EU4Environment in Eastern Partner Countries:
Water Resources and Environmental Data (ENI/2021/425-550)

GROUNDWATER SURVEY REPORT 2023

MOLDOVA

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ABOUT THIS REPORT

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ABOUT EU4ENVIRONMENT – WATER RESOURCES AND ENVIRONMENTAL DATA

This Programme aims at improving people's wellbeing in EU's Eastern Partner Countries and enabling their green transformation in line with the European Green Deal and the Sustainable Development Goals (SDGs). The programme's activities are clustered around two specific objectives: 1) support a more sustainable use of water resources and 2) improve the use of sound environmental data and their availability for policy-makers and citizens. It ensures continuity of the Shared Environmental Information System Phase II and the EU Water Initiative Plus for Eastern Partnership programmes.

The Programme is implemented by five Partner organisations: Environment Agency Austria (UBA), Austrian Development Agency (ADA), International Office for Water (OiEau) (France), Organisation for Economic Co-operation and Development (OECD), United Nations Economic Commission for Europe (UNECE). The action is co-funded by the European Union, the Austrian Development Cooperation and the French Artois-Picardie Water Agency based on a budget of EUR 12,75 million (EUR 12 million EU contribution). The implementation period is 2021-2024.

https://eu4waterdata.eu

CONTENTS

List of abbreviations

ADA .... Austrian Development Agency
BQE .... Biological Quality Elements
DoA .... Description of Action
DG NEAR .... Directorate-General for Neighbourhood and Enlargement Negotiations of the European Commission
EaP .... Eastern Partners
EC .... European Commission
EECCA .... Eastern Europe, the Caucasus and Central Asia
EMBLAS .... Environmental Monitoring in the Black Sea
EPIRB .... Environmental Protection of International River Basins
ESCS .... Ecological Status Classification Systems
EU .... European Union
EUWI+ .... European Union Water Initiative Plus
GEF .... Global Environmental Fund
ICPDR .... International Commission for the Protection of the Danube River
INBO .... International Network of Basin Organisations
IOW/OIEau .... International Office for Water, France
IWRM .... Integrated Water Resources Management
NESB .... National Executive Steering Board
NFP .... National Focal Point
NGOs .... Non-Governmental Organisations
NPD .... National Policy Dialogue
OECD .... Organisation for Economic Cooperation and Development
RBD .... River Basin District
RBMP .... River Basin Management Plan
Reps .... Representatives (the local project staff in each country)
ROM .... Result Oriented Monitoring
ToR .... Terms of References
UBA .... Umweltbundesamt GmbH, Environment Agency Austria
UNDP .... United Nations Development Programme
UNECE .... United Nations Economic Commission for Europe
WFD .... Water Framework Directive

Country Specific Abbreviations Moldova

AAM .... Agency “Apele Moldovei”

AGMR.................... Agency for Geology and Mineral Resources

AMAC.................... Association of Apacanals

ANRE .... National Agency for Economic Regulation of the Energy Sector (also regulates WSS)

EAM .... Environment Agency Moldova

EHGeoM .... State Enterprise Hydrogeological Expedition from Moldova

MoAgri .... Ministry of Agriculture (of the Republic of Moldova)

MoENV................. Ministry of Environment (of the Republic of Moldova)

Moldova................ Republic of Moldova

SHS........................ State Hydrometeorological Service

Key Messages

The chemical study of groundwater is essential for monitoring and maintaining the quality and sustainability of groundwater resources. By regularly collecting and rigorously analyzing samples of groundwater, we are able to obtain detailed information about the state of water bodies and anticipate potential problems before they become critical. Thus, the chemical study of groundwater is an important foundation for informed and responsible management of these vital resources.

Executive Summary

Groundwater is widely acknowledged as important source of drinking water in rural regions, and it, therefore, plays a critical role in the realization of the human right to good quality water. The population form Moldova uses groundwater for drinking, being captured from springs, shallow wells, and deep wells. However, the proportion of households using good quality groundwater is very small. Understanding the prevalence of groundwater reliance for drinking is critical for those involved in water services planning and management, so they can better monitor and advocate the management of water resources that supports important services for households.

This final report combines a detailed series of actions and outcomes from the study of groundwater conducted in the year 2023. In total 35 monitoring sites from 6 groundwater bodies were sampled and analysed on 21 different indicators and substances.

The development of the industry, the increase of the need to use the groundwater for the drinking water supply in Moldova, determines the need to improve the methods of control and monitoring of the groundwater. This survey had the purpose to assess the condition of groundwater, modification of their chemical and physical components under the influence of natural and anthropogenic factors for the elaboration and realization of activities for the rational use of groundwater and their protection from exhaustion and pollution in the territory of Moldova.

The monitoring data gathered under this activity will be used for the validation of the delineated groundwater bodies, the validation of the monitoring design, the validation of the pressure and impact assessment and the upcoming status and trend assessment.

Although groundwater is generally considered “cleaner” than surface water, because it is not directly exposed to surface contaminants, groundwater does accumulate anthropogenic and naturally occurring substances from its surroundings that, if left untreated, could be harmful to human health.

1. Introduction and scope

This groundwater chemical survey focused at the Danube-Prut and Black Sea River Basin District (RBD) of Moldova and aimed at gathering additional monitoring data, in particular on additional substances, which are not subject to routine scope of the national monitoring.

The Hydro-Geological Expedition of Moldova (EHGeoM) precisely selected 35 sites. Strategically distributed across the Danube-Prut and Black Sea hydrographic basin district, these sites was the focus of data collection efforts for the groundwater study. Special attention was given to ensuring the sites were representative of the region's geographical and hydrological diversity, allowing for a more comprehensive analysis.

Chemical analyses of water samples from these sites were performed with the support and under the aegis of the "EU4Environment - Water Resources and Environmental Data" project. This collaboration facilitated access to international standard protocols and enabled the strengthening of a vital partnership between field teams and experts in environmental quality assessment.

Selecting the parameters for monitoring was a complex task and was influenced by two key considerations: competence, experience, and the identification of potentially hazardous substances. The contamination parameter profile was designed to meet the specific challenges of pollution in the region and to match international standards in contaminant research. In the ongoing effort to maintain the quality of groundwater and to assess potential risks posed by agricultural pollutants, we focused on identifying atrazine, a commonly used herbicide with potentially harmful effects on the environment. We chose the National Public Health Agency's Laboratory in Cahul to conduct chemical tests on 35 samples of groundwater to check for the presence of atrazine.

Between November 1st and 10th, 2023, two experienced hydrogeologists (Table 1) from the Hydro-Geological Expedition of Moldova (EHGeoM) conducted detailed field investigations. They rigorously followed pre-established procedures, collecting water samples and measuring specific parameters directly in the field, thus ensuring a high level of consistency and credibility for the samples designated for laboratory analyses.

Proceeding with adherence to quality standards, the gathered samples were safely transported to the EHGeoM laboratory and then to the laboratory of the National Public Health Agency in Cahul. The analyses were conducted in strict compliance with current protocols to ensure the accuracy and integrity of the obtained data.

The hydrogeologists from EHGeoM then entered the data into a meticulous interpretation process, carefully analyzing the laboratory reports to ensure a correct understanding of the results and their impact on groundwater quality.

Through this final report, we expect to provide a solid database for stakeholders, to make well-informed decisions and implement concrete measures for the protection and management of our vital groundwater resources.

Table 1: Sampling team

Date	Name	Organization
1- 3 November 2023 7-10 November 2023	Mr. Vasile Ceban	EHGeoM
1- 3 November 2023 7-10 November 2023	Mr. Denis Rotari	EHGeoM

1.1. Preparatory activities before the survey

Before initiating the survey for the groundwater study, a series of essential preparatory activities were designed and implemented to ensure the precision and efficiency of the sample collection phase. The preparation for the survey was a detailed process that involved several steps. Activities began with initial planning and review of existing documentation to ensure we were prepared in this regard. Then, logistical planning was considered, selecting strategic drilling locations and arranging the necessary logistics, including transport and equipment. The next step was the mobilization of teams and professional training. An experienced team of specialists was assembled, including geologists and hydrogeologists. Training and instruction were provided to ensure that all team members understand the drilling procedures and safety protocols.

In the end, care was taken to stabilize and calibrate the equipment, testing and ensuring that all instruments and gear were prepared to deliver reliable and precise data. Through these meticulous steps, it was ensured that the preparation for the survey was complete and that all safety measures were respected. Concurrently, detailed coordination with the laboratories was crucial, having preliminary discussions and establishing agreements to ensure they were ready to handle the volume of samples within the project's timeline. This extensive preparation, which addressed both theoretical and practical aspects, provided a solid foundation for the survey and significantly contributed to the success and integrity of the groundwater quality study.

1.2. List of measured parameters and analysed substances

In order to provide a comprehensive assessment of groundwater quality, a list of parameters has been selected based on a deep understanding of the essential factors that influence the chemical characteristics of groundwater resources. The selected parameters reflect the main chemical compounds responsible for determining groundwater quality, as well as the presence of pesticides. Furthermore, our study paid special attention to the potential impact of dissolved metals on groundwater (Table 3).

In addition to the laboratory-collected data, field-measured parameters, which are often critical for a dynamic and current interpretation of water quality, are systematized in Table 2. These field parameters include essential measurements that provide an immediate insight into underground conditions and represent a vital component in the comprehensive assessment of groundwater status.

