

## ASSESSMENT OF THE BALANCE OF WASTE WATER DISCHARGED INTO A SURFACE FLOWS IN SLOVAKIA

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### ABSTRACT

Information and data on the quantity and polluting discharges of wastewater from point sources of pollution within the Slovak Water Act are annually reported to the Central Water Register (so called: “Súhrnná evidencia o vodách”) performed by Slovak Hydrometeorological Institute. Based on these data the balance of pollution in wastewater is annually evaluated.

The causes of pollution of the waste water and evaluation of the pollution in the years 2000 – 2016 are analysed. Analysis of the significant sources of the pollution in the different sub-basins of Slovakia provide the basic data for evaluation of the status of surface water and to control the effectiveness of measures set to reduce the pollution in surface flows. The development of the pollution of waste water in the years 2000 – 2016 were analysed.

**Keywords:** water use, Central Water Register, waste water, pollution, surface water, annual balance

### 1 INTRODUCTION

The basis of processing of the balance of the waste water in the Slovak republic are reported by the water users, who carry out their activity according to the issued permits for use of the water. Water users have an obligation to notify the data of waste water discharges to the Slovak Hydrometeorological Institute (SHMI) on the prescribed forms in accordance Act No. 364/2004 Coll. on water and on amendment and supplement to act No. 372/1990 Coll. delicts in wording of later regulations (Water act) as follows:

*„Any person who discharges waste water or special water into surface water or groundwater in quantities of more than 10 000 m<sup>3</sup> per year or over 1 000 m<sup>3</sup> per month from household and who produces and discharges waste water, special water or geothermal water in the course of entrepreneurial activities, is obliged to report the annual data...“*

(Forms for the commencement of discharges of waste water within 30 days of the establishment of the reporting obligation and annual forms until 31 January of the following calendar year.)

Information and data on the quantity and the pollution of discharged waste water from point sources of pollution within the Slovak Water Act shall be reported annually to the Central Water Register (so called: “Súhrnná evidencia o vodách”) performed by SHMI. Information database system (Central Water Register) is able to perform the data collection, their evaluation and reporting in accordance with national and EU legislative regulations valid in water sector.

The annual notifications of the waste water discharges into surface waters shall include the monthly amounts of the discharged waste water and the results of analyses of the produced pollution and the discharged pollution and other necessary information. Based on these data the balance of pollution in waste water is annually evaluated.

Analysis of the major sources of the pollution in the different sub-basins of Slovakia provides the basic data for the evaluation of the status of surface water and to control the effectiveness of the measures set to reduce the pollution in surface flows. The development of the pollution of waste water in the years 2000 – 2016 were analysed.

## **2 METHODOLOGY FOR PROCESSING OF THE WASTE WATER DATA**

The annual balance of discharged pollution from point sources to surface water is expressed by the individual parameters and processed according to the methodology valid in Slovakia:

If the frequency of pollutant measurements is at least once a month, the annual balance of pollution shall be calculated as the sum of the monthly values of balance (in kg or tonnes per year).

