmental restoration activities in the future.



KOSOVO SPATIAL ANALYSIS

The purpose of this report is to support the identification, prioritisation and planning of future interventions within the Ibar/Ibër River basin by providing a broader understanding of the environmental and hydrological context in which the observed pollution sources occur. For this reason, the introduction first presents key national characteristics that influence water resources management before focusing on the project area.

Kosovo's environmental landscape has supported human settlement and economic activity from the Neolithic period to the present day. Historical settlement patterns indicate that the availability of freshwater resources, fertile land and other natural assets played an important role in shaping the spatial distribution of communities and the development of agricultural and economic activities. Historical records and spatial

evidence show that a dense network of streams and rivers contributed to water availability across much of the territory while also facilitating regional connectivity.

Historically, agriculture, including livestock production, fisheries and the sustainable use of natural resources, represented the primary economic activities throughout much of Kosovo. Over time, infrastructure development, urban expansion and industrialization have transformed land use and the economic structure. As a result, several traditional agricultural practices, particularly extensive livestock production in mountainous areas, have declined in relative importance compared with other economic sectors.

During the twentieth century, industrial development and population growth were accompanied by increasing demand for water resources. Spatial analysis and available historical information indicate that expanding urban areas, industrial activities and growing water abstraction have placed increasing pressure on freshwater systems. At the same time, changes in precipitation patterns, including reduced snow accumulation and greater seasonal variability, have influenced the hydrological regime. Understanding these broader national trends provides important context for interpreting the environmental pressures observed within the Ibar/Ibër River basin and helps identify and prioritise future interventions that support integrated water resources management, long-term water availability and ecosystem resilience.

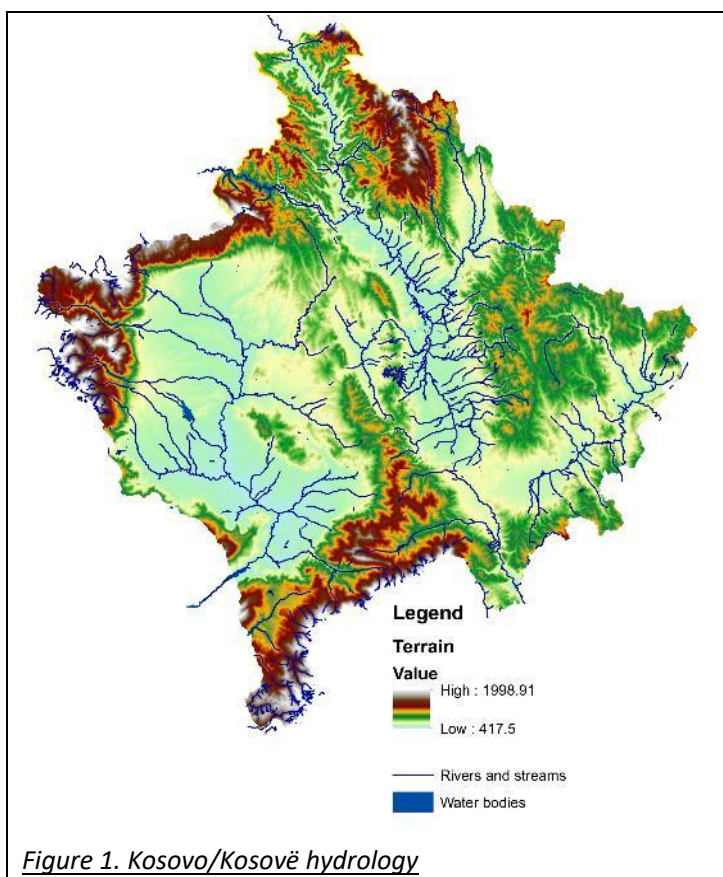


Figure 1. Kosovo/Kosovë hydrology



Kosovo is a landlocked territory without major international river systems, with the exception of the transboundary Ibar/Ibër River basin. Consequently, water availability depends primarily on precipitation and locally available surface and groundwater resources. Average annual precipitation is broadly comparable with neighboring countries; however, the relatively small catchment area and the absence of large transboundary river inflows limit the overall availability of renewable freshwater resources. Spatial analysis of precipitation data (2004–2024) presented in Figure 2 indicates considerable spatial and annual variability in rainfall distribution across Kosovo. Understanding this variability provides important context for interpreting the environmental conditions within the Ibar/Ibër River basin and should be considered when identifying and prioritizing future interventions, planning water infrastructure, allocating water resources, and guiding investments that support integrated water resources management.

The findings presented in this document are based on visual field observations, spatial analysis and desk research. The assessment identifies environmental characteristics and observed pollution point sources to support the identification and prioritization of future restoration and conservation measures, inform integrated water resources management, and provide municipalities and other stakeholders with an evidence base for planning future interventions within the project area. The document does not establish causality, assign responsibility, or constitute a legal, regulatory, or compliance assessment.

Ibar/Ibër River system

The Ibar/Ibër River is one of the principal transboundary river systems influencing water resources in Kosovo. Historical records indicate that the river previously exhibited pronounced seasonal flow variations and supported activities such as timber transport during periods of higher discharge.

Today, the Ibar/Ibër River represents the only major transboundary river contributing significant inflow to Kosovo's surface water system. It forms an important component of the country's water resources and supports domestic, agricultural, industrial, and environmental water demands. The transboundary Ibar/Ibër River basin covers approximately 7,950 km², with a substantial portion of the catchment associated with Kosovo through the Sitnica/Sitnicë sub-basin, the country's largest internal river system.

The Ibar/Ibër originates from a karst spring on Mount Hajla/Hajlë near Rozhajë/ožaje, Montenegro. From its source, the river flows through mountainous terrain before entering the Gazivode/Ujmani Reservoir near Ribariće/Ribariq at an elevation of approximately 694.5 meters above sea level, subject to seasonal water-level variation.

Downstream of the reservoir, the river continues through the valley of Zubin Potok toward Zvečan/Zveçan before changing direction near Mitrovica and continuing northward toward its confluence with the Zapadna Morava/Morava Përendimore River near Kraljevo/Kraljevë, Serbia.



Available observations and desk research indicate that water quality characteristics vary along the river course. Near its karst source, the river exhibits water quality typically associated with karst spring systems. Further downstream, in and around populated areas of the Municipality of Rožaje/Rozhajë, changes in water quality have been reported in available sources and supported by field observations. During the desk research, a landfill site ("Mostina") located on the right bank of the river between Rožaje/Rozhajë and Bać/ Baç was identified as a documented pollution point of interest. According to the available information, waste material from this location may be transported by surface runoff into the Ibar/Ibër River and subsequently toward the Gazivode/Ujmani Reservoir. This document records the location as an observed pollution point source and does not provide an assessment of legal responsibility or regulatory compliance.

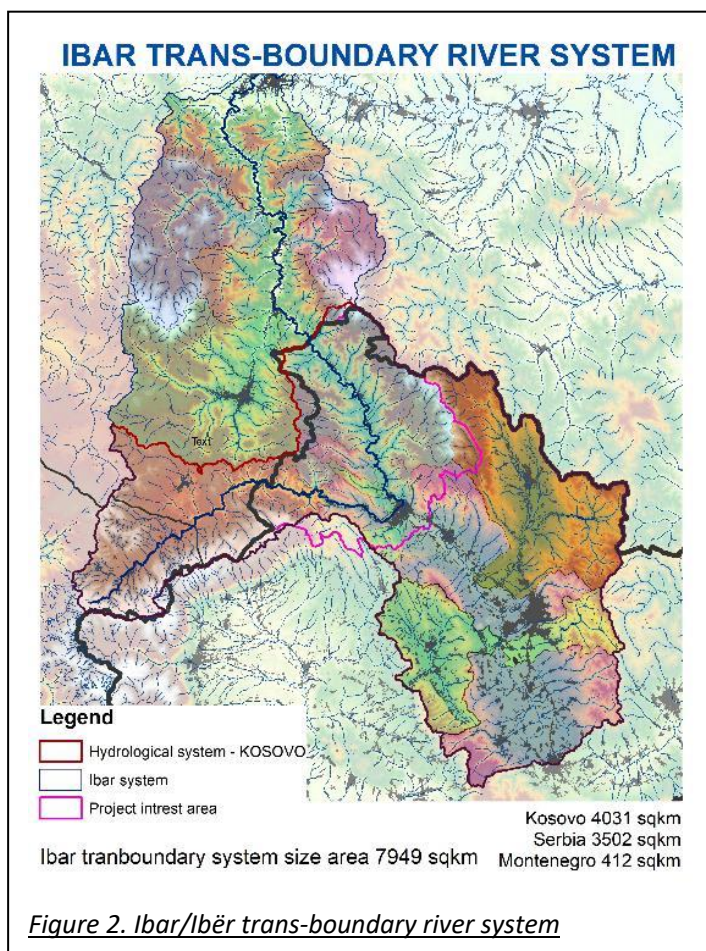


Image 18. Nov. 2025: Entrance Mitrovica, industrial zone (former FAFOS) poor runoff management practice
Photo credit: NGO ACDC



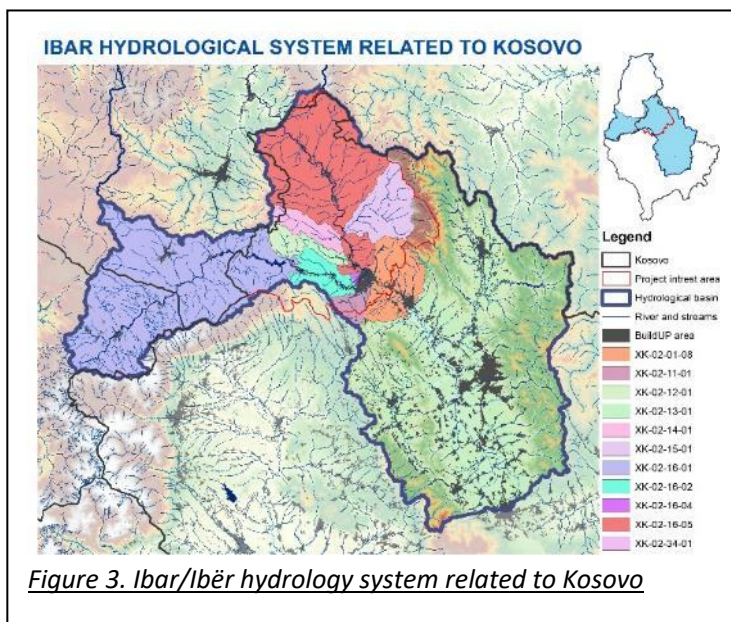
Image: 18. Nov. 2025: Entrance Mitrovica, industrial zone (former FAFOS) poor runoff management practice



Kosovo Ibar/Ibër system

The Kosovo portion of the Ibar/Ibër River basin covers approximately **4,040 km²**, representing around **37% of Kosovo's territory** (Kosovo Agency of Statistics). The Ibar/Ibër River flows approximately **102.1 km** through Kosovo.

The principal right-bank tributaries within Kosovo include the Brnjačka/Bërnjakut, Čečevska/Çeçevës (discharging directly into Gazivode/Ujmani Reservoir), Zubodolska/Zubodollit, Zli Potok/Përroi I Keq, Ljušta/Llushtë, Sitnica/Sitnicë, Trepčanska/Trepçës, Bistrica/Bistricë and Drenska/Drenit rivers. The principal left-bank tributaries include the Varaška/Varashit, Lučka/Llukës, Jagnjenička/Jagnjenicës, Kozarevačka/Kozarevës, Banjska/Banjskës and Jošanička/Jashanicës rivers.



The Sitnica/Sitnicë River is the largest tributary of the Ibar/Ibër within Kosovo. It originates near Ferizaj/Uroševac and flows through the central Kosovo plain before joining the Ibar/Ibër River in Mitrovica. Its major tributaries include the Drenica/ Drenicë River on the left bank and the Lab/ Llap River on the right bank, together with numerous smaller watercourses.

Spatial analysis, field observations and desk research indicate that the Sitnica/Sitnicë catchment contains a high concentration of settlements, industrial facilities, agricultural land and transport infrastructure. These characteristics suggest that the tributaries within this basin represent important pathways through which pollutants may reach the Ibar/Ibër River downstream of Mitrovica. The basin also includes several major urban centres and industrial areas, including the Kishnica/Kishnicës mining area, the Ferronikeli industrial complex, Prishtina, Obilić/Obiliq, Kosovo Polje/Fushë Kosova, Ferizaj/Uroševac, Vushtrri/Vučitrn and Mitrovica/ Mitrovicë.

River	Measuring station	R (km ²)	Qmin,95% (m ³ /s)	Q (m ³ /s)	Qmax, 1% (m ³ /s)
Ibar/Ibër ¹	Rozaje/Rozhajë			2,5	
Ibar/Ibër ²	Bač/Baç	405,2	0,2	5,6	545
Ibar/Ibër ⁵	Ribariće/Ribariq	850		10,32	
Ibar/Ibër-Lepenac/Lepenc ³	Pridvorica/Pridvoricë			-3,5m ³ /s	
Ibar/Ibër ⁴	Prelez/Prelez	1109	1,29	12,52	416,9
Ibar/Ibër	Prelez/Prelez		0,8	13,39	452,80
Kanal-Trepča/Trepça ³	Prelez/Prelez			-1,0 m ³ /s	
Sitnica/Sitnicë	Nedakovac/Nedakoc	2590	0,30	12,9	482,2
Ibar/Ibër	Leposavić/Leposaviq	4701	2,81	31,39	1030,0
Ibar/Ibër	Raska/Rashkë	6268	5,24	41,65	1137,0

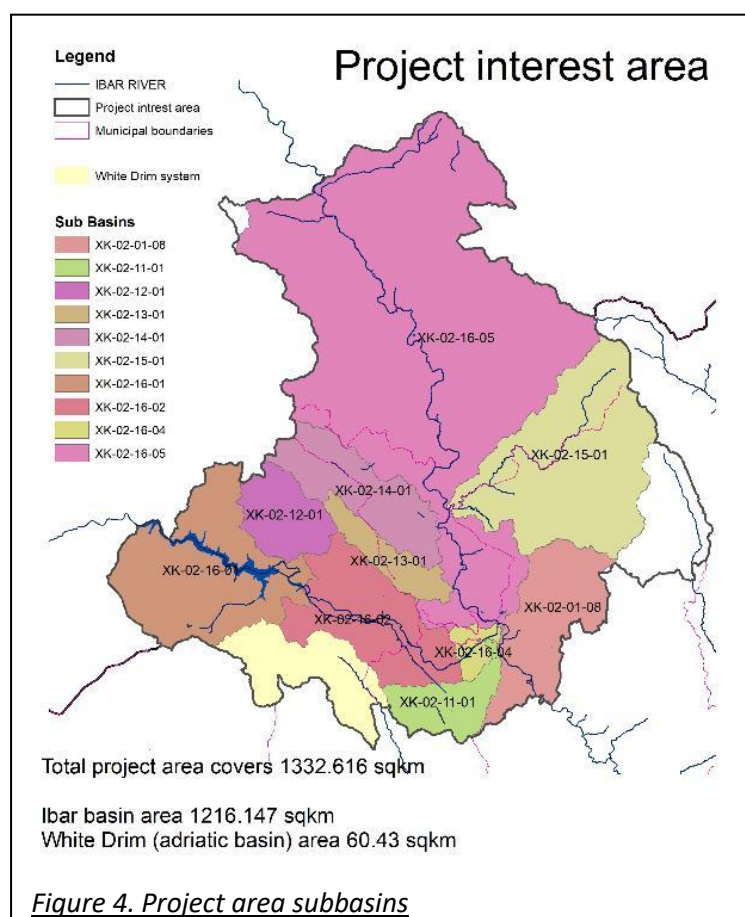
Table 1: The Ibar/Ibër river basin and the amount of water at the measuring points –multiple year average annual data

Project interest area / Methodology

The study covers five municipalities located along the Ibar/Ibër River corridor: Zubin Potok, North Mitrovica, South Mitrovica, Zvečan/Zveçan and Leposavić/Leposaviq.

The project area extends from approximately 430 metres above sea level at the northern outflow of the Ibar/Ibër River to elevations approaching 2,000 metres above sea level on Mount Kopaonik within the Municipality of Leposavić/Leposaviq. Climatic conditions are predominantly continental and characteristic of the Danube River Basin.

The selected municipalities represent the administrative authorities directly responsible for the management of the Ibar/Ibër River corridor within the project area. They are also influenced by upstream inflows originating from Montenegro, Serbia



¹ (Hrvacevic, 2004)

² (Gore, 2000)

³ (data, 2020)

⁴ (AMMK, 2015)

and the central Kosovo catchments, while downstream river conditions may also be influenced by activities occurring within the study area.

The assessment focuses on the identification and documentation of observed pollution point sources. Data collection consisted of visual field observations supported by desk research and available spatial datasets. Field activities were conducted during late 2025 within the implementation period of the project.

The present assessment did not include laboratory sampling or seasonal monitoring of water, soil or sediment quality. Consequently, the findings should be interpreted as an inventory of observed conditions and pollution point sources rather than a quantitative assessment of environmental impacts. Comprehensive evaluation of pollutant loads, and seasonal variation would require long-term monitoring and laboratory analysis.

Desk research

Kosovo occupies a relatively small landlocked territory with limited renewable freshwater resources. Average annual precipitation is approximately **768 mm**, while the estimated runoff coefficient is approximately **41.3%**. The territory forms part of the Danube River Basin and the Black Sea drainage system.

Available hydrological data indicate an uneven spatial distribution of precipitation. Approximately half of Kosovo's population and the majority of industrial activities are located within areas receiving comparatively lower annual rainfall. Spatial analysis also indicates continued concentration of urban development and commercial activities within these water-stressed catchments.

Desk research and field observations indicate that increasing urbanisation, industrial activities and infrastructure development have introduced additional pressures on river systems and streams. These pressures include wastewater discharges, altered river morphology, reduced floodplain connectivity and other forms of anthropogenic influence observed throughout the study area.

According to internationally recognised water availability indicators, including the methodology adopted by the Forum on Natural Resources (1989)⁵, Kosovo falls below the commonly referenced threshold of **1,700 m³ of renewable water resources per capita per year**, indicating relatively limited renewable freshwater availability. Similar findings are presented in the **World Bank Water Security Report (2018)** and the **Kosovo Water Strategy 2017–2035**. These references provide contextual information supporting the need for integrated water resources management but do not constitute an assessment of legal obligations or institutional performance.

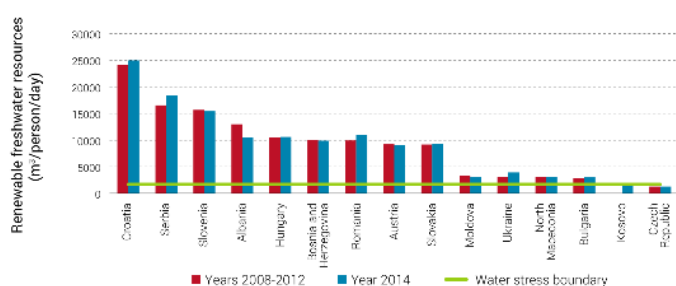


Figure 5. Water stress (World Bank Group, 2018)

⁵ (Falkenmark, 1989)

Land cover analysis

Population density in Kosovo is among the highest within the Western Balkans, averaging approximately **147 inhabitants per km²**. Combined with relatively limited land and freshwater resources, this spatial distribution represents an important consideration for long-term environmental planning.

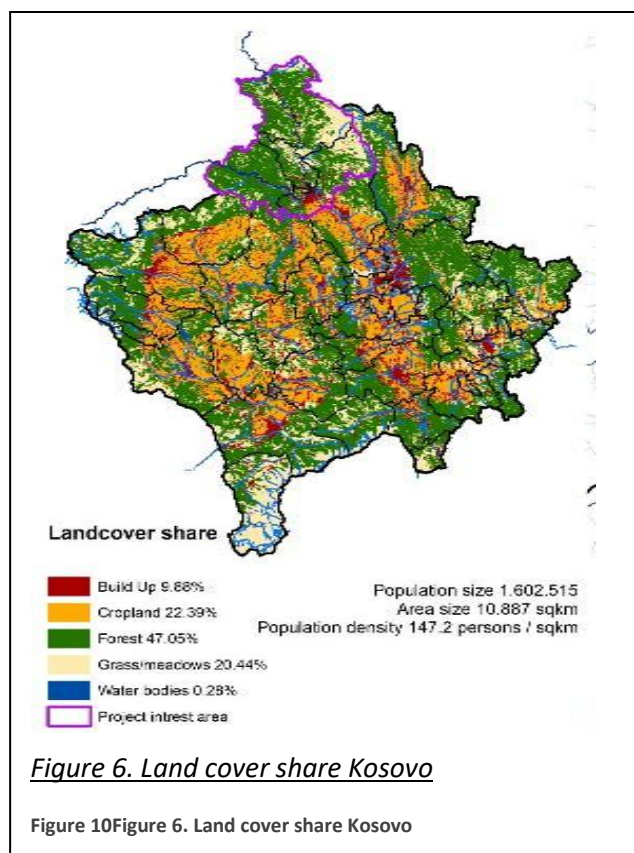
Forest ecosystems occupy approximately **50%** of Kosovo's territory, while settlements and agricultural land together account for approximately **32%**. Grasslands, shrublands and other open land cover types represent approximately **20%** of the territory.

