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REPORT

**Water resources in Bulgaria**

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# Content

- Surface waters ..... 3
  - Rivers ..... 3
  - Sources ..... 3
  - Lakes ..... 4
  - Swamps ..... 4
  - The artificial lakes (dams) ..... 4
- Underground waters..... 5
  - Primary water ..... 5
  - Pressure (artesian) waters ..... 5
  - Mineral water ..... 5
- Use..... 6

The waters on the territory of Bulgaria (excluding the Black Sea) cover all waters, water sources and watercourses that are on the Earth's surface, as well as those that are accumulated under it, in the Earth's strata. Therefore, water is divided into two main types: surface and underground.

### Surface waters

These are the waters located on the surface - rivers, lakes and swamps.

#### Rivers

**Rivers** as permanent water flows on the lowest parts of the Earth's surface form a complex river network on the territory of the country. The small territory, the considerable disintegration of the relief, the peculiarities of the rock base and the proximity to the Black Sea and the Aegean Sea did not allow the formation of large water catchment areas, large river systems and large rivers. At the same time, the country has a relatively dense river network - 1.18 km / km<sup>2</sup>. The highest is the density of the river network (over 2 km / km<sup>2</sup>) in Rila (3.0 km / km<sup>2</sup>) and in the northern slopes of Stara Planina and Osogovo. The average density (between 1 and 2 km / km<sup>2</sup>) is the river network in the low-mountain regions and the hill areas.

In general, the Bulgarian rivers are short in length. The longest on the Bulgarian territory is the Iskar River (368 km), followed by Tundzha, Maritsa, Struma and others. Our rivers also have a small amount of water, even a part of them decreases or even dries in the summer. A great incline of the river bed has rivers only in the high parts of the mountains.

#### Sources

**The sources** of almost all of our rivers are the territory of Bulgaria. Exceptions are the border rivers Danube, Timok, Rezovska, and Veleka, Strumeshnitsa, Lebnitsa and Erma. Less favorable is the fact that the lower currents of rivers such as Maritsa, Struma, Mesta, Tundzha and Arda, which are relatively high (for Bulgaria), are on the territory of other countries (Turkey and Greece). The Erma River springs from Serbia, enters Bulgaria and then re-runs in Serbia.

### The biggest Bulgarian rivers

No	Name	Length	Source	Water area км2	Outflow
1.	Maritsa	321	Rila	21084	Aegean Sea
2.	Struma	290	Vitosha	10797	Aegean Sea
3.	Iskar	368	Rila	8640	Dunav
4.	Tundja	350	Stara Planina	7884	Maritsa
5.	Arda	241	Rodopy	5201	Maritsa
6.	Mesta	126	Rila	2767	Aegean Sea

### Lakes.

Bulgaria is comparatively poor on lakes, ponds and resources. The available in Bulgaria over 400 lakes are of small size, small depth and small water volume. Their total area is 95 km<sup>2</sup> and the volume of fresh water contained in them - 64 million m<sup>3</sup>. Depending on their origin, the lakes in Bulgaria are: glacial, coastal, riparian, tectonic, karst and landslides.

The glacial lakes in Bulgaria are the most numerous - about 330, with 259 permanent. Their total area is 3.6 km<sup>2</sup>. They are located mainly at the bottom of the cirques and only a few of them are formed by the barrier of a valley of moraines. They are formed during the icing of the high parts of Rila and Pirin. They are located at an altitude of 1900 to 2700 meters.

### Swamps.

In the past there have been many swamps along the Danube River in our country. After World War II, they were almost all drained and turned into arable land. Only a few of them are stored. The best known among them is the Garvan Marsh (Leshtava) in Silistra with an area of about 200 ha and a depth of 0.5 m. The Straldzha and Aldomiers marshes are also known. In the mountainous areas there are also swamps. They are located in decreases in the earth's surface.

### The artificial lakes (dams)

**Artificial lakes (dams)** are the result of purposeful economic activity. Their construction and use creates prerequisites for a better use of water resources. They have a significant impact on the drainage regime. There are

over 2200 different dams in the country, which are unique artificial equalizers of the water flow of the rivers. Their maximum water volume is about 7 billion m<sup>3</sup>. or about 33% of the water potential of freshwater in Bulgaria.

### **Underground waters**

Underground are the waters that are contained in the earth's layers and are below the surface of the earth - the cracks of rocks, pores, and various underground cavities. They are found almost exclusively in the water-permeable layers of earth.

#### **Primary water.**

Primrose are called waters in the first aquifer (horizon) that is not covered by a waterproofing layer on top. They are fed mainly by seepage of surface water and precipitation. In Bulgaria they are very unevenly distributed. The most favorable conditions for the formation of this type of underground water exist in the alluvial deposits over the floodplain terraces of the rivers and the nozzle cones at the foot of the mountain slopes. Significant are their reserves in the lowlands along the Danube River, river banks of the rivers that flow into the Danube - Lom, Ogosta, Iskar, Vit, Osam, Yantra and other Bulgarian rivers.

#### **Pressure (artesian) waters.**

These are groundwaters formed in the ground layers beneath the aquifer of the groundwater and are contained in another aquifer (or layers) located between two watertight layers. They are predominantly in bent terrain with negative shape - depressions, decreases, synclines. Because they are located at a greater depth than groundwater and are less directly influenced by the rivers, they are less polluting.

#### **Mineral water.**

Mineral water is a type of groundwater with increased salt, gas and some specific physical properties - fever, radioactivity, etc. They are mainly formed by atmospheric waters that permeate the earth layers and undergo complex changes. Their distribution is directly related to the geological conditions in the country. It is mainly connected with deep ground fault lines. In the way of formation the mineral waters in Bulgaria are of two types - infiltration and sedimentation.

## Use

Surface and ground water are primarily used for water supply to settlements. In Bulgaria the majority of the settlements has a water supply system. Many springs were captured, dams and water pipes were built. Nevertheless, most of the settlements and mostly large cities experience a severe shortage of drinking water.

Secondly, water is used in electricity for electricity generation. Because of the limited water resources, HPPs have a small share in the electricity produced in Bulgaria. More than 100 hydropower plants, the majority of which have low power, have been built. Due to water scarcity, they are usually included in the hours of peak power consumption.

Thirdly, much of the water is used for irrigation of agricultural land. Large irrigation systems have been built in the Danube Plain, the Upper Thracian Plain, the Bourgas Lowland and elsewhere.

Fourth, large quantities of water are used for industrial purposes. Large water users are metallurgical plants, chemical plants, pulp, paper, textile, sugar, petroleum, thermal power plants and others.

In the fifth place a number of mineral springs are used as a resource for the development of tourism, especially the balneological activity. These are the springs

built sanatoriums, holiday homes and hotels where various water treatments are carried out. Such facilities are built in Hisarya, Velingrad, Varshets, Sandanski and many other settlements in the country.

Some of the water sources are used in a complex way - for drinking, electricity, industrial, sports, recreational and other. Some of the lakes and dams are used for fishing and fishing. And in some seaside lakes there is salt.

**Source:** [http://www.geoznanie.com/2015/08/blog-post\\_19.html](http://www.geoznanie.com/2015/08/blog-post_19.html)