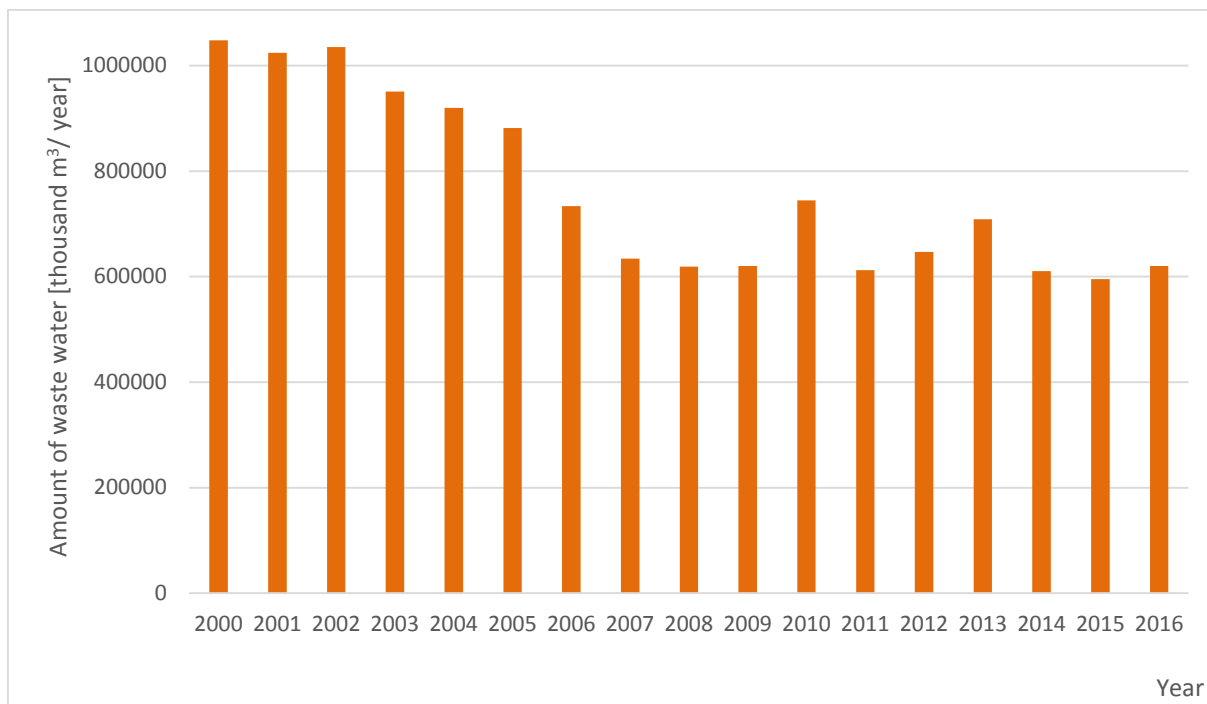
If the frequency of pollutant measurements is less, an average annual value of the concentration for the selected parameter shall be determined and multiplied by the annual amount of discharged waste water from a specific point source (in kg or tonnes per year).

The list of parameters:

- BOD<sub>5</sub>, COD<sub>Cr</sub>, N<sub>total</sub> and P<sub>total</sub>
- Synthetic and non-synthetic pollutants: priority substances (WFD) and pollutants relevant for the Slovakia.

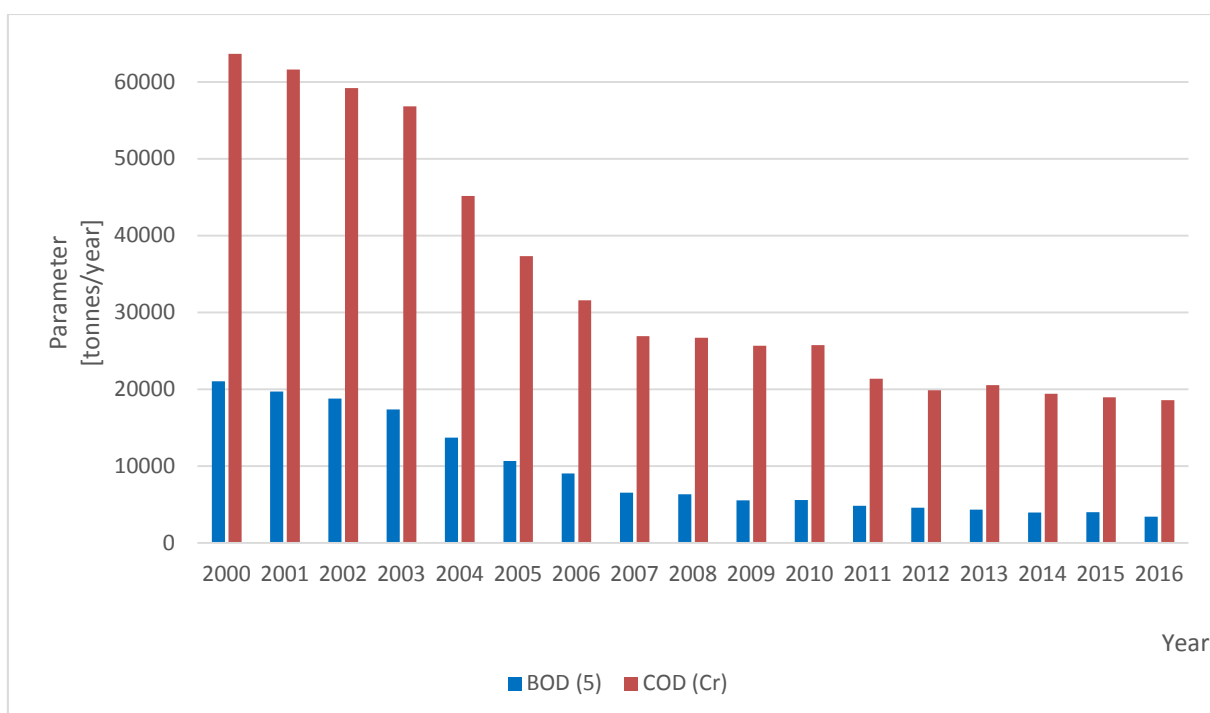
## **3 ASSESSMENT OF THE BALANCE OF WASTE WATER DISCHARGED INTO A SURFACE FLOWS**