The observed land-use pattern reflects a combination of geomorphological conditions, climatic characteristics and historical patterns of economic development. Spatial analysis indicates that the concentration of settlements and industrial activities within the central lowland areas has increased pressures on terrestrial and aquatic ecosystems, particularly surface water and groundwater resources.

Within the project area, mountainous terrain results in a greater proportion of forest cover, natural grasslands and water bodies compared with the national average. Population density is generally lower than in central Kosovo. However, the area contains a number of legacy industrial and mining sites, including brownfield locations, tailings deposits and former processing facilities. These locations were identified during desk research as environmental features

requiring further investigation because of their proximity to watercourses and groundwater resources.

Field observations indicate that urban expansion is most evident in the municipalities of South Mitrovica and North Mitrovica. Development patterns have occurred alongside the continued presence of former industrial areas and associated infrastructure. These characteristics should be considered during future environmental restoration and land-use planning.



#	Land Cover	AREA sqkm	Percentage	Avg sqm/capita
1	Built area	1075,29	9,9%	671,00
2	Cropland	2437,77	22,4%	1521,21
3	Forest	5122,69	47,1%	3196,65
4	Industry	0,58	0,0%	0,35
5	Grassland	2225,61	20,4%	1388,82
6	Open range	5,63	0,1%	3,51
7	Water bodies	30,99	0,3%	19,34

Table 2. Kosovo land cover area (atlas ESRI / ASK data)



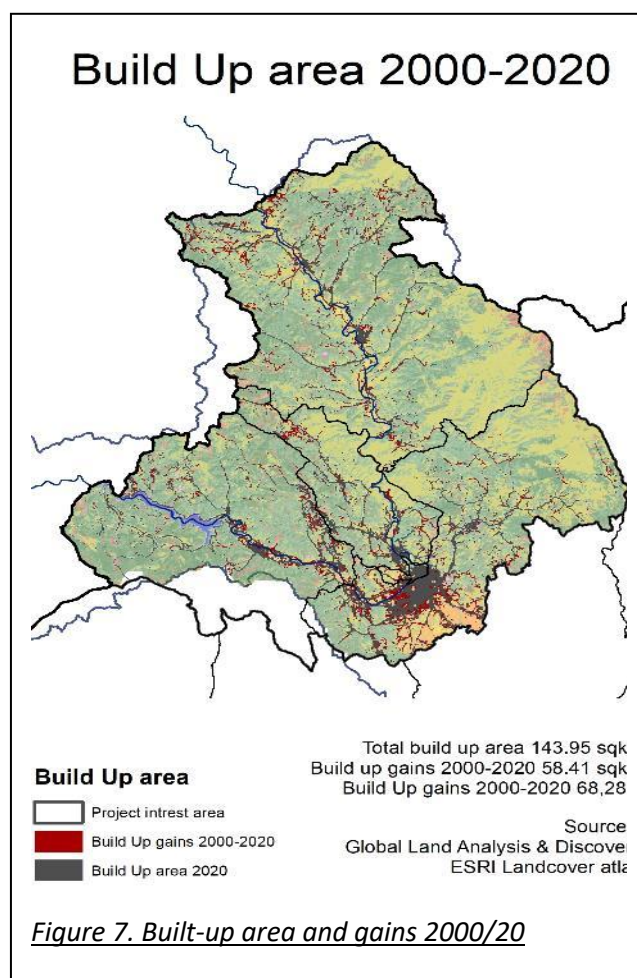
Identification of pollution point sources was based on a combination of desk research and systematic field observations. Field surveys targeted visually identifiable sources of environmental pressure, including illegal waste disposal sites, wastewater discharge points, mining and industrial legacy sites, tailings, and other locations where direct evidence of pollution was observed. Locations were selected based on their visibility in the field, accessibility, proximity to rivers and streams, and information obtained through available municipal documentation and previous environmental studies. All observations were georeferenced using GPS and verified through GIS analysis. The purpose of the assessment was to document existing pollution point sources rather than to establish a formal remediation priority ranking.

Build-Up area and demography

Historical demographic and economic development has been accompanied by substantial urban expansion throughout Kosovo. Spatial analysis indicates that the most intensive urban growth has occurred within central Kosovo, where demand for water resources has also increased. Historical investment in regional water infrastructure, including the Ibar/Ibër–Lepenac/Lepenc system, reflects this spatial distribution of population and economic activity.

Urban development has been accompanied by observable changes in land use, including the conversion of agricultural land, modification of riverbanks, reduction of wetlands and flood retention areas, and increasing demand for water supply, energy and transport infrastructure. These changes have also increased pressure on existing public infrastructure in several municipalities.

Field observations indicate that urban expansion extends beyond established urban centres into surrounding natural landscapes, including areas of ecological importance. The present assessment records these observed land-use changes but does not evaluate planning decisions or regulatory compliance.



Available economic data, including the OECD Competitiveness Outlook 2024⁶, indicate that a significant proportion of foreign direct investment in Kosovo has been concentrated in the construction and real-estate sectors. Spatial analysis suggests that continued expansion of built-up areas has coincided with reductions in agricultural land and other natural land cover classes in several locations within the study area.

(OECD, 2024)

According to the Global Land Analysis and Discovery (GLAD)⁷ dataset, built-up land increased from approximately 146 km² in 2000 to approximately 202 km² in 2020, representing an increase of more than 68% over two decades. Within the project area, field observations indicate that a proportion of this expansion has occurred in locations previously occupied by agricultural land and wetlands, particularly in and around Mitrovica. Population density within the project area remains below the national average at approximately 66 inhabitants per km², although local variations exist among municipalities. Built-up land accounts for approximately **11.4%** of the project area, compared with the national average of **9.8%**. This distribution reflects the historical concentration of mining, metallurgy and associated industrial activities.

The study documents several active and legacy industrial locations that may warrant further investigation because of their proximity to surface water and groundwater resources. The present inventory should therefore be considered a baseline for future site-specific assessments and more comprehensive investigations of potential pollution point sources.

Municipality		Area Sqkm	PoP density
North Mitrovica	Mitrovica V.	5	1584
Kosovo Polje	Fushë Kosovë	84	761
Mamuša	Mamushë	11	510
Priština	Prishtinë	523	435
Mitrovica	Mitrovicë J	331	196
Štrpce	Shtërpçë	248	43
Ranilug	Ranillug	78	32
Zvečan	Zveqan	123	23
Novo Brdo	Novobërdë	204	22
Leposavić	Leposaviq	539	18
Zubin Potok	Zubin Potok	334	10

Table 3. Population density (atlas ESRI / ASK data)

Forest sector

⁷ (Potapov, 2000-24)



Forests play an important role in watershed protection, soil conservation, carbon storage, biodiversity conservation, and the regulation of hydrological processes. In addition to providing habitat for terrestrial species, forest ecosystems contribute to groundwater recharge, protection of spring catchments, erosion control, and the long-term resilience of freshwater systems.

According to the **ESRI Land Cover Atlas⁸** (GIS area-weighted calculations), forests cover approximately **47.05%** of Kosovo's territory, exceeding the global average forest cover of approximately one-third of total land area . However, forest availability per capita in Kosovo is estimated at **0.32 hectares per inhabitant**, compared with the global average of approximately **0.52 hectares per inhabitant⁹** . Table 4 presents the distribution of forest resources across the municipalities included in this assessment.

The project area is characterised by extensive forest cover. Based on available spatial data, the municipalities of **Zubin Potok**, **Leposavić/Leposaviq** and **Zvečan/Zveçan** have the highest forest area per capita within the study area, while **North Mitrovica** records the lowest value due to its relatively small administrative area and higher population density.

Municipality		Area sqkm	Population 2024	Forest Area sqkm	Sqm per capita
Zubin Potok	Zubin Potok	334	3385	276,13	81575
Leposavić	Leposaviq	539	9485	324,73	34236
Zvečan	Zveqan	123	2867	75,99	26505
Novo Brdo	Novobërdë	204	4493	101,38	22564
Ranilug	Ranillug	78	2481	39,51	15927
Štrpce	Shtërpçë	248	10771	160,04	14858
Kamenica	Kamenicë	417	22868	262,78	11491
Mitrovica	Mitrovicë	331	64742	162,21	2505
Mamuša	Mamushë	11	5607	1,65	294
Kosovo Polje	Fushë Kosovë	84	63949	14,93	233
North Mitrovica	Mitrovica V.	5	7920	0,88	111

Table 4. Ranking municipalities Forest land cover / capita (Land cover atlas ESRI / ASK data)

⁸ Esri. (2024). (ESRI, 2024). Environmental Systems Research Institute (Esri)

⁹ (ESRI, 2024)

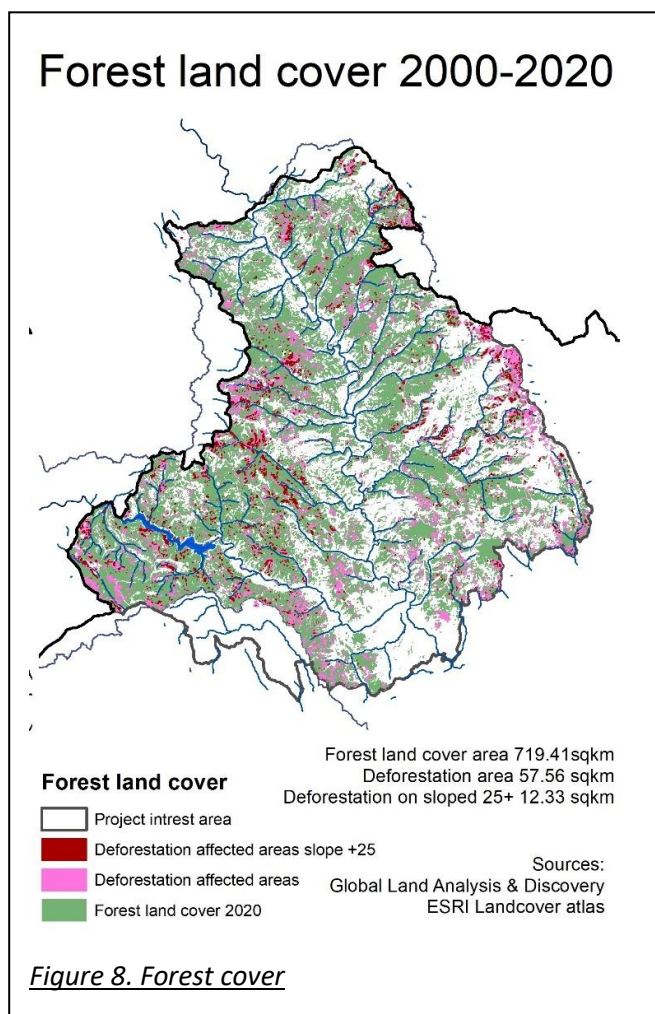


Forest ecosystems are recognised internationally as an important component of climate change mitigation and adaptation. They contribute to greenhouse gas sequestration, reduce soil erosion, regulate surface runoff, support groundwater recharge, and provide ecosystem services that improve environmental resilience. Urban forests and other green infrastructure are also increasingly recognised as Nature-Based Solutions (NBS) for reducing urban heat island effects and improving local environmental conditions.¹⁰

Spatial analysis using the **Global Land Analysis & Discovery (GLAD)** dataset was undertaken to assess changes in tree cover between 2000 and 2020 (Figure 16).¹¹ The analysis indicates a total recorded tree cover loss of approximately **57.56 km²** during the observed period. Approximately **20%** of the recorded loss occurred on terrain with slopes exceeding **25 degrees**.

Field observations and spatial analysis indicate that deforested areas located on steeper terrain may be more susceptible to soil erosion, slope instability and altered surface runoff patterns. These changes may also influence groundwater recharge processes and the hydrological conditions supporting local springs.

Desk research and field observations further indicate that several local communities have reported reduced spring discharge or seasonal drying of previously utilised water sources. The present assessment records these observations as indicators that may warrant further hydrological investigation. The study does not establish a direct causal relationship between observed forest cover changes and variations in spring discharge, as such an assessment would require long-term hydrological monitoring.



¹⁰ (IUCN, 2020)

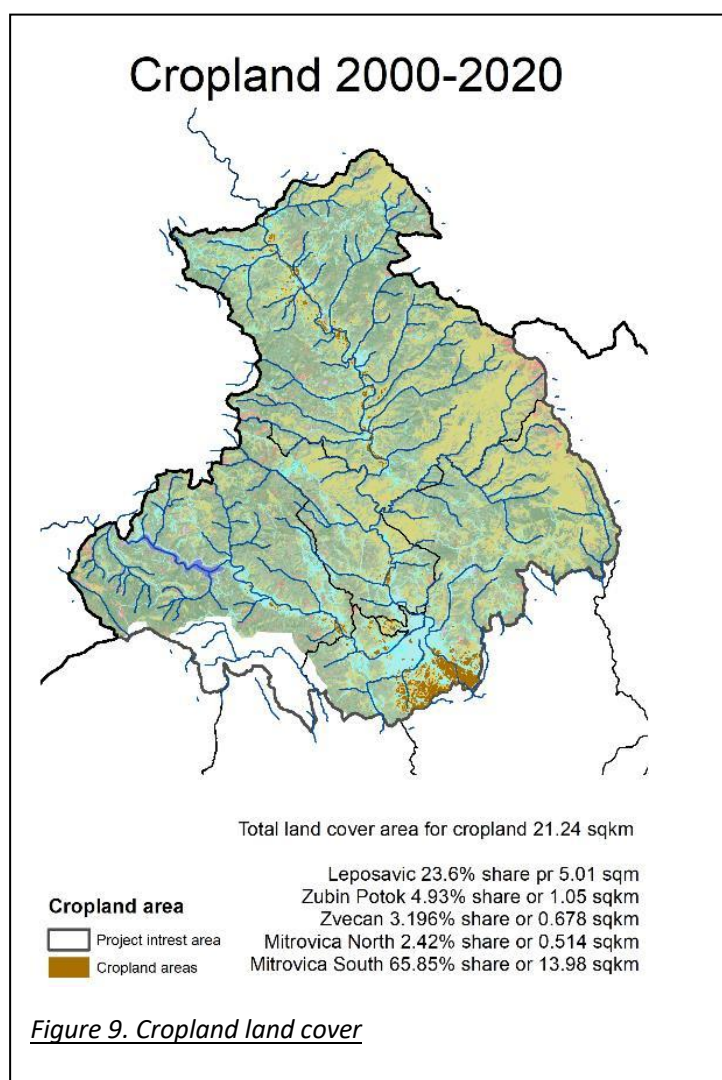
¹¹ (Potapov, 2000-24)

Agrarian land use

Agriculture remains one of Kosovo's principal economic sectors and represents an important source of employment and rural livelihoods. According to the **2024 Population and Agriculture Census (Kosovo Agency of Statistics)**, Kosovo contains approximately **129,220 registered agricultural households**.¹² The scale and spatial distribution of agricultural activity make the sector an important consideration in the assessment of water demand, land use and potential diffuse pollution sources.

Within the project area, agricultural land occupies a relatively small proportion of total land cover compared with the national average. Of the approximately **21.24 km²** of mapped cropland within the study area, around **65%** is located in the Municipality of **South Mitrovica**.

The national average availability of cropland is estimated at approximately **2,438 m² per capita**. All municipalities included in this assessment record values below the national average. Comparative municipal values are presented in Table 5.



¹² (data A. , 2025)

Municipality		Area sqkm	Population 2024	Crops sqkm	Crops area %	Sqm per capita
Ranilug	Ranillug	78	2481	15,89	20,37%	6403
Klokot	Klllokot	23	3041	15,71	68,30%	5165
Istok	Istog	454	33008	156,73	34,52%	4748
Zubin Potok	Zubin Potok	334	3385	3,24	0,97%	957
Leposavić	Leposaviq	539	9485	6,93	1,29%	731
Zvečan	Zveqan	123	2867	1,84	1,50%	643
Prizren	Prizren	627	147246	85,02	13,56%	577
Mitrovica	Mitrovicë	331	64742	21,18	6,40%	327
Priština	Prishtinë	523	227466	41,54	7,94%	183
S. Mitrovica	Mitrovica V.	5	7920	1,36	27,27%	172
Dragaš	Dragash	434	28896	1,45	0,33%	50

Table 5. Ranking municipalities Crops land cover / capita (Land cover atlas ESRI / ASK data)

Agricultural production is recognised as a significant water user. Field observations and desk research indicate that agricultural activities may influence both water abstraction and water quality, depending on farming practices, irrigation methods, fertiliser application, pesticide use, and soil management. These factors should therefore be considered in future integrated water resources management planning.

Spatial analysis indicates that, during the last two decades, agricultural land has experienced conversion to residential, commercial and other developed land uses in several parts of Kosovo. This trend is particularly evident in areas surrounding larger urban centres. Changes in land use may alter soil permeability, increase surface runoff, reduce groundwater infiltration, and modify local hydrological conditions.

Within the project area, agricultural holdings are predominantly small and medium-sized. This structure presents both challenges and opportunities from an environmental management perspective.

Observed management considerations

Farm structure

Small and medium-sized agricultural holdings may face constraints related to production efficiency and economies of scale. At the same time, their relatively limited size may facilitate site-specific soil management, environmental monitoring and the implementation of sustainable agricultural practices.

Agricultural inputs

Desk research indicates that the management of fertilisers and plant protection products represents an important consideration for soil and water quality protection. Appropriate storage, application and

monitoring of agricultural inputs are recognised as measures that may reduce nutrient losses and minimise diffuse pollution reaching nearby watercourses.

Land management

The absence of extensive monoculture systems within most of the project area contributes to greater landscape diversity. This land-use pattern may provide opportunities for improved soil conservation, sustainable crop management and targeted environmental monitoring at the farm level.

Industrial legacy

Kosovo has a long history of mineral extraction and metallurgical production, which has played an important role in the country's industrial and economic development. Historical mining and processing activities contributed to the establishment of industrial infrastructure, employment opportunities and the development of settlements associated with the extractive sector.

During the twentieth century, mining and metallurgical production expanded considerably in scale. Spatial analysis indicates that industrial growth was accompanied by the development of new residential areas and supporting infrastructure in close proximity to mining and processing facilities. In several locations, these developments occurred within catchments where freshwater resources and other environmental assets are limited.

Mining and mineral processing activities involve excavation, handling and storage of large quantities of earth materials. Depending on the geological characteristics of the extracted material, exposure of waste rock, tailings and processing residues to weather conditions may influence soil, surface water and groundwater quality. In many mining operations, only a proportion of the extracted material becomes a final product, while the remaining material is stored as waste rock or tailings requiring long-term environmental management.

Desk research identified numerous active and legacy mining and industrial sites within Kosovo that are associated with historical waste deposits, tailings facilities and former processing infrastructure. These locations represent environmental features that may require continued monitoring because of their proximity to surface watercourses and groundwater resources.