Table 2: Field measurements

Parameter/Indicator	Unit	Measurement device
Depth to groundwater table	m	field device
Air temperature	°C	field device
Water temperature	°C	field device
Electrical conductivity	µS/cm	field device
Dissolved oxygen	mg/l	field device
pH value		field device

Parameter/Indicator	**Unit**	**Sample treatment / Conservation**
	Major ions	
Fixed residue	mg/l	

Mineralization	mg/l	
Total hardness	°dH	
Calcium (Ca)	mg/l	
Magnesium (Mg)	mg/l	
Sodium + Potassium (Na+K)	mg/l	
Chlorides (Cl)	mg/l	
Hydrocarbons (HCO3)	mg/l	
Sulphates (SO4)	mg/l	
Ammonium (NH_4^+)	mg/l	
Nitrates (NO_3)	mg/l	
Nitrite (NO_2)	mg/l	
Fluorine (F)	mg/l	
Polyphosphates (PO4)	mg/l	
Metals		
Iron (Fe)	mg/l	
Copper (Cu)	mg/l	
Lead (Pb)	mg/l	
Arsenic (As)	mg/l	
Selenium (Se)	mg/l	
Manganese (Mn)	mg/l	
Pesticides		
Atrazine	µg/l	

1.3. Characteristics of the investigated groundwater bodies

In Moldova, about 40% of the rural population is supplied with water from underground layers with hydrostatic pressure and from the first groundwater aquifer (not- pressure). The phreatic waters and deep water layer have particular significance for Moldova. This report analyzes the chemical status of groundwater bodies (GWBs) in the Danube-Prut- Black Sea River Basin in the Republic of Moldova. The groundwater bodies investigated are:

- MDDBSGWQ120 / MDPRTGWQ130, Alluvial water body (a,adQ3), Holocene, aquifer rocks – sand with gravel;
- MDDBSGWQ220 / MDPRTGWQ230, Pliocene-Pleistocene (aN2-aQ1+2) water body, aquifer rocks – sand with gravel;
- MDDBSGWD310, Pontic water body (N2p), aquifer rocks – sand intercalations;
- MDPRTGWQ510, Middle Sarmatian water body (N1s2), aquifer rocks – sand intercalations;
- MDPRTGWD740, Badenian-Sarmatian water body (N1b-s1), aquifer rocks – limestone;
- MDPRTGWD820, Silurian – Cretaceous (S-K) water body, aquifer rocks - limestone, sandstones.

GWB **MDDBSGWQ120** and **MDPRTGWQ130** refers to an alluvial-deluvial water body (a,adQ3) within the Danube-Prut and Black Sea basin, consisting of Holocene aquifer rocks including sand and gravel. The groundwater from this water body flows through the river meadows of the hydrographic basin, with the Ialpug, Cahul, and Cogalnic rivers being the largest in the area. In these meadows, the groundwater is stored within alluvial-deluvial deposits comprising of clayey sands, sandy clays with gravel intercalations, and sands of varying grain sizes. The aquifer's thickness is up to 5.0 m out of a total 15.0 m thickness of alluvial deposits. The flow from exploitation wells ranges from 0.003 to 0.3 l/s, while springs yield from 0.01 to 0.2 l/s.

The water body's supply region corresponds to the spreading area. The supply takes place from the account of atmospheric precipitation. The water regime is closely related to the atmospheric regime. The direction of the flow depends on the morphological conditions of the land.

This water body is widely used to supply the population with domestic water. The alluvial-deluvial water body, Holocene, is widely used by rural population for the individual households. This body of water is highly susceptible to contamination with pollutants originating from surface run-off. Improper agricultural practices, such as the excessive use of fertilizers and pesticides, deforestation, along with uncontrolled discharges of domestic and industrial waste, can lead to the degradation of water quality. Consequently, anthropogenic pollution, resulting directly from human activities, threatens the balance of aquatic ecosystems and can diminish access to clean water for communities reliant on this water body, impacting human health and local biodiversity.

GWB **MDDBSGWQ220** and **MDPRTGWQ230**, Pliocene-Pleistocene water body (aQ1+2 - aN2) (Danube-Black Sea and Prut River basin) includes groundwater from the alluvial deposits of the Eopleistocene - Pleistocene, and upper - middle Pliocene deposits. The water body is spread on the slopes of the large rivers and is constituted by the water-bearing layers from terraces I - X of the river from Prut-Danube-Black Sea basin. Groundwater is stored in clayey sands, sands with gravel. The thick-ness of the water-bearing layers varies between 0.5 - 15.0 m. The opening depth of the aquifer varies between 0.0 m to 27.0 m, more often between 5.0 - 10.0 m. The abundance of water in the terraces varies depending on the lithological composition, the degree of permeability of the terraces deposits. The flow of springs does not exceed 0.1 l/s, the flow of wells 0.05 l/s, the flow of wells 0.001-0.1 l/s.

The alimentation region of the water body corresponds to the spreading area. Most of the alimentation takes place from atmospheric precipitation and surface water during floods. The direction of water flow is from the upper terraces to the lower ones and along the valleys to the base of the terraces. Variations in groundwater levels are directly influenced by changes in the atmospheric regime. During periods of heavy rainfall, the aquifer level tends to rise, and as a result, the salt content of the groundwater is diluted, thereby reducing its salinity. On the other hand, during droughts, the concentration of minerals in the water increases, leading to a higher degree of mineralization and a decline in the aquifer level. These underground water resources hold significant practical value due to their generally satisfactory quality and accessibility owing to their shallow depth. Therefore, they are crucial for supplying potable water in decentralized areas and are commonly used for domestic and household purposes.

However, it must be noted that this aquifer is not protected by impermeable surface layers and, therefore, is vulnerable to pollutants from both anthropogenic sources and natural processes. This highlights the need for increased vigilance and the implementation of sustainable land management practices to minimize the risk of water contamination.

GWBs **MDDBSGWD310**, Pontian water body (N2p) (Danube-Black Sea and Prut Rivier basin). The Pontian deposits are widely represented in the west and northeast of the Danube-Black Sea basin, and in the southern part of the Prut River basin. The Pontian deposits are represented by the littoral facies. In the lower part of the Pontian section it consists of thin layers of blue-grey clay, alternating with blue-grey fine-grained sands and yellowish-brown shelly limestones rich in marine fauna remains with thin intercalations of clays gray-green colour. In the upper part of the Pontian section, it is constituted by microgranular, grey-yellowish sands, sometimes clay and limestone inclusions are found. These sands, unlike those in the lower part, are more clayey and therefore less saturated with water. The thickness of the aquifer layer is varies within quite large limits 7.0 m - 40.0 m. The alimentation of the water body takes place due to the infiltration of atmospheric precipitation, the infiltration of groundwater from the overlying aquifers layers on the Pontian water body and by the absorption of groundwater of the upper Sarmatian - Meotian water body. Water discharge occurs through springs, infiltration of groundwater into bodies of water located below the aquifer bed, and by capturing groundwater through shallow wells or artesian wells, also by draining it into the network of ravines that is highly devel-oped in the region. The waters have a direction of flow towards the river valleys or along the base of the ravines. The depth to the Pontian aquifer varies depending on the relief from 2 m to 125 m. The flow rate of the exploitation wells varies from 1.1 to 2.3 l/s, increasing in the southern part to 3.7 -7.6 l/s. Near the village Taraclia there are several springs with a flow rate of 8 - 9 l/s. Groundwater is used for drinking and technical water supply in the southern part of the republic.

Among the negative factors that prevent the wide use of these waters, the high hardness, high mineralization, sulfate content that does not meet the standard norms, nitrate pollution, and in the southern part of the distribution area of the water body, it is located at relatively great depths.

GWB **MDPRTGWQ510** is associated with Middle Sarmatian clay-sand terrigenous formation (Codru formation (N1s2 kd1-2)). Groundwater is stored in fine-grained sands with intercalations of clays, sand-stones and limestones. The thickness of the water-soaked deposits varies from 5-15 m to 40-50 m with an average value of 20-30 m. The depth of the aquifer varies depending on the relief and varies from 1.5 m to 100 m. The flow rate of wells operation varies from 0,1 to 5 l/s. Groundwater with a chemical com-position dominated by hydrocarbon - sulfate - chlorinated anions has a mineralization of less than 1.5 g/l, and groundwater with a chemical composition dominated by chloride-hydrocarbon and sodium ions, the total mineralization exceeds 2 g/l. This GWB in most cases is unconfined and shallow. Waters from this aquifer are used for drinking The Middle Sarmatian water body is used for centralized water supply in the central and southern part of the Republic of Moldova.

GWB **MDPRTGWD740**, Badenian-Sarmatian water body (N1b-s1), is spread in the central part of the Prut river basin and is represented by calcareous rocks with intercalations of fine-grained sands, sometimes clays, marls and gypsum. The thickness of the water body reaches up to 50 m, in some regions up to 90 m, with an average thickness of 25 m. Groundwater discharges in the valley of the Prut River and its affluents. In the southern part, the Badenian - Sarmatian aquifer deepens and in the Gotești village region it was detected by drilling at a depth of 572 m. The flow rate of the exploitation wells varies in the range of 0.09 - 8.0 l/s.

When the rocks stored with water are composed by limestone, they contain fresh or slightly saline waters, of the calcium-sodium hydrocarbonate type, with mineralization below 1.0 g/l. However, such areas are quite few and the basin is dominated by groundwater with mineralization above 1.0 g/l. In this body of water the mineralization is high (2.0 – 3.0 g / l) because gypsum is present, which is quite common in the water-bearing rocks of the Badenian- Sarmatian aquifer.

GWB **MDPRTGWD820**, Silurian – Cretaceous (S-K) water body, is spread over the entire territory of the Prut river basin, but it is used for centralized water supply only in the northern part of the Prut basin (Lipcani, Briceni, Edinet, Riscani). Groundwater is stored in limestone, sandstone, with intercalations of marl and argillite with a total thickness varying from 50-60 m to 100-120 m.

The Silurian - Cretaceous water body is hydraulically connected to the Badenian - Sarmatian water body. Two aquifers in the Silurian - Cretaceous water body have been outlined. Groundwater from both aquifers is widely used for centralized and local water supply.

The chemical composition of groundwater in the Silurian-Cretaceous water body is heterogeneous. In the northern part of the Prut river basin, fresh waters with mineralization below 1.0 g/l are detected and hydrocarbon, sulfate, calcium and magnesium ions predominate. In the southern part of the basin, the chemical composition of the groundwater changes and ions of hydrocarbons, sulfates, sodium or hydrocarbons, sodium predominate, and the dry residue value increases up to 2-10 mg/l.

1.4. Monitoring sites

Groundwater monitoring aims to conduct a detailed study of seasonal variations that impact the quality and quantity of groundwater. The goal is to collect a comprehensive set of data to evaluate trends and patterns in the behavior of these water resources. This includes measuring the water level, flow rate, and specific concentration of pollutants, such as nitrates, heavy metals, and organic compounds. The selected points for monitoring are vital as they serve as an indicator of the environmental conditions they are in. Studying groundwater bodies at risk of pollution from the surface is particularly important, as they are directly affected by human activities such as agricultural runoff, industrial waste, and urban expansion. Chemical substances and waste from these sources can infiltrate the soil and contaminate groundwater, which often constitutes a primary source of drinking water.

Equally fundamental is the monitoring of areas near water collection points, as cities in the Republic of Moldova rely on these sources for the population's drinking water supply. The quality of this water directly affects public health. Regular and rigorous monitoring can provide early warning signs of pollution, allowing for the adoption of preventative measures before the levels of contaminants reach a critical threshold and potentially enter the urban water supply system.

