



RIVER BASIN MANAGEMENT PLAN FOR THE TERRITORY OF THE REPUBLIC OF SERBIA BY 2027

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- ◆ developed by Public Water Management Companies “Srbijavode” and “Vode Vojvodine” with coordination of Ministry of Agriculture, Forestry and Water Management – Republic Water Directorate; adopted by the Government in April 2023 (“Official Gazette of RS”, No. 33/23)
- ◆ in accordance with Art. 33 and 34 of the Law on Water (“Official Gazette of RS”, No. 30/10, 93/12, 101/16, 95/18 and 95/2018 - other law) as well as applicable laws and regulations of RS and international agreements signed by RS related to water sector, with respect to requirements of the EU Directives, primarily WFD
- ◆ development of the Plan is part of the WFD implementation process, as an obligation under the Negotiating Chapter 27
- ◆ significant support for the development of Plan within the EU twinning project for capacity building in the water sector in Republic of Serbia "Support to policy planning in the water management sector“
- ◆ <https://rdvode.gov.rs/plan-upravljanja-vodama.php>

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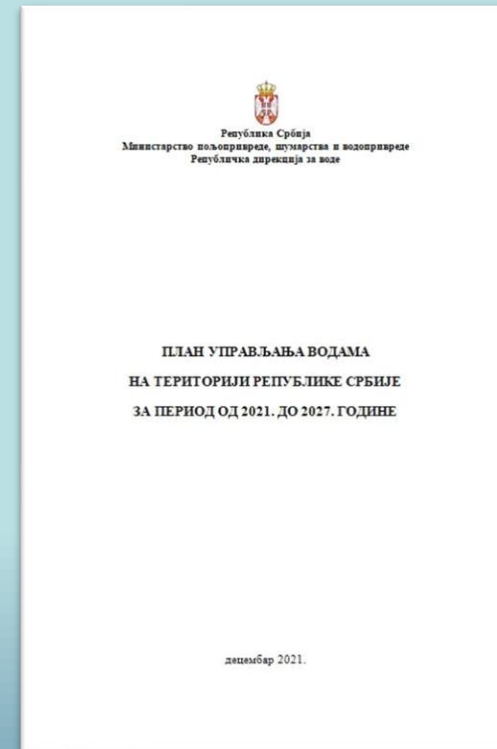
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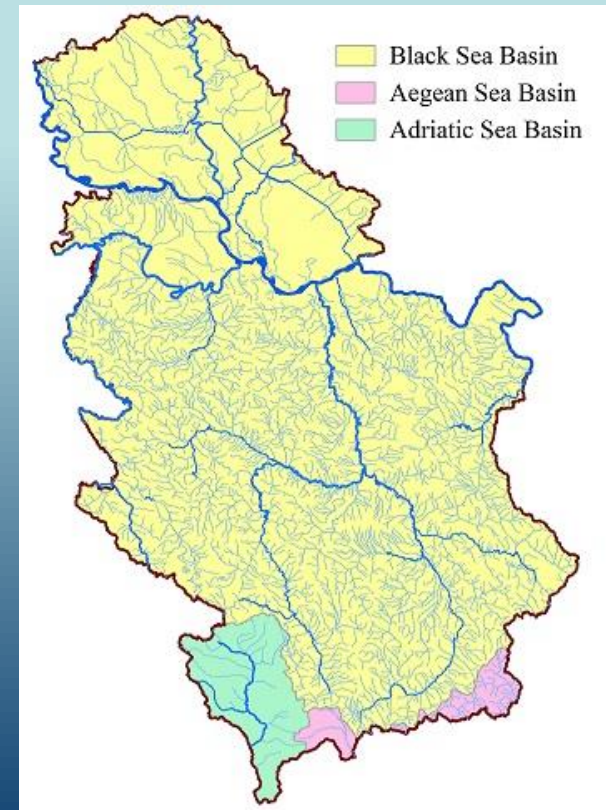


The area of the Republic of Serbia is about 88,499 km². The Republic of Serbia includes two autonomous provinces: AP Vojvodina (area: 21,614 km²), and AP Kosovo and Metohija (area: 10,910 km²).

The territory of the Republic of Serbia represents a unique water management territory.

All rivers in the territory of the Republic of Serbia gravitate towards three seas: the Black Sea (the Danube River), the Adriatic Sea (the Pčinja, the Lepenac, and the Dragovištica rivers) and the Aegean Sea (the Beli Drim and the Plavska Reka rivers).

The Black Sea Basin is the largest one in the Republic of Serbia and covers 92.6% of the territory, Adriatic Sea Basin covers 5.24% of the territory and Aegean Sea Basin covers only 2.14% of the territory.



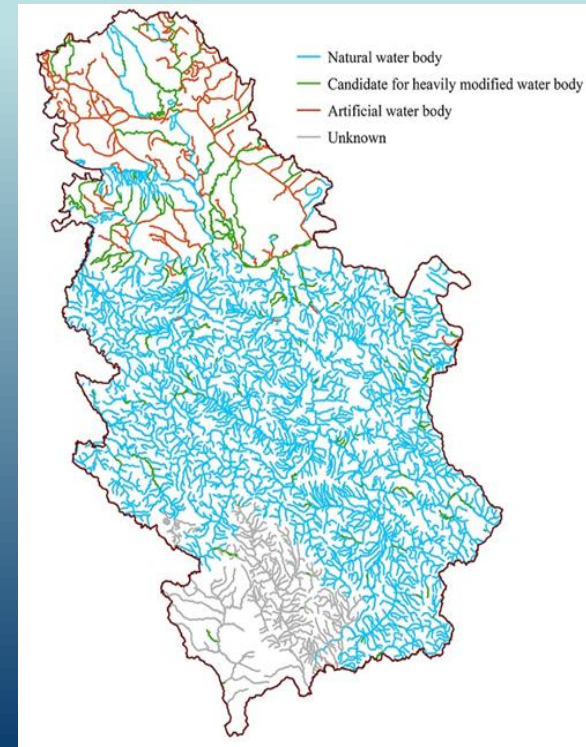
Delineation of surface water bodies was performed for catchment areas greater than 10km², taking in account: surface water category; typology, natural physical and morphological characteristics of watercourses; positions of the mouths of major tributaries; positions of significant hydromorphological pressure; general quality of the watercourses.

The total number of surface water bodies is **3,216** and their average length is 8.45 km.

Three natural lakes greater than 0.5 km² have been identified in historical documentation: Palić (5.45 km²), Ludoš (3.18 km²), and Veliko Blato (1.78 km²).

Due to lack of data designation of heavily modified water bodies was not performed for 84 water bodies located in the territory of the Pešter Plateau (karst), and 312 in the territory of AP Kosovo and Metohija.