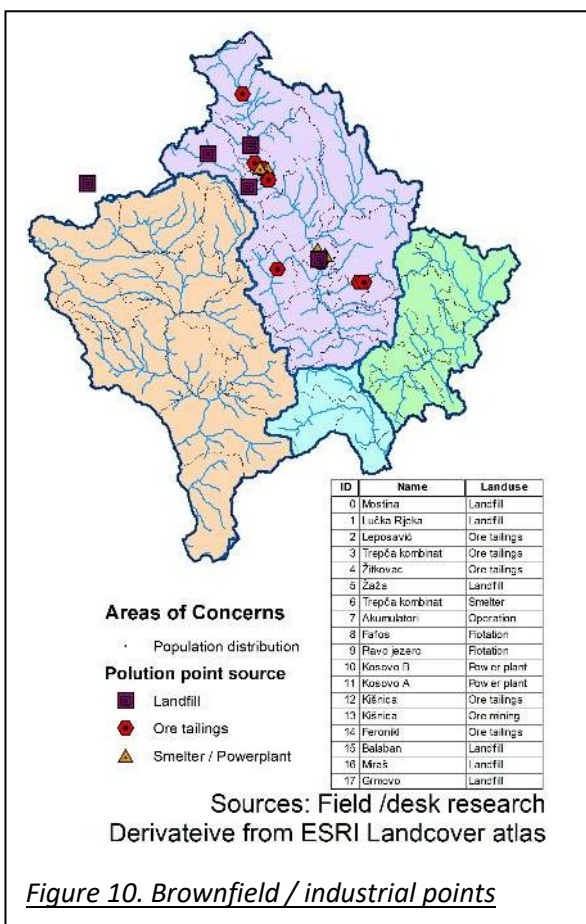


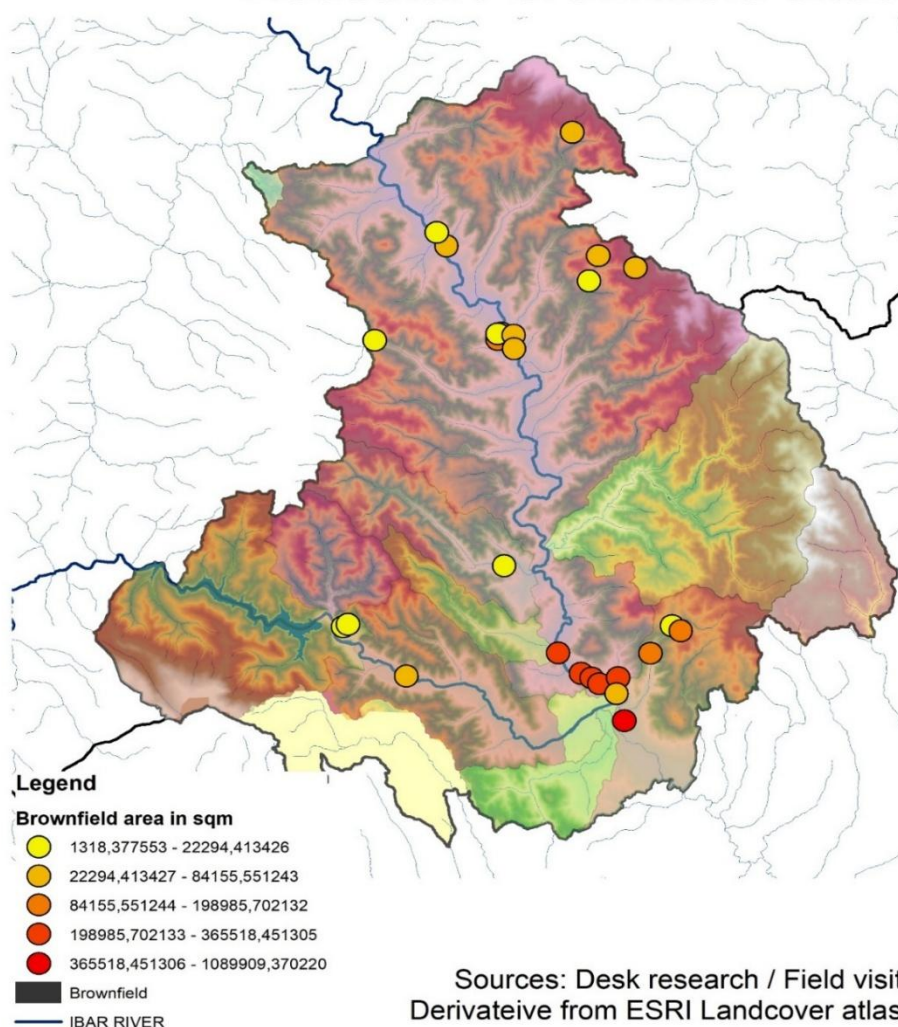
Figure 10. Brownfield / industrial points



Previous scientific studies and reports have documented environmental concerns associated with historical mining and metallurgical activities in several locations in Kosovo (UNEP, 2000;¹³ Protano et al., 2021¹⁴) These references provide important contextual information for understanding the historical development of industrial areas. The present assessment does not evaluate health impacts or establish causal relationships between environmental conditions and specific health outcomes.

Available information indicates that remediation of legacy industrial sites represents a long-term environmental management challenge requiring substantial technical, institutional and financial resources. The present study documents observed conditions and identified pollution point sources and does not assess future remediation priorities or institutional responsibilities.

Industrial / brownfield sites



¹³ (UNEP, 2000)

¹⁴ Protano, G., Di Lella, L. A., & Nannoni, F. (2021).

Field/location visits records

Field investigations represented one of the principal components of this assessment. Site visits were conducted during **November and December 2025**, when seasonal vegetation conditions provided improved visibility and accessibility for the identification of potential pollution point sources.

Field observations focused on documenting the location and characteristics of visible pollution point sources within the project area. Geographic coordinates, waypoints and field tracks were recorded using a **Garmin eTrex Vista C** Global Positioning System (GPS) device and subsequently processed using **ArcGIS** and **Google Earth** software for spatial analysis and mapping.

The following figure presents the original GPS waypoint and track records collected during field surveys without post-processing modifications.

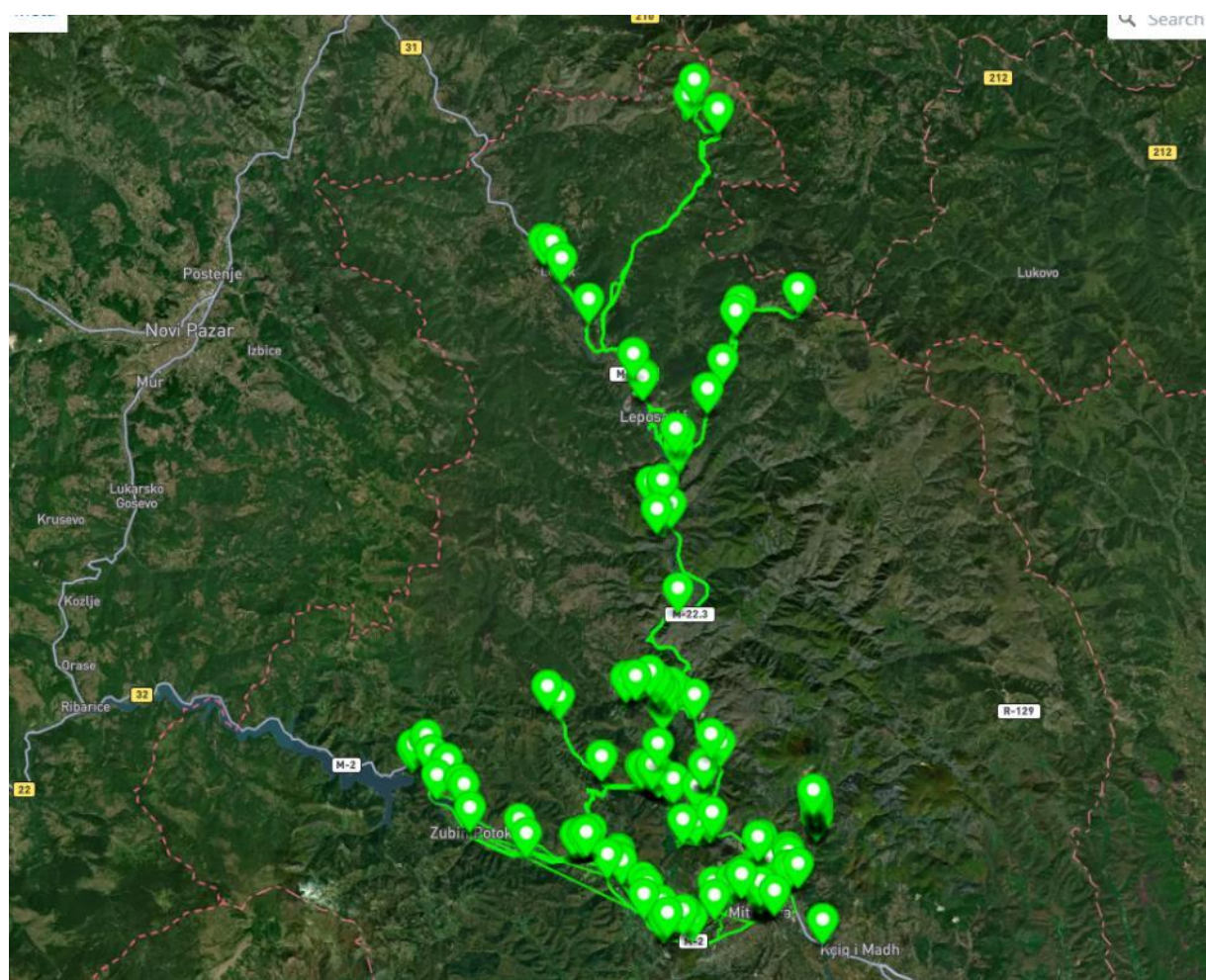


Figure 11. Unedited GPS records of field survey

Sewer Work Inventory - General Recommendations

The field assessment identified the need for a more comprehensive inventory of sewer infrastructure and pollution point sources throughout the project area. Available information differs considerably among municipalities with respect to completeness, level of detail and data standardisation, which may limit its application in future wastewater infrastructure planning.

The recommendations presented below are intended to support the future development of a harmonised wastewater information system. They represent planning recommendations based on field observations and desk research and should not be interpreted as regulatory requirements.

1. Sewer network inventory

The first recommended activity is the development of a standardised inventory of underground sewer infrastructure and associated discharge points.

Existing information is available within municipalities and utility companies responsible for operation and maintenance of sewer systems. However, desk research indicates that datasets vary in structure, completeness and attribute quality, reducing interoperability between municipalities.

A standardised inventory could include information on:

- sewer network alignment;
- pipe materials;
- pipe dimensions and capacity;
- operational status;
- discharge locations;
- stormwater, combined and sanitary sewer classification.

Harmonised data collection procedures, supported by common technical standards and staff training, would improve the consistency and long-term usability of municipal wastewater information. Existing digital datasets may also be incorporated where appropriate following quality control and standardization.

Training of municipal personnel together with provision of appropriate surveying equipment, GIS software and GPS devices could further strengthen local data management capacity.

2. Inventory of Individual Effluent Discharge Points

Field observations indicate that a substantial proportion of wastewater discharges originate from residential, commercial and other privately managed properties. Consequently, comprehensive documentation of discharge locations represents an important component of future wastewater management planning.



The assessment recommends consideration of a voluntary information collection mechanism through which property owners, businesses and other wastewater generators could provide information regarding the type and location of wastewater discharge connections.

The primary objective of this activity would be to establish a reliable technical database describing whether wastewater is discharged through:

- the public sewer network;
- septic tank systems; or
- direct discharge to surface waters where applicable.

Any future implementation of such a mechanism should ensure transparency, clear communication of objectives and appropriate protection of submitted information in accordance with applicable legislation and institutional procedures.

The assessment does not recommend enforcement activities within the scope of this project. Rather, the proposed approach is intended to support the collection of technical information necessary for long-term wastewater infrastructure planning.

Potential implementation measures could include awareness campaigns, technical guidance and, where appropriate, financial or administrative incentives encouraging voluntary participation. Decisions regarding incentive mechanisms would require separate policy consideration and are therefore outside the scope of this assessment.

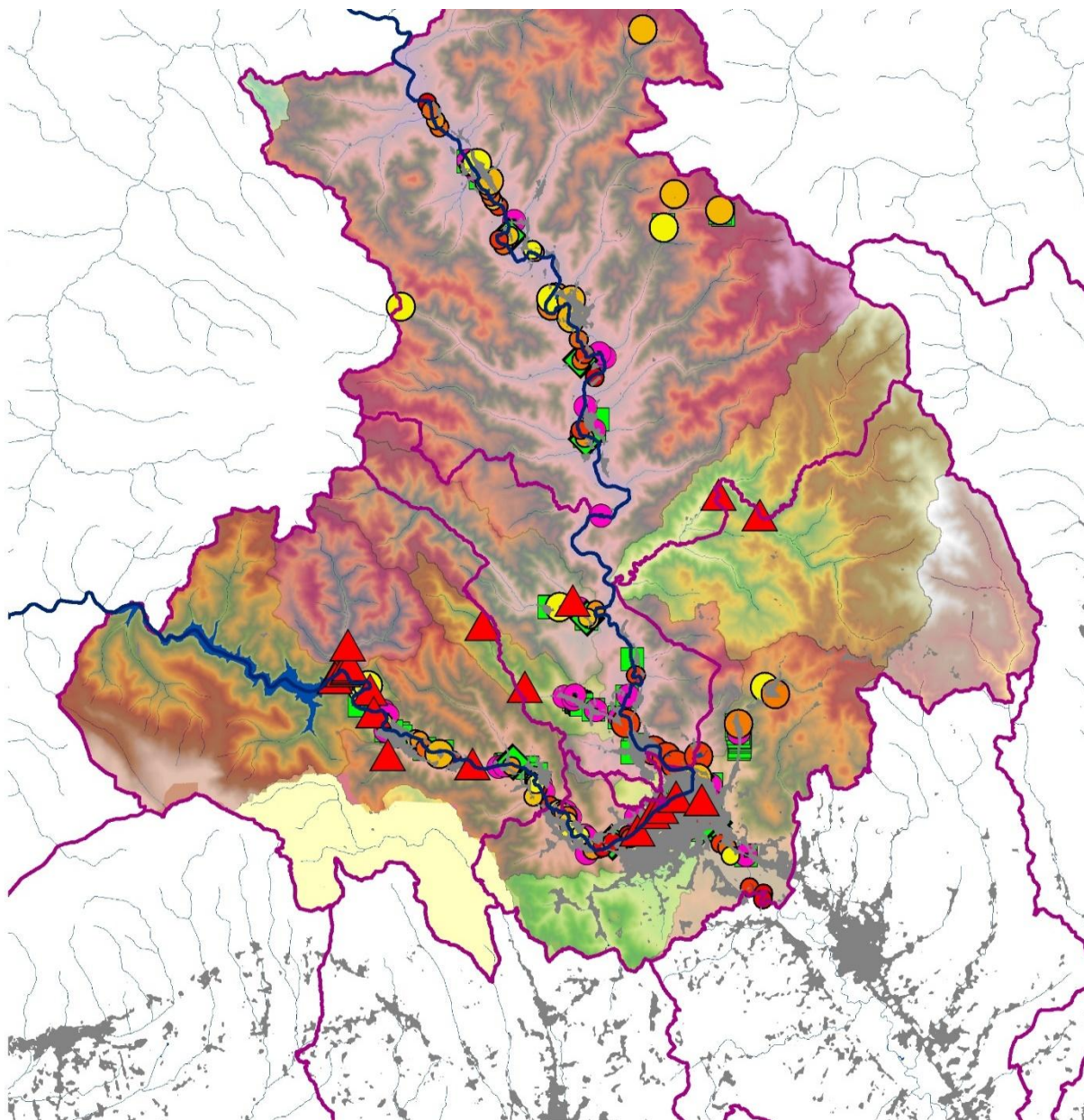
If implemented, coordination between municipal sewer network mapping and voluntary discharge-point reporting could improve the completeness of the overall wastewater inventory and provide a stronger technical basis for future wastewater treatment planning.

The information collected through such an inventory may also support future environmental planning activities, including groundwater abstraction inventories, stormwater management, impermeable surface assessments and other components of integrated water resources management.



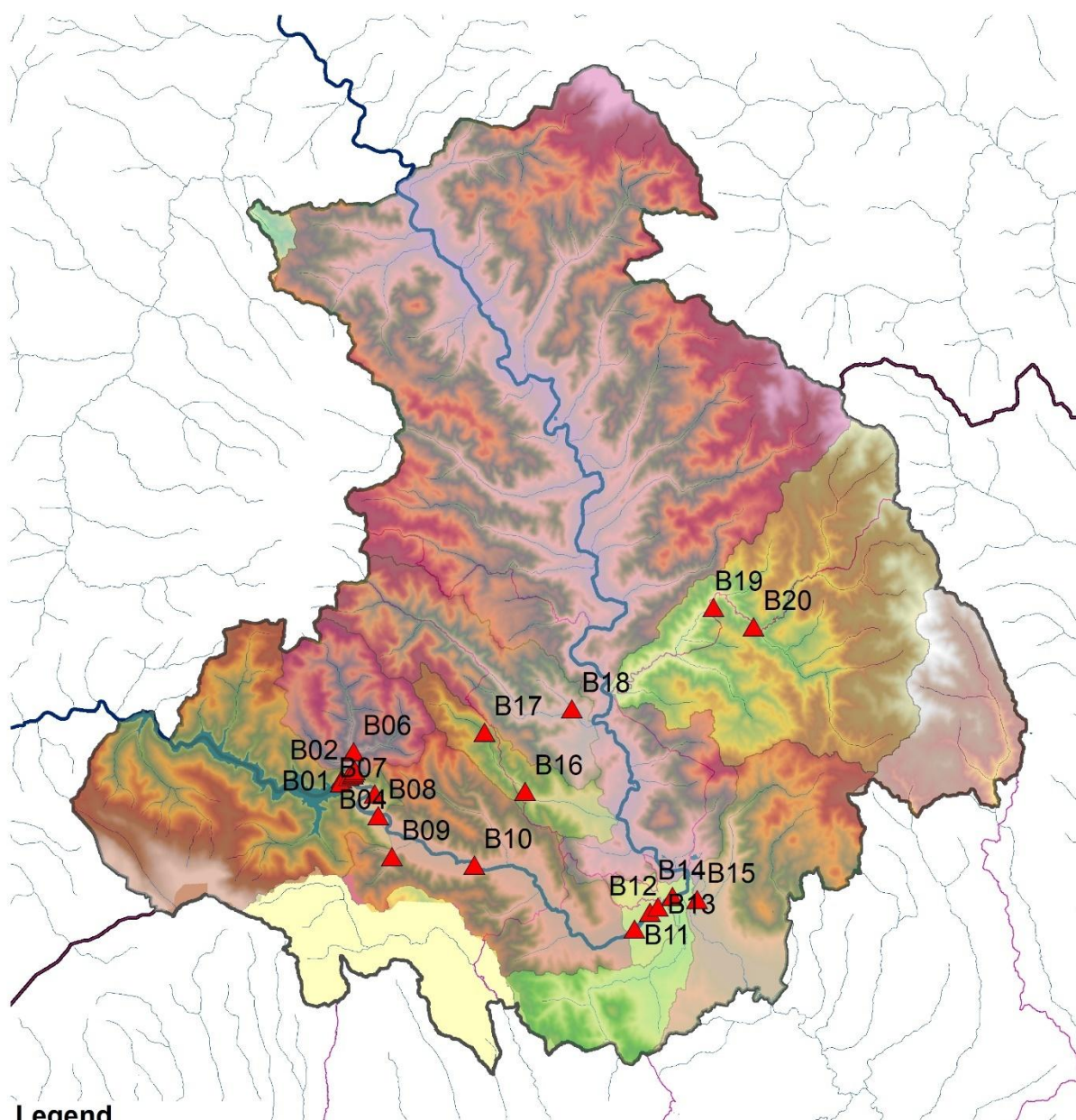
Potential project and activity pipeline

This segment is to be used for the communication and outreach activities of the project toward local institutions in the project interest area