Therefore, establishing a comprehensive framework for monitoring groundwater in the Republic of Moldova is essential for maintaining the integrity of the aquatic ecosystem and protecting public health against risks associated with polluted water sources. This promotes informed decision-making and the prudent management of a critical natural resource. (Table 4 and Figure 1).

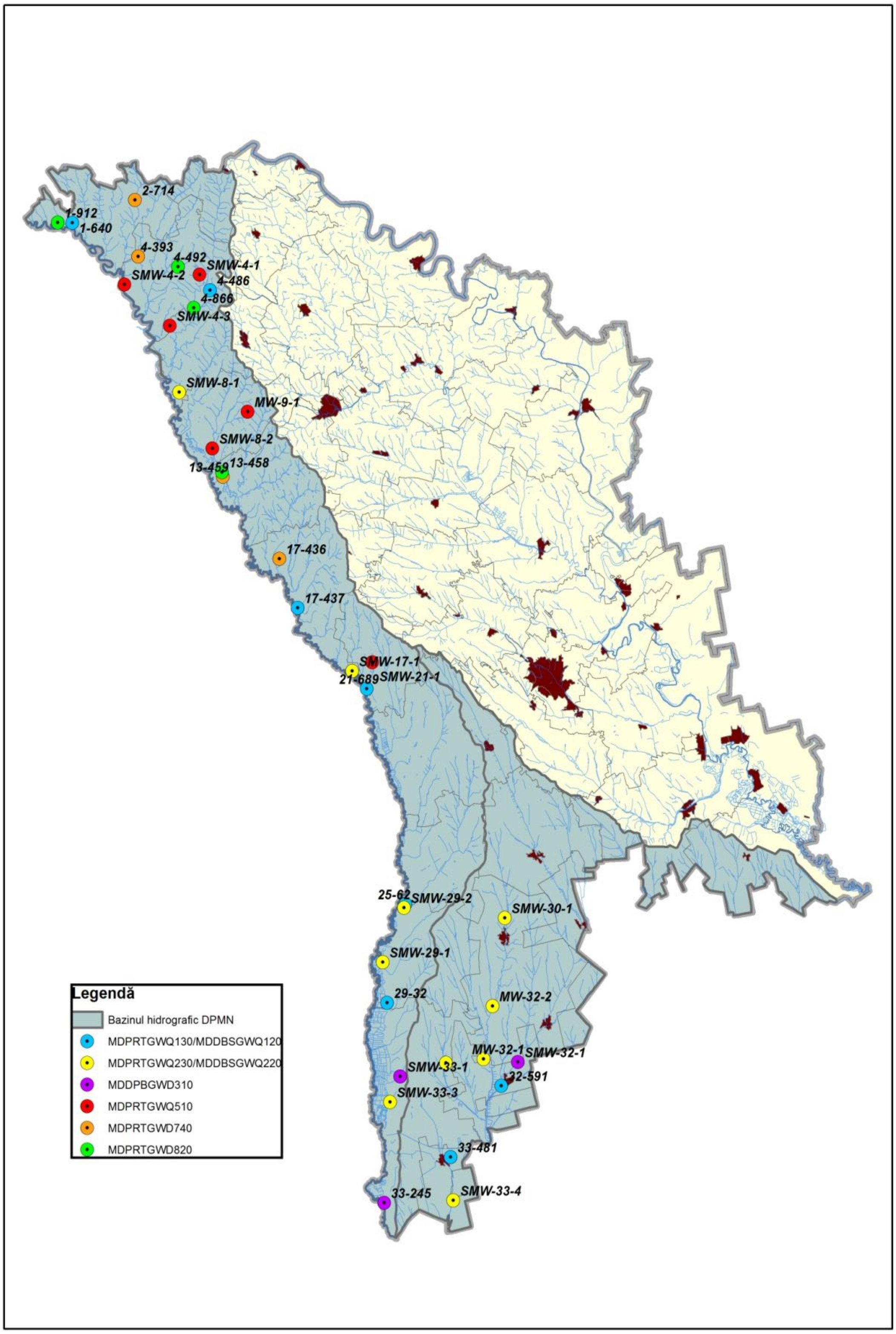

Figure 1: Location of the monitoring sites

Table 4: Monitored sites

No. of site	Site ID	Type of site (spring, well, artesian well etc.)	Discharge, l/s	Location	GWB code	GWB environment (water-bearing rocks and geological index according to the map)	Coordinate system MOLDREF 99		altitude
							X coordinate	Y coordinate	
1.	1-640	artesian well	0,018	village Lipcani, district Briceni	MDPRTGWQ130	Alluvial water body (a,adQ3), Holocene, aquifer rocks – sand with gravel	82525	348585	166,8
2.	4-486	artesian well	0,016	village Bratuseni, district Edinet	MDPRTGWQ130	Alluvial water body (a,adQ3), Holocene, aquifer rocks – sand with gravel	126255	327876	168,8
3.	17-437	artesian well	0,024	city Ungheni, str. Musatov 1	MDPRTGWQ130	Alluvial water body (a,adQ3), Holocene, aquifer rocks – sand with gravel	154074	230285	61
4.	21-689	artesian well	0,028	village Grozesti, district Nisporeni	MDPRTGWQ130	Alluvial water body (a,adQ3), Holocene, aquifer rocks – sand with gravel	175990	205372	27,32
5.	25-62	artesian well	0,010	village Nicolaevca, district Leova	MDPRTGWQ130	Alluvial water body (a,adQ3), Holocene, aquifer rocks – sand with gravel	188307	139263	17,38
6.	29-32	artesian well	0,018	village Gotesti, district Cantemir	MDPRTGWQ130	Alluvial water body (a,adQ3), Holocene, aquifer rocks – sand with gravel	182417	108920	9,94
7.	32-591	artesian well	0,018	city Taraclia, district Taraclia	MDDBSGWQ120	Alluvial water body (a,adQ3), Holocene, aquifer rocks – sand with gravel	218685	83424	19,1
8.	33-481	artesian well	0,583	city Vulcanesti, UTA Gagauzia	MDDBSGWQ120	Alluvial water body (a,adQ3), Holocene, aquifer rocks – sand with gravel	202603	61439	50,4
9.	*SMW -29-2*	*spring*	*0,003*	*village Vilcele, district Cantemir*	*MDPRTGWQ230*	*Pliocene-Pleistocene aN2-aQ1+2 water body, aquifer rocks – sand with gravel*	*187812*	*138158*	*69,8*
10.	*SMW-17-1*	*spring*	*0,016*	*village Frasinesti, district Ungeni*	*MDPRTGWQ230*	*Pliocene-Pleistocene aN2-aQ1+2 water body, aquifer rocks – sand with gravel*	*171339*	*210884*	*80,00*
11.	*SMW - 8-1*	*spring*	*0,158*	*village Braniste, district Riscani*	*MDPRTGWQ230*	*Pliocene-Pleistocene aN2-aQ1+2 water body, aquifer rocks – sand with gravel*	*116400*	*296614*	*161,00*
12.	*SMW-33-3*	*spring*	*0,295*	*village Crihana Veche, district Cahul*	*MDPRTGWQ230*	*Pliocene-Pleistocene aN2-aQ1+2 water body, aquifer rocks – sand with gravel*	*183818*	*80107*	*36,00*

No. of site	Site ID	Type of site (spring, well, artesian well etc.)	Discharge, l/s	Location	GWB code	GWB environment (water-bearing rocks and geological index according to the map)	Coordinate system MOLDREF 99		altitude
							X coordinate	Y coordinate	
13.	*SMW -29-1*	*spring*	*0,100*	*village Tiganca, district Cantemir*	*MDPRTGWQ230*	*Pliocene-Pleistocene aN2-aQ1+2 water body, aquifer rocks – sand with gravel*	*181065*	*121458*	*18,5*
14.	*SMW-33-2*	*spring*	*0,581*	*village Lopatica, district Cahul*	*MDDBSGWQ220*	*Pliocene-Pleistocene aN2-aQ1+2 water body, aquifer rocks – sand with gravel*	*201155*	*90435*	*92,5*
15.	*SMW-33-4*	*spring*	*0,156*	*village Alexandru Ion Cuza, district Cahul*	*MDDBSGWQ220*	*Pliocene-Pleistocene aN2-aQ1+2 water body, aquifer rocks – sand with gravel*	*203451*	*48152*	*27*
16.	*SMW - 30-1*	*spring*	*0,006*	*village Bugeac, UTA Gagauzia*	*MDDBSGWQ220*	*Pliocene-Pleistocene aN2-aQ1+2 water body, aquifer rocks – sand with gravel*	*219777*	*134960*	*83*
17.	MW - 32-1	artesian well	0,36	village Balabanu, district Taraclia	MDDBSGWQ220	Pliocene-Pleistocene aN2-aQ1+2 water body, aquifer rocks – sand with gravel	213208	91683	70
18.	MW-32-2	artesian well	0,432	village Congaz, UTA Gagauzia	MDDBSGWQ220	Pliocene-Pleistocene aN2-aQ1+2 water body, aquifer rocks – sand with gravel	214860	105556	35
19.	33-245	artesian well	6,18	village Slobozia Mare, district Cahul	MDDPBGWD310	Pontian water body (N2p), aquifer rocks – sand intercalations	181519	47374	6,28
20.	*SMW-32-1*	*spring*	*9,53*	*city Taraclia, district Taraclia*	MDDPBGWD310	Pontian water body (N2p), aquifer rocks – sand intercalations	*223894*	*90661*	*122*
21.	SMW-33-1	spring	7,20	city Cahul, district Cahul	MDDPBGWD310	Pontian water body (N2p), aquifer rocks – sand intercalations	186607	86263	58
22.	*SMW - 4-1*	spring	0,068	*city Cupcini, district Edinet*	MDPRTGWQ510	Middle Sarmatian water body (N1s2), aquifer rocks – sand intercalations	122942	332747	176
23.	*SMW - 8-2*	spring	0,29	*Mos Ion, district Glodeni*	MDPRTGWQ510	Middle Sarmatian water body (N1s2), aquifer rocks – sand intercalations	126928	279280	72
24.	SMW - 4-2	spring	0,429	village Viisoara, *district* Edinet	MDPRTGWQ510	Middle Sarmatian water body (N1s2), aquifer rocks – sand intercalations	99022	329631	115
25.	SMW - 4-3	spring	0,096	village Sipot, *district* Edinet	MDPRTGWQ510	Middle Sarmatian water body (N1s2), aquifer rocks – sand intercalations	113469	317020	163