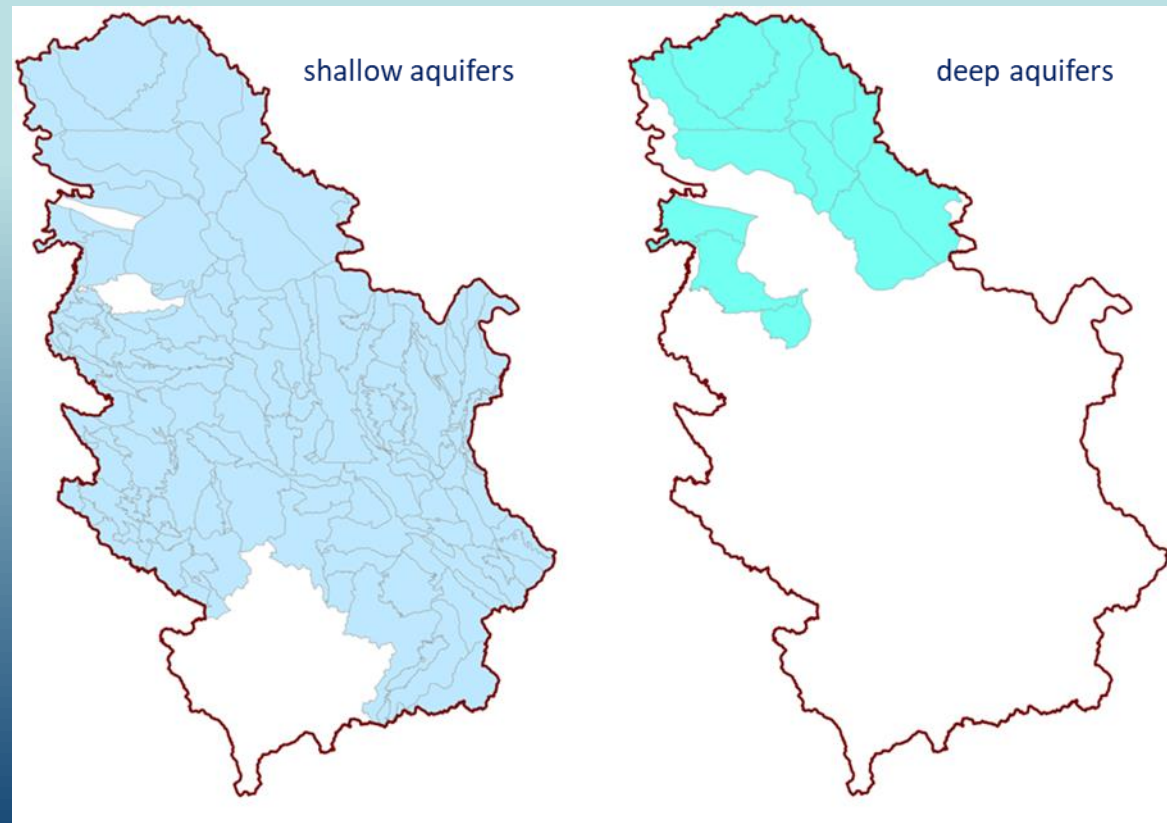
Out of the remaining 2,820 water bodies, 2,454 are natural water bodies, 218 are candidates for heavily modified water bodies, and 148 are artificial water bodies.



There were delineated **153** groundwater bodies (141 in shallow and 12 in deep aquifers), out of which 152 belong to the Danube basin (Black Sea Basin) and one belongs to the Aegean Sea basin. In the territory of the Autonomous Province of Kosovo and Metohija, groundwater bodies have not been delineated.

The total area of all groundwater bodies in the Danube basin in the RS is 96,217 km², and in the Aegean basin 1,156 km².

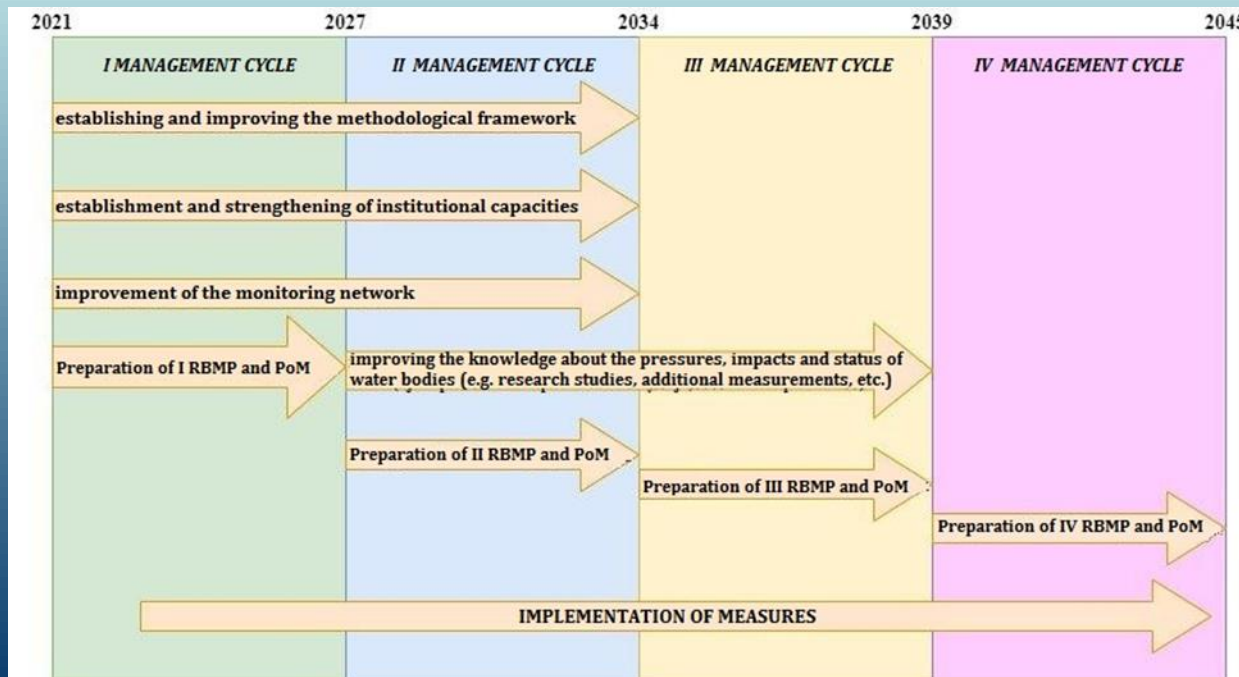
There are 131 national groundwater bodies, and 22 have been identified as transboundary: 6 with Hungary and Romania, 3 with Croatia and Bulgaria and 2 with Montenegro and Bosnia and Herzegovina.



The main objective of the WFD is to achieve good status of all water bodies by 2027. The good status is defined as:

- good ecological and chemical status of surface water bodies or good ecological potential and chemical status for HMWB and AWB
- good quantitative and chemical status of groundwater bodies.

The first water management cycle in the Republic of Serbia covers the period from 2021 to 2027, which is the third water management cycle for EU Member States.



Significant Water Management Issues (SWMIs) are the most important pressures affecting water status. SWMIs represent the thematic framework of the Plan and the basis for determining the Programme of measures in order to improve the status of surface and groundwater, as well as to prevent the deterioration of the existing status of all waters.