Water barrier

Water barriers



Legend

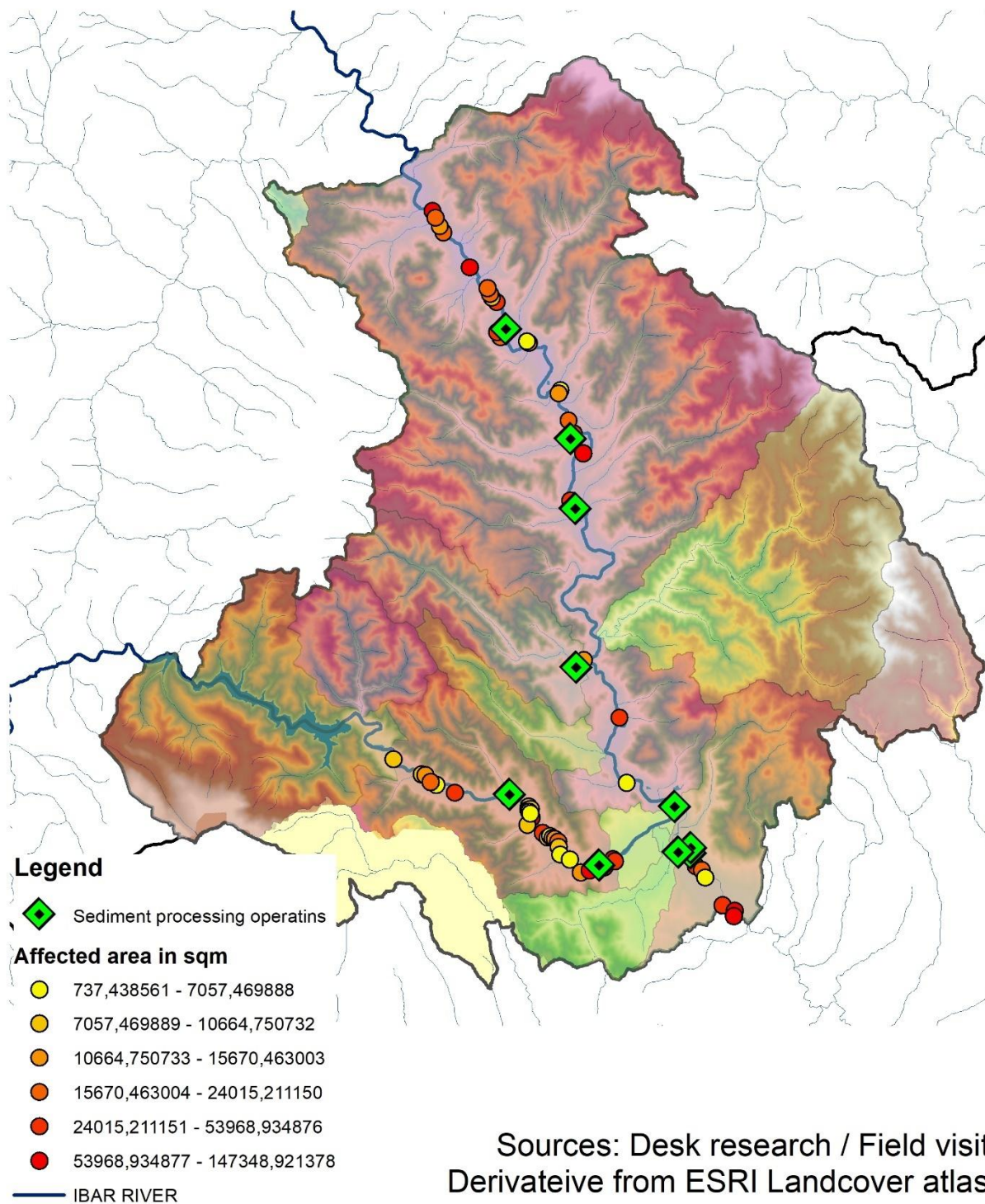
- ▲ Water barriers
- IBAR RIVER
- Project interest area
- Municipal boundaries

Sources: Desk research / Field visit
Derivateive from ESRI Landcover atlas



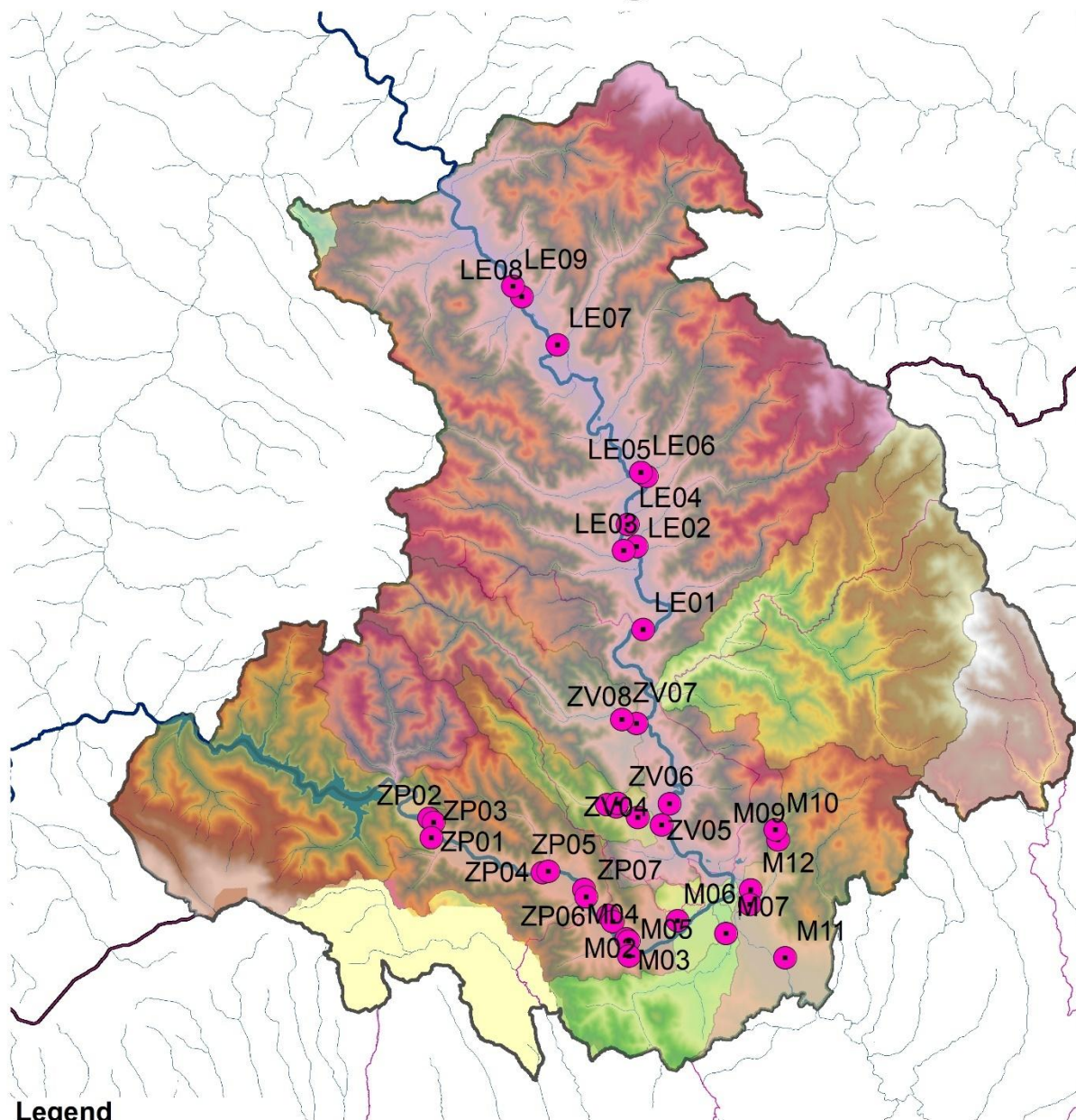
Sand mining

Sediment extraction



Illegal landfills

Illegal landfill sites



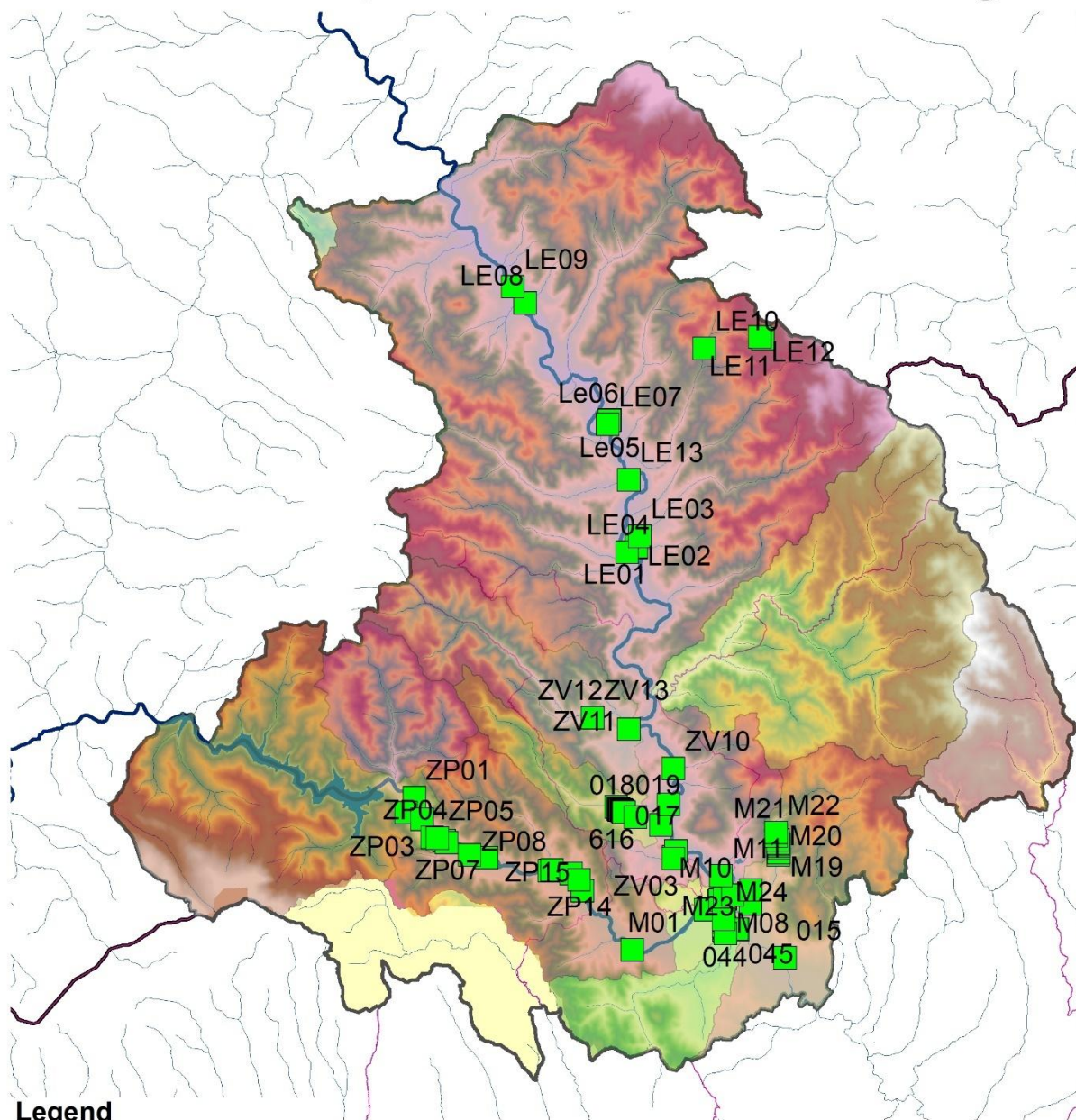
Legend

- Illegal Dump Sites
- IBAR RIVER
- Project interest area
- Municipal boundaries

Sources: Desk research / Field visit
Derivateive from ESRI Landcover atlas

Discharges into the river

Pollution point source discharges



Legend

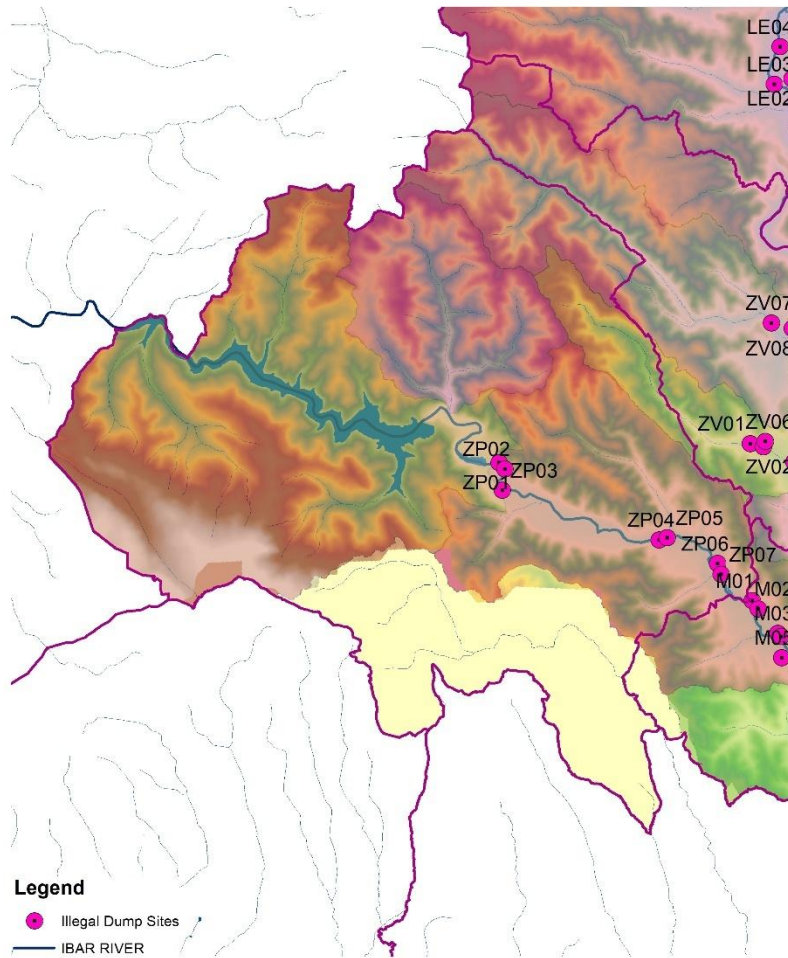
- PollutionPointSourceWater
- IBAR RIVER
- Project interest area
- Municipal boundaries

Sources: Desk research / Field visit
Derivateive from ESRI Landcover atlas

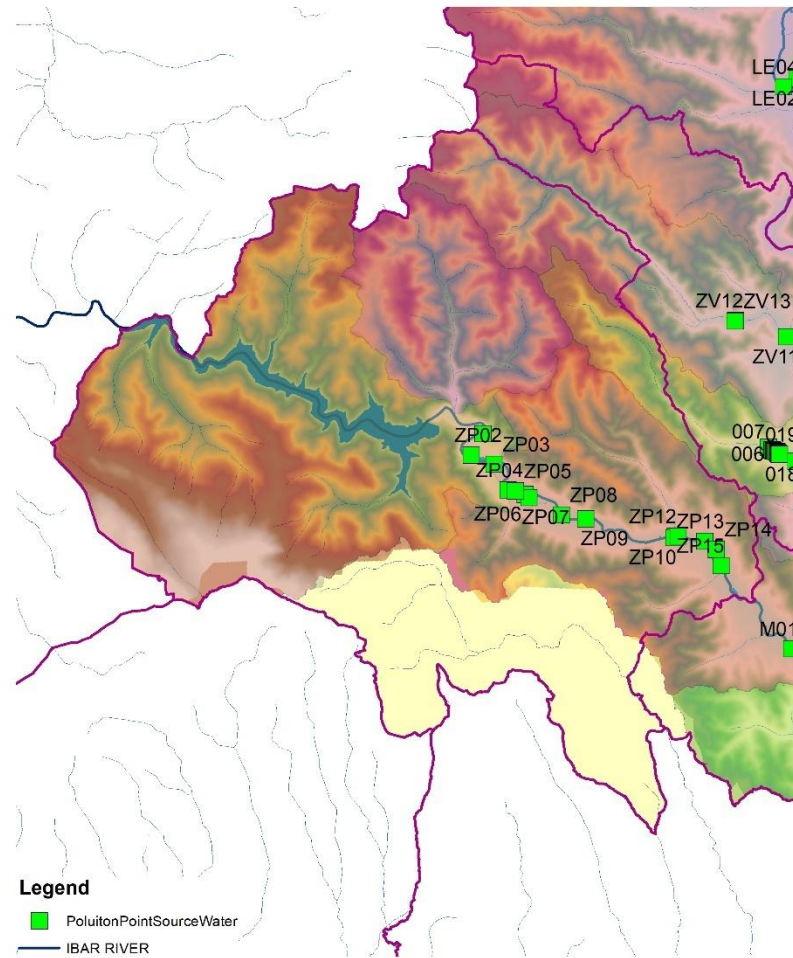


Municipality of Zubin Potok

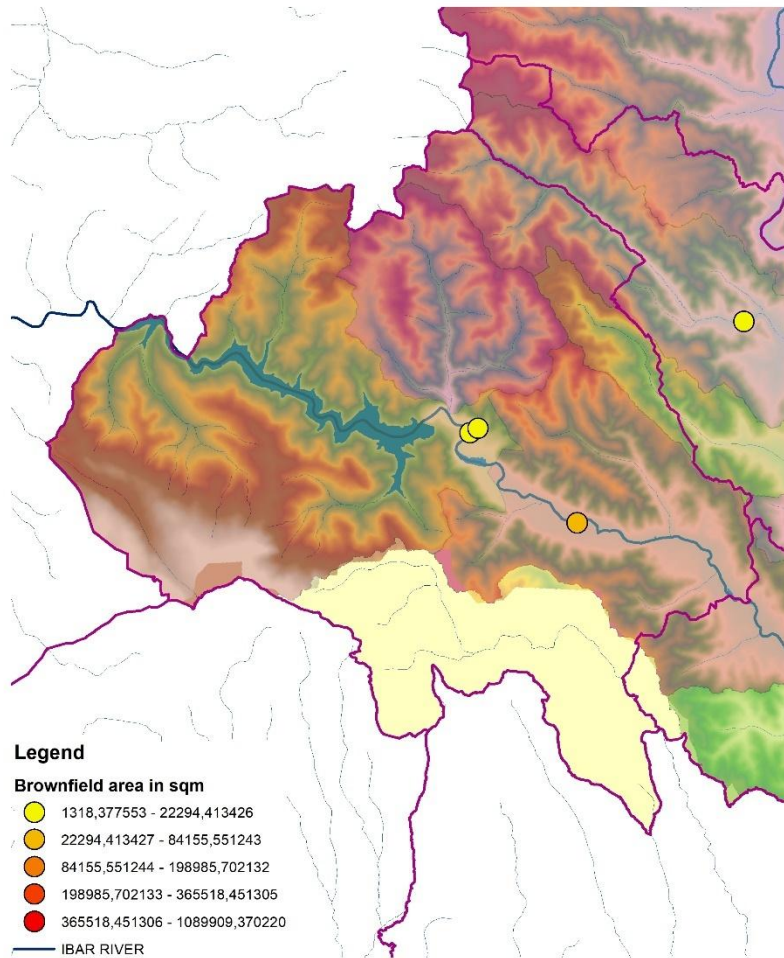
Zubin Potok/Illegal landfil sites



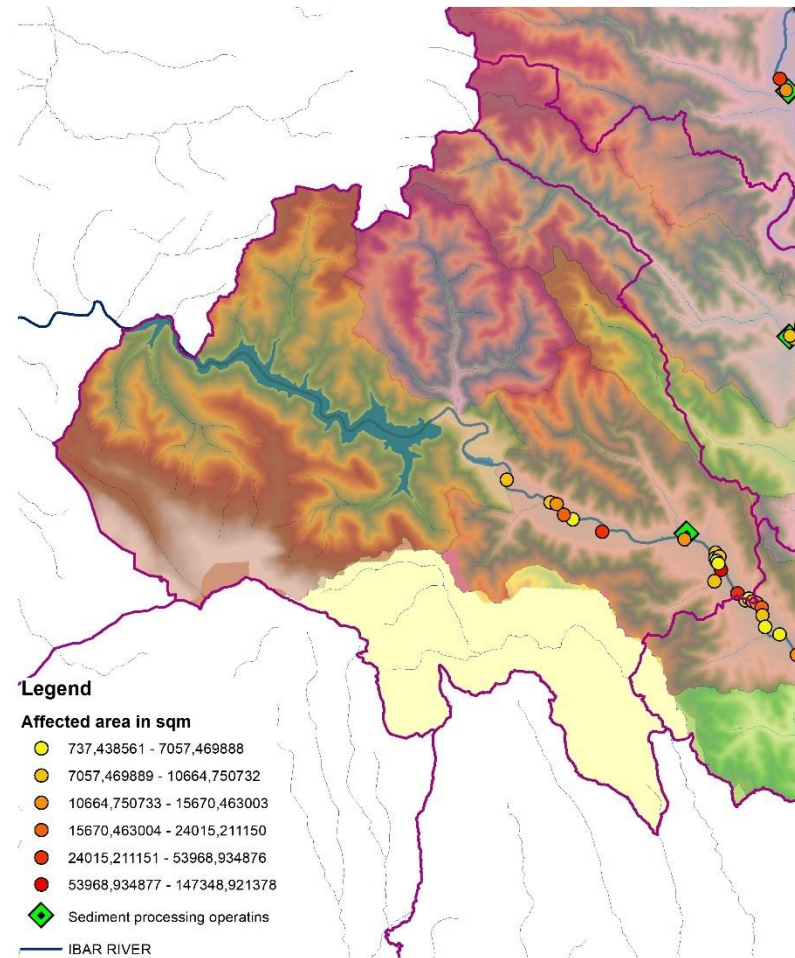
Zubin Potok/Pollution discharges



Zubin Potok/Industry brownfields



Zubin Potok/Sediment extraction



Wastewater management

#	Action	Issues	Proposed activity	Activity	Source of funding
1	Pollution point source inventory	The assessment recommends establishing a standardised pollution point source inventory to provide a technical baseline for future wastewater management planning. A voluntary reporting mechanism, combined with municipal infrastructure mapping, could improve the completeness and reliability of available data.	Implement a two-year programme to establish a baseline inventory of pollution point sources across the participating municipalities.	Develop a voluntary self-reporting mechanism for identifying wastewater discharge points and sewer network connections. Municipal authorities would simultaneously prepare an underground sewer infrastructure inventory and mapping database. Participation could be supported through awareness activities and appropriate incentive mechanisms, where considered suitable by the competent authorities.	Municipal budgets; Ministry of Environment and Spatial Planning (MESP); EU IPA programmes
2	Sewer network mapping		Develop a comprehensive sewer network mapping programme covering existing wastewater infrastructure within the municipality.		
3	Putting the newly built (Waste Water Treatment Plant) in operation mode	Three wastewater treatment plants constructed after 2020 were observed to be non-operational during the assessment period. Available information indicates that operation and maintenance requirements represent one of the factors affecting their commissioning.	Identify and establish a sustainable financing mechanism for the operation and maintenance of the newly constructed wastewater treatment facilities.	Develop a financial and institutional framework defining responsibilities for operation, maintenance and long-term management of the facilities in order to enable their full operational use.	Central institutions grant, or funds transfer to the municipality or other designated authority
4	Evaluation of Existing Septic Tanks	More than five older sedimentation tanks were identified within the municipality. Their current	Assess the condition of existing sedimentation tanks together with the associated sewer network in order to	Evaluate all identified facilities. Existing obsolete facilities at Gazivode/Ujmani and Velji Breg/ Breg i Madh could be	Central institutions grant to the municipality of Zubin Potok.

		technical condition and operational functionality require evaluation to determine whether rehabilitation, repurposing or decommissioning represents the most appropriate management option.	identify opportunities for upgrading existing wastewater infrastructure.	considered for decommissioning and safe closure, while three sedimentation tanks in Čabra/Çabra should undergo technical assessment to determine their potential for rehabilitation or upgrading.	Technical assistance from international sources
5	Eliminate the illegal landfill site	Illegal dumping sites identified during the assessment may contribute to environmental degradation and pose risks to surface water quality. Preventing the recurrence of illegal waste disposal is considered equally important as site rehabilitation.	Remove illegal dumping sites and implement accompanying public awareness and enforcement measures aimed at preventing future illegal waste disposal.	Carry out clean-up operations using appropriate machinery and transport equipment, followed by communication campaigns and enforcement activities designed to discourage repeated illegal dumping.	Central institutions grant to the municipality of Zubin Potok. Technical assistance from international sources

Monitoring activities

#	Action	Issues	Proposed activity	Activity	Source of funding
1	River and water bodies water levels	Field observations indicate that climate variability has altered historical hydrological patterns within the municipality. The January 2023 event at Gazivode/Ujmani Reservoir demonstrated the importance of continuous hydrological monitoring for water management and infrastructure safety.	Expand the hydrometric monitoring network to improve understanding of changing hydrological conditions and strengthen flood preparedness.	Install hydrometric monitoring stations at: 1. Lake of Gazivode/Ujmani 2. Lake of Pridvorica/Pridvoricë 3. Lake of Prelez/Prelez Monitoring data should be publicly available where appropriate and integrated into existing open-data systems managed by relevant water authorities.	Municipal funding and donor support, with operation and maintenance provided by the municipal directorate and relevant water management authorities.

