



Republic of Serbia  
MINISTRY OF AGRICULTURE AND  
ENVIRONMENTAL PROTECTION  
- Republic Water Directorate -  
B e l g r a d e

**RIVER BASIN MANAGEMENT PLAN FOR  
THE DANUBE RIVER BASIN IN SERBIA**

**Extract**

## 1. INTRODUCTION

The document titled “River Basin Management Plan for the Danube River Basin in Serbia” (RBMPDRBS) was developed pursuant to the Water Law (Official Gazette of the Republic of Serbia 30/10) and accompanying implementing legislation. The present document is an excerpt from the RBMPDRBS, produced for the purposes of public debate, international cooperation, and the like.

The RBMPDRBS is comprised of two parts. The heading of Part 1 is “Characterization of the Danube River Basin in Serbia”. Its draft was completed in December 2011 and posted on the website of the then Ministry of Agriculture, Forestry and Water Management – Republic Water Directorate, for comments and suggestions. In the allotted timeframe, comments were received from Waters of Vojvodina, which have been approved and entered into the document. According to the terms of reference of the project, parts of the DRBMP relating to the assessment of surface water and groundwater status were also completed in December 2011.

Given that the RBMPDRBS needed to be harmonized with the Water Management Strategy of the Republic of Serbia, whose draft was completed at the end of 2014, this document, comprised of: Part 1 (Characterization of the river basin) and Part 2 (River Basin Management Plan and Program of Measures), was also completed at the end of 2014.

The international Danube River Basin Management Plan (ICPDR DRBMP) and the Integrated Tisza River Basin Management Plan have been developed and adopted within the framework of the International Commission for the Protection of the Danube River (ICPDR). The Sava River Basin Management Plan has been developed and adopted within the framework of the International Sava River Basin Commission.

The ICPDR DRBMP addresses watercourses whose catchment area is larger than 4,000 km<sup>2</sup>, whereas the plans for the Sava and Tisza sub-basins consider catchment areas larger than 1,000 km<sup>2</sup>. However, the RBMPDRBS covers watercourses relevant to the Danube River Basin (DRB) in Serbia, that is, all watercourses whose catchment area is larger than 500 km<sup>2</sup>, as well as all transboundary watercourses whose catchment area is larger than 100 km<sup>2</sup> or are addressed in existing bilateral agreements with neighboring countries.

With regard to lakes, the ICPDR DRBMP includes all lakes larger than 100 km<sup>2</sup>, whereas the plans for the Sava and Tisza sub-basins address lakes larger than 50 km<sup>2</sup>. Given that Serbia has no lakes whose size would make them relevant to the DRB in Serbia (i.e. lakes larger than 10 km<sup>2</sup>), the subject of lakes will be addressed in water (river basin) district management plans.

Kosovo and Metohija is an autonomous province of the Republic of Serbia and based on United Nations Security Council Resolution 1244 of 10 June 1999, it is under temporary UN civil and military administration. Due to a lack of data, the territory of Kosovo and Metohija is addressed only in sections that describe the natural characteristics of the DRB in Serbia, on which information is available from the previous period.

## 2. STATE OF AFFAIRS

This section describes the general natural and socioeconomic characteristics of the DRB in Serbia.

The following aspects are presented under **Natural Characteristics**: relief, river network, climate (air temperature, relative humidity, precipitation, evaporation from the water surface), hydrology (average river discharges, monthly discharge regimes, low flows, high flows), geology, soil, and diversity of aquatic ecosystems.

The following aspects are addressed under **Socioeconomic Characteristics**: population, employment, basic economic activities (gross domestic product, gross added value), and the status of principal industries (agriculture, manufacturing, construction).

## **Current status of the water sector**

### **Water use**

The current state of affairs in the **municipal water supply** segment in the DRB in Serbia is deemed to be somewhere between acceptable and good. There are water quality and water quantity issues in some parts of the country and certain municipalities are lacking in water supply infrastructure.