No. of site	Site ID	Type of site (spring, well, artesian well etc.)	Discharge, l/s	Location	GWB code	GWB environment (water-bearing rocks and geological index according to the map)	Coordinate system MOLDREF 99		altitude
							X coordinate	Y coordinate	
26.	MW-9-1	artesian well	0,014	village Petrunea, *district Glodeni*	MDPRTGWQ510	Middle Sarmatian water body (N1s2), aquifer rocks – sand intercalations	138126	290557	163
27.	SMW-21-1	spring	0,047	village Faisenberg, district Nisporeni	MDPRTGWQ510	Middle Sarmatian water body (N1s2), aquifer rocks – sand intercalations	177740	213542	88,00
28.	4-393	artesian well	1,46	village Fetesti, district Edinet	MDPRTGWD740	Badenian-Sarmatian water body (N1b-s1), aquifer rocks - limestone.	103434	338304	135,4
29.	2-714	artesian well	1,50	village Tabani, district Briceni	MDPRTGWD740	Badenian-Sarmatian water body (N1b-s1), aquifer rocks - limestone.	102382	355623	196,2
30.	13-459	artesian well	1,20	village Calinesti, district Falesti	MDPRTGWD740	Badenian-Sarmatian water body (N1b-s1), aquifer rocks - limestone.	130326	270590	50,5
31.	17-436	artesian well	1,50	village Petresti, district Ungheni	MDPRTGWD740	Badenian-Sarmatian water body (N1b-s1), aquifer rocks - limestone.	148199	245392	172
32.	1-912	artesian well	3,40	village Criva, district Briceni	MDPRTGWD820	Silurian – Cretaceous (K-S) water body, aquifer rocks - limestone, sandstones.	77845	348678	110
33.	4-866	artesian well	2,60	village Stolniceni, district Edinet	MDPRTGWD820	Silurian – Cretaceous (K-S) water body, aquifer rocks - limestone, sandstones.	121040	322448	119,7
34.	13-458	artesian well	2,70	village Calinesti, district Falesti	MDPRTGWD820	Silurian – Cretaceous (K-S) water body, aquifer rocks - limestone, sandstones.	130047	271987	51
35.	4-492	artesian well	2,80	village Alexandreni, district Edinet	MDPRTGWD820	Silurian – Cretaceous (K-S) water body, aquifer rocks - limestone, sandstones.	116038	335141	168,5

2. Survey results

The study of the chemical composition quality of groundwater aims to determine the regularities in the exploitation process. In this regard, in 2023, 35 water samples were taken from 35 monitoring points, then analyzed by the "EHGeoM" laboratory for major ions and dissolved metals, as well as by the Public Health Agency Cahul Laboratory for pesticides (atrazine). Water quality assessments were carried out in accordance with current sanitary norms to ensure compliance with drinking water quality regulations, according to Government Decision No. 934/2 of 15.08.2007 and Law No. 182 of 19.12.2019.

Along with the collection of water samples, the following parameters were studied in the field to obtain a complete picture of groundwater quality: temperature, conductivity, oxidability, pH, and discharge (springs) for all monitoring points (Table 5).

Measuring the temperature of groundwater is an important step in understanding the dynamics of the underground ecosystem and water quality. Variations in water temperature can influence the level of dissolved oxygen, the solubility of chemicals, and microbial activity. In the study, the temperature of groundwater was measured at 35 monitoring points, using both specialized sensors and manual measurement devices. The results showed that the temperature of groundwater varies between 11.4°C and 16.1°C. These variations can be influenced by factors such as the depth of the groundwater, atmospheric pressure, the influence of human activities, and seasonal changes.

The groundwater conductivity was analyzed to assess the mineral composition of the water. Conductivity was measured at the same 35 monitoring points and ranged from 412 µS/cm to 5500 µS/cm.

The oxidizability of the groundwater indicates the degree of water oxidation, which can be influenced by the presence of organic or inorganic substances in the water. Measurements taken at the monitoring points showed values between 1.88 mg/l and 9.7 mg/l, suggesting variable groundwater quality and partial pollution from wastewater. Additionally, the pH of the groundwater was measured to determine the level of acidity or alkalinity, and this information is crucial for understanding how chemical substances and natural processes affect groundwater quality. The groundwater pH ranges from 6.5 to 9.0 and ranges from slightly acidic to strongly alkaline.

The spring overflow discharge is influenced by the amount of precipitation and climatic conditions. It has varied from 0.018 l/s to 9.5 l/s.

The water quality was studied for different water bodies:

The water quality for ***the alluvial-deluvial water body*** was studied at 8 monitoring points (Figure 2), and the results of laboratory analyses revealed an increased content of sulphates (SO_4) up to 314 mg/l, sodium and potassium up to 485 mg/l, ammonia (NH_4) in a water sample being 5.42 mg/l (probe no. 32-591 in the city of Taraclia), nitrites (NO_2) up to 4.79 mg/l, increased fluoride content in probe no. 33-481 in the city of Vulcanești, UTA Gagauzia (2.50 mg/l), total dissolved solids up to 1899 mg/l, and iron content up to 0.54 mg/l (Table 6, 7).

The groundwater of this body of water is located at shallow depths, making it more susceptible to surface pollution. The main factors influencing the quantity and quality of this body of water are exogenous processes and climatic factors.

It is important to continue monitoring and evaluating the water quality at these monitoring points in order to identify sources of pollution and implement measures to protect the water and prevent pollution. Additionally, informing and educating the local community is essential for raising awareness of the importance of preserving water quality for the health and well-being of all.

The Pliocene-Pleistocene water body was studied at 10 monitoring points (Figure 3), and the results revealed various elevated levels of chemicals. In particular, it was found that the level of sulphates reached up to 723 mg/l, while sodium and potassium recorded concentrations of up to 725 mg/l. Additionally, a high content of nitrates was identified, with a maximum of 136.32 mg/l, and fluoride, with a level of up to 7.75 mg/l. Furthermore, the dry residue was measured at a maximum value of 3461 mg/l, and the total iron reached a level of 0.84 mg/l at monitoring point SMW-17-1 in the village of Frăsinești, Ungheni district (Tables 6, 7).

In light of these findings, it is essential to continue monitoring the quality of groundwater at these observation points. Elevated levels of chemicals can pose a risk to human health and the surrounding ecosystem, making it crucial to regularly assess their evolution. Additionally, it is important to identify the sources of these substances and develop strategies to reduce them as much as possible.

The groundwater quality of ***the Pontian water body*** has been subjected to a detailed analysis at three monitoring points (Figure 4). According to the study, an increased content of sulfates has been found, with values of up to 280 mg/l. Additionally, an elevated presence of sodium and potassium has been identified, with concentrations of up to 301 mg/l, as well as high levels of fluoride, reaching up to 7.30 mg/l (Tables 6, 7).

It is important to conduct further studies to determine the source of these high chemical concentrations in groundwater and their long-term impact on the surrounding environment.

The middle Sarmatian water body has been subjected to a detailed study at 6 monitoring points (Figure 5), and the results have shown an increased content of sulfates, sodium, potassium, and fluoride in the water samples. The sulfate content has reached up to 324 mg/l, while sodium and potassium have reached values of up to 311 mg/l. Additionally, the fluoride content has been measured up to 1.76 mg/l (Table 6, 7).

As the groundwater from this water body is used for drinking water supply in several localities in the Republic of Moldova, it is imperative to continue monitoring the observation points that have shown increased ion content. This will ensure that the drinking water supplied to the population is safe and of high quality, protecting public health and the environment.

The Badenian-Sarmatian water body represents the most important source of drinking water in the Republic of Moldova, providing the necessary water for human consumption and agricultural activities. However, the results of laboratory analyses conducted at 4 monitoring points have highlighted the presence of harmful substances in the water content (Figure 6).

According to the analyses, an increased content of sodium and potassium has been found, with levels of up to 2601 mg/l, exceeding the permitted values for drinking water. Additionally, elevated levels of ammonia, with a concentration of up to 26.44 mg/l, as well as nitrites, with a value of 0.82 mg/l in sample no. 17-436 from Petrești village, Ungheni district, were identified in the Badenian-Sarmatian water. Fluoride, with concentrations of up to 15.70 mg/l, have also been detected in excessive amounts in the water of this body of water, raising public health concerns regarding long-term consumption. Other substances such as dry residue, with values of up to 6732 mg/l, and total iron, with concentrations of up to 0.48 mg/l, have also been found in quantities that exceed permissible standards for drinking water (Tables 6 and 7).

The water source at monitoring point no. 17-436 in Petrești village, Ungheni district, has been identified as heavily polluted, both during the drilling of the well in 2017 and at present. The groundwater is of great depth, which rules out natural surface pollution, indicating possible anthropogenic causes or unsatisfactory well construction. It is recommended to clean the monitoring point and identify sources of surface pollution in order to remedy the situation.

The Silurian-Cretaceous water body underwent a detailed analysis based on 4 water samples collected from 4 different monitoring points (Figure 7). After analysis, it was found that these samples contained high levels of sulfates (up to 441 mg/l), sodium and potassium (up to 850 mg/l), ammonia (up to 7.92 mg/l), nitrites (up to 5.80 mg/l), fluorine (up to 18.10 mg/l), total dissolved solids (up to 2061 mg/l), and total iron (up to 2.70 mg/l) (Table 6, 7).

Although these groundwater sources are used for centralized drinking water supply for the communities, the laboratory study revealed that the water quality is unsatisfactory and heavily polluted. Therefore, continuous monitoring of water quality is necessary. Additionally, a revision of the existing monitoring points, sanitary protection zones, and identified sources of pollution is needed.

This analysis of the Silurian-Cretaceous aquifer shows the need for implementing effective measures to protect and clean up the groundwater in this area. It is essential for the competent authorities to consider the results of this study and to implement strategies to reduce the impact of pollution on groundwater resources, as well as to ensure a safe supply of drinking water.