2	River water quality monitoring	The Ibar/Ibër River within the Municipality of Zubin Potok currently represents an important upstream reference location for assessing water quality within the wider basin. Establishing long-term monitoring would provide valuable baseline information for evaluating downstream environmental changes.	Consider installing additional water quality monitoring stations to support integrated water resources management and long-term environmental assessment.	Installing 3 measuring stations on the Ibar/Ibër River measuring a wide range of effluents. 1. At the base of the Gazivode/Ujmani dam 2. Downstream from Zubodolska/ Zubodollit River in Zubin Potok 3. Borderline with the municipality of Mitrovica	Municipality / Donors Joint venture with the water authority
3	Groundwater monitoring	Reservoir regulation and reduced sediment transport may influence groundwater dynamics within the municipality. Continued monitoring would improve understanding of long-term groundwater trends and support sustainable water resource management.	Establish a groundwater monitoring network supported by a municipal groundwater inventory.	Register existing groundwater wells and install monitoring equipment, including pressure transducers, in selected wells located near the Ibar/Ibër River to monitor groundwater levels over time.	Municipality of Zubin Potok, Directorate for Environment, in possible cooperation with the university staff or NGOs
4	Aquatic ecosystem health	The municipality contains several artificial water bodies whose ecological balance requires continuous observation. The transboundary nature of the aquatic ecosystem and fish migration patterns increases the importance of coordinated monitoring.	Develop a long-term aquatic ecosystem monitoring programme in cooperation with local communities, fishing associations and scientific institutions.	Establish an outreach programme coordinated by the municipal environmental department with technical support from an external ichthyologist. Develop communication mechanisms and digital tools for collecting field observations and sharing ecological monitoring data.	Municipality of Zubin Potok, Directorate for Environment would be the custodian and project manager. A possible portal/server or other means could be established where the information would be shared and accumulated.

5	Monitoring of Aquatic Ecosystems in Tributaries	Several tributaries within the municipality contain important fish spawning habitats that contribute to the ecological integrity of the wider Ibar/Ibër River basin. Continued monitoring would support conservation and fisheries management.	Monitor priority tributaries and evaluate fish population dynamics, including the effectiveness of fish stocking programmes.	Implement annual monitoring of the Čečevska/ Çeçevës ,Lučka/ Lluçkarekë and Jagnjenica/ Jagnenicë rivers together with periodic assessment of fish stocking activities involving grayling and trout.	Municipality of Zubin Potok, Directorate for Environment in collaboration with the university, local NGOs and central institutions.
6	Bird monitoring	Bird populations represent useful indicators of freshwater ecosystem health. The municipality contains several aquatic habitats that support resident and migratory bird species.	Establish a municipal bird monitoring programme documenting bird populations associated with rivers, reservoirs and wetlands.	Bird action camera installed in water bodies and near the bird nesting areas (20+) Information billboard placement with the birds' spaces information for the tourists and amateur birdwatchers.	Municipality of Zubin Potok / donors / local NGOs Potential collaboration with the global conservation organization especially on migratory spaces monitoring and reporting (tag records/ registry)

Restoration activities

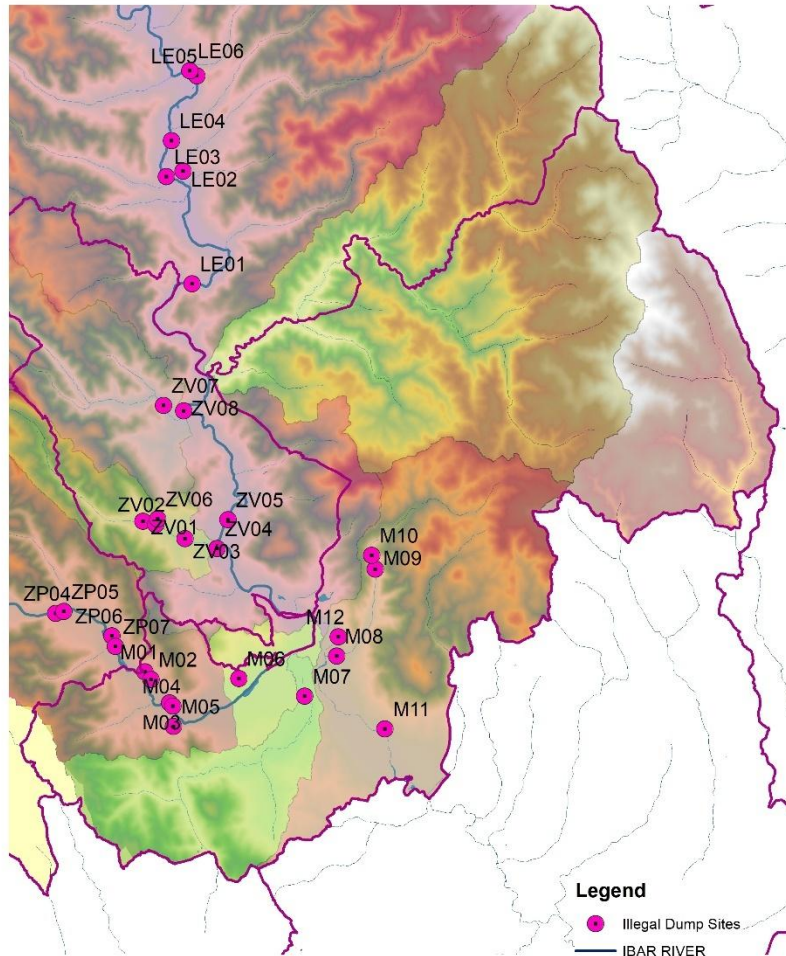
#	Action	Issues	Proposed activity	Activity	Source of funding
1	Sand mining area restoration	Sediment extraction was a historically profitable activity when agriculture was not. Today, commodity values skewed values in favour of agrarian activities. Zubin Potok has been affected by this activity, but not so much as in other municipalities. Nevertheless, even in less intense operation, effects are even more severe because there is no sediment transport to replace the deficit created.	Riparian area scars and soil and sediment extraction have to be restored to the shape, quality and condition of sound, undisturbed property in near proximity. This activity should be done to restore the land use area to the designated use (Agrarian land, pasture, floodplain, etc)	Mapping the critical areas of sediment extraction operation and estimating the level of damage. Cross-reference data with the ownership in order to allocate responsibility/beneficiary of the potential restoration activity. Floodplain definition and spatial planning techniques could be helpful as an NBS (Nature-Based Solution) testing	Central institution grants, international restoration and conservation programmes, including EU freshwater initiatives (INTERREG, RESTORIVER) and Nature-based Solutions programmes.
2	Forest sector	The forest sector has a critical role in the hydrological cycle. Forests conserve water and make springs hydrologically active over longer intervals. In the absence of forests, flashfloods and landslides would disrupt the waterways and make the water bodies shallow.	The assessment recommends reforestation of priority areas with native tree species to reduce erosion risk, improve slope stability and support watershed functions.	Indicative activity: planting approximately 20,000 native trees on public land and distributing approximately 30,000 seedlings for voluntary planting on private land, subject to site suitability and available funding.	A PPP project (Public-Private Partnership) could be an excellent testing ground for a municipality to develop skills in this type of investment product at minimal risk.

Conservation Activities

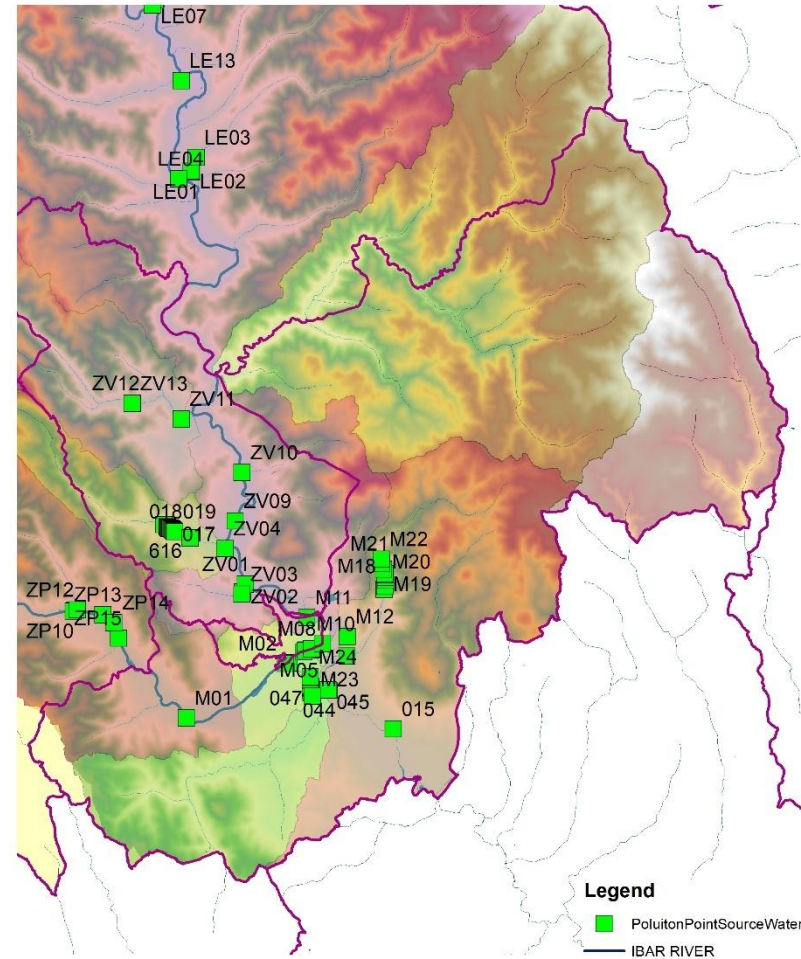
#	Action	Issues	Proposed activity	Activity	Source of funding
1	Cecevska Rijeka	This is the most potent river and direct tributary to the lake of Gazivode/Ujmani. It is the only significant river that has potential for fish spawning; thus, it is critical for the fish ecology and economy in the lake of Gazivode/Ujmani, under full control within the municipality of Zubin Potok	Designate this river sub-basin as the critical spawning area. The historical legacy of this river in power production has no value, and it would never have value that exceeds the benefits in environmental goods and services that could be yielded if the river subbasin were rewilded.	Assess the feasibility of restoring longitudinal river connectivity where technically, environmentally and legally appropriate.	Municipality of Zubin Potok capital investment with the assistance of a donor. International Freshwater Program available (ORP – open river program), Dam removal, etc.
2	Fish stoking	The Ibar/Ibër River has great potential in sport fly fishing. Due to the stable water temperature, fish spawning is not prominent. Subject to ecological assessment and fisheries management planning, seasonal fish stocking may be considered as one of several measures supporting fisheries management.	The Municipality of Zubin Potok have a local know-how and capacity in performance with these activities that have been productive in the past.	Develop a plan for seasonal fish stocking in volume, quantity, and location Place signs of fishing rules (catch and release, and designated authority to obtain the sport fishing license)	Municipality of Zubin Potok capital investment with the assistance of a donor.

Municipality of Mitrovica south

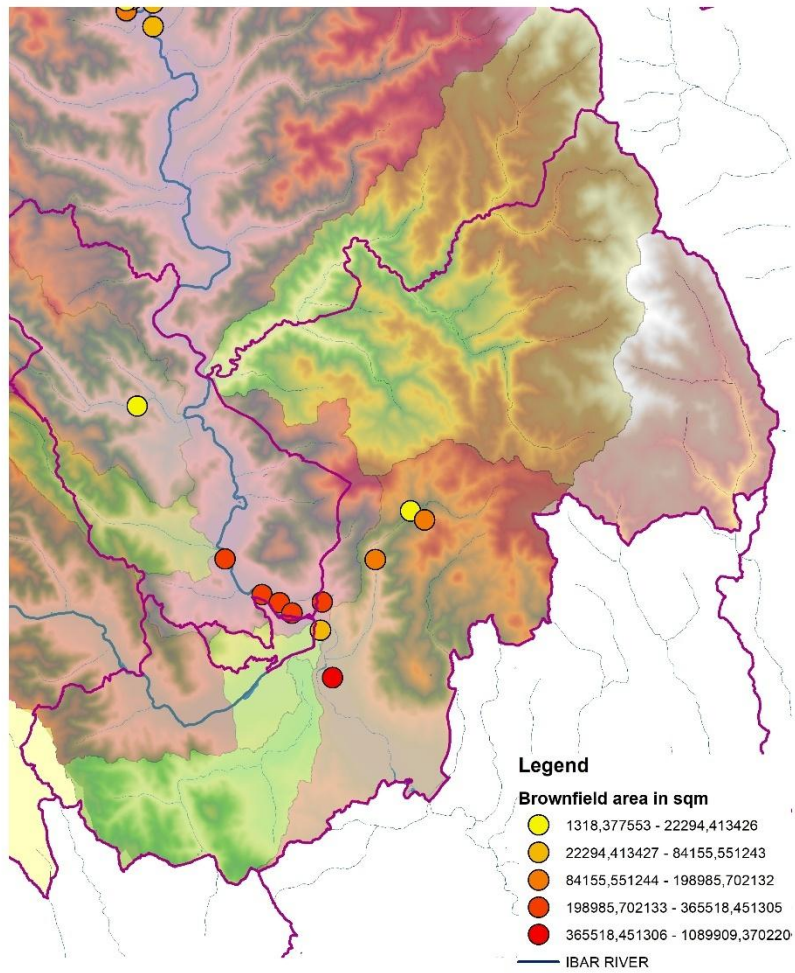
Mitrovica south/Illegal landfil sites



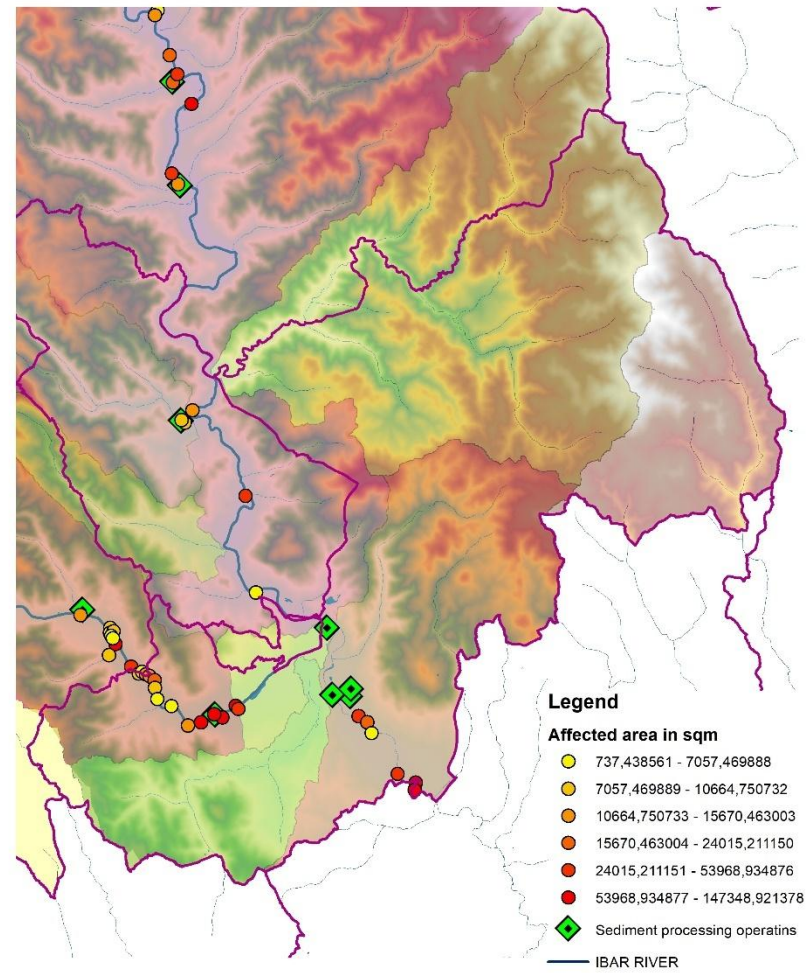
Mitrovica south/Pollution discharges



Mitrovica south/Industry brownfields



Mitrovica south/Sediment extraction



Wastewater management

#	Action	Issues	Proposed activity	Activity	Source of funding
1	Pollution point source inventory	This recommendation is described in a separate section of the report.	A two-year programme is recommended to establish a baseline database of pollution point sources for municipalities within the Ibar/Ibër River basin.	Develop a voluntary self-reporting mechanism for identifying wastewater discharge locations and sewer network connections. Municipal authorities would simultaneously prepare an underground sewer infrastructure inventory and mapping database. Participation could be supported through awareness activities and appropriate incentive mechanisms, where considered suitable by competent authorities	Municipal budgets; Ministry of Environment and Spatial Planning (MESP); EU IPA programmes
2	Sewer network mapping	Establishing a comprehensive pollution point source inventory is recommended to provide a consistent information base for future wastewater management planning. A voluntary reporting mechanism, combined with municipal infrastructure mapping, could improve the completeness and reliability of available data.	Develop a municipality-wide sewer network mapping programme to improve knowledge of existing wastewater infrastructure and support future planning activities.		
3	Industrial heritage pollution cadaster	Historical industrial and brownfield sites have been identified as potential pollution point sources that may influence water quality. Although the management of these facilities extends beyond municipal responsibilities, knowledge of their location and characteristics would support local environmental planning and mitigation measures.	Municipalities of Mitrovica North, Mitrovica South, Zvečan/Zveçan and Leposavić/Leposaviq, in cooperation with industrial site operators, could support the preparation of a comprehensive industrial heritage pollution cadaster.	Prepare an independent technical assessment of industrial pollution point sources to distinguish industrial discharges from the municipal wastewater system and provide information for future remediation planning.	Central institutions grant or funds transfer to the industrial complex operators, and/or municipalities where the industrial facilities are located.
4	Grmovo/	The Grmovo/ Gërmovë	Develop an appropriate	Design and install a landfill	Municipality,