In the Republic of Serbia following pressures have been identified as SWMIs:

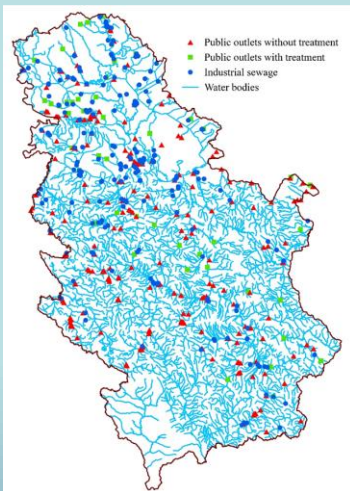
- pollution by organic substances
- pollution by nutrients
- pollution by hazardous substances
- hydromorphological alterations
- groundwater abstraction.

Cross-cutting issues :

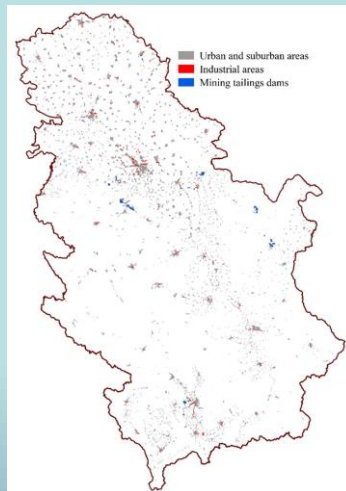
- water governance
- climate change
- sediment management
- invasive species.



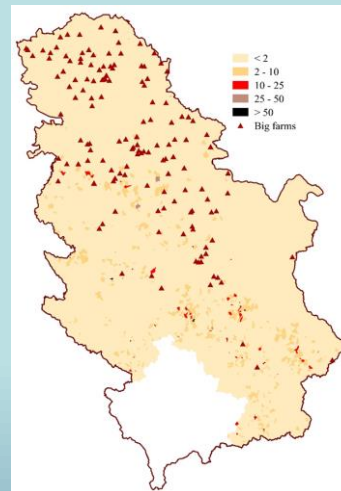
Pressure and impact analysis is the basis for creating an effective Programme of measures as an integral part of the planning cycle. The main objective of the pressure analysis is to assess where and to what extent anthropogenic activities may pose a risk to achieving good status of the WB.



Urban and industrial sewage discharge points

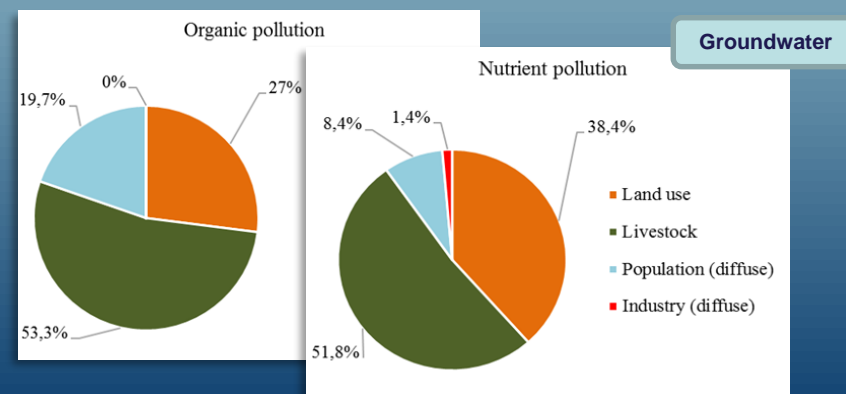
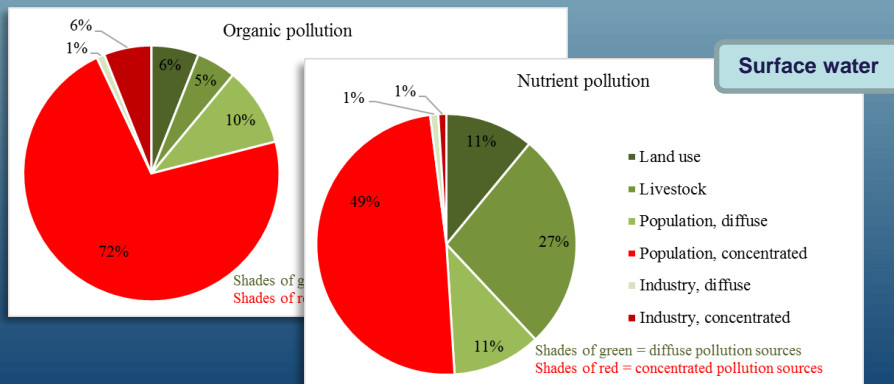


Industrial and mining areas



Livestock density and locations of big farms

Pressures on surface water may be caused by point or diffuse sources of pollution or hydromorphological alterations, while groundwater pressures are mainly related to diffuse pollution, often from agriculture or through groundwater abstraction, e.g. for water supply or irrigation.



Specific pressure from organic and nutrient pollution on surface water bodies

Specific pressure from organic and nutrient pollution on shallow groundwater bodies

Hydromorphological alterations and their effects are of great importance in water management due to the impact on the ecological status and ecological potential of surface waters.

Hydromorphological pressures used to assess hydromorphological alterations:

❑ Hydrological regime

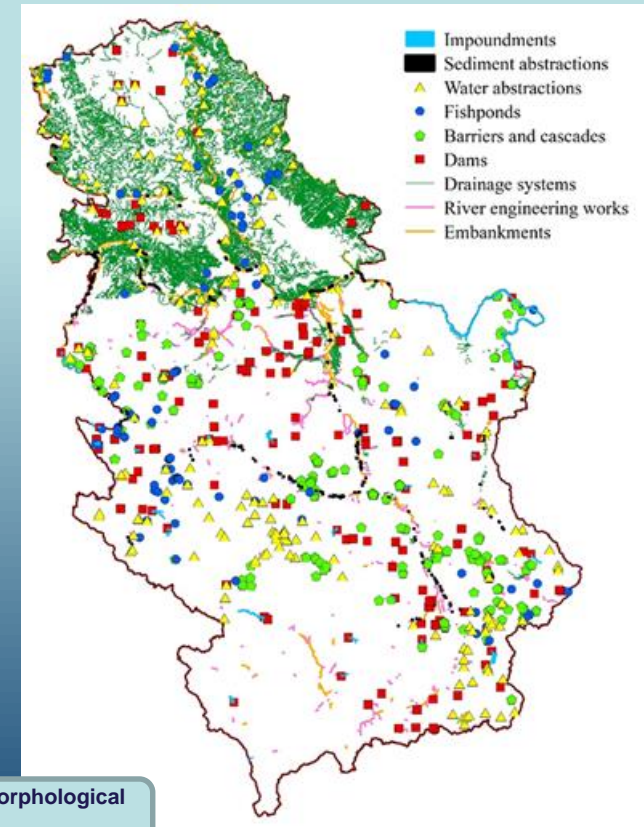
- Impoundments
- Water abstractions
- Hydropeaking
- Drainage systems

❑ Longitudinal continuity of rivers

- Unpassable dams and barriers
- Sediment extractions

❑ Morphological conditions

- River engineering works
- Dykes
- Altered land use within riparian zone
- Planform (sinuosity)