There are **drinking water quality** issues in a considerable part of the Province of Vojvodina and in parts of the catchment areas of the Zapadna Morava, the Južna Morava, and especially the Velika Morava. With regard to **water quantity**, the most adversely affected is the region of Šumadija, but there are also problems in a number of small municipalities. Most of Vojvodina is deemed to be threatened by over-exploitation of groundwater.

The situation with regard to water supply infrastructure coverage is considerably worse in Central Serbia than in Vojvodina, and generally in small rather than large municipalities.

**Industrial water supply:** A significant decrease has been noted in the DRB in Serbia, compared to the previous period, as a result of an overall decline in manufacturing, particularly in processing industries.

**Irrigation:** Despite rather conducive natural conditions for the development of irrigation, it has lagged behind societal needs, as demonstrated by relatively low irrigation coverage and insignificant use of available water resources.

### **Hydropower, navigation, other uses (fishing, fish farming), tourism and recreation**

### **Water protection**

In the DRB in Serbia there are more than 4,700 human settlements, of which 498 have a population greater than 2,000. There is a substantial disparity between public water supply and public sanitation coverage, particularly in settlements whose population is less than 50,000. It is estimated that 65-70% of the settlements have separate sewer systems for wastewater and stormwater, while the remainder only have access to combined systems. There is an evident issue with regard to industrial wastewater treatment prior to discharge into recipients, which is a precondition for achieving prescribed standards. More than 50 urban wastewater treatment plants have been built in Serbia over the past several decades but according to available data, less than 50% are operational at present.

## **Protection against the adverse effects of water, Protection from erosion and flashfloods**

**Multi-purpose water use** (regional water schemes, water storage reservoirs)

**Characterization of surface water resources** (identification of surface water bodies, typology)

**Identification of water bodies.** The starting point for the identification of surface water bodies is the Regulation of the Designation of Surface Water and Groundwater Bodies. Primary identification was based on the following parameters: morphology of the river valley; mouths of significant tributaries and other forms of water regime change; presence of hydromorphological alterations; and the location of the state border.

A total of 221 water bodies have been identified on 78 watercourses, which is less than three water bodies per watercourse on average. The average water body length is 27.5 km.

**Heavily modified and artificial water bodies.** Heavily modified water bodies (HMWBs) and artificial water bodies (AWBs) constitute special categories of water resources, introduced at the beginning of implementation of the Water Framework Directive (WFD) in European Union member states. The Water Law also defines HMWBs and AWBs. A total of 96 non-natural water bodies have been identified, which account for roughly 44% of all water bodies on the considered watercourses. Among them are 13 man-made channels (all channels of the Danube-Tisza-Danube Scheme and the Cer Perimeter Channel). The remaining water bodies not identified as natural, make up 37% of all water bodies.

**Characterization of groundwater resources.** The following hydrogeological provinces have been identified in Serbia: Bačka and Banat, Srem (Syrmia), Mačva and Sava-Tamnava, southwestern Serbia, western Serbia, central Serbia, and eastern Serbia.

**Groundwater quality.** Groundwater quality in the DRB in Serbia is rather non-uniform, as a result of natural drivers and different origins of groundwater and aquifers; it ranges from exceptional quality (which does not need treatment) to that which requires highly-complex conditioning prior to use.

**Identification of groundwater bodies.** The primary criteria for the delineation of groundwater bodies included the geologic framework and hydrogeological characteristics of water-bearing rocks. The lithological composition, age, type of porosity, groundwater flow characteristics, and similar parameters were assessed. Of the 152 delineated groundwater bodies, 130 were identified as national and 22 as transboundary groundwater bodies.

## **Overview of significant pressures on surface water and groundwater status**

### **Water pollution**

The following pressures have been assessed: organic pollution based on BOD<sub>5</sub>; total nitrogen; total phosphorus; and COD (for industry).