	Gërmovë Landfill Leachate Management	regional landfill has been in operation for many years. Field observations indicate that untreated landfill leachate may represent a potential source of contamination entering the Ibar/Ibër River, highlighting the importance of improved leachate management.	leachate collection and treatment system in order to reduce potential environmental impacts associated with landfill operations.	leachate treatment facility together with controlled drainage infrastructure and an effluent monitoring station to enable regular water quality monitoring.	Directorate for Environment in collaboration with the university, local NGOs and central institutions.
5	Elimination of Illegal Landfills	Illegal dumping sites have been identified along sections of the riverbank. Although some locations have previously been cleaned, repeated illegal dumping has been observed, indicating the need for both remediation and preventive measures.	Remove illegal dumping sites and implement communication and enforcement measures aimed at preventing future illegal waste disposal.	Carry out clean-up operations using appropriate machinery and transport equipment, followed by awareness campaigns and strengthened inspection measures to discourage repeated illegal dumping.	Central institutions grant to the municipality Technical assistance from international sources

Monitoring activities

#	Action	Issues	Proposed activity	Activity	Source of funding
1	River and water bodies' water levels	Historical records indicate several flood protection embankment failures in the Bosnjačka Mahala/ Lagjja e Boshnjakëve area during the last decade. This recommendation complements the monitoring measures proposed for Mitrovica South, with additional consideration for	Install hydrometric monitoring stations to improve flood risk assessment and emergency response. Water level information should be publicly available and presented together with historical reference values where available.	Hydrometric stations at the outlet of the following water barrier structures: 1. Lake Kosutovo/Koshutovë first barrier 2. Confluence of Sitnica/Sitnicë/Ibar/Ibër	Hydrometric stations funded from municipal sources or Donors. Operation and maintenance of the facilities by the municipal directorate

		emergency preparedness. Mitrovica has built several barriers and water bodies that are excellent platforms to measure water mass balance.			
2	River water quality monitoring	Field observations indicate that changes in water quality become more apparent within the urban area of Mitrovica/ Mitrovicë, where population density and economic activities are concentrated.	Consider installing additional water quality monitoring stations to support integrated water resources management and establish a long-term monitoring baseline.	Install monitoring stations at: 1. Ljushta/ Lushtë River upstream of its confluence with the Ibar/Ibër; 2. Sitnica/Sitnicë River upstream of its confluence with the Ibar/Ibër; 3. Ibar/Ibër River between Mitrovica North and Zvečan/Zveçan.	Municipality south and north / Donors Joint venture with the water authority
3	Groundwater monitoring	The existing groundwater pumping station in Mitrovica North provides an opportunity for systematic monitoring of groundwater quantity and operational trends	Digitalisation and public dissemination of monitoring data could improve transparency and support long-term groundwater resource management.	Develop an open-data platform providing information on groundwater abstraction, production capacity and consumption trends.	Municipality, Directorate for Environment, in possible cooperation with the university staff or NGOs
4	Aquatic Ecosystem Monitoring	Tributaries of the Ibar/Ibër River play an important role in determining the ecological condition of the main river. Field observations also indicate that recently constructed reservoirs may be experiencing eutrophication and the potential development of	Newly built water reservoirs in the recreational area of Mitrovica/ Mitrovicë have shown some issues with eutrophication and potentially developing cyanobacteria in the bottom sediments. Establish a reporting mechanism managed by the municipal	Monitoring aquatic and amphibian ecosystem health and sampling water bodies' sediments is needed to ensure that the water quality is not impaired. Drought seasons are more efficient in acquiring information on this issue. Develop communication channels (telephone, e-mail or	Municipality, Directorate for Environment, in collaboration with the university, local NGOs and central institutions.

		cyanobacteria, highlighting the need for continued ecological monitoring.	environmental department that enables citizens to report observed environmental incidents such as fish mortality, wildlife mortality or accidental pollution events.	QR-code reporting) supported by periodic sediment and water quality sampling where appropriate.	
6	Bird monitoring	Bird populations are recognised as valuable indicators of freshwater ecosystem health. Monitoring resident and migratory species can provide additional information on the ecological condition of aquatic habitats.	Establish a municipal bird monitoring programme documenting resident and migratory bird populations associated with rivers and other aquatic habitats.	Install wildlife observation cameras near wetlands, nesting areas and designated feeding sites. Information boards may also be installed to support environmental education and nature-based tourism.	Municipality/donors / local NGOs Potential collaboration with the global conservation organisation, especially on migratory species monitoring and reporting (tag records/ registry)

Restoration activities

#	Action	Issues	Proposed activity	Activity	Source of funding
1	Sand mining area restoration	Historical sand and gravel extraction has altered sections of the riparian zone, leaving excavated areas and disturbed riverbanks. Restoration of these areas would reduce environmental degradation, improve landscape quality and support the recovery of natural floodplain functions.	Restore former extraction sites by returning them, where feasible, to their designated land use, such as agricultural land, pasture or natural floodplain areas.	Use suitable dredged sediment, where technically and environmentally appropriate, to rehabilitate abandoned extraction pits. Prepare restoration plans incorporating floodplain designation and spatial planning approaches based on Nature-based Solutions (NBS). Restoration activities should include public consultation	Central institutions grant, international organisation restoration and conservation organisation. Freshwater practice transnational programs (EU, INTERREG, RESTORIVER...). NBS solutions.

				prior to implementation.	
2	Trepca/ Trepçë River restoration	Trepca/ Trepçë River is a small river system at the heart of the Trepca/ Trepçë mining operation in Mitrovica South, including the sediment of Trepca/ Trepçë Tunnel. This river is heavily regulated on both river banks. There are no major retention areas, and flashfloods could pose severe damage to the people and property. More critically, this sub-basin system is picking up all the industrial effluents from the Trepca/ Trepçë mining and flotation facility, and this aspect must not be neglected.	Industrial facilities' runoff management and contamination from the processing operation must be eliminated. The flotation facility poses a major and significant threat to this system and overall to the Ibar/Ibër River. Establish a transparent coordination mechanism between municipalities for riverbank development, flood management and environmental protection.	River management through NBS solutions could be exercised with the designation of the floodplain area and retention zones to reduce the flashflood water kinetic energy, thus reducing damage and human loss. Encourage joint technical review of riverbank development proposals and establish an inter-municipal working group in accordance with IWRM-K recommendations.	Central institutions, grants, international organisation restoration and conservation organisation.
2	Ljušta/ Lushtë River restoration	Field observations indicate that the Ljušta/ River receives numerous wastewater discharges within the urban area. Reduced water quality, elevated turbidity and persistent odours suggest significant pressure from untreated wastewater entering the river system.	Prepare a comprehensive river restoration programme aimed at reducing direct wastewater discharges and improving ecological conditions within the river corridor.	Identify and map wastewater discharge locations and progressively redirect identified discharges to appropriate wastewater infrastructure where technically feasible. Restoration measures should be based on detailed field assessments and integrated into future wastewater management planning.	Central institutions grant, international organisation restoration and conservation organisation.
2	Agrarian sector	Mitrovica South contains a significant proportion of agricultural land within the	Strengthen sustainable agricultural practices by improving oversight of	Support municipal inspection services in monitoring the sale and distribution of	Municipality inspectorate / Central institutions/donors /

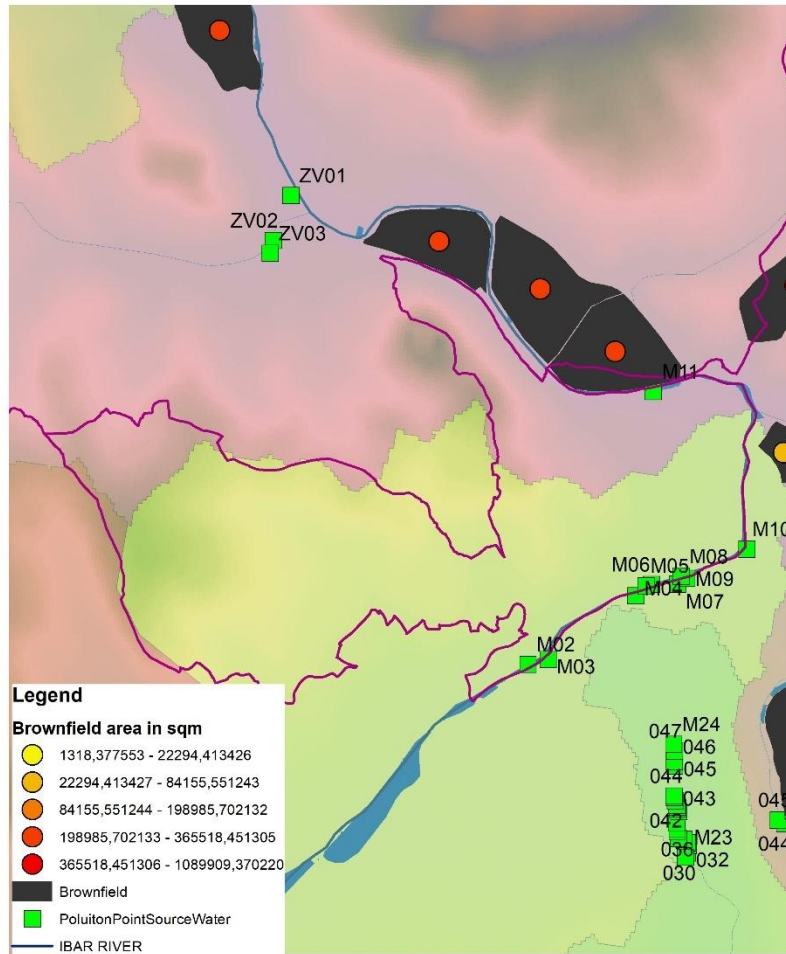
		project area. Agricultural production provides important economic benefits, but inappropriate handling of agrochemicals may contribute to diffuse pollution of surface water and groundwater.	agrochemical distribution and promoting responsible pesticide and fertiliser management.	agrochemicals while strengthening cooperation with relevant central institutions responsible for regulatory oversight. Complement enforcement activities with awareness programmes promoting environmentally responsible agricultural practices.	local NGOs Municipality inspectorate / Central institutions/donors / local NGOs
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Conservation Activities

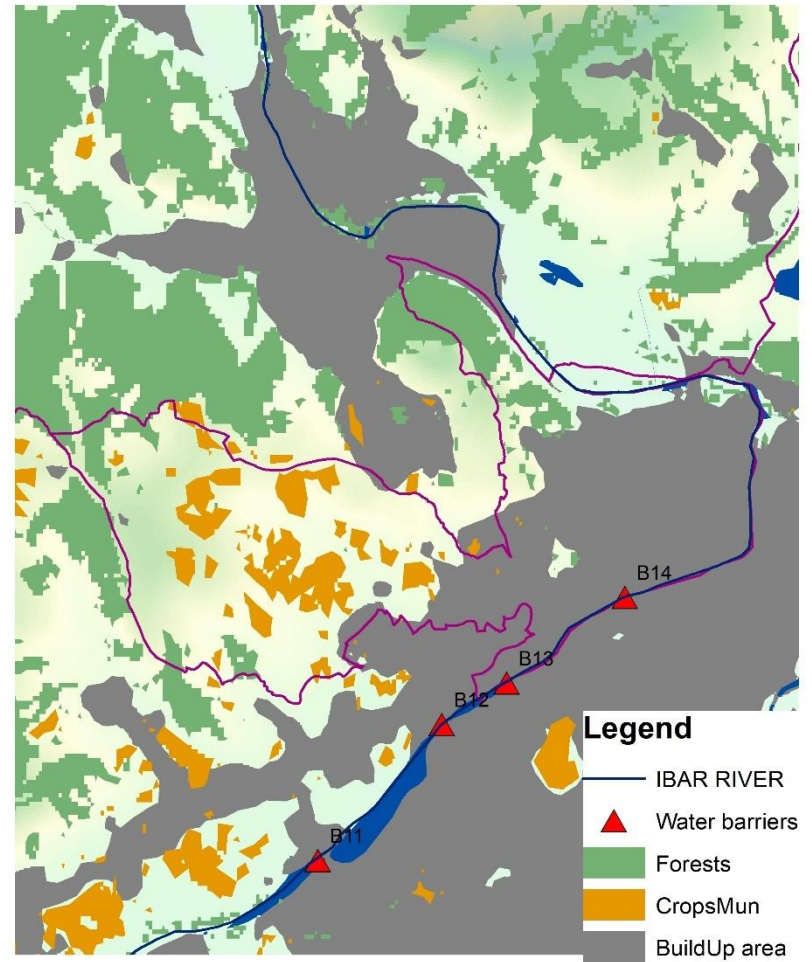
#	Action	Issues	Proposed activity	Activity	Source of funding
1	Bistrica/ Bistricë River hydropower	The Bistrica/ Bistricë River is shared by the municipalities of Leposavić/Leposaviq and Mitrovica South and represents an important tributary of the Ibar/Ibër River system. Upstream developments (hydropower plant) may influence downstream ecological conditions, highlighting the need for improved coordination between municipalities when planning major water infrastructure projects.	Mitrovica South has allocated significant assets and produced several significant water infrastructure projects that posed costs or impaired the ecology elsewhere. Promote coordinated monitoring, data sharing and communication among municipalities within the Ibar/Ibër River basin using harmonised methodologies. Assess the ecological performance of existing river barriers and identify opportunities to improve aquatic connectivity while maintaining their intended hydraulic and urban functions.	Develop an integrated water management mechanism and system for collaboration on any major and significant project on the Ibar/Ibër. Establish an inter-municipal coordination mechanism supported through municipal budgets and technical guidance developed under the IWRM-K programme. Carry out technical and ecological assessments of existing river barriers, including fish migration studies and evaluation of mitigation measures such as fish passages or other ecological engineering solutions where appropriate.	Technical support provided by international expertise Central institutions administrative measure Municipality
2	Ibar/Ibër River barriers and water bodies	Several river barriers and hydraulic structures have been constructed within Mitrovica South to improve urban riverfront conditions. While these structures provide local urban benefits, they may also influence fish migration and river ecosystem connectivity, warranting further technical assessment.			

Municipality of Mitrovica north

Mitrovica north/Polution source



Mitrovica N. land use water barriers



Wastewater management

#	Action	Issues	Proposed activity	Activity	Source of funding
1	Pollution point source inventory	This recommendation is described in a separate section of the report.	Implement a two-year programme to establish a baseline inventory of pollution point sources across the participating municipalities.	Develop a voluntary self-reporting mechanism for identifying wastewater discharge points and sewer network connections. Municipal authorities would simultaneously prepare an underground sewer infrastructure inventory and mapping database. Participation could be supported through awareness activities and appropriate incentive mechanisms, where considered suitable by the competent authorities.	Municipal budgets; Ministry of Environment and Spatial Planning (MESP); EU IPA programmes
2	Sewer network mapping	Establishing a comprehensive pollution point source inventory is recommended to provide a consistent information base for future wastewater management planning. A voluntary reporting mechanism, combined with municipal infrastructure mapping, could improve the completeness and reliability of available data.			
3	Industrial heritage pollution cadaster	Historical industrial and brownfield sites have been identified as potential pollution point sources that may influence water quality. Although the management of these facilities extends beyond municipal responsibilities, knowledge of their location and characteristics would support local environmental planning and mitigation measures	Municipalities of Mitrovica North, Mitrovica South, Zvečan/Zveçan and Leposavić/Leposaviq could cooperate with industrial facility operators in preparing a comprehensive industrial heritage pollution cadaster.	Prepare an independent technical assessment of industrial pollution point sources in order to distinguish industrial discharges from municipal wastewater systems and support future remediation planning.	Central institutions grant or funds transfer to the industrial complex operators, and/or municipalities where the industrial facilities are located.
4	Eliminate the illegal landfill site	The left bank of the Ibar/Ibër River in Mitrovica North is build up area. Some areas are	Conduct periodic assessments of riverbank conditions, including	The municipality can, through the legislative process, designate free access to the	Municipality inspectorate and assembly

	accessible for park and recreation activities, some are residential and commercial. Private individual residential areas have the least access to the shore and have an adverse effect.	inspections of riparian areas where legally applicable, while promoting good environmental management practices among property owners.	river riparian zone even on private property. This could introduce river shore access and produce environmental activities that could be an environmental watchdog (fishing, birdwatching, etc.).	Technical assistance from international sources
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Monitoring activities

#	Action	Issues	Proposed activity	Activity	Source of funding
1	River and water bodies' water levels	Historical records indicate several flood protection embankment failures in the Bosnjačka Mahala/ Lagjja e Boshnjakëve area during the last decade. This recommendation complements the monitoring measures proposed for Mitrovica South by incorporating additional emergency preparedness.	Install hydrometric monitoring stations to improve flood risk assessment and emergency preparedness. Monitoring data should be publicly available and presented together with historical reference values where available.	Hydrometric stations at the outlet of the following water barrier structures: 1. Lake Kosutovo/Koshutovë first barrier 2. Confluence of Sitnica/Sitnicë/Ibar/Ibër 3. Warning sirens and escape routes have to be defined	Hydrometric stations are funded from municipal sources or donors. Operation and maintenance of the facilities by the municipal directorate
2	River water quality monitoring	Field observations indicate that changes in water quality become more evident within the urban area of Mitrovica/ Mitrovicë, where population density and economic activities are concentrated. This recommendation complements the monitoring framework proposed for Mitrovica South.	The assessment recommends consideration of installing additional water quality monitoring stations to support integrated water resources management and establish a long-term monitoring baseline.	Install monitoring stations at: 1. Ljušta/ Lushtë River upstream of its confluence with the Ibar/Ibër; 2. Sitnica/Sitnicë River upstream of its confluence with the Ibar/Ibër; 3. Ibar/Ibër River between Mitrovica	Municipality north and south / Donors Joint venture with the water authority

				North and Zvečan/Zvečan.	
3	Groundwater monitoring	The existing groundwater pumping station in Mitrovica North provides an opportunity for systematic monitoring of groundwater quantity and operational trends	Digitalisation and public dissemination of monitoring data could improve transparency and support long-term groundwater resource management.	Develop an open-data platform providing information on groundwater abstraction, production capacity and consumption trends.	Municipality, regional water company, public health institute. Open data and transparency would provide evidence of the groundwater availability and consumption peaks.
4	Aquatic ecosystem monitoring in waterways	Monitoring aquatic ecosystems, including amphibian populations and other aquatic organisms, may provide additional information on ecological conditions and potential changes in water quality.	Establish a reporting mechanism managed by the municipal environmental department to enable citizens to report observed environmental incidents, including fish mortality, wildlife mortality and accidental pollution events.	Develop communication channels (telephone, e-mail or QR-code reporting) supported by periodic sediment and water quality sampling where appropriate.	Municipality, Directorate for Environment in collaboration with the university, local NGOs and activists
5	Bird monitoring	Bird populations are recognised as useful indicators of freshwater ecosystem condition. Field observations confirmed the presence of resident and migratory waterbird species within the study area Ducks and some migratory birds are present, and they can be a great indicator of the state of the environment.	Establish a municipal bird monitoring programme documenting resident and migratory bird populations associated with rivers and other aquatic habitats.	Bird action camera installed in water bodies and near the bird nesting areas, and next to the possible bird feeding stations (10+) Information billboard placement with the birds' spaces information for the tourists and amateur birdwatchers.	Municipality/donors / local NGOs Potential collaboration with the global conservation organization especially on migratory spaces monitoring and reporting (tag records/ registry)