Hydromorphological pressures

ASSESSMENT OF HYDROMORPHOLOGICAL PRESSURES

Each hydromorphological pressure is classified into one of the three hydromorphological classes:

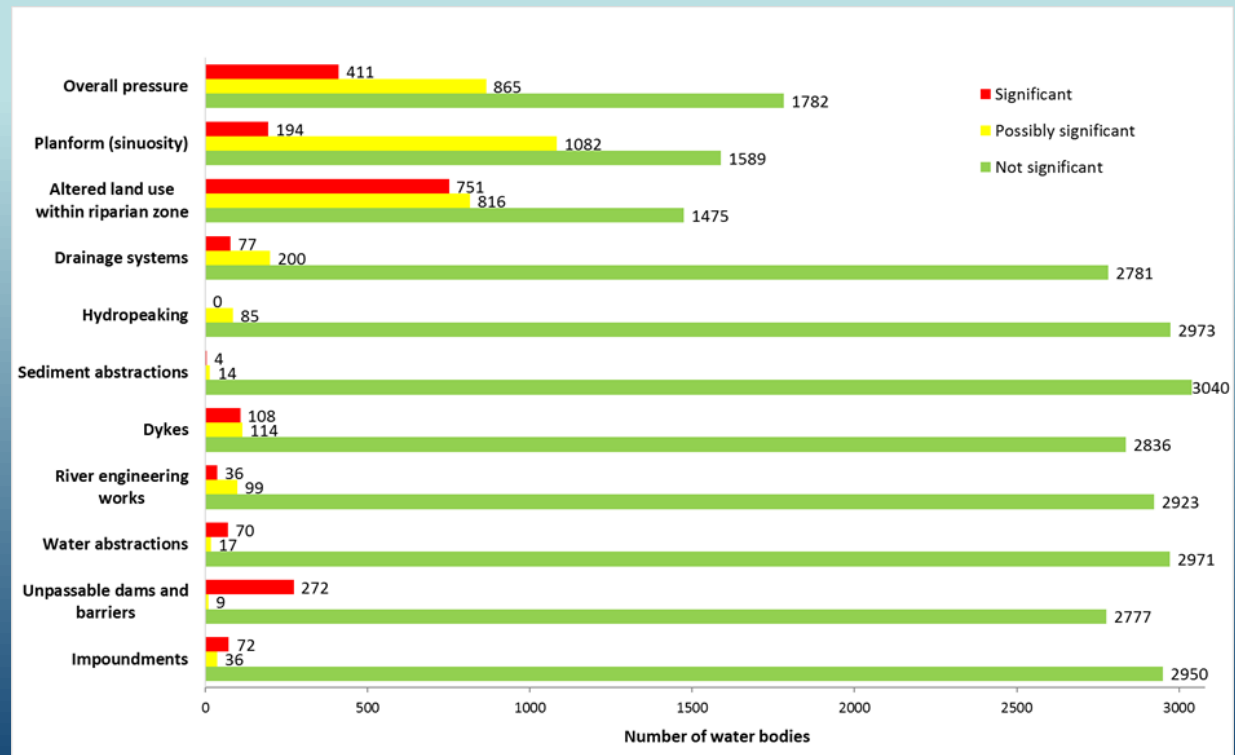
- Class 1 represents natural or near-natural hydromorphological conditions (no significant pressure)
- Class 3 represents moderately altered conditions (potential significant pressure)
- Class 5 highly altered conditions (significant pressure).

Hydromorphological class	Pressure significance
1	Not significant
3	Potentially significant
5	Significant

The defined criteria for hydromorphological classes are also criteria for impact and risk assessment.

Based on available data, about 13.3% of all water bodies in the Republic of Serbia are under high hydromorphological pressure, 28.2% are under moderate pressure, and 58.1% are not under pressure.

The overall hydromorphological impact assessment was carried out using the worst-case principle.



The impact assessment of pressures on surface water bodies was carried out based on the results of pressure analysis and data on average flows of surface water bodies. The analysis could not be conducted for 400 surface water bodies due to the unavailability of data on relevant pressures and/or data on the average flow of that water body.

Impact significance	Impact class	
Not significant	1	2
Potentially significant	3	
Significant	4	5

The impact significance was assessed on the basis of impact classification.

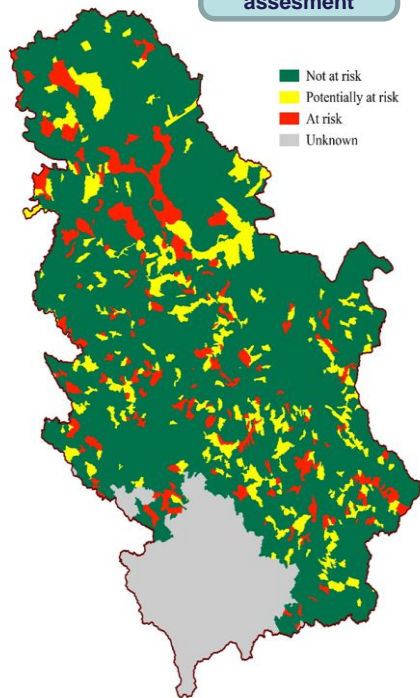
The assessment of the impact of pressures from priority and priority hazardous substances, in the absence of adequate data, introduces a precautionary approach that equates the existence of pressure from these substances as a definitive indicator of impact.

The assessment of the impact of organic pollution and nutrient pollution on groundwater was carried out based on the analysis of the sensitivity of groundwater. The assessment of the impact of quantitative pressures on groundwater was not possible due to a lack of necessary data.

Active substances in pesticides, including their metabolites, degradation products, and reactions, have not been identified as a problem in groundwater and have not been used for analyzing the impact of pollution.

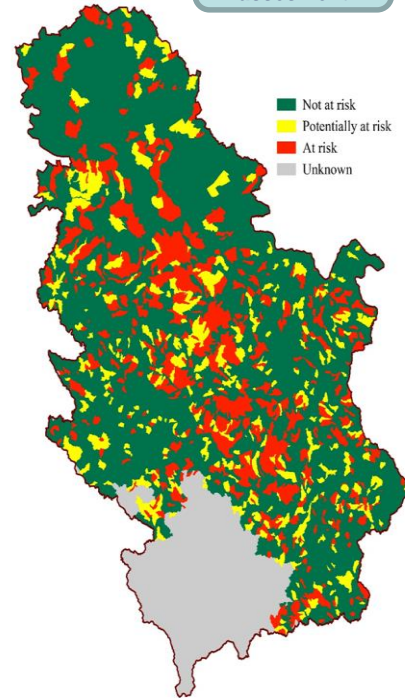
Based on the pressures and impacts analysis of organic pollution, nutrient pollution, pollution from priority and hazardous substances and hydromorphological alterations, surface water bodies are categorized as: **“Not at risk”**, **“Potentially at risk”** or **“At risk”**.