### **Categories of pressures**

Potential pressures have been divided into the following categories and sub-categories:

Point sources of pollution: population with access to public sanitation; industry;

Diffuse sources of pollution: population without access to public sanitation; runoff from all surfaces according to the *CORINE* land use database; livestock; municipal landfills; undeveloped (illegal) dumpsites.

### **Surface water quality**

Surface water quality in the DRB in Serbia is systematically monitored by competent authorities, as well as for special needs of certain institutions and systems. A critical review has been undertaken for the purposes of developing of RBMPDRBS, and select data are shown in the attached figures.

The studied data led to a general conclusion that water quality along the Danube, between the points of entry into and exit from Serbia, shows a permanent improvement trend.

### **Assessment of pressures on water status in the DRB in Serbia (municipal scale)**

#### **Hydromorphological pressures**

##### **Hydromorphological pressures on surface water bodies**

Hydromorphological alterations, including changes in water and sediment regimes, river hydrology and hydraulics, shrinkage of floodplains, and the like, fall under a special category of pressures on water bodies. These changes are a result of human activity, such as the construction of hydraulic structures that create conditions for various types of water use.

##### **Hydromorphological pressures on groundwater bodies**

Hydromorphological pressures on groundwater bodies are those that lead to changes in surface water and sediment regimes, river hydrology and river hydraulics as a result of human activity, and consequently affect associated groundwater bodies.

##### **Pressures on the quantitative status of groundwater bodies**

In essence, the vulnerability of groundwater resources to quantitative pressures differs depending on the type of setting in which the resource is formed. This vulnerability can be high if groundwater renewal (recharge) is slow and where there is over-exploitation, or virtually negligible if groundwater is extracted in areas very close to the dominant recharge boundary.

In the DRB in Serbia, groundwater is found in all rocks whose porosity is conducive to water storage in an extended area. Groundwater is stored in intergranular, karst and fractured aquifers.

#### **Other significant pressures**

##### **Invasive species**

### **Synopsis of risk areas**

#### **Identification and description of flood risk areas**

Significant flood risk areas are identified in the Preliminary Flood Risk Assessment (2011). Based on the applied methodology, a flood risk area is exposed to potential river floods and/or inland waterlogging. Significant flood risk areas are those in which either a historic flood has been recorded or there is a potential for such a flood to occur in the future.

### **Identification and description of erosion risk areas**

Erosion risk areas have been identified and shown on maps. The scale of detailed maps is 1:25,000, while overview maps on a smaller scale show proportions of erosion risk areas as a percentage of the total land area. The erosion risk map is an important document because it clearly identifies areas where a minor change in land use alters the intensity of erosion processes. These areas need to be managed in a way that will mitigate erosion, often accompanied by structural erosion control measures. Such an approach to land use management is referred to as “integrated” and the law requires that it be applied in designated erosion risk areas.

### **Overview of protected areas**

#### **Types of protected areas**

Protected areas are all areas designated as such based on applicable regulations, in order to specifically protect surface waters, groundwaters, and valuable ecosystems dependent on them.

The Water Law stipulates six types of protected areas: 1) sanitary protection zones of water supply sources, 2) areas intended for abstracting water for human consumption, 3) water bodies intended for recreation and bathing, 4) areas vulnerable to nutrients, including areas prone to eutrophication and areas sensitive to nitrates from agricultural sources, 5) areas intended for the protection of habitats or species, where the maintenance or improvement of water status is an important element of protection, and 6) areas intended for the protection of economically significant aquatic species.

#### **Sanitary protection zones of water supply sources**

There are several hundred water supply sources in the DRB. Most of them are groundwater sources. There are no exact records of the number of water supply sources for which the boundaries of sanitary protection zones have been delineated and approved. Generally speaking, since the year 2000 such approvals have largely been granted by the Ministry of Health. Recently, however, following the establishment of the new Regulation, it became mandatory for the boundaries of sanitary protection zones to be defined via polygon vertex coordinates. The Water Law (Article 77) introduced an important novelty for applicants, such that applications for the designation of sanitary protection zones are now submitted by the local administration that has territorial jurisdiction over the water supply source, for which a formal study requires sanitary protection zones.