Restoration activities

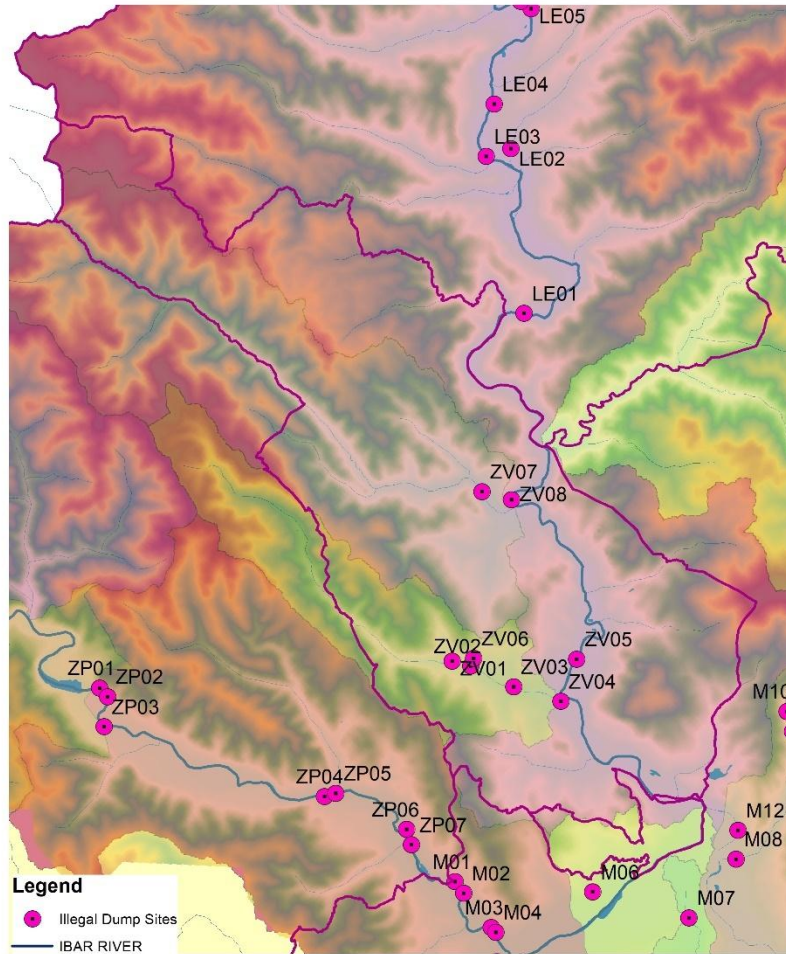
#	Action	Issues	Proposed activity	Activity	Source of funding
1	Landfill site restoration at the Sitnica/Sitnicë confluence	A former municipal landfill located near the confluence of the Sitnica/Sitnicë and Ibar/Ibër rivers was identified during the assessment. The site currently represents an underutilised brownfield area that may warrant further environmental assessment regarding future land use.	Prepare a restoration concept aimed at reducing potential environmental risks while identifying appropriate long-term land use options.	Develop a restoration plan followed by public consultation and subsequent implementation, subject to available funding and technical assessment.	Central institutions, grants, international organisations, restoration and conservation organisations. Freshwater practice transnational programs (EU, INTERREG, RESTORIVER...). NBS
2	Mitrovica North River Restoration	The Ibar/Ibër River forms the municipal boundary between Mitrovica North and Mitrovica South, providing opportunities for coordinated river management and planning.	Develop a transparent inter-municipal coordination mechanism for riverbank management, flood risk reduction and environmental protection.	Establish a joint technical review process for riverbank development projects and consider forming an inter-municipal working group supported by IWRM-K technical guidance.	Mitrovica North and South task force on the Ibar/Ibër River could be established with the assistance of the local NGOs Technical assistance from international sources

Conservation Activities

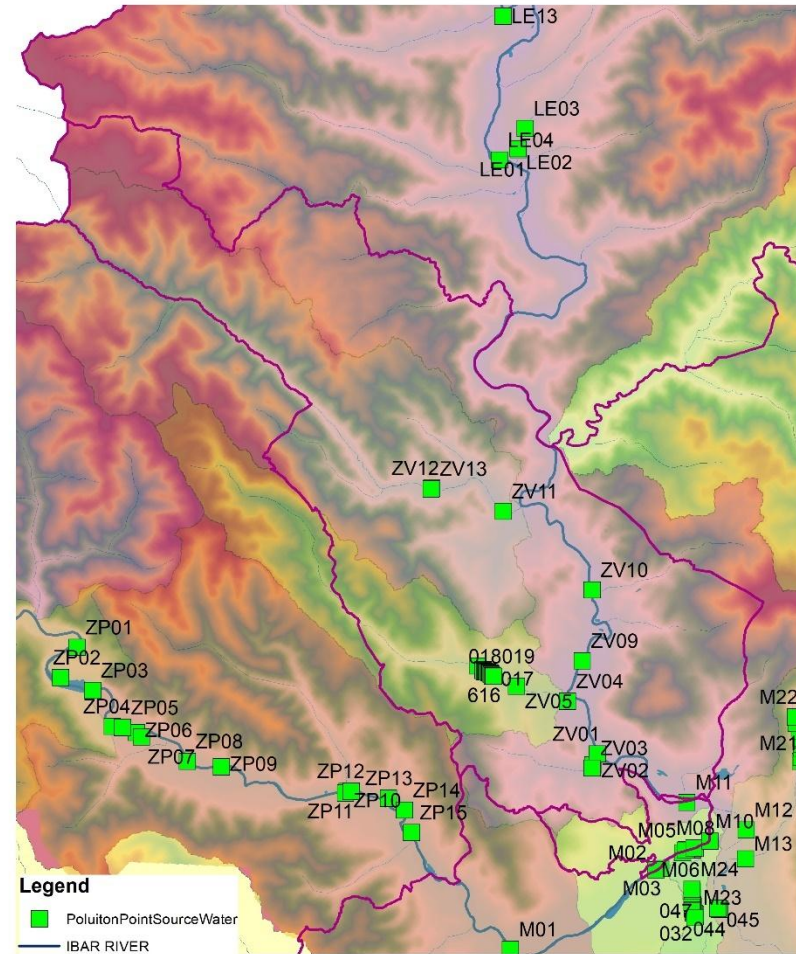
#	Action	Issues	Proposed activity	Activity	Source of funding
1	Collaboration with other municipalities	The Ibar/Ibër River basin is influenced by upstream tributaries and activities throughout the catchment. Consistent monitoring methodologies across municipalities would improve the comparability of collected data and strengthen basin-wide assessments.	Promote coordinated monitoring, data sharing and communication among municipalities within the Ibar/Ibër River basin using harmonised methodologies.	Establish an inter-municipal coordination mechanism for monitoring activities, information exchange and joint planning, supported by technical guidance developed through the IWRM-K programme.	Municipal budget, joint task force Technical support provided by international expertise

Municipality of Zvečan/Zvečan

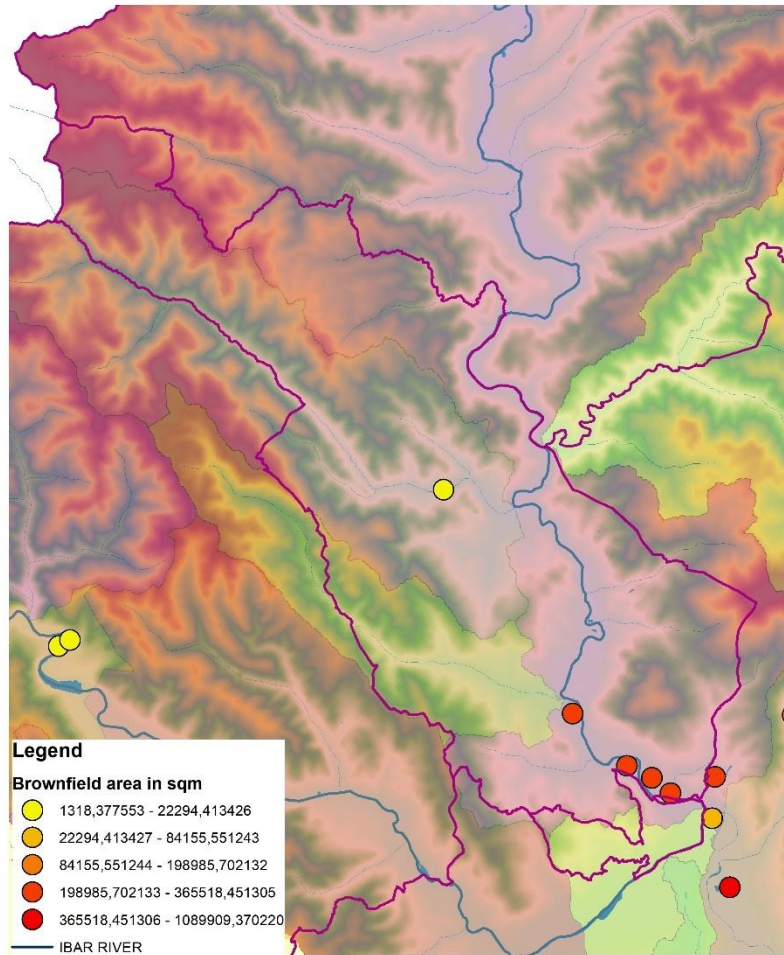
Zvecan/Illegal landfil sites



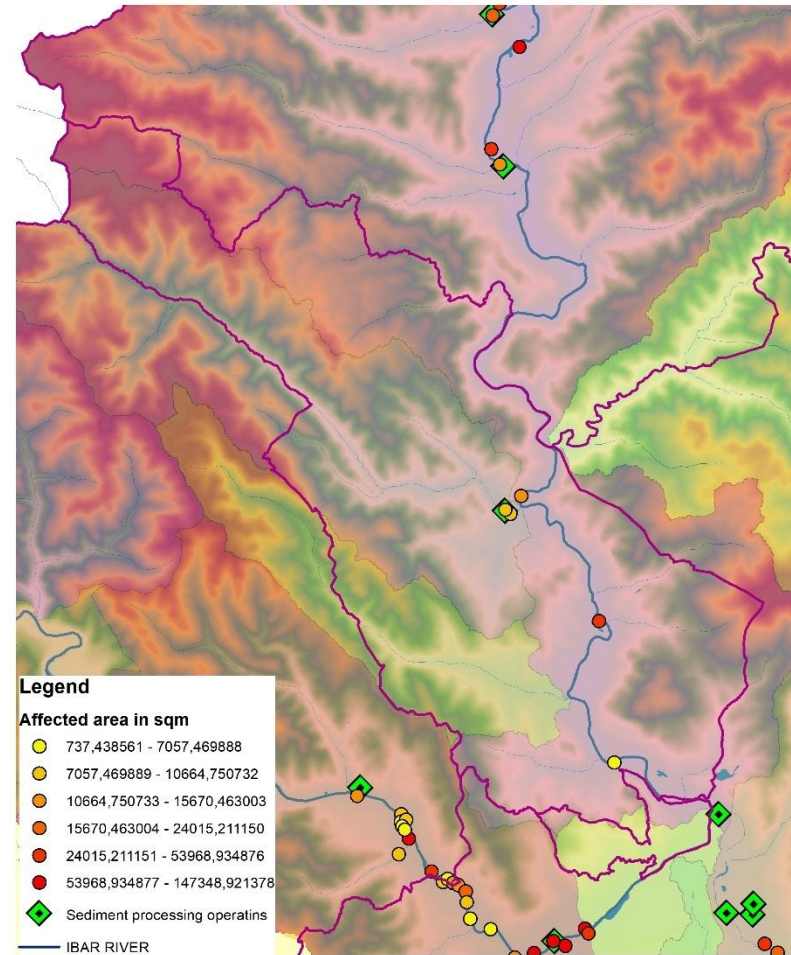
Zvecan/Pollution discharges



Zvecan/Industry brownfield sites



Zvecan/Sediment extraction



Wastewater management

#	Action	Issues	Proposed activity	Activity	Source of funding
1	Pollution point source inventory	This recommendation is described in a separate section of the report. Establishing a comprehensive pollution point source inventory is recommended to provide a consistent information base for future wastewater management planning. A voluntary reporting mechanism, combined with municipal infrastructure mapping, could improve the completeness and reliability of available information.	Implement a two-year programme to establish a baseline inventory of pollution point sources for the municipalities within the project area.	Develop a voluntary self-reporting mechanism for identifying wastewater discharge points and sewer network connections. Municipal authorities would simultaneously prepare an underground sewer infrastructure inventory and mapping database. Participation could be supported through awareness activities and appropriate incentive mechanisms, where considered suitable by the competent authorities.	Municipal budgets; Ministry of Environment, Spatial Planning (MESP); EU IPA programmes
2	Sewer network mapping				
3	Industrial heritage pollution cadaster	Historical industrial and brownfield sites have been identified as potential pollution point sources that may influence water quality. While the management of these facilities extends beyond municipal responsibilities, knowledge of their	Municipalities of Zvečan/Zvečan, Mitrovica North, Mitrovica South and Leposavić/Leposaviq could cooperate with industrial site operators in preparing a comprehensive industrial heritage pollution cadaster.	Prepare an independent technical assessment of industrial pollution point sources and associated environmental risks to support future wastewater management and remediation planning.	Central institutions grant or funds transfer to the industrial complex operators, and/or municipalities where the industrial facilities are located.

		location and characteristics would support local environmental planning and future mitigation measures.			
4	Eliminate the illegal landfill site	Field observations identified an improvised landfill area established following the closure of the Balaban landfill approximately 15 years ago.	Support the operationalisation of the Regional Landfill Srbovac/Sërboc in order to provide a designated waste management facility serving the municipalities in northern Kosovo.	Complete the remaining administrative and technical procedures necessary for commissioning the landfill and initiating its intended waste management functions.	Municipality of Zvečan/Zveçan and other beneficiary municipalities with the EU Technical assistance from international sources
5	Industrial heritage pollution cadaster (Ore Tailings)	Field observations identified several historical ore tailing sites within the municipality of Zvečan/Zveçan. Surface runoff and drainage pathways may represent potential pathways for pollutant transport toward the Ibar/Ibër River. Further technical assessment is recommended to determine environmental risks.	Municipalities of Zvečan/Zveçan, Mitrovica North, Mitrovica South and Leposavić/Leposaviq could cooperate with industrial site operators in preparing a detailed inventory of industrial heritage pollution point sources.	Prepare an independent technical assessment and environmental risk analysis of industrial heritage sites to support future remediation planning.	Central institutions grant or funds transfer to the industrial complex operators, and/or municipalities where the industrial facilities are located.

Monitoring activities

#	Action	Issues	Proposed activity	Activity	Source of funding
1	River and water bodies flood prevention	Seasonal flooding has been observed within the municipality of Zvečan/Zvečan, particularly during periods of increased discharge from the Sitnica/Sitnicë River. Available hydrological information indicates the need for improved flood preparedness and planning.	Existing and planned hydrometric monitoring stations upstream could provide information supporting flood risk assessment and planning.	Surveying the surface level in the riparian area Defining the floodplain zone and potential retention areas. Developing designs for raising dikes or other permanent structures to protect public and private properties.	Collaboration of the Municipality of Zvečan/Zvečan and other beneficiary municipalities upstream and downstream. Central institutions grants Technical assistance from international sources
2	River water quality	Water quality monitoring downstream of the Trepça/Trepçë industrial complex would provide valuable information regarding spatial changes in river water quality within the Ibar/Ibër River system.	The assessment recommends consideration of installing additional monitoring stations to establish a long-term water quality monitoring network.	Install monitoring stations at: 1. Ibar/Ibër River near Valaç; 2. Ibar/Ibër River near Srbovac/Sërboc downstream of the regional landfill; 3. Ibar/Ibër River downstream of the former Balaban landfill.	Municipality North and South / Donors Joint venture with the water authority
3	Groundwater monitoring	Agricultural activities within the Ibar/Ibër floodplain represent one of several factors influencing groundwater conditions. Available observations indicate that continued groundwater monitoring would improve understanding	Develop a municipal groundwater monitoring programme.	Prepare a municipal water well inventory and install pressure transducers at representative monitoring locations near the Ibar/Ibër River.	Municipality, Directorate for Environment, in possible cooperation with the university staff or NGOs

		of long-term hydrological trends.			
4	Aquatic ecosystem monitoring in waterways	The municipality of Zvečan/Zveçan represents an important section of the Ibar/Ibër River where several tributary systems converge without major hydraulic barriers. Recreational fishing activity is also well established within this area.	Develop a long-term aquatic ecosystem monitoring programme supported by scientific methodology.	Engage fisheries experts to develop monitoring protocols while strengthening cooperation with local fishing associations and improving environmental data sharing through digital platforms.	Municipality of Zvečan/Zveçan, Directorate for Environment, would be the custodian and project manager. A possible portal/server or other means could be established where the information would be shared and accumulated.
5	Bird monitoring Valacka/ Vallaqstena location	Bird populations represent useful ecological indicators of freshwater ecosystem condition. Field observations confirmed nesting areas near Valaç/Vallaq and Srbovac/Sërboc.	Establish a municipal bird monitoring programme documenting resident and migratory bird populations associated with aquatic habitats.	Install wildlife observation cameras near nesting areas and water bodies. Information boards may also be installed to support environmental education and nature-based tourism.	Municipality/donors / local NGOs Potential collaboration with the global conservation organisation, especially on migratory species monitoring and reporting (tag records/ registry)

Restoration activities

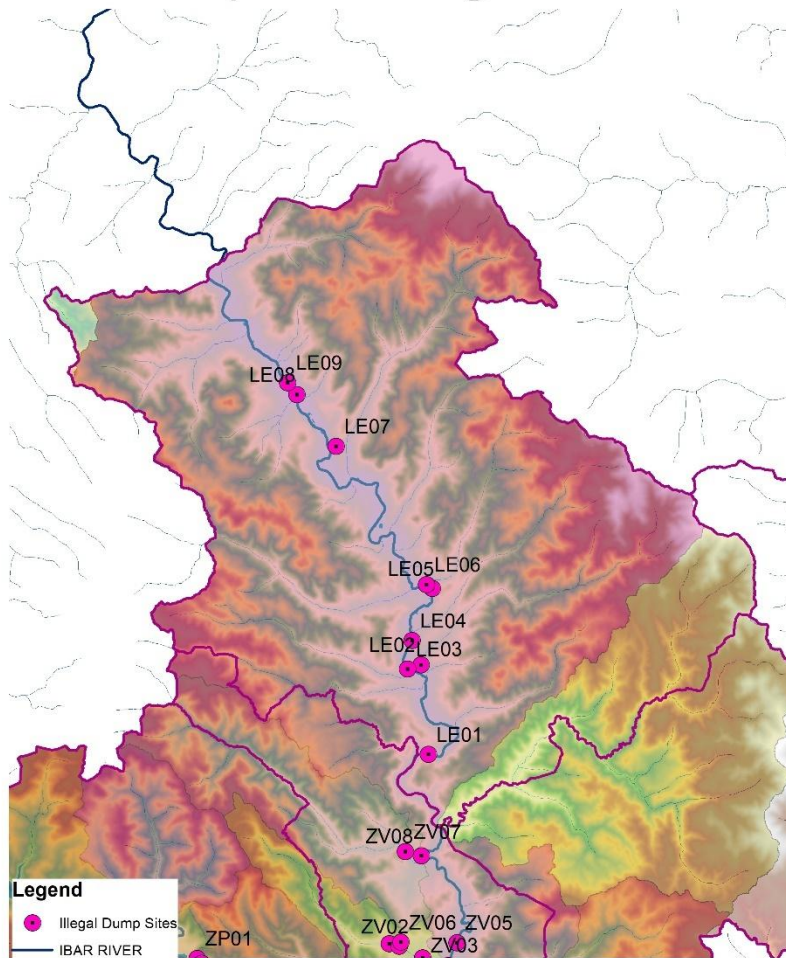
#	Action	Issues	Proposed activity	Activity	Source of funding
1	Žitkovac/ Zhitkoc Landfill Restoration	A temporary landfill located near the Žitkovac/ Zhitkoc ore tailings was identified during field observations. The site's proximity to the Ibar/Ibër River suggests that additional environmental assessment would be beneficial in evaluating potential pathways for contaminant transport.	Prepare and implement a restoration plan aimed at reducing potential environmental impacts associated with the site.	Relocate waste material to an appropriate waste management facility where feasible and implement engineering measures to minimise infiltration and surface runoff.	Central institutions grant transferred to the municipality of Zvečan/Zveçan
2	Kozarevačka/ Kozarevcit River Restoration	Field observations identified numerous wastewater discharge points along the Kozarevačka/ Kozarevcit River. During low-flow periods, reduced streamflow may increase the relative influence of wastewater discharges on river conditions.	Prepare a comprehensive restoration and wastewater management plan for the Kozarevačka/ KozarevcitRiver sub-basin.	Develop the restoration concept in parallel with the pollution point source inventory programme, providing the technical basis for future wastewater infrastructure planning.	Municipal budget, joint task force Technical assistance from international sources The implementation plan should be through the central institutions' grant transferred to the municipality of Zvečan/Zveçan