Organic pollution risk assesment



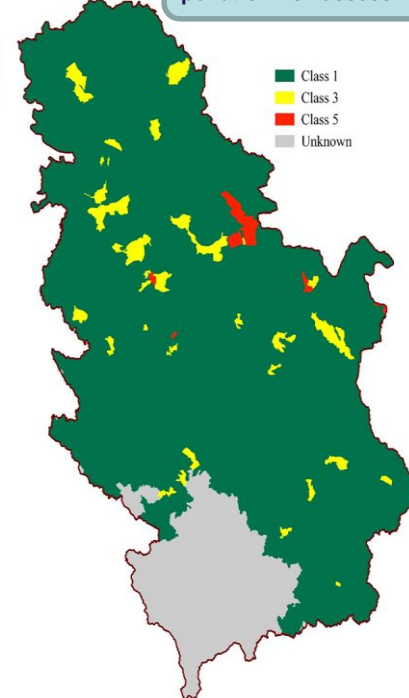
- Not at risk
- Potentially at risk
- At risk
- Unknown

Nutrient pollution risk assesment



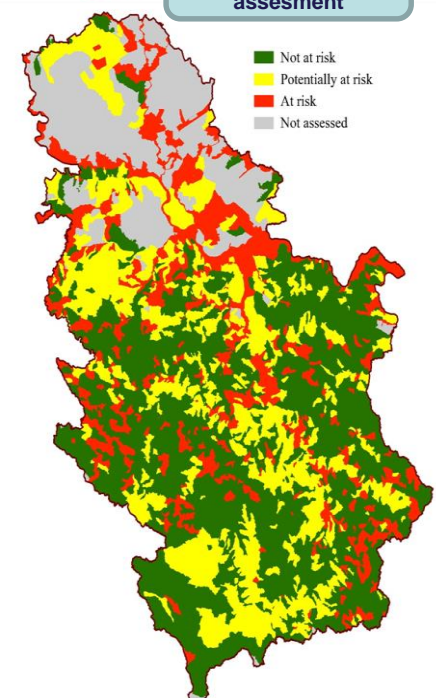
- Not at risk
- Potentially at risk
- At risk
- Unknown

Priority and priority hazardous substances pollution risk assesment



- Class 1
- Class 3
- Class 5
- Unknown

Hydromorphological alteration risk assesment



- Not at risk
- Potentially at risk
- At risk
- Not assessed

КЛАСА РИЗИКА	1	3	5	непознато
Број водних тела	2308	292	216	400

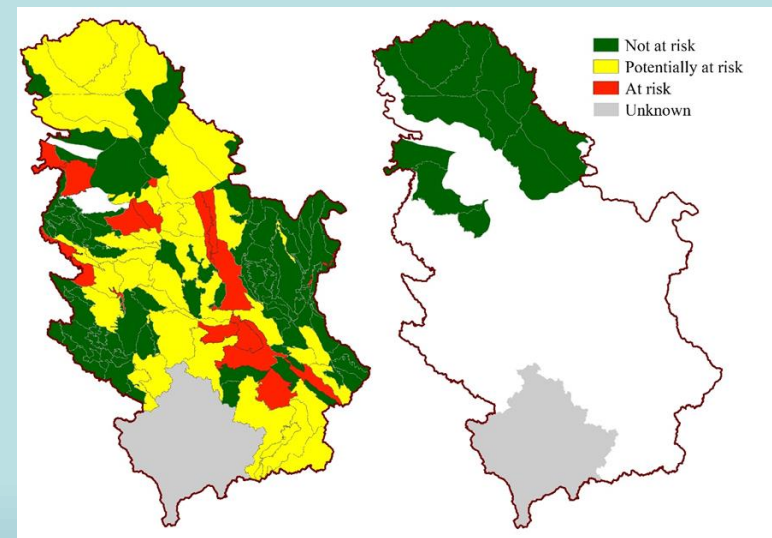
КЛАСА РИЗИКА	1	3	5	непознато
Број водних тела	1413	432	971	400

КЛАСА РИЗИКА	1	3	5	непознато
Број водних тела	2754	56	6	400

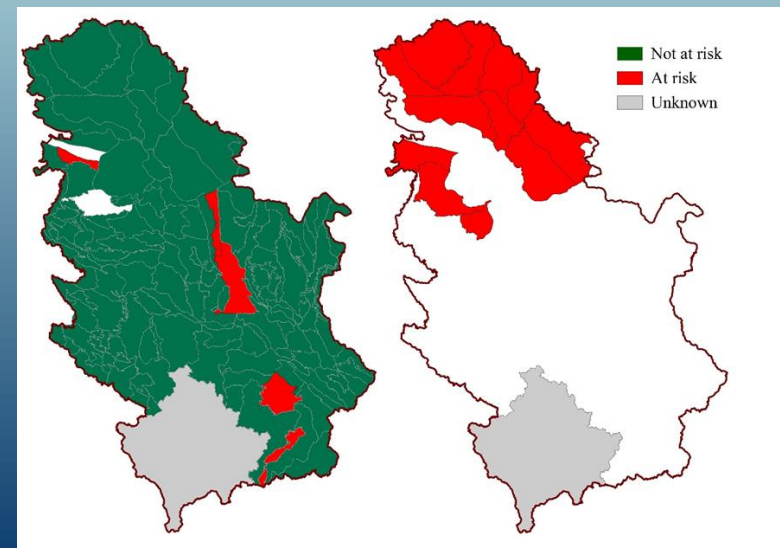
КЛАСА РИЗИКА	1	3	5	непознато
Број водних тела	1782	865	411	158

The confidence level of the risk assessment for a specific WB is directly related to the reliability of the input data.

Risk of failure to achieve good chemical status by 2027



Risk of failure to achieve a good quantitative status by 2027



The risk assessment to groundwater was carried out with a low confidence level because monitoring covered a relatively small number of groundwater sites and the frequency of monitoring is very low (once a year).

Priority and hazardous substances were not detected above concentrations that would raise concerns in groundwater, so the risk analysis was conducted only for the parameter total nitrogen.

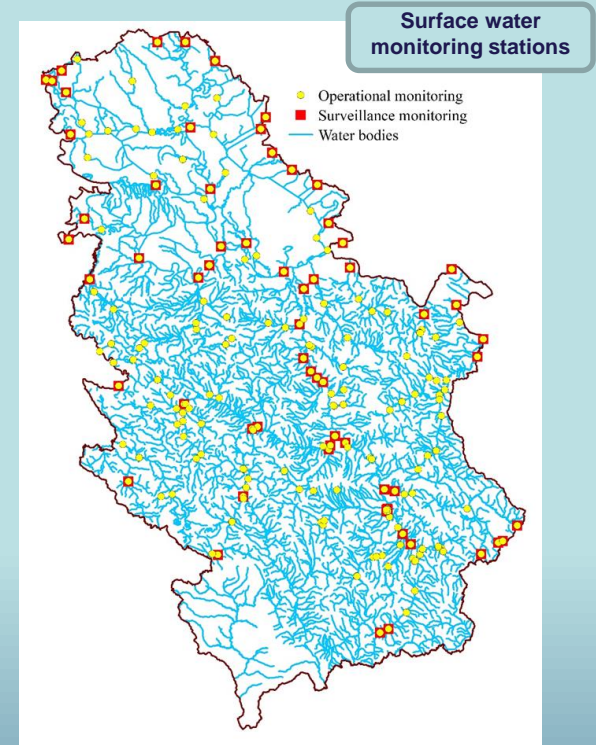
Significant abstraction of groundwater for public water supply is the main reason for the exposure to risk of 16 groundwater bodies (11 in the deep aquifer complex in the AP Vojvodina, 4 in neogene porous deposits, and 1 in karst deposits). In addition, the reason for the vulnerability of 2 groundwater bodies in the alluvial aquifer in the Velika Morava valley is the extraction of sand and gravel from the riverbed.