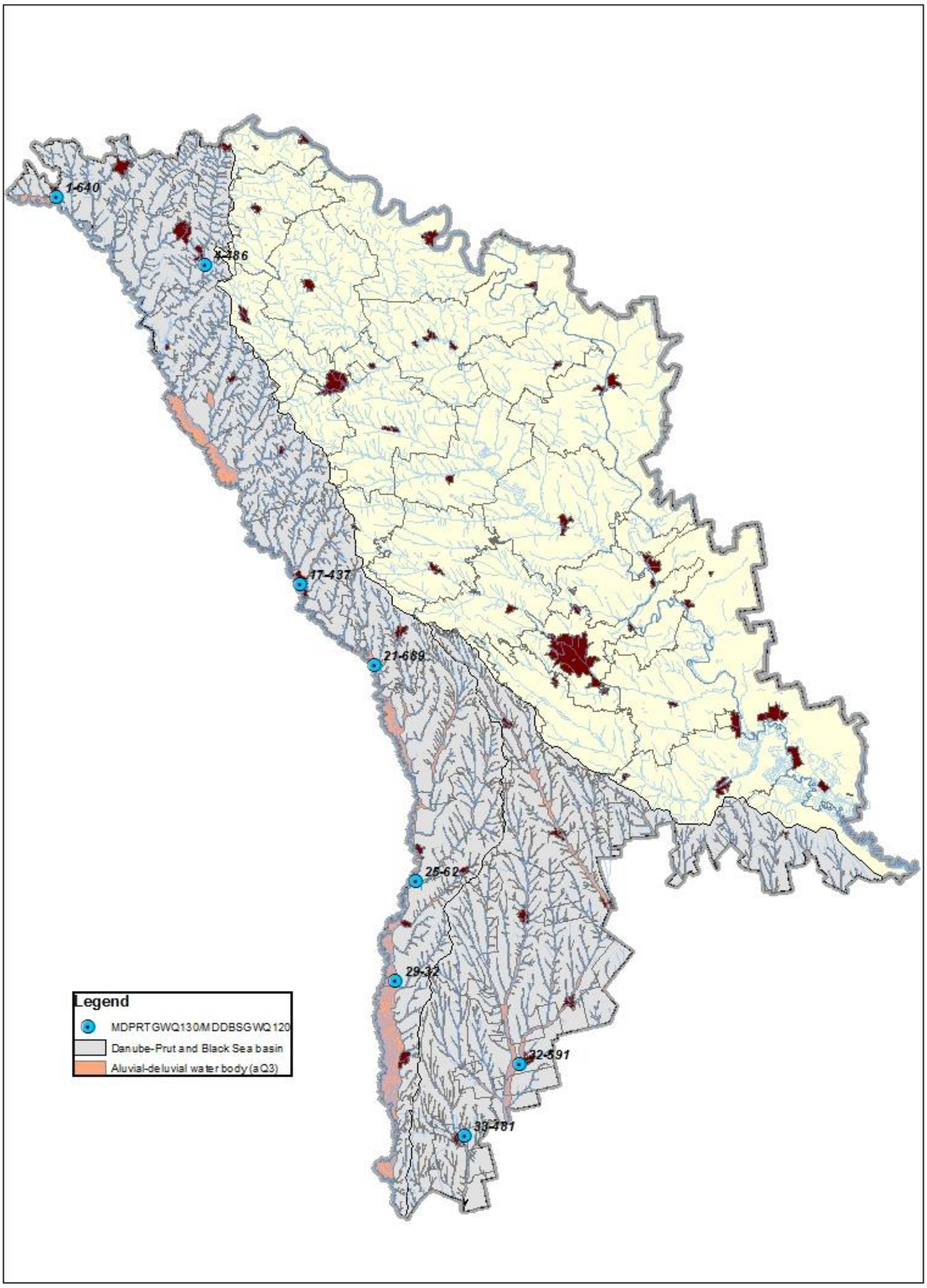

Figure 2: The alluvial-deluvial water body

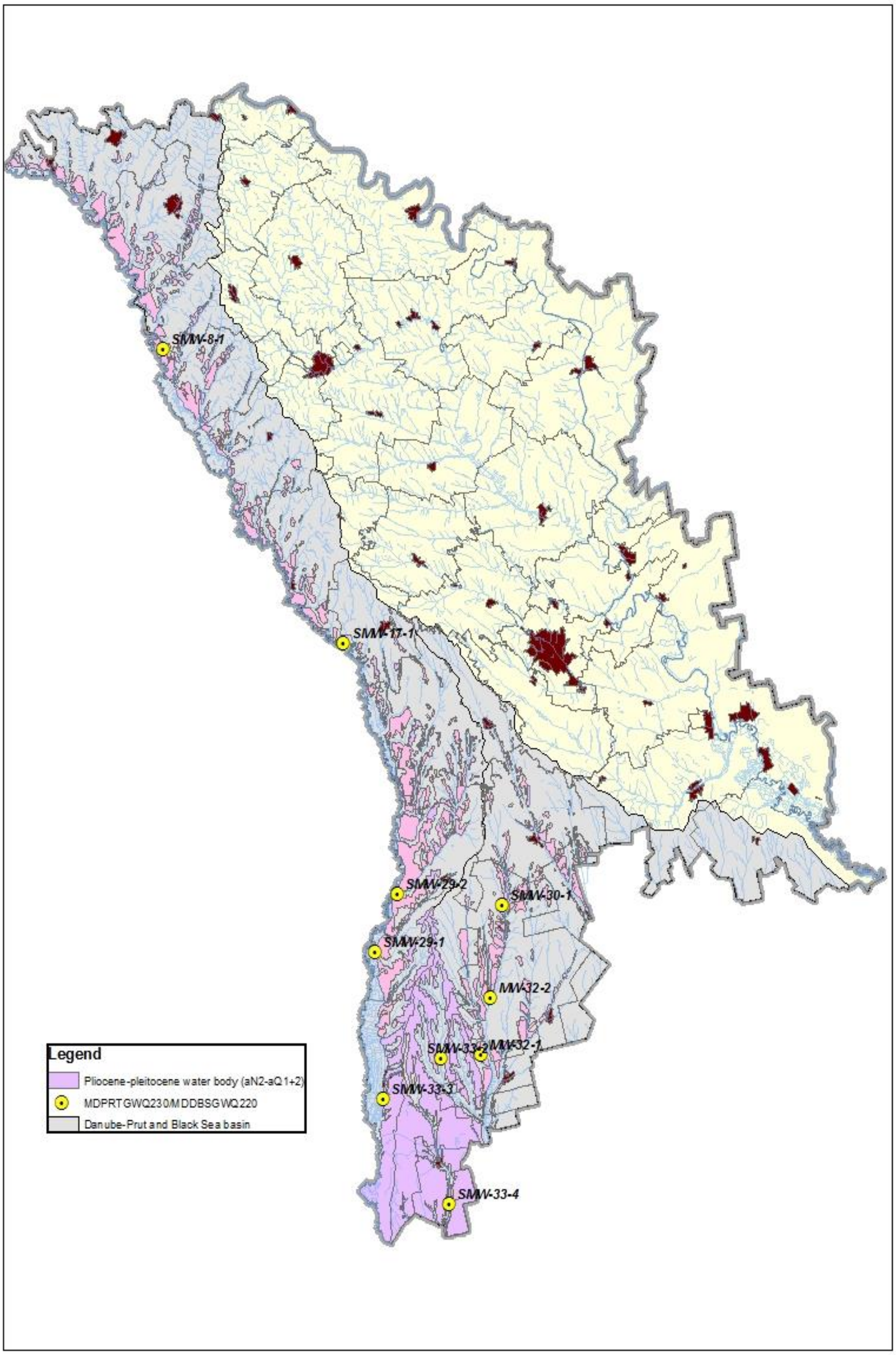

Figure 3: The Pliocene-Pleistocene water body

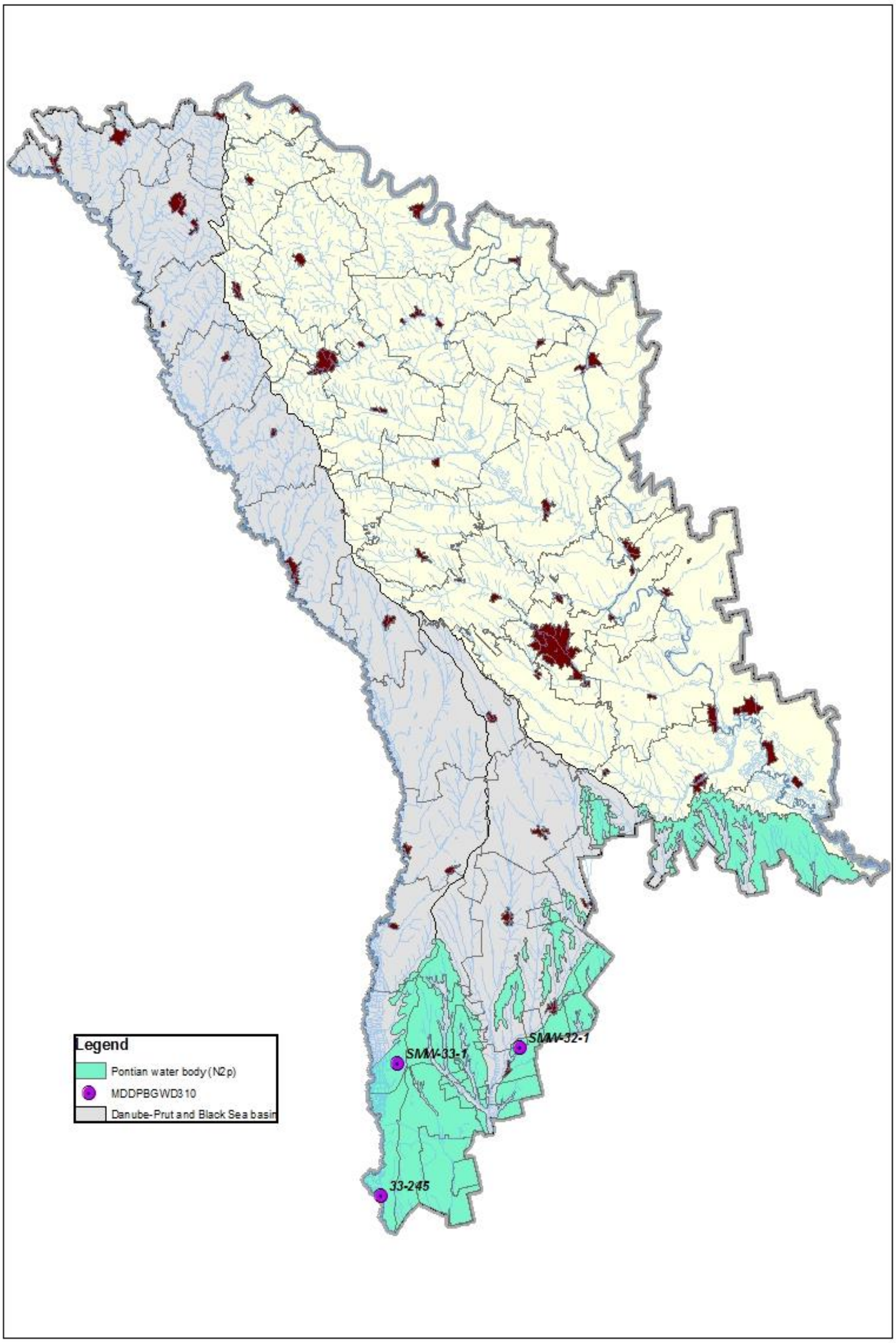

Figure 4: The Pontian water body

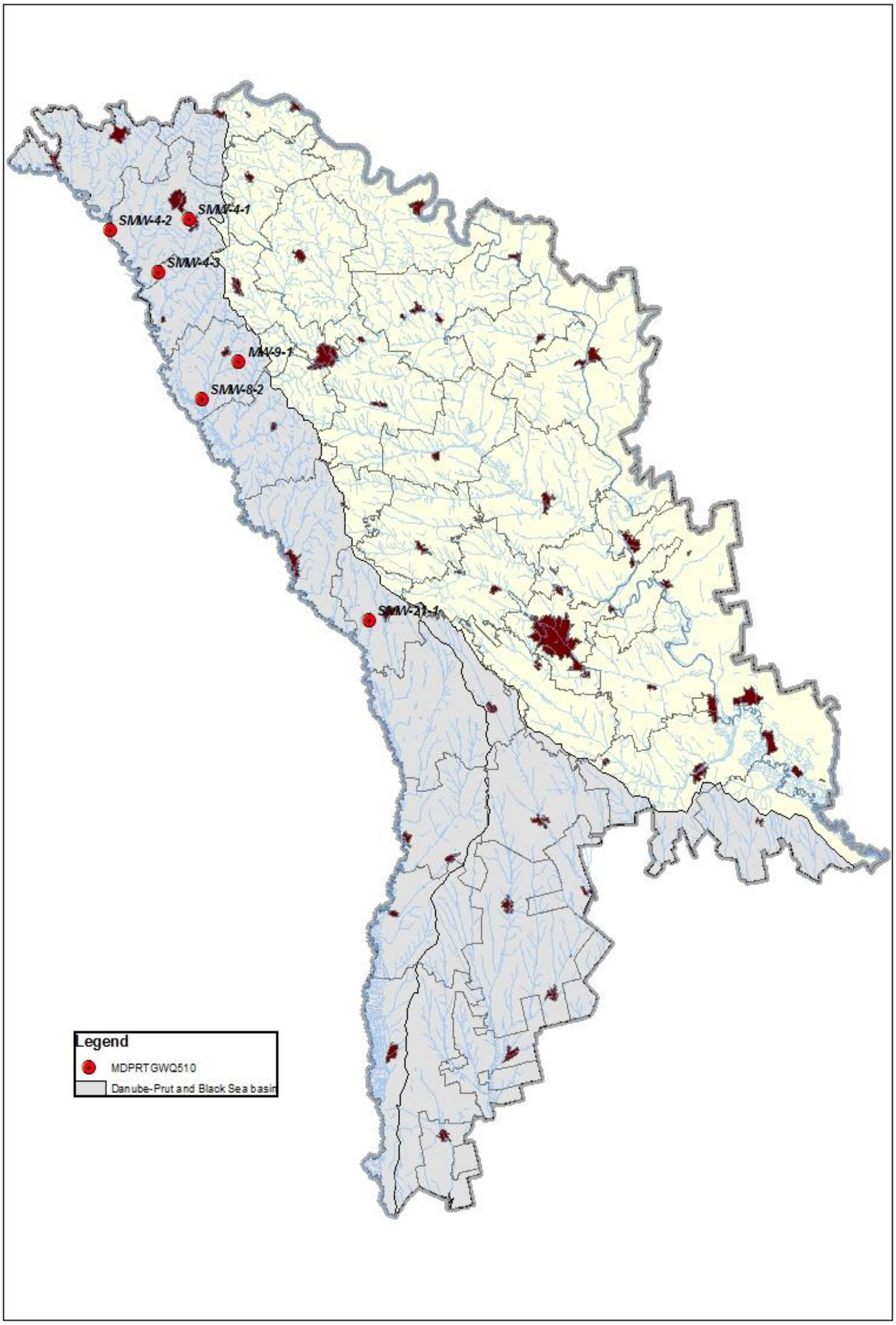

Figure 5: The middle Sarmatian water body

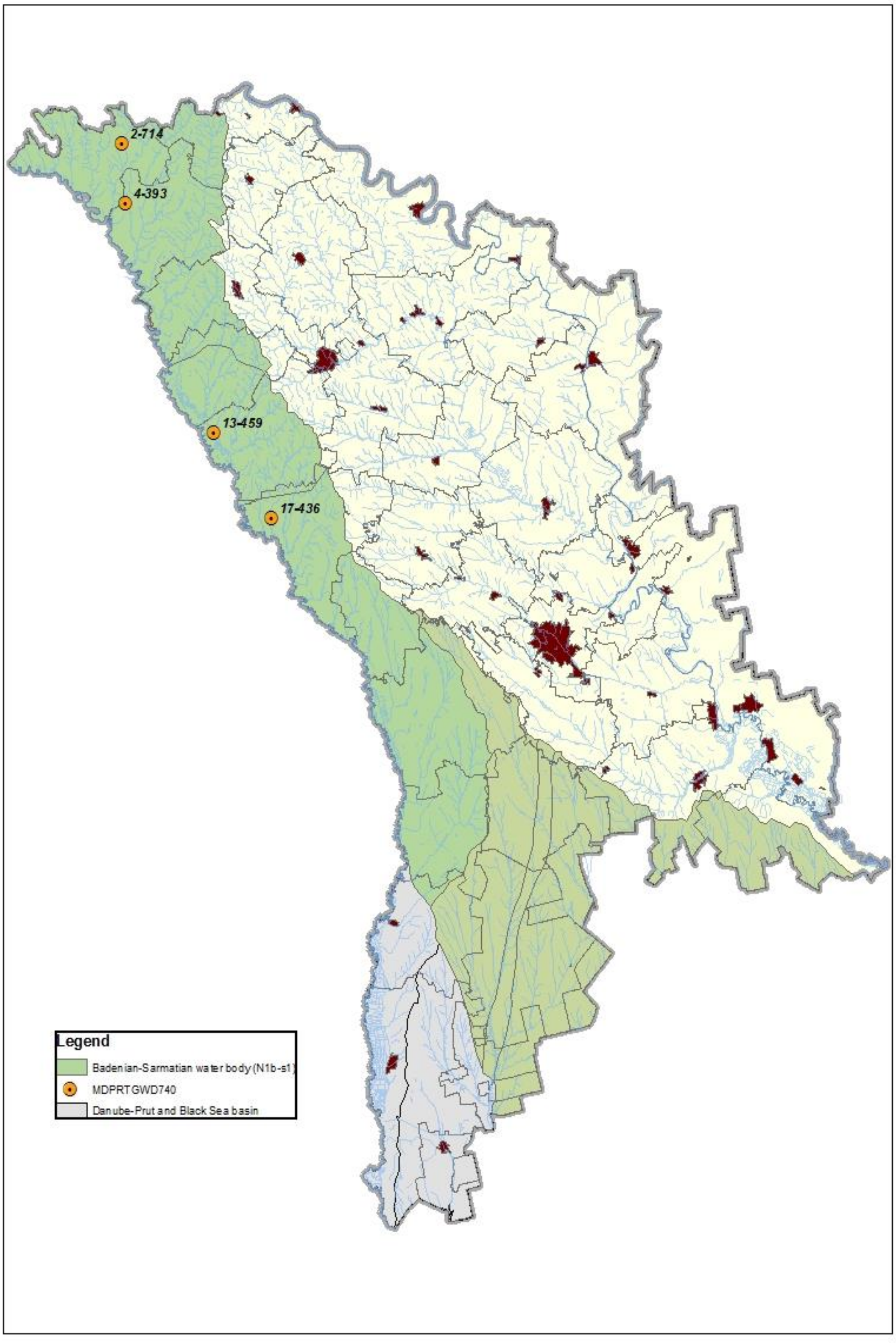

Figure 6: The Sarmatian-Badenian water body

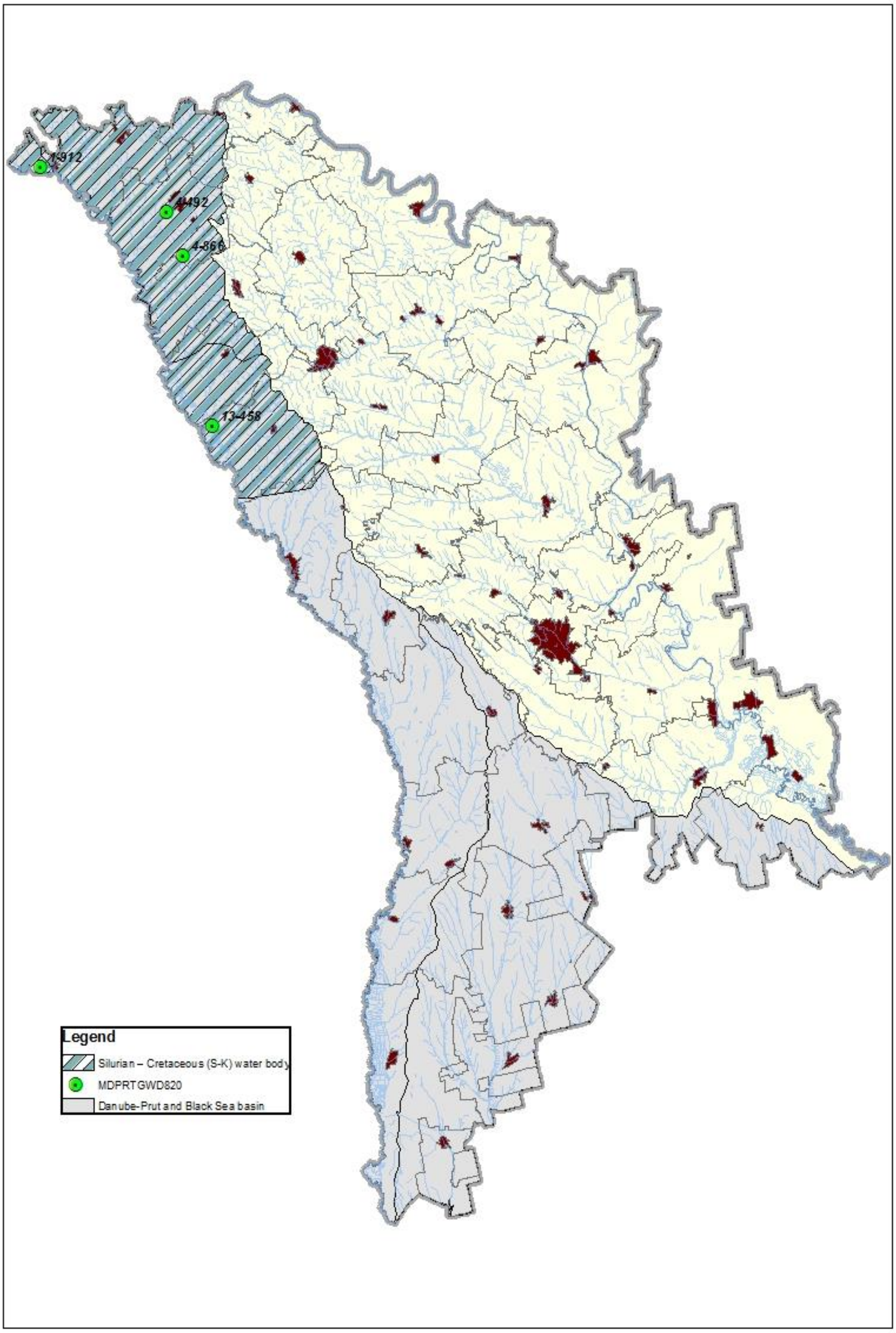

Figure 7: The Silurian-Cretaceous water body

Table 5: The characteristic of the studied sites

Nr.	Site ID	Type of site	Location	DW level, m	Discharge, l/s	pH-value	Water temp (°C)	Dissolved oxygen (mg/l)	Electrical conductivity (µS/cm)
1	*1-640*	artesian well	City Lipcani, district Briceni	10,77	-	7,0	13,6	1,88	898
2	*4-486*	artesian well	Village Bratuseni, district Edinet	7,83	-	7,33	13,1	1,92	1549
3	*17-437*	artesian well	City Ungheni, str. Musatov 1	18,17	-	8,5	14,2	3,07	1087
4	*21-689*	artesian well	Village Grozesti, district Nisporeni	6,04	-	7,6	14,2	2,18	973
5	*25-62*	artesian well	Village Nicolaevca, district Leova	5,55	-	8,04	12,7	2,04	1167
6	*29-32*	artesian well	Village Gotesti, district Cantemir	4,63	-	8,6	15,0	2,39	982
7	*32-591*	artesian well	City Taraclia, district Taraclia	7,47	-	6,5	14,3	2,64	2885
8	*33-481*	artesian well	City Vulcanesti, UTA Gagauzia	7,75	-	7,75	13,2	2,68	2154
9	*SMW -29-2*	spring	Village Vilcele, district Cantemir	-	0,018	6,83	14,7	5,12	1748
10	*SMW-17-1*	spring	Village Frasinesti, district Ungeni	-	0,033	8,05	13,6	7,81	1243
11	*SMW - 8-1*	spring	Village Braniste, district Riscani	-	0,135	6,9	12,0	8,55	1568
12	*SMW-33-3*	spring	Village Crihana Veche, district Cahul	-	0,28	6,70	14,3	8,56	1978
13	*SMW -29-1*	spring	villageTiganca, district Cantemir	-	0,12	7,07	14,4	7,41	1357
14	*SMW-33-2*	spring	Village Lopatica, district Cahul	-	0,5	6,77	13,7	6,54	1982
15	*SMW-33-4*	spring	Village Alexandru Ion Cuza, district Cahul	-	0,167	7,0	14,0	6,58	1968