Figure 1 shows the development of waste water discharged into surface water from 2000 to 2016.



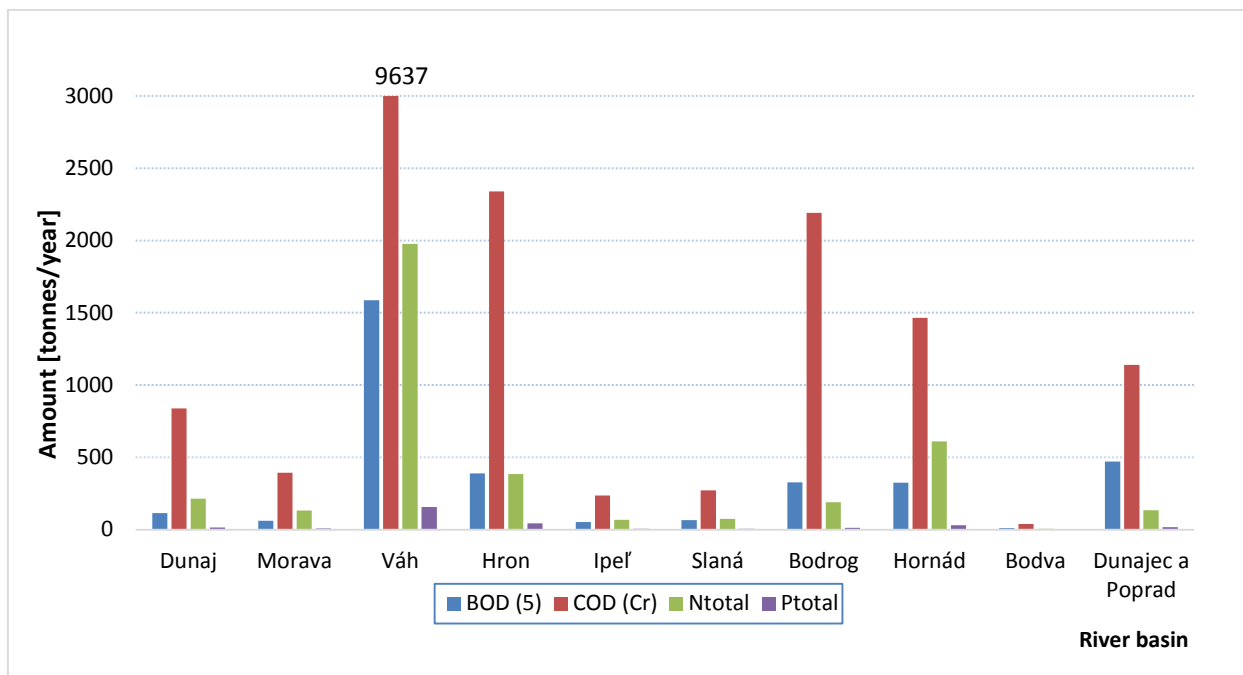
**Fig. 1:** Development of discharged waste water into surface water

At present, the decreasing trend of discharged pollution (BOD<sub>5</sub>, COD<sub>Cr</sub>) is observed in comparison with 2000. (Fig. 2).