Monitoring programmes:

- Surveillance monitoring (for catchments larger than 2,500 km² and transboundary WB; serves to monitor trends in long-term changes in WB)
- Operational monitoring (covers the water bodies at risk; includes quality parameters that are most sensitive to existing pressures)
- Investigative monitoring (when there is insufficient data and when WB is potentially at risk)

The surface water quality monitoring is executed by Environmental Protection Agency (SEPA).

Year	Total number of sampling locations	Network density (number of monitoring sites/ 1000 km ²)	Surveillance monitoring		Operational monitoring	
			Rivers	Lakes/ reservoirs	Rivers	Lakes/ reservoirs
2012	101	1.14	49	0	90	4
2013	95	1.08	50	0	87	4
2014	88	1.00	51	0	84	4
2015	86	0.97	50	0	81	3
2016	78	0.88	50	0	72	2
2017	74	0.84	51	0	70	1
2018	77	0.86	66	0	74	2

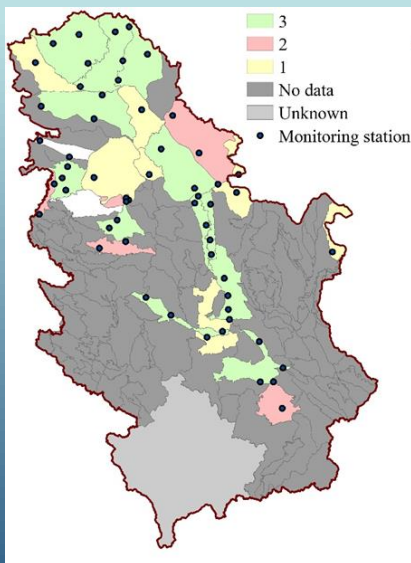


Monitoring has been aligned with Annex V of the WFD since 2012.

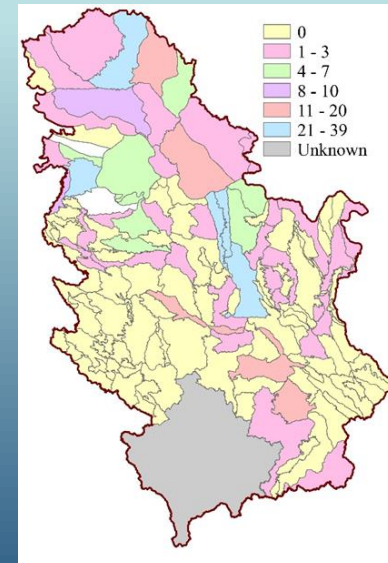
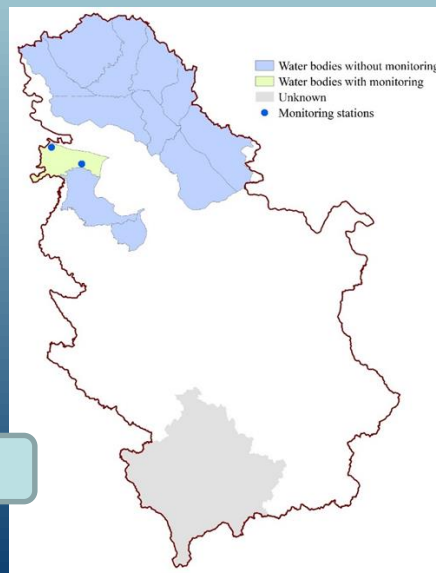
Appendix 2: Guidelines for the preparation of a multi-year monitoring program for surface and groundwater

Groundwater monitoring programmes shall include quantitative monitoring, the monitoring of chemical quality elements (surveillance and operational), as well as the monitoring which will enable achieving the environmental objectives for protected areas, such as the protected areas designated for the abstraction of water intended for human consumption or areas designated for the protection of habitats or species.

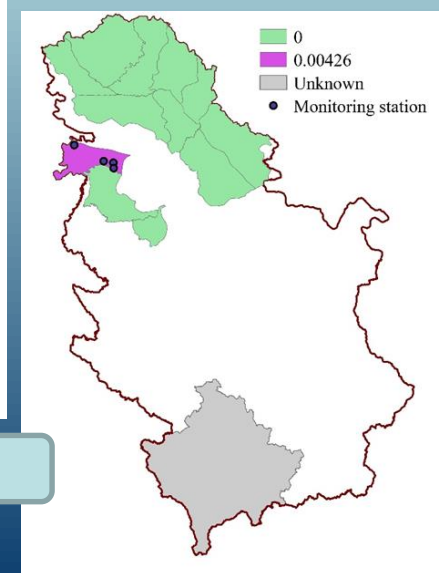
The groundwater quality monitoring is executed by Environmental Protection Agency (SEPA) while quantity monitoring is executed by Republic Hydrometeorological Service (RHMS).



Monitoring of the quality parameters

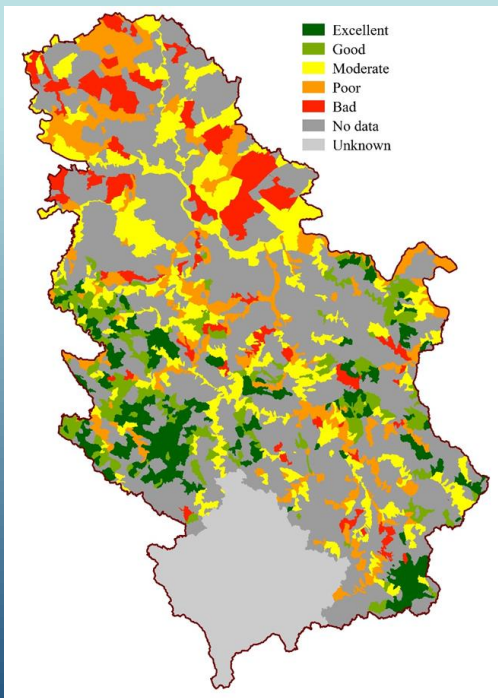


Monitoring of the quantity parameters

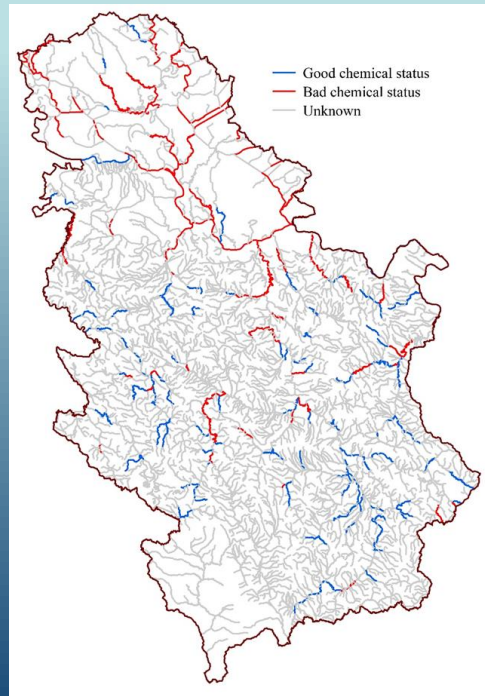


Surface water bodies status is assessed by evaluating the ecological and chemical status.

