



Danube Facts and Figures

Bosnia and Herzegovina

(April 2007)

General Overview

The waters of Bosnia and Herzegovina are split between the Danube River Basin District and the Adriatic Sea Basin. Some 40.2% of the Sava River Sub-Basin, the second largest sub-basin of the Danube River Basin, lies in Bosnia and Herzegovina, and the rest of the watershed is shared by Croatia, Serbia and Slovenia.

The main watercourses that make up the Sava River Sub-basin – and thus the Danube River Basin District in Bosnia and Herzegovina – are: the Una River (covering 9,130 km²), the Vrbas (covering 6,386 km²), the Bosna (10,457 km²), the Drina (7,240 km²) and the remaining smaller river tributaries (covering 5,506 km²).

A large part of the watercourses in Bosnia and Herzegovina are international waterways – the Sava forms the country's border in the north, the Una partly makes its western border, and the Drina mostly makes up the country's eastern border.

Topography

To the north, Bosnia and Herzegovina opens to the Pannonian Plain. The central part of the country is mountainous with peaks ranging from 500 to 2,000 metres above sea level. The watercourses belonging to the Danube River Basin in Bosnia and Herzegovina – the Sava and its tributaries – are located at the lowest part of the country, ranging from less than 200 metres above sea level at the lower tributaries, to 500 metres at the upper tributaries.

The Sava River runs 345 km in Bosnia and Herzegovina, from Croatia at the mouth of the Una River and leaving at the Drina River mouth. Four tributaries flow to the Sava in Bosnia and Herzegovina. The Una is 215 km long and has an average riverbed slope of 1.56‰. The Vrbas River flows 235 km north to the Sava and has an average slope of 6.92‰. The Bosna has a total length of 272 km and an average slope of 1.53‰. The Drina is the largest tributary in terms of total catchment area and runs 345 km to the Sava from its sources the Piva and Tara Rivers.

The complex geologic structure and petrography composition of the terrain in Bosnia and Herzegovina is the result of a long geological past of magmatic,

sediment and metamorphous rocks. Mineralisation and various karst forms played an important role in the character and formation of waterways in Bosnia and Herzegovina. In general, with the same precipitation and geomorphologic conditions, but without karst, the water regime would be radically different.

Precipitation, climate and water flow

The area of the Danube River Basin within Bosnia and Herzegovina is divided into two groups. The upper and central parts of the Danube River Basin watercourses in Bosnia and Herzegovina have an Alpine climate. The lower parts at the mouth of the Sava River in the northern part of the country have a middle-European climate, or temperate continental.

The mountainous, central part of the country is characterized by continental and mountain climate of Alpine type with severe winters in which temperatures drop to between -24 °C to -34 °C. The average rainfall in this area ranges from 1,000 to 1,200 l/m² – the highest quantities fall in November, and the lowest in February. Snowfall is also abundant, especially on higher elevations.

The whole territory north of the central mountains has a moderate-continental climate with rather severe winters and warm summers. The average annual precipitation is lower than in the central part – ranging from 800-1,100 l/m².

Of the total run-off water in the country, 722 m³/s runs to the Black Sea.

Land use and settlements

Agricultural land covers roughly 2,700,000 ha (about 52%) of the country, and the remaining 2,400,000 ha (or 48%) are forests. In the northern part of Bosnia and Herzegovina the conditions are ideal for intensive agricultural production. The central area is mainly covered with forests and pasture and meadow vegetation.

Today, none of Bosnia and Herzegovina's settlements with over 10,000 ES has a treatment facility for wastewaters, which means that all settlements over this size are also significant sources of pollution.

Selected natural highlights on rivers and lakes

The wetland and pond ecosystems of Bardača are located on the left bank of the Vrbas River immediately before it joins the Sava River. The Bardača complex covers 3,400 ha and belongs to an alluvial plain created of sediments of the Vrbas and Sava Rivers.

The Bardača complex is a unique wetland-swamp system. Bardača has a high level of biodiversity; aquatic plants and dense vegetation provide habitats for 178 bird species.

Human uses of water and water bodies

▪ Flood and torrent management, landslides

Construction for flood protection of urban areas was built mainly to increase the capacity of existing riverbeds and thus prevent flooding. In areas where there is protection of agricultural land, embankments were built as well as structures for the evacuation of water behind the banks to pump water to canals. Flood protection measures, especially embankments, prevent the flooding of water into defended areas and are not built for flow-management.