16	*SMW - 30-1*	spring	Village Bugeac, UTA Gagauzia	-	0,07	7,16	16,1	4,02	3210
17	*MW - 32-1*	artesian well	Village Balabanu, district Taraclia	11,70	-	7,3	13,5	3,37	1625
18	*MW-32-2*	artesian well	Village Congaz, UTA Gagauzia	5,36	-	6,80	14,2	3,88	3870
19	*33-245*	artesian well	Village Slobozia Mare, district Cahul	Self-pouring	0,03	7,50	15,4	2,48	1049

Nr.	Site ID	Type of site	Location	DW level, m	Discharge, l/s	pH-value	Water temp (°C)	Dissolved oxygen (mg/l)	Electrical conductivity (µS/cm)
20	*SMW-32-1*	spring	City Taraclia, district Taraclia	-	9,5	7,05	13,1	6,89	2658
21	*SMW-33-1*	spring	City Cahul, district Cahul	-	0,9	6,6	14,1	2,62	1154
22	*SMW - 4-1*	spring	City Cupcini, district Edinet	-	0,087	6,65	13,5	3,12	1389
23	*SMW - 8-2*	spring	Mos Ion, district Glodeni	-	0,55	7,11	13,3	8,47	1157
24	*SMW - 4-2*	spring	Village Viisoara, district Edinet	-	0,544	6,83	13,2	8,99	1045
25	*SMW - 4-3*	spring	Village Sipot, district Edinet	-	0,056	6,93	13,6	7,13	2178
26	*MW-9-1*	artesian well	Village Petrunea, district Glodeni	9,78	-	7,1	12,1	7,49	1287
27	*SMW-21-1*	spring	Village Faisenberg, district Nisporeni	-	0,02	7,7	13,8	2,45	1930
28	*4-393*	artesian well	Village Fetesti, district Edinet	3,88	-	7,57	11,4	2,19	412
29	*2-714*	artesian well	Village Tabani, district Briceni	2,84	-	7,7	13	6,82	1023
30	*13-459*	artesian well	Village Calinesti, district Falesti	Self-pouring	-	8,5	14	6,89	1089
31	*17-436*	artesian well	Village Petresti, district Ungheni	113,26	-	9,0	13,0	5,78	5480
32	*1-912*	artesian well	Village Criva, district Briceni	2,67	-	7,43	12,9	5,56	1129
33	*4-866*	artesian well	Village Stolniceni, district Edinet	11,60	-	8,24	12,9	2,88	2354
34	*13-458*	artesian well	Village Calinesti, district Falesti	8,21	-	8,06	12,2	7,15	1438
35	*4-492*	artesian well	Village Alexandreni, district Edinet	1,15	-	7,1	13,0	9,7	1274

Table 3: The chemical composition of the groundwater from studied sites