#### **Areas intended for the abstraction of water for human consumption**

Areas in which such water bodies are found must be protected from pollution or other impacts that might have an adverse effect on the capacity of the water supply source or the health adequacy of the water. The criterion for identifying these surface water and groundwater bodies is an average volume of water greater than 10 m<sup>3</sup>/day, or an existing or planned use of drinking water by more than 50 inhabitants. There are 152 groundwater bodies in the entire DRB in Serbia. The rate of groundwater abstraction from all groundwater bodies is greater than 10 m<sup>3</sup>/day.

**Water bodies intended for recreation and bathing**

**Areas vulnerable to nutrients, including areas prone to eutrophication and areas sensitive to nutrients from agricultural sources**

**Areas intended for the protection of habitats of species, where the maintenance or improvement of water status is an important element**

**Areas intended for the protection of economically significant aquatic species**

**Identification of protected areas.** Data have been collected and protection areas identified as assumed relevant to the DRBMP.

Based on available data, 411 protected areas have tentatively been identified, including:

- Sanitary protection zones of water supply sources – 105 approvals have been issued by the Ministry of Health since 2000;
- Areas intended for the abstraction of water for human consumption – 152 groundwater bodies and 19 surface water bodies;
- Water bodies intended for recreation and bathing – 57;
- Areas vulnerable to nutrients, including areas prone to eutrophication and areas sensitive to nitrates from agricultural sources – 0;
- Areas intended for the protection of habitats or species, where the maintenance or improvement of water status is an important element – 78; and
- Areas intended for the protection of economically significant aquatic species – 0.

Given that all the needed implementing legislation has not yet been passed, protected areas have not been formally designated as such pursuant to the Water Law.

**Inventory of protected areas.** Article 110 of the Water Law requires the relevant public water management enterprise to maintain an inventory of protected areas, which specifies, without limitation:

- the regulation under which the area was designated as a protected area,
- the institution that designated such area as a protected area,
- the location, and
- the characteristics of the area.

It was not possible to describe or provide a synopsis of the inventory of protected areas pursuant to Article 33 of the Water Law because the content and criteria for the designation of protected areas and the way in which the inventory of protected areas is to be maintained have not yet been defined.

### **3. RIVER BASIN MANAGEMENT PLAN**

#### **Assessment of surface water and groundwater status**

##### **Assessment of surface water status**

According to applicable legislation, the status of surface water bodies is determined on the basis of the ecological status of natural water bodies, the ecological potential of heavily modified water bodies, and the chemical status of water bodies, such that the poorer of the two (ecological status/potential and chemical potential) determines the overall status of the water body.

The ecological status/potential is determined based on: biological parameters; chemical and physical parameters; and hydromorphology.

The status of water bodies is assessed applying the procedure and methodology defined in the Regulation (Official Gazette of RoS 74/2011). The procedure is comprised of two steps:

1. Assessment of ecological status, and
2. Assessment of chemical status.

The results of systematic monitoring of water bodies in Serbia constitute the starting point for status assessment. The outcomes of the assessment of ecological status/potential and chemical potential are presented in detail in the RBMPDRBS. Summary results are shown on Ecological Status/Potential Maps and Chemical Status Maps of RBMPDRBS. With regard to the physical and chemical parameters, available data from the period 2007-2009 were used for status assessment.

The outcomes of status, ecological potential and risk assessments are presented in tabular form, as well as graphically (on maps), using the color code and symbols stipulated in the Regulation.

The risk from existing pressures is assessed in all cases where available data are insufficient to assess the status with high or medium reliability.

Status assessment for the purposes of the RBMPDRBS took into account the results of the analysis of pressures, wherever available data supported such assessment. If not, expert judgment was used. The assessment of pressures is based on the current situation.