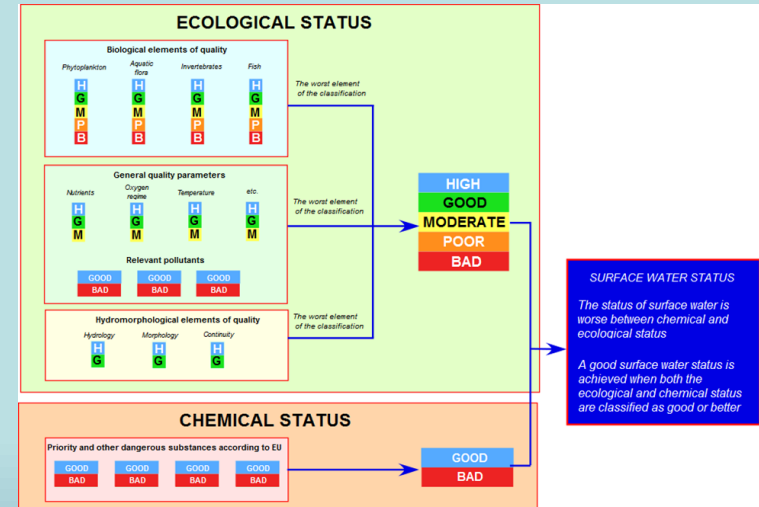
Based on the available monitoring data of biological parameters, the ecological status was assessed at 800 surface water bodies. By grouping water bodies (1070 group of surface water), the ecological status was assessed for another 265 surface water bodies.



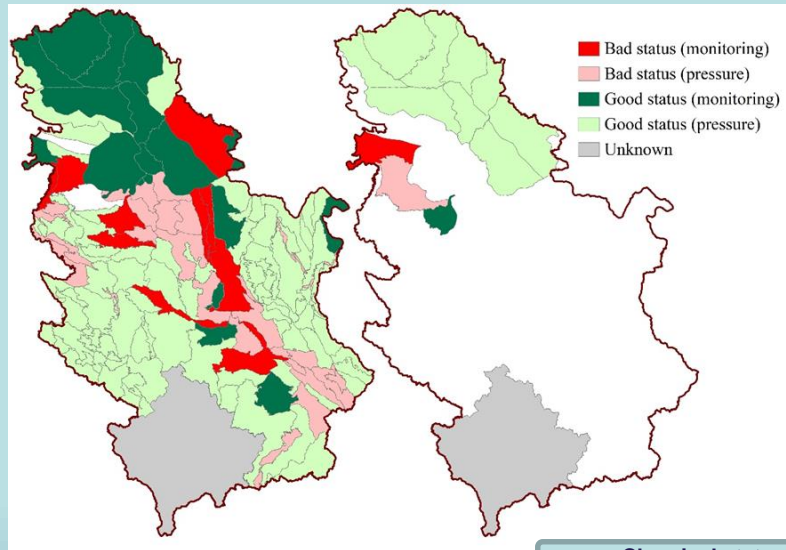
Ecological status



Chemical status



The assessment of the chemical status was carried out based on data from the state monitoring of priority and hazardous substances for 185 surface water bodies during the period from 2012 to 2018. For 3031 surface water bodies, the chemical status is unknown.

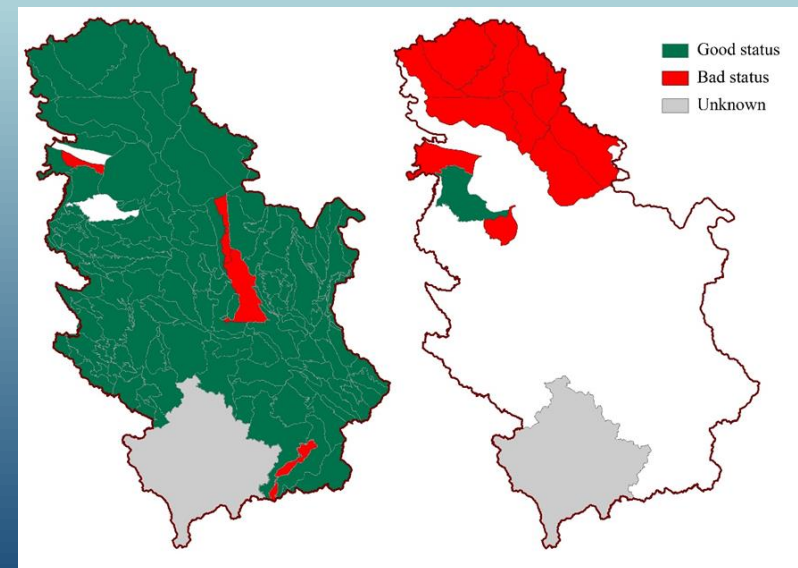


Chemical status

A good chemical status of groundwater is achieved when EU quality standards are met (nitrates 50 mg/l, pesticides 0.5 µg/l and individual pesticides 0.1 µg/l).

The analysis of the chemical status of groundwater, not covered by monitoring, was conducted based on the results and insights gained during the pressure analysis and risk assessment process.

- 15 groundwater bodies are in poor quantitative status:
- 10 WB in the main aquifer complex in Vojvodina (overexploitation)
 - 1 WB in Srem region (overexploitation)
 - 1 WB in the Velika Morava valley (gravel extraction)
 - 1 WB in the karst region Nepričava (overexploitation)
 - 2 WB in Neogene sediment in Southern Serbia (overexploitation)