Conservation Activities

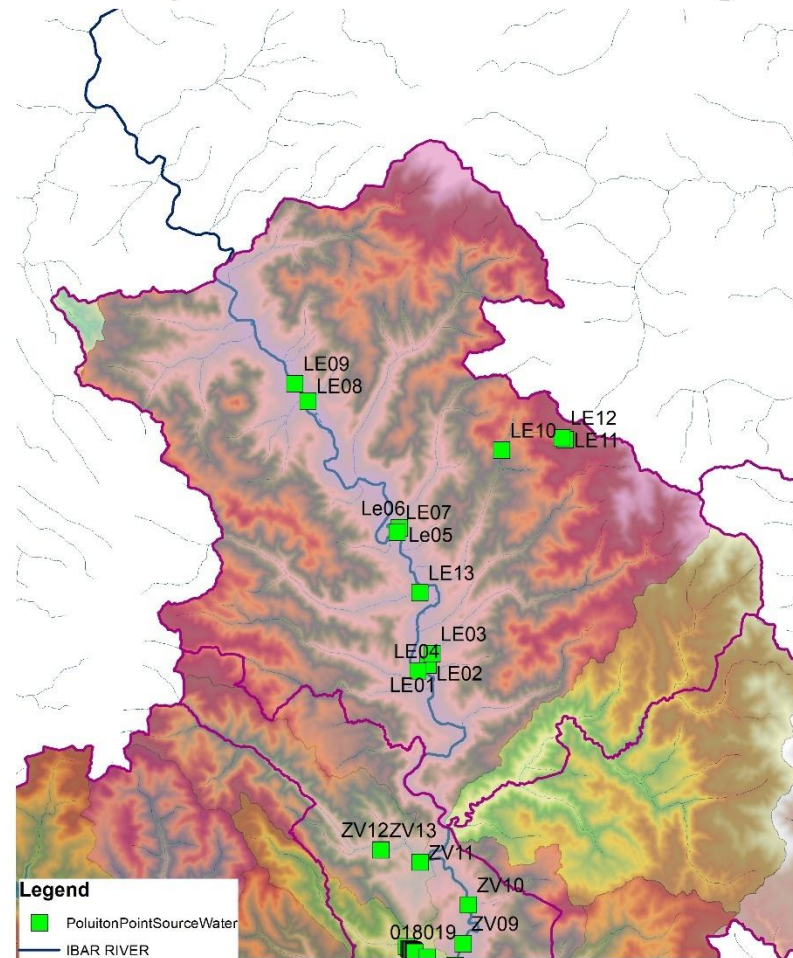
#	Action	Issues	Proposed activity	Activity	Source of funding
1	Banjska/ Banjskë thermal springs	The Banjska/ Banjskë thermal springs represent an important natural resource with environmental, tourism and local economic value.	All turmoil aside, this area's livelihood and community sustainability depend on the appropriate support from the local institutions. The Municipality of Zvečan/Zveçan must regain control over the resource developed under its umbrella. Support sustainable management of the thermal spring complex through cooperation between relevant institutions and local stakeholders.	Promote efficient and sustainable use of the thermal spring facilities while integrating them into future local development planning.	Central institutions' allocation of rights and property to the local institutions. Funds for the north assets could be a good starting point Technical assistance from international sources
2	Banjska/ Banjskë river	The Banjska/ Banjskë River represents an ecologically important tributary contributing sediment transport and habitat diversity within the Ibar/Ibër River basin.	Prepare a river restoration and conservation plan supporting sustainable land use and protection of aquatic habitats.	Develop a sub-basin management plan incorporating spatial planning, land use guidance and river restoration measures that support long-term ecological integrity.	Municipality of Zvečan/Zveçan, spatial planning document: Banjska/Banjskë River, Restoration action plan. Technical assistance from international sources

Municipality of Leposavić/Leposaviq

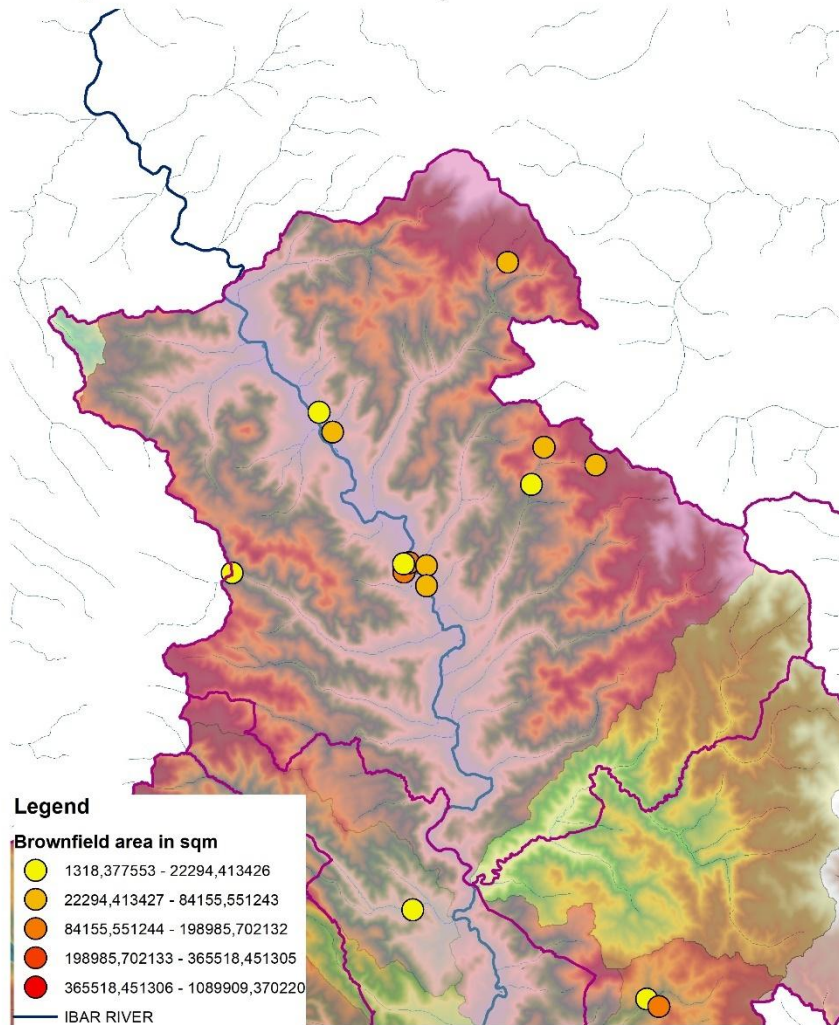
Leposavic/Illegal landfill sites



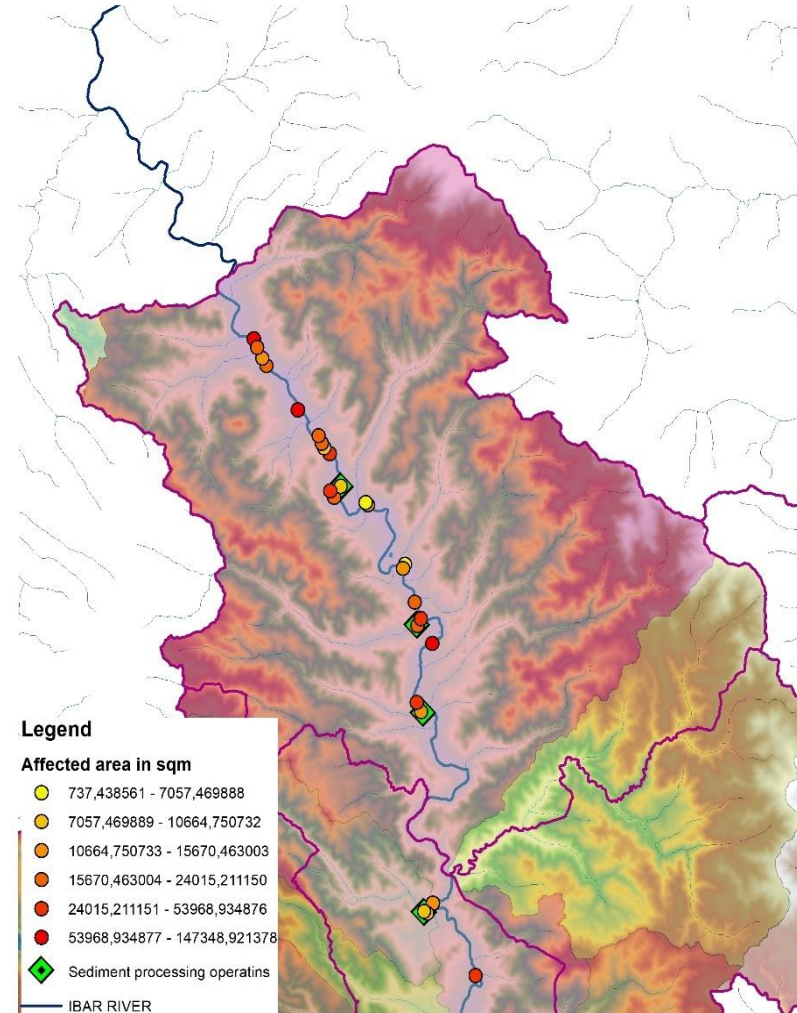
Leposavic/Pollution discharges



Leposavic/Industry brownfield sites



Leposavic/Sediment extraction



Wastewater management

#	Action	Issues	Proposed activity	Activity	Source of funding
1	Pollution point source inventory	This recommendation is described in a separate section of the report.	Implement a two-year programme to establish a baseline inventory of pollution point sources across the participating municipalities.	Develop a voluntary self-reporting mechanism for identifying wastewater discharge points and sewer network connections.	Municipal budgets; Ministry of Environment and Spatial Planning (MESP); EU IPA programmes
2	Sewer network mapping	Establishing a comprehensive pollution point source inventory is recommended to provide a consistent information base for future wastewater management planning. A voluntary reporting mechanism, combined with municipal infrastructure mapping, could improve the completeness and reliability of available data.	Develop a comprehensive digital inventory and mapping database of the municipal sewer network.	Municipal authorities would simultaneously prepare an underground sewer infrastructure inventory and mapping database. Participation could be supported through awareness activities and appropriate incentive mechanisms, where considered suitable by the competent authorities. Survey and map the existing sewer infrastructure, including pipelines, pumping stations, manholes, discharge points and associated facilities. Standardised data collection should support future wastewater management planning.	
3	Industrial heritage pollution cadaster	Leposavić/Leposaviq has a significant industrial and mining legacy that continues to influence environmental quality. Historical industrial facilities, abandoned mining infrastructure and brownfield	Develop a comprehensive industrial heritage pollution cadaster in cooperation with neighbouring municipalities, industrial operators and relevant institutions.	Prepare an independent technical assessment of industrial pollution sources, abandoned industrial facilities and brownfield sites. The inventory should identify Areas of Environmental	Municipality in cooperation with the local NGOs and academia. Processing operators and Operation and

		sites may represent potential sources of contamination affecting surface water, groundwater and surrounding ecosystems. Although these facilities are outside direct municipal management, documenting their condition would support future remediation planning.		Concern and support future remediation, redevelopment and potential cultural reuse of former industrial areas.	Maintenance designated authorities' cooperation is desirable Technical assistance from international sources
4	Eliminate the illegal landfill site	Leposavić/Leposaviq continues to experience challenges in municipal waste management due to the absence of a fully operational regional sanitary landfill. Existing disposal sites located within riparian areas present potential risks to groundwater and surface water quality, while previously used landfill sites require appropriate closure and rehabilitation measures.	Support the operationalisation of the EU-funded Regional Landfill at Srbovac/ Sërboc while progressively closing and rehabilitating existing informal and obsolete disposal sites.	Complete the commissioning of the regional landfill facility and gradually redirect municipal waste disposal to the new facility. Existing landfill sites should be rehabilitated, sealed where appropriate and monitored to minimise environmental risks.	Municipality of Leposavić/Leposaviq and other beneficiary municipalities with the EU Technical assistance from international sources
5	Evaluation of Existing Septic Tanks	Several obsolete sedimentation tanks remain within Leposavić/Leposaviq Municipality, while no modern wastewater treatment facilities currently serve these locations. Their technical condition and remaining operational value should be assessed before	Evaluate existing sedimentation tanks and associated sewer infrastructure to determine opportunities for rehabilitation or replacement with modern wastewater treatment solutions.	Conduct technical assessments of existing facilities, analyse wastewater volumes and characteristics, and prepare feasibility studies for new wastewater treatment systems where appropriate.	Central institutions grant to the municipality of Leposavić/Leposaviq. Technical assistance from international sources

future investment decisions.

Monitoring activities

#	Action	Issues	Proposed activity	Activity	Source of funding
1	River and Flood Monitoring	Leposavić/Leposaviq experiences seasonal flooding associated with changing hydrological conditions, particularly along the Ibar/Ibër River. Climate change has increased the frequency of hydrological extremes, highlighting the need for improved flood preparedness and monitoring.	Strengthen flood monitoring by using upstream hydrological information together with local floodplain mapping and flood risk assessment.	Conduct topographic surveys of riparian areas, define floodplain boundaries and potential retention zones, and prepare technical designs for flood protection infrastructure where necessary.	Collaboration with the Municipality of Zvečan/Zvečanand other beneficiary municipalities upstream and downstream. Central institutions grants. Technical assistance from international sources
2	River water quality monitoring	The Leposavić/Leposaviq section of the Ibar/Ibër River provides important information on downstream water quality following the industrial and mining areas of the central Ibar/Ibër basin. Continuous monitoring would support early detection of pollution events and long-term assessment of ecological conditions.	Install permanent water quality monitoring stations along the Ibar/Ibër River to establish baseline conditions and monitor changes in water quality.	Install monitoring stations at: 1. Ibar/Ibër River near Sočanica/ Soçanicë, upstream of the Jošanica/ Joshanicë confluence; 2. Ibar/Ibër River downstream of the ore tailings landfill; 3. Ibar/Ibër River downstream of Lešak/ Leshaku.	Municipality north and south / Donors Joint venture with the water authority
3	Groundwater monitoring	Agricultural land within the Leposavić/Leposaviq floodplain has historically been influenced by mining activities and sediment	Establish a municipal groundwater monitoring network to improve understanding of groundwater availability and	Water wells inventory work must be conducted to register all water wells in the municipality. 12+ small hydrometric devices	Municipality, Directorate for Environment, in possible cooperation with the university staff

		deposition. Groundwater quality and quantity require systematic monitoring due to potential contamination risks and changing hydrological conditions.	quality.	(pressure transducers) installed in a water well in near proximity to the Ibar/Ibër River. 4 in Socanica/Soçanica 4 in Leposavić/Leposaviq 4 in Lesak/Leshaku	or NGOs
4	Aquatic ecosystem monitoring in waterways	The Leposavić/Leposaviq section of the Ibar/Ibër River represents an important migration corridor for aquatic species entering Kosovo from upstream areas. Monitoring of fish populations and aquatic habitats would provide valuable information on ecosystem health and support future conservation planning.	Fish health, population volume and overall health are sensitive matters in a natural ecosystem. Develop a long-term aquatic ecosystem monitoring programme in cooperation with fishermen, academic institutions and civil society organisations.	Establish a reporting network involving local fishermen, riverside landowners and environmental organisations. An external ichthyologist should support the development of monitoring methodologies, while a digital platform could facilitate information sharing and long-term data collection.	Municipality of Leposavić/Leposaviq, Directorate for Environment, would be the custodian and project manager. A possible portal/server or other means could be established where the information would be shared and accumulated.
5	Bird monitoring	Bird populations associated with rivers, wetlands and former gravel extraction sites can provide useful indicators of freshwater ecosystem condition. Restored extraction areas may also provide opportunities for habitat enhancement and biodiversity conservation.	Establish a municipal bird monitoring programme focusing on aquatic habitats and restored riparian areas.	Bird action camera installed in water bodies and near the bird nesting areas, and next to the possible bird feeding stations (10+) Information billboard placement with the birds' spaces information for the tourists and amateur birdwatchers.	Municipality/donors / local NGOs Potential collaboration with the global conservation organisation, especially on migratory spaces monitoring and reporting (tag records/ registry)

Restoration activities

#	Action	Issues	Proposed activity	Activity	Source of funding
1	Ore Tailings Site Restoration	The Trepča/ Trepçë ore tailings landfill located adjacent to the Ibar/Ibër River in Leposavić/Leposaviq has been identified as a significant historical pollution source. Previous contamination incidents indicate that the site may continue to present environmental risks to the river system if not appropriately managed.	Develop a comprehensive remediation plan addressing the ore tailings landfill, abandoned industrial facilities and associated mining infrastructure in order to reduce potential environmental risks.	Prepare a detailed technical assessment of the site, including environmental risk analysis, remediation options and financial estimates required for implementation.	Central institutions grant transferred to the municipality of Leposavić/Leposaviq.
2	Abandoned mine shafts	Several abandoned mine shafts within the municipality discharge groundwater containing visible mineral sediments into surrounding waterways. Field observations suggest that these discharges may require further investigation to determine their composition and potential environmental impacts.	Carry out a technical assessment of abandoned mine drainage to identify contamination pathways and provide the information necessary for designing appropriate treatment or filtration measures. Sampling work would provide the information base for designing appropriated filter unit to eliminate open contamination of the waterways.	Conduct sampling and monitoring of groundwater discharges from abandoned mine shafts, including laboratory analysis of water and sediment quality. Based on the findings, develop technical recommendations for mitigating contamination.	Municipality/donors / local NGOs Potential collaboration with academia, geologists and mine operators.
3	Koporić/ Koporiq Open Pit Mine Restoration	The abandoned open pit mine at Koporić/ Koporiq represents a heavily degraded landscape characterised by unstable terrain, limited	Undertake an integrated environmental, geological and spatial assessment to evaluate the site's condition and identify suitable long-	Prepare a comprehensive survey of the approximately 80-hectare site, including geological investigations, soil and water quality assessment,	Municipality/donors / local NGOs Potential collaboration with academia,

		vegetation and standing water that may be affected by historical mining activities. The area may require comprehensive environmental assessment before any future redevelopment.	term land use options.	terrain mapping and stability analysis. The findings should support future restoration planning and be presented through public consultation.	geologists and mine operators. Technical assistance from international sources
4	Jošanica/ Joshanicë Hazardous Waste Site Assessment	The Jošanica/ Joshanicë location has been identified by local communities as a historical disposal area for industrial waste. Although previous measures have attempted to reduce surface runoff, the composition and extent of potential contamination remain insufficiently documented.	Carry out a detailed environmental investigation to identify contaminants and evaluate appropriate remediation measures for the site.	Implement a pilot scientific assessment, including sampling of deposited materials, surrounding soils and potential contamination pathways, while applying appropriate environmental and occupational safety procedures throughout the investigation.	Municipality/donors / local NGOs Potential collaboration with academia, geologists and mine operators. Technical assistance from international sources
5	Tvrđjanska/ Terdan River protection	The Tvrđjanska/ Terdan River flows between flotation processing facilities and associated waste disposal areas. Field observations identified locations where damaged transport infrastructure may allow mining material to enter the surrounding environment, potentially affecting water quality.	Implement measures to eliminate industrial runoff and prevent contamination originating from mining and flotation operations.	Require appropriate maintenance of industrial transport infrastructure, remove contaminated material where necessary and implement measures to prevent future releases into the river system.	Trepca mining operation, Central institutions grant, Technical assistance from international sources
6	Sand mining area restoration	Historical sand and gravel extraction has altered river morphology and floodplain conditions within	Restore degraded extraction sites while considering opportunities for habitat enhancement and Nature-	Identify priority restoration sites, assess the extent of environmental degradation and clarify ownership	Central institution grants, international restoration and conservation

		Leposavić/Leposaviq. Several former extraction sites may require restoration to improve landscape stability and ecological function.	based Solutions (NBS).	responsibilities. Restoration planning should incorporate floodplain management principles and evaluate opportunities for wetland creation, bird habitats and fish spawning areas where appropriate.	programmes, including EU freshwater initiatives (INTERREG, RESTORIVER) and Nature-based Solutions programmes.
7	Forest sector	Forests play an important role in regulating the hydrological cycle, reducing soil erosion and maintaining water resources. Maintaining and restoring forest cover is therefore considered an important component of watershed management within the municipality.	Implement reforestation activities using native tree species to improve watershed protection, reduce erosion and support biodiversity conservation.	Plant approximately 30,000 trees on public land and support the distribution of an additional 50,000 seedlings to private landowners. Explore partnerships with the local wood-processing industry to promote sustainable forest management practices and evaluate opportunities for establishing a municipal nursery and genetic resource collection.	A PPP project (Public-Private Partnership) could be an excellent testing ground for the municipality to develop skills in this type of investment product at minimal risk.

Conservation Activities

#	Action	Issues	Proposed activity	Activity	Source of funding
1	Recreational zone Leposavić/Leposaviq	The recreational zone located along the left bank of the Ibar/Ibër River includes recently developed sports infrastructure that may be exposed to seasonal flooding. Future flood protection measures should balance infrastructure protection with ecological conservation objectives.	The municipality has some solid, good propositions for the conservation of this area by defining the floodplain and building the dikes that would structurally serve the purpose of retaining the flood prevention wall, but in idle mode, it would be utilised as a sports installation structure (trim track). Develop an integrated floodplain management concept combining flood protection, ecosystem conservation and recreational land use through Nature-based Solutions.	Prepare a detailed technical design for floodplain management over two years, including flood protection structures that can also serve recreational purposes where appropriate. Restoration of wetland habitats and enhancement of aquatic and terrestrial ecosystems should form an integral part of the planning process.	Central institutions grant support to the local institutions. Funds for the north assets could be a good starting point. Technical support provided by international expertise



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