##### **Summary outcomes of surface water body status assessment in Serbia (catchment area of water body > 500 km<sup>2</sup>)**

There are 222 water bodies in Serbia, whose catchment area is larger than 500 km<sup>2</sup>. Due to a lack of appropriate data, it was not possible to determine the ecological status/potential of any of the 222 water bodies with a high level of reliability.

For 99 of the 222 water bodies it was possible to determine the status with medium reliability, and for the remaining 123 the status assessment reliability is low.

Ecological status assessment based on relevant physical and chemical parameters was possible only for 146 of the 222 water bodies.

Ecological status assessment based on incomplete biological parameters was possible only for 120 of the 222 water bodies. In this regard, it should be noted that relevant data on the fish fauna and

microbiological parameters were available for none of the water bodies, and relevant data on aquatic invertebrates, phytobenthos, phytoplankton and macrophytes were available for only two water bodies.

## CONCLUSIONS

1. The database for a reliable assessment of the status of surface water bodies in Serbia is insufficient and existing monitoring does not fulfill status assessment requirements.
2. Medium-reliability ecological status assessment is possible only for 99 of the total of 222 water bodies.
3. Ecological status assessment based on available data is not possible for 101 of the 222 water bodies. For these water bodies, the ecological status was assessed based on an analysis of pressures, a risk assessment and expert judgment.
4. The essence of Appendix 3 of the Regulation on the Parameters of Ecological and Chemical Status of Surface Water Bodies needs to be amended.
5. Based on the outcome of assessment, the ecological status of 40% of the water bodies in Serbia is moderate (27%) or good (13%). Water bodies whose ecological status is good are generally located in upper river catchment areas.
6. The ecological status of 14% of the water bodies is poor.
7. The chemical status of 37% of the water bodies is good, and of the remaining 63% not good. As in the case of ecological status, water bodies whose chemical status is good are found in upper river catchment areas.

## Assessment of groundwater status

According to the Water Law, the status of a groundwater body is a general expression determined by the poorer of its quantitative status and chemical status. The chemical status of a water body is good if the following criteria are fulfilled:

- The results of monitoring of status parameters show that the chemical composition of the groundwater is such that the threshold values of pollutant concentrations are not exceeded at any test point within the water body or group of water bodies;
- Pollutant concentrations do not indicate intrusion of water whose mineral content (TDS) is high;
- Pollutant concentrations do not threaten the ecological and chemical status of surface water bodies associated with the groundwater body;
- There is no adverse effect on terrestrial or aquatic ecosystems associated with the groundwater body;
- The possibility of using the body of water for human consumption is not significantly impaired.

The quantitative status of a groundwater body is good if:

1. The long-term average rate of groundwater abstraction does not exceed the availability of the groundwater resource;
2. No declining water table trend has been registered on more than 70% of the surface of the water body;
3. The average groundwater level on more than 70% of the surface of the water body is higher than the critical level based on long-term three-month minimum;
4. A change in water table or rate of groundwater abstraction for human consumption will not:
  - (1) jeopardize the achievement of environmental objectives relating to surface water bodies associated with the groundwater body,
  - (2) cause significant degradation of the status of surface water bodies associated with the groundwater body,
  - (3) result in a significant and adverse impact on terrestrial ecosystems dependent on the

groundwater body.

### **Outcomes of quantitative status assessment**

The assessment included a total of 152 groundwater bodies in 6 water districts. The quantitative status of 18 groundwater bodies was found to be poor. These are:

- Ten groundwater bodies within the main water-bearing complex in Bačka, Banat and Srem (due to over-exploitation);
- Two groundwater bodies in Pliocene sediments in Srem (due to over-exploitation);
- Two groundwater bodies in the Velika Morava alluvium (due to a declining water table as a result of hydromorphological pressures from gravel excavation);
- One groundwater body in carbonate rocks, at Nepričava (due to over-exploitation);
- Three water bodies in Neogene sediments (due to a declining water table as a result of abstraction for water supply purposes).

The quantitative status of 134 groundwater bodies, or 88%, is good.