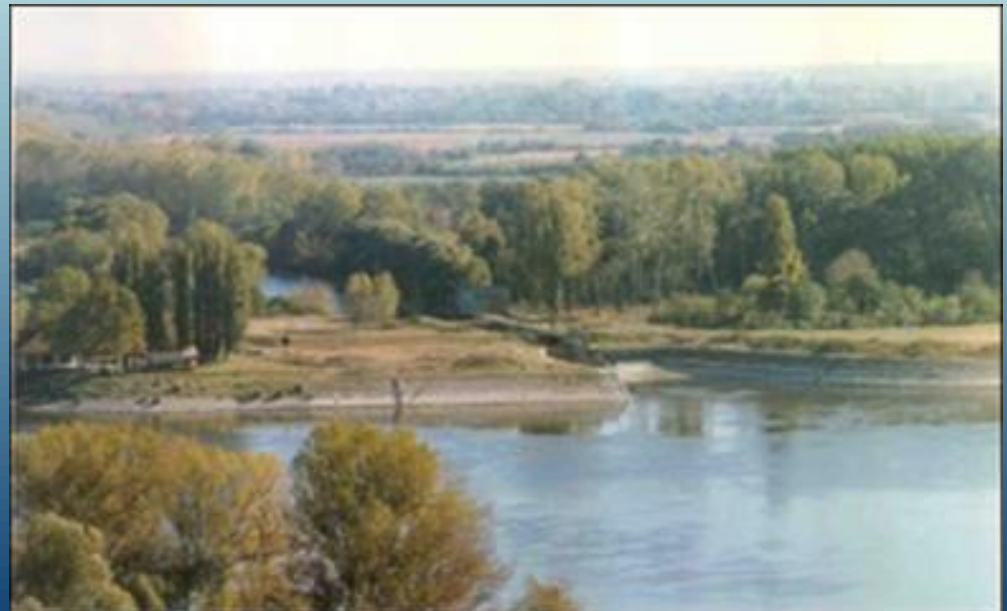


Quantitative status

The Programme of Measures (PoM) is an integral part of the River Basin Management Plan, and plays a key role in achieving environmental objectives. PoM for the first planning cycle in the RS (2021 - 2027) has been established in accordance with the requirements of the WFD.

For each pressure that puts the water body "at risk", a corresponding "key measure" has been defined. The initial identification of key measures was carried out based on the main pressures listed in the Report on Significant Water Management Issues (SWMIs). A total of 25 key measures have been identified.

The economic analysis conducted during the preparation of the Programme of Measures enabled to select the most effective combinations of measures.



Measures

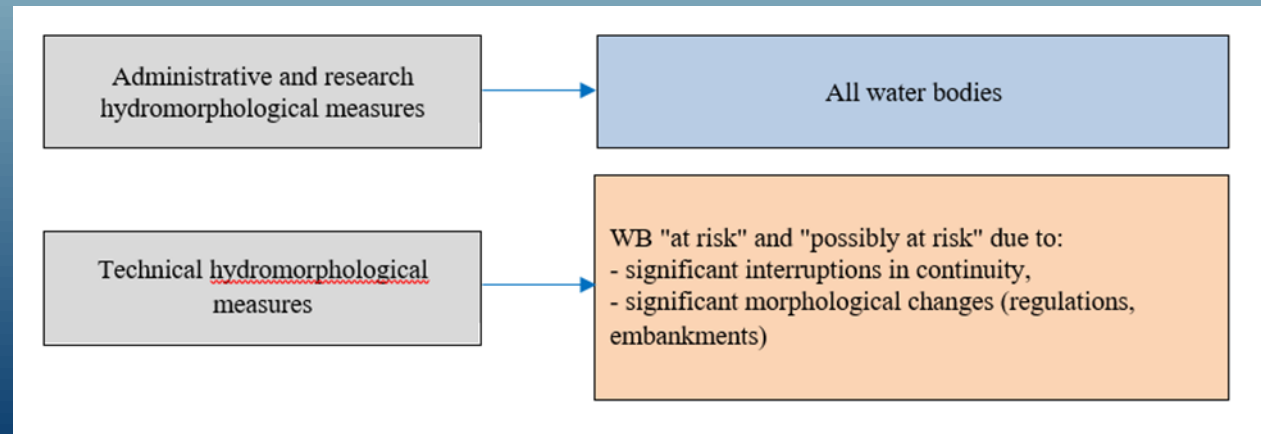
The programme of measures includes "basic measures" required by other EU directives and national legislation for water protection, defined regardless of the status of water bodies, as well as "complementary measures" specifically intended to achieve environmental objectives. Complementary measures must be taken if it is not possible to achieve environmental objectives by applying only basic measures.

The full implementation of measures to achieve good status for all water bodies in the first planning cycle (by 2027) is not possible due to a significant lack of data, methodology, insufficient monitoring that is not fully aligned with the WFD, and, most importantly, a lack of human resources and financial means.

Measures for Hydromorphological alterations

Key measures (KM)	HYMO pressure
KM5 Improvement of longitudinal continuity of watercourses (e.g. by establishing fish passes, demolition of old dams, etc.)	Unpassable dams / barriers
KM6 Improvement of hydromorphological conditions of WBs other than the longitudinal continuity (e.g. river rehabilitation)	Engineering works, dykes, sediment extraction, altered riparian zone
KM7 Improvement of flow regime and/or establishment of ecological flows	Reservoirs, water intakes, drainage systems
KM14 Research, improvement of knowledge base reducing uncertainty	All hydromorphological pressures
KM17 Measures to reduce sediment from soil erosion and surface run-off	Land use
KM23 Natural water retention measures	River training works, embankment, land use

Two kinds of hydromorphological measures related to particular KTM can be distinguished:



Cost - effective combination of measures

For the first planning cycle in the Republic of Serbia, a Cost-effectiveness analysis ("CEA") was made only for such measures which are expected to produce relevant results.

PoM mainly consists of basic measures related to the complete transposition of EU directives. About 80% of the total costs for the implementation of the WFD in the Republic of Serbia is attributed to the mandatory basic measures for the three most demanding EU directives: the Urban Wastewater Treatment Directive, the Drinking Water Directive, and the Nitrates Directive.

The measures for implementation of these directives in the Republic of Serbia are developed within Directive Specific Implementation Plans and Multi-annual Investments and Financial Plan. They contain the technical measures, legal and administrative instruments for implementation.

Considering that the basic measures are yet to be implemented, it is difficult to identify and quantify the need for supplementary measures at this stage. The preliminary assessment of the types of measures that will be needed is based on expert evaluations and the use of comparable data from neighboring countries.

The scope of identified measures far exceeds the financial and other resources available in the six-year planning period. Therefore, some measures have been postponed for later planning cycles.

- ◆ In December 2016, the RWD established a working group consisting of employees from the PWMCs, with the aim of developing elements for the River Basin Management Plan for the territory of the Republic of Serbia 2021-2027.
- ◆ At the end of 2017, a broader working group was established to prepare the Plan (competent ministries, institutions responsible for supervision and spatial planning, scientific and academic institutions, representatives of the civil sector).
- ◆ The first stakeholder conference was held in December 2019. The conference presented the "Work Program and the Dynamics of the Development of the RBM Plan for the Territory of the Republic of Serbia 2021-2027", as well as the "Report on Significant Water Management Issues in the Republic of Serbia".
- ◆ The second stakeholders conference was held in September 2020. The professional public was informed about the progress in the development of the Plan. Three presentations were held: on the program of measures, analysis of pressures and impacts, risk assessment, and the status of surface and groundwater.
- ◆ The third stakeholders conference (scheduled for the fall of 2021), where the Draft Plan with Strategic Environmental Impact assessment was to be presented, was not held due to the poor epidemiological situation in the country.
- ◆ The public consultation was conducted in accordance with national legislation in November 2021.



QUESTIONS?