No. of site	Site ID	Type of site	Location	Cl, mg/l	HCO_3, mg/l	SO_4, mg/l	Ca, mg/l	Mg, mg/l	Total hardness, °dH	Na+K, mg/l	NH_4, mg/l	NO_2, mg/l	NO_3, mg/l	PO_4, mg/l	F, mg/l	Fixed residue mg/l	Minera lization mg/l	Atrazin µg/l
				CMA														
				250	-	240	-	-	5	200	0.5	0.5	50	-	1.5	1500	-	0.1
1	*1-640*	artesian well	City Lipcani, district Briceni	24	444	58	68	74	26.64	24	<0.05	<0.003	**86.98**	0.02	1.40	579	779	<0,01
2	*4-486*	artesian well	Village Bratuseni, district Edinet	32	924	137	37	126	34.14	178	<0.05	<0.003	**60.84**	0.10	1.50	1065	1495	<0,01
3	*17-437*	artesian well	City Ungheni, str. Musatov 1	50	462	52	4	43	10.38	148	<0.05	<0.003	1.93	0.02	<0.19	560	761	<0,01
4	*21-689*	artesian well	Village Grozesti, district Nisporeni	29	1442	98	8	94	22.80	**424**	<0.05	<0.003	2.40	<0.01	0.38	1403	2097	<0,01
5	*25-62*	artesian well	Village Nicolaevca, district Leova	205	776	**314**	8	45	11.47	**485**	<0.05	**4.79**	1.98	0.05	0.24	1489	1840	<0,01
6	*29-32*	artesian well	Village Gotesti, district Cantemir	161	276	126	5	35	8.75	198	<0.05	<0.003	1.54	<0.01	<0.19	691	802	<0,01
7	*32-591*	artesian well	City Taraclia, district Taraclia	**1023**	19	250	410	92	78.52	140	**5.42**	0.06	0.73	0.68	1.04	**1899**	1940	<0,01
8	*33-481*	artesian well	City Vulcanesti, UTA Gagauzia	**319**	338	127	10	126	30.32	162	<0.05	**0.86**	41.28	0.13	**2.50**	991	1124	<0,01
9	*SMW -29-2*	spring	Village Vilcele, district Cantemir	7	357	52	90	27	18.70	16	<0.05	<0.003	16.52	0.10	0.72	401	566	<0,01
10	*SMW-17-1*	spring	Village Frasinesti, district Ungeni	30	912	62	25	32	10.94	**310**	<0.05	<0.003	17.34	<0.01	**1.88**	964	1388	<0,01
11	*SMW - 8-1*	spring	Village Braniste, district Riscani	7	676	25	55	68	23.36	82	<0.05	<0.003	5.52	0.13	1.46	598	918	<0,01
12	*SMW-33-3*	spring	Village Crihana Veche, district Cahul	219	332	**304**	153	95	43.43	107	<0.05	<0.003	**136.32**	0.36	0.72	1206	1346	<0,01