### **Assessment of chemical status**

Depending on the availability of data on groundwater quality, the chemical status of groundwater bodies was assessed in two ways:

- 1) *If groundwater quality data were available* – standard procedure;
- 2) *If groundwater quality data were not available or were insufficient* – based on an assessment of the risk to groundwater quality from diffuse and point sources of pollution.

### **Summary of the DRB water budget**

### **Climate change and impact on the DRBMP**

The relevant questions were as follows:

1. What kind of climate change has been noted in Serbia to date?
2. Has climate change already impacted river discharges and water resources?
3. What can be expected in the near and distant future, and what is the level of (un)certainly of predictions of future climate conditions and hydrology?

The answers to the first two questions were sought through regression and other analyses, and to the third by applying global (GYM) and regional (RKM) climate models and hydrological models.

## **4. ENVIRONMENTAL OBJECTIVES**

### **Primary water management objectives**

The Water Management Strategy of the Republic of Serbia identifies the primary objectives of the water sector as follows:

- Long-term – to achieve integrated water management, or, in other words, a harmonized water regime across the territory of Serbia, and to ensure that the selected water management approach will maximize economic and social benefits in an equitable and sustainable manner, while honoring international agreements;
- Priority (first part of the planning period) – to establish appropriate governance, or, in other words, ensure that the needed legislative, institutional, financial and other capacities and conditions are in place, as a prerequisite for achieving the long-term strategic objective of water sector development.

In addition, the following strategic objectives have been defined by water sector segment:

- *Water use*: to view water resources as drivers of integrated societal development and provide needed water quantities of appropriate quality for various uses, primarily public drinking water supply;
- *Water protection*: to achieve good ecological and chemical status/potential of surface water bodies and good chemical and quantitative status of groundwater bodies;
- *Protection against the adverse effects of water*: to ensure protection from floods and waterlogging, as well as protection from erosion and flashfloods, and to mitigate damage to human health, the environment, cultural heritage and economic activity.

## Principal objectives and measures

### Water use segment

The main objective in the water use segment is to view water resources as drivers of integrated societal development and ensure the availability of needed water quantities of appropriate quality for various use, primarily public drinking water supply.

**Municipal water supply.** If natural, technical and economic conditions are in place, to first expand and update the network and then expand existing water supply sources. However, if drinking water supply issues cannot be addressed in a more cost-effective manner, to build new regional schemes.

**Industrial water supply.** The planned spatial distribution of industries is based on the existing distribution, space availability and constraints, as well as general strategic choices related to spatial organization at regional and local levels.

**Irrigation.** The water demand for farmland irrigation will largely depend on the overall development of agriculture; the role of the water sector will be to provide the required water quantity of appropriate quality.

**Hydropower harnessing.** Development in the field of electric power generation will follow the guidelines adopted in strategic documents of the energy sector of the Republic of Serbia. The hydropower segment needs to take into account the requirements of the water sector and environmental sector concerning sustainable flows, provision of space for accommodation of flood waves, construction of fish passes, and the like.

### Navigation

Other uses: **Fish farming, sports, recreation and tourism**

### Water protection

#### Point sources of pollution

Population with access to public sanitation and industrial facilities are the most significant point sources of pollution, whose adverse impact is eliminated by constructing sanitation systems and wastewater treatment plants (WWTPs). These systems are closely associated with municipal water supply systems and together constitute a functional whole. As such, sanitation systems needed to be developed in parallel with drinking water supply systems.

#### Diffuse sources of pollution

Diffuse sources include all surface water and groundwater pollution originating from settlements whose population is less than 2,000 (or settlements with no access to public sanitation), as well as from farmland, runoff from forests and soil, livestock, undeveloped municipal landfills, and other types of human activity.

### **Protected areas**

The Water Law defines protected areas and identifies the designating authorities. First regulatory and then administrative and technical measures are needed to improve the state of affairs in this segment.