▪ Use of hydroelectric power

There are 12 hydropower plants in the Sava River Sub-basin, all located on tributaries (see table). Many plants are shared with neighbouring countries, as the rivers form natural borders between the countries.

Hydropower facilities in the part of Danube river basin in Bosnia and Herzegovina

| | Basin | River | Ordinal number of facility | HPP name | Installed capacity | Mean annual generation | Basin potential | | Potential utilization | | Start of operation |
|--------|-------|-----------------------|----------------------------|----------------|--------------------|------------------------|-----------------|-------------|-----------------------|-----------|--------------------|
| | | | | | Ni (MW) | Eg (GWh) | Ni (MW) | Eg (GWh) | Ni (%) | Eg (%) | |
| 1 | Una | Una | HP5 | Slapovi na Uni | 6.0 | 27.4 | | | | | 1953 |
| Total: | | | | | 6.0 | 27.4 | 392.10 | 1556.70 | 1.5 | 1.7 | |
| 2 | Vrbas | Vrbas | HP39 | Jajce II | 27.0 | 170.0 | | | | | 1954 |
| | | | HP40 | Bočac | 110.0 | 307.0 | | | | | 1981 |
| | | Pliva | HP70 | Jajce I | 51.93 | 216.9 | | | | | 1957 |
| Total: | | | | | 188.93 | 693.9 | 616.89 | 2427.47 | 30.6 | 28.5 | |
| 3 | Bosna | Željeznica | HP104 | Bogatići | 8.0 | 46.5 | | | | | 1948 |
| | | Water supply Sarajevo | HP121 | Hrid | 0.3 | 0.7 | | | | | 1917 |
| Total: | | | | | 8.3 | 47.2 | 365.78 | 1593.60 | 2.2 | 2.9 | |
| 4 | Drina | Drina | HP127 | Višegrad * | 315.0 | 1120.0 | | | | | 1989 |
| | | | HP128 | Bajina bašta * | 241.2 | 1121.4 | | | | | 1965 |
| | | | HP139 | Zvornik * | 47.8 | 262.4 | | | | | 1954 |
| | | Prača | HP141 | Mesići | 3.0 | 16.0 | | | | | 1950 |
| | | Jadar | HP150 | Vlasenica | 0.9 | 6.9 | | | | | 1950 |
| | | Tišća | HP151 | Tišća | 1.2 | 8.6 | | | | | 1990 |
| Total: | | | | | 609.10 | 2635.3 | 1838.60 | 7107.66 | 33.12 | 37.07 | |
| 5 | Sava | | | | | | | | | | |
| Total: | | | | | | | 55.55 | 283.05 | 0.00 | 0.00 | |

* Shared with neighbouring country

- Navigation

Nearly the entire length of the Sava River in Bosnia and Herzegovina is used for navigation, although it has not been identified as an international navigation course.

- Use of groundwater bodies: drinking water supply

According to 1991 data, water consumption for the needs of the population is approximately 15.5 m³/s. This quantity was secured approximately 28% by intergranular groundwater and 51% by karst-fissure sources, with the remainder secured by open streams. This points to an ever greater pressure on groundwater sources. Currently, the situation is managed by artificially recharging the Sarajevo Field and Novoselije aquifers from open watercourses due to extensive exploitation. So far, a good estimate of the anthropological influence on groundwater has not been possible.

Establishing a monitoring network for the quality of groundwater and protection against anthropogenic influence is a priority for water management in Bosnia and Herzegovina.

The influence of exploitation on the ecological status of groundwater is considered insignificant, however, because for most of the identified groundwater bodies (excluding the cases stated above), the total groundwater exploitation is far lower than the total estimated aquifer capacity.

Pressures and impacts on surface and groundwater bodies

All watercourses should reach 'Good Ecological Status' by 2015 with the exception of the four water bodies on the Bosna River. All bodies under pressure were classified as 'Exposed to risk in the first approximation'. The insufficiency of such an approach was due to the inadequate connection between the pressures and impacts, in terms of quantity of water, sum loads of several less significant pressures in the water body which exceed the threshold of a significant pressure, and upstream pressures (according to data from before 1990).

To make this assessment more objective, available data from 2005 was used for organic pollutants, nutrients and saprobic indexes.

Of 22 groundwater bodies, 6 are considered to be 'at risk' due to human intervention, 4 are at risk of both quantity (due to over extraction) and quality, while the rest are threatened with quality risk only. Four groundwater bodies have insufficient data to estimate status.