No. of site	Site ID	Type of site	Location	Cl, mg/l	HCO_3, mg/l	SO_4, mg/l	Ca, mg/l	Mg, mg/l	Total hardness, °dH	Na+K, mg/l	NH_4, mg/l	NO_2, mg/l	NO_3, mg/l	PO_4, mg/l	F, mg/l	Fixed residue mg/l	Mineralization mg/l	Atrazin µg/l
				CMA														
				250	-	240	-	-	5	200	0.5	0.5	50	-	1.5	1500	-	0.1
13	*SMW -29-1*	spring	Village Tiganca, district Cantemir	156	391	**530**	130	60	31.95	**277**	<0.05	<0.003	**99.68**	0.24	0.58	1487	1644	0,01
14	*SMW-33-2*	spring	Village Lopatica, district Cahul	102	375	**597**	39	134	36.32	**206**	<0.05	<0.003	27.12	0.23	1.14	1317	1480	<0,01
15	*SMW-33-4*	spring	Village Alexandru Ion Cuza, district Cahul	161	412	**403**	108	87	35.24	168	<0.05	<0.003	11.24	0.12	1.22	1177	1350	<0,01
16	*SMW - 30-1*	spring	Village Bugeac, UTA Gagauzia	**300**	738	**723**	47	79	24.72	**627**	<0.05	<0.003	30.42	0.07	**7.75**	**2207**	2544	0,02
17	*MW - 32-1*	artesian well	Village Balabanu, district Taraclia	62	812	88	20	62	17,08	**256**	<0.05	<0.003	19.44	0.01	**5.50**	943	1319	<0,01
18	*MW-32-2*	artesian well	Village Congaz, UTA Gagauzia	**362**	763	**1586**	108	233	68.96	**725**	<0.05	<0.003	21.74	0.01	**1.56**	**3461**	3799	0,01
19	*33-245*	artesian well	Village Slobozia Mare, district Cahul	13	763	33	7	2	1.51	**301**	<0.05	<0.003	4.12	0.21	**3.10**	778	1123	<0,01
20	*SMW-32-1*	spring	City Taraclia, district Taraclia	112	605	**280**	53	60	21.17	**273**	<0.05	<0.003	31.52	0.15	**7.30**	1144	1414	0,01
21	*SMW-33-1*	spring	City Cahul, district Cahul	50	332	**278**	104	70	30.86	42	<0.05	<0.003	11.68	0.04	0.67	750	888	<0,01
22	*SMW - 4-1*	spring	City Cupcini, district Edinet	50	874	174	49	154	42.34	101	<0.05	<0.003	6.30	0.07	**1.52**	1004	1408	<0,01
23	*SMW - 8-2*	spring	Mos Ion, district Glodeni	10	605	161	45	65	21.17	144	<0.05	<0.003	16.52	0.03	1.22	772	1046	<0,01
24	*SMW - 4-2*	spring	Village Viisoara, district Edinet	25	512	52	18	94	24.17	47	<0.05	<0.003	36.40	0.09	**1.58**	551	784	0,03
25	*SMW - 4-3*	spring	Village Sipot, district Edinet	6	605	156	53	92	28.54	84	<0.05	<0.003	29.20	0.11	**1.76**	754	1025	<0,01

No. of site	Site ID	Type of site	Location	Cl, mg/l	HCO_3, mg/l	SO_4, mg/l	Ca, mg/l	Mg, mg/l	Total hardness, °dH	Na+K, mg/l	NH_4, mg/l	NO_2, mg/l	NO_3, mg/l	PO_4, mg/l	F, mg/l	Fixed residue mg/l	Minera lization mg/l	Atrazin µg/l
				CMA														
				250	-	240	-	-	5	200	0.5	0.5	50	-	1.5	1500	-	0.1
26	*MW-9-1*	artesian well	Village Petrunea, district Glodeni	51	688	**324**	74	141	42.88	114	<0.05	<0.003	46.90	0.04	**1.74**	1136	1439	<0,01
27	*SMW-21-1*	spring	Village Faisenberg, district Nisporeni	56	912	**270**	35	92	26.08	**311**	<0.05	<0.003	43.72	<0.01	**1.76**	1294	1720	<0,01
28	*4-393*	artesian well	Village Fetesti, district Edinet	83	106	19	25	26	9.56	25	<0.05	<0.003	1.74	<0.01	0.55	255	286	<0,01
29	*2-714*	artesian well	Village Tabani, district Briceni	22	388	22	49	38	15.70	**421**	<0.05	<0.003	0.68	0.04	1.02	383	562	<0,01
30	*13-459*	artesian well	Village Calinesti, district Falesti	112	2032	248	3	1	0.67	**946**	**4.88**	0.28	1.12	0.02	**15.70**	**2378**	3348	<0,01
31	*17-436*	artesian well	Village Petresti, district Ungheni	**3142**	1504	100	3	8	2.33	**2601**	**26.44**	**0.82**	2.02	<0.01	**1.64**	**6732**	7387	0,01
32	*1-912*	artesian well	Village Criva, district Briceni	20	543	**334**	43	28	12.56	**274**	**2.71**	**5.80**	2.20	0.01	**4.60**	1006	1253	<0,01
33	*4-866*	artesian well	Village Stolniceni, district Edinet	31	726	250	2	1	0.56	**412**	0.16	**5.43**	2.36	0.15	**6.55**	1101	1430	<0,01
34	*13-458*	artesian well	Village Calinesti, district Falesti	117	2000	52	2	2	0.67	**850**	0.47	**2.39**	1.50	0.16	**18.10**	**2061**	3027	<0,01
35	*4-492*	artesian well	Village Alexandreni, district Edinet	34	1123	**441**	12	11	4.09	**616**	**7.92**	**3.88**	1.54	1.14	1.22	**1722**	2250	<0,01

Table 4: The chemical composition (metals) of the groundwater from studied sites

Nr.	Site ID	Type of site	Location	Total Fe mg/l	Cu^{2+} mg/l	Pb^{2+} mg/l	Mn^{2+} mg/l	As^{3+} mg/l	Se^{6+} mg/l
				CMA					
				0.3	1.0	0.01	0.05	0.01	0.01
1	1-640	artesian well	City Lipcani, district Briceni	0.19	0.09	0.0014	0.01	<0.005	<0.0001
2	4-486	artesian well	villageBratuseni, district Edinet	0.05	<0.02	0.0021	0.01	<0.005	<0.0001
3	17-437	artesian well	City Ungheni, str. Musatov 1	0.14	0.08	0.0016	<0.01	<0.005	<0.0001
4	21-689	artesian well	villageGrozesti, district Nisporeni	0.17	0.04	0.0018	0.02	<0.005	<0.0001
5	25-62	artesian well	villageNicolaevca, district Leova	**0.54**	0.16	0.0017	<0.01	<0.005	<0.0001
6	29-32	artesian well	villageGotesti, district Cantemir	**0.36**	0.16	0.0014	0.01	<0.005	<0.0001
7	32-591	artesian well	City Taraclia, district Taraclia	**0.46**	0.06	0.0010	0.01	<0.005	<0.0001
8	33-481	artesian well	City Vulcanesti, UTA Gagauzia	0.29	0.02	0.0019	0.02	<0.005	<0.0001
9	*SMW -29-2*	spring	villageVilcele, district Cantemir	0.10	<0.02	0.0011	0.02	<0.005	<0.0001
10	*SMW-17-1*	spring	villageFrasinesti, district Ungeni	**0.84**	<0.02	0.0015	0.01	<0.005	<0.0001
11	*SMW - 8-1*	spring	villageBraniste, district Riscani	0.12	0.04	0.0011	0.01	<0.005	<0.0001
12	*SMW-33-3*	spring	villageCrihana Veche, district Cahul	0.05	<0.02	0.0009	0.01	<0.005	<0.0001
13	*SMW -29-1*	spring	villageTiganca, district Cantemir	0.03	<0.02	0.0013	0.01	<0.005	<0.0001
14	*SMW-33-2*	spring	villageLopatica, district Cahul	0.06	0.02	0.0020	<0.01	<0.005	<0.0001
15	*SMW-33-4*	spring	villageAlexandru Ion Cuza, district Cahul	0.14	<0.02	0.0013	<0.01	<0.005	<0.0001
16	*SMW - 30-1*	spring	villageBugeac, UTA Gagauzia	0.06	<0.02	0.0015	0.02	<0.005	<0.0001
17	MW - 32-1	artesian well	villageBalabanu, district Taraclia	0.06	<0.02	0.0011	0.01	<0.005	<0.0001
18	MW-32-2	artesian well	villageCongaz, UTA Gagauzia	0.08	<0.02	0.0013	0.01	<0.005	<0.0001
19	33-245	artesian well	villageSlobozia Mare, district Cahul	0.21	0.03	0.0021	0.02	<0.005	<0.0001
20	*SMW-32-1*	spring	City Taraclia, district Taraclia	0.08	0.03	0.0009	<0.01	<0.005	<0.0001

Nr.	Site ID	Type of site	Location	Total Fe mg/l	Cu^{2+} mg/l	Pb^{2+} mg/l	Mn^{2+} mg/l	As^{3+} mg/l	Se^{6+} mg/l
				CMA					
				0.3	1.0	0.01	0.05	0.01	0.01
21	*SMW-33-1*	spring	City Cahul, district Cahul	0.09	<0.02	0.0015	<0.01	<0.005	<0.0001
22	*SMW - 4-1*	spring	City Cupcini, district Edinet	0.28	<0.02	0.0018	0.02	<0.005	<0.0001
23	*SMW - 8-2*	spring	Mos Ion, district Glodeni	0.08	<0.02	0.0013	<0.01	<0.005	<0.0001
24	*SMW - 4-2*	spring	villageViisoara, district Edinet	<0.03	<0.02	0.0011	0.01	<0.005	<0.0001
25	*SMW - 4-3*	spring	villageSipot, district Edinet	<0.03	<0.02	0.0012	0.01	<0.005	<0.0001
26	MW-9-1	artesian well	villagePetrunea, district Glodeni	**0.69**	<0.02	0.0021	0.03	<0.005	<0.0001
27	SMW-21-1	spring	villageFaisenberg, district Nisporeni	<0.03	<0.02	0.0009	0.01	<0.005	<0.0001
28	4-393	artesian well	villageFetesti, district Edinet	0.3	0.04	0.0017	0.02	<0.005	<0.0001
29	2-714	artesian well	villageTabani, district Briceni	0.17	0.24	0.0026	0.03	<0.005	<0.0001
30	13-459	artesian well	villageCalinesti, district Falesti	**0.38**	0.36	0.0017	0.04	<0.005	<0.0001
31	17-436	artesian well	villagePetresti, district Ungheni	**0.48**	0.06	0.0021	0.03	<0.005	<0.0001
32	1-912	artesian well	villageCriva, district Briceni	**2.70**	0.10	0.0019	0.04	<0.005	<0.0001
33	4-866	artesian well	villageStolniceni, district Edinet	0.11	0.04	0.0020	0.03	<0.005	<0.0001
34	13-458	artesian well	villageCalinesti, district Falesti	0.24	0.31	0.011	0.01	<0.005	<0.0001
35	4-492	artesian well	villageAlexandreni, district Edinet	0.21	0.17	0.0013	0.01	<0.005	<0.0001

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