### **Groundwater: protection of quality and quantity**

Groundwater is the dominant source (about 70%) of drinking water supply. As such, it requires special attention and appropriate handling. Consequently, this section combines the objectives and measures needed to improve the status of groundwater resources, even though groundwater was addressed in the context of the objectives and measures relating to the other areas of water protection.

### **Hydromorphological pressures**

Human activity, as the most frequent cause of hydromorphological alterations of surface water bodies, is often unavoidable because it ensures economic and societal development.

### **Protection against the adverse effects of water**

The main objective of this segment is to ensure protection from river floods and waterlogging, as well as protection from erosion and flashfloods, in order to mitigate damage to human health, the environment, cultural heritage and economic activity.

### **River engineering**

River engineering, which involves construction of river training structures and works in the river channel, needs to be as synchronized as possible with ecological conditions.

### **Flood protection**

Structural measures aimed at preventing river floods will continue to be the principal task of the water sector, while other institutions, along with the water sector, will be in charge of implementing numerous non-structural measures.

### **Protection from waterlogging**

Protection from waterlogging (i.e. drainage) involves structural measures that will be implemented according to plans, requirements and financial resources of the government and farmers, and synchronized with farmland irrigation activities and requirements relating to the protection of populated areas from waterlogging.

### **Protection from erosion and flashfloods**

### **Drought and water scarcity**

### **Objectives and measures relating to multi-purpose use of water**

**Water storage reservoirs**  
**Regional drinking water supply schemes**

**Supplemental measures**

Other strategic objectives

*Area: Economic policy in water management*

**Strategic objective 1:** Establishment of sustainable long-term funding of the water sector, including stable sources of funding, a continuous revenue stream, and well-defined revenue collection mechanisms.

**Strategic objective 2:** Self-funded operations of the water sector.

**Area: Legal and institutional framework**

**Strategic objective 1:** Finalization of the legal reform of the water sector, as needed to adapt to social conditions and EU requirements

**Strategic objective 2:** Efficient organization of the water sector and institutional support to the implementation of identified main strategic objectives in all water sector segments, as well as fulfillment of EU requirements relating to this sector.

**Economic analysis.** Socioeconomic indicators directly affect all segments of the water sector, whose operation and development funding is on a constant decline.

**Total expenditure: water use, water protection and protection against the adverse effects of water**

**Projection of funding needed for water sector development.** One of the conditions for initiating rapid development of the water sector in the DRB in Serbia and the establishment of a self-funding system through the implementation of “user pays” and “polluter pays” principles, as well as the achievement of economic water pricing consistent with the economic and social standing of water users.

**Procurement of funding.** This section describes in detail the potential sources of funding for development activities in all segments of the water sector.

**Increase in water prices and revenues from fees**

**Water and service prices** constitute the primary source of funding of the public utility sector; implementation of the cost-recovery principle and then achievement of economic pricing of water supply services.

## **Spending on development programs in the Danube River Basin**

**Priorities.** In order to achieve environmental objectives in the individual water sector segments, considerable funding needs to be procured and substantial scientific, technical and service capacities engaged. Such capacities are currently insufficient. As a result, activities aimed at improving the water regime and the overall state of affairs in the water sector need to be synchronized with socioeconomic capabilities, while adhering to set priorities.

### **Water use**

Municipal water supply has priority over all other types of water use, such that the drinking water demand of consumers needs to be determined first. However, specific consumption also needs to include other users of drinking water from the public water supply system.

### **Water protection**

The state and the autonomous province will primarily take part in the construction of main sewers and WWTPs, complying with regulated criteria. The most important criteria are the level of threat to public health and the degree of pollution impact on wastewater recipients and aquatic and riparian ecosystems.

### **Protection against the adverse effects of water**

Recognizing the fact that the adverse effects of water cannot be fully eliminated, but only reduced to a socioeconomically acceptable level, an integrated approach to flood risk management (including river floods and waterlogging) will be followed.

### **Possible departures and postponement of deadlines**

Given the current state of affairs in the water sector, as well as Serbia's economic circumstances, environmental objectives in the field of water cannot be expected to be achieved during the planning period. The timeframe for achieving environmental objectives needs to be harmonized with Serbia's macroeconomic development and its economic stability cannot be compromised (through a significant increase in indebtedness).

### **International agreements**

The RBMPDRBS must recognize the fact that Serbia belongs to the UNECE (UN Economic Commission for Europe) region, and by most of its territory to the Danube River Basin, in which countries have established multilateral coordination of water management. Serbia also belongs to the group of EU candidate countries and, as such, is required to gradually harmonize its legislation and strategic orientation in the field of water with documents that apply to EU member states. Some of these documents are mandatory international conventions, whereas others provide guidelines ("soft conventions").

### **Forms of international cooperation**

International cooperation with neighboring countries and the extended international community, which is both important and essential to the water sector, has been regulated by international agreements and conventions, which are or need to become an integral part of Serbia's legislative framework for water management. The most important documents in this field address: *cooperation in the UNECE region, international cooperation in the Danube River Basin, international cooperation in water resources management in the Sava River Basin, and navigation on the Danube.*

## **EU water directives**

The EU water legislation is extremely important not only to member states, but also to those that intend to cooperate with or join the EU. The most important document in the field of water is the Water Framework Directive, which is an operational tool for achieving the key objectives of EU water policy.

## **Obligations arising from EU directives and international cooperation**

As part of the EU integration process, Serbia has begun to transpose EU directives relevant to the water sector and environmental protection into national legislation. Serbia also takes part in international activities in the river basins of the Danube, Tisza and Sava.

## **Listing of detailed programs and plans by sub-basin**

Given available capacities and financial resources, and in view of the fact that water management plans for water districts have not yet been completed, the development of detailed programs and plans by sub-basin is not expected.

## **Water Information System**

In view of the level of information and data, the Water Information System is an important part of water regime monitoring and improvement, as well as of water infrastructure development and operational management of water resources and water systems.

## **Procurement of basic documents and information**

According to Serbia's Water Law and the WFD, a river basin management plan needs to specify procedures for procuring basic documents and information.

## **Public relations**

Serbia's Water Law, based on WFD guidelines, promotes public participation in the development of water management plans. The parent ministry is in charge of ensuring active public participation by keeping the National Water Conference formally advised and informing the general public through media outlets about:

- the commencement of development or updating of a water management plan, at least three years prior to the beginning of the period to which the plan refers;
- the progress of water management plan development and any significant issues in the relevant water district, not later than two years before the beginning of the period to which the plan refers.

## **Conclusions**

The strategic and operational objectives and implementation measures, as defined in the RBMPDRBS, can only be achieved if:

- an appropriate legislative environment is provided, including regulation of property rights;
- an organizational and institutional system, capable of ensuring integrated water management in the river basin, is established;
- conditions for industrial development are provided;
- an investment and profitable business environment is created;
- a system of government priorities is defined, and incentives and favorable credit lines provided for financing;
- water sector self-funding is established through the implementation of “user pays” and “polluter pays” principles, and economic water pricing achieved, consistent with the economic and social standing of users of services;
- a multi-tariff system is established in the municipal water supply and sanitation segment;
- designated use of financial resources is ensured via the Water Fund or appropriate financial institutions;
- the use of EU funds is defined;
- a legislative framework for public-private partnerships is instituted;
- a regulatory function and standards for water sector operations are established;
- the public is more motivated and involved in all stages of water sector planning;
- the level of cooperation between government bodies, public enterprises, and public, scientific, technical and financial institutions is raised;
- better relationships are established between the state, provincial and local administrations in the areas of capital project planning, financing and spending.

The establishment of a suitable legislative environment requires full implementation of the Water Law, including drafting and passing of missing implementing legislation within the timeframe stipulated by law. This also applies to planning documents (water management plans for water districts, flood risk management plans and water pollution control plan), which need to be passed not later than the end of 2017. The completion of missing documentation also applies to the environmental sector, specifically the segment that involves water.