**Fig. 2:** Development of the waste water pollution discharged into surface water

Fig. 3 shows the amount of pollutants (BOD<sub>5</sub>, COD<sub>Cr</sub>, N<sub>total</sub> and P<sub>total</sub>) discharged in river basins in Slovakia. More significant amount of pollutions were identified in the river basins of Váh, Hron and Bodrog.



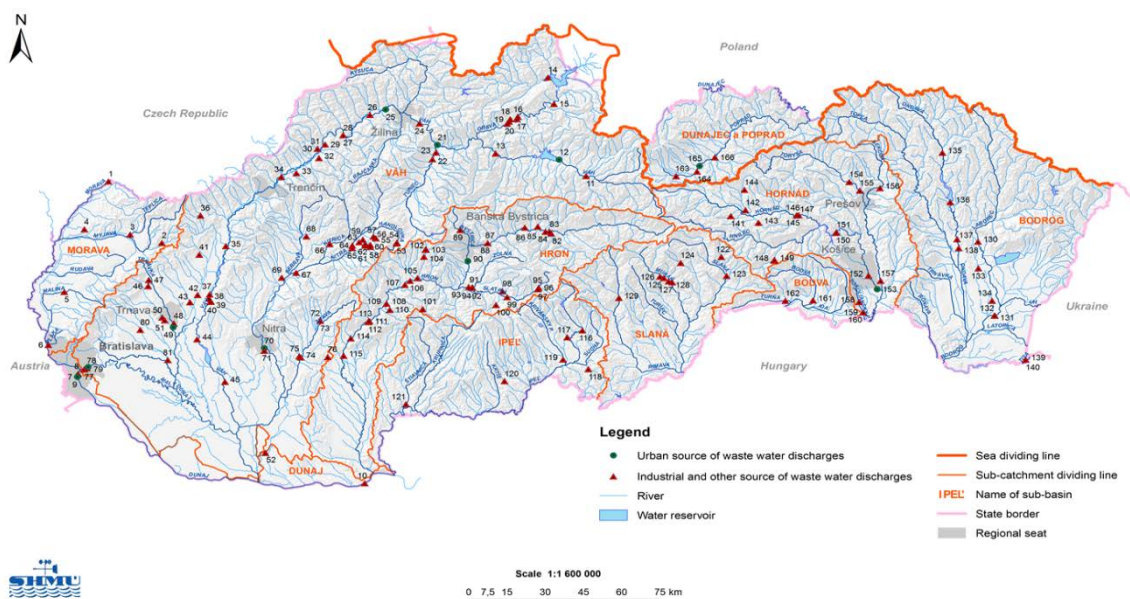
**Fig. 3:** Total amount of pollutants (BOD<sub>5</sub>, COD<sub>Cr</sub>, N<sub>total</sub> and P<sub>total</sub>) in river basins of the Slovak Republic in year 2016

The criteria for the selection of significant sources of pollution:

- sources of waste water discharges subject to The Act No. 205/2004 Coll. on the Collection, Storage and Dissemination of Environmental Information and on Amendments to Certain Acts, and The Act No. 39/2013 Coll. on Integrated Prevention and Control of Environmental Pollution as amended,
- sources of waste water discharges subject to The Council Directive 91/271/ EEC on the urban waste water treatment,
- sources of waste water discharges which obtain synthetic and non-synthetic pollutants (List of priority substances and certain other pollutants under the Water Framework Directive),
- sources of pollution which obtain synthetic and non-synthetic pollutants relevant to the Slovak Republic (Government) Decree No. 269/2010 Coll., listing the requirements to achieve good status of waters as amended),
- waste water in Q<sub>355</sub> ratio to flow recipient (1:1 and above).

At present, 166 significant point sources in Slovakia, including 10 significant urban sources are identified (Fig. 4).

Significant Point Sources of Waste Water Discharges in Slovakia



**Fig 4:** Significant point sources of waste water discharges (urban and industrial sources) in Slovakia

#### 4 CONCLUSION

The poster presents the assessment of the annual balance of waste water pollution discharged into surface water from the data reported into Central Water Register. It also provides data processing on total amount of the waste water pollution discharged into surface water in Slovakia. The results show that although more significant amount of pollutions were identified in the river basins of Vah, Hron and Bodrog, the decreasing trend of discharged pollution ( $BOD_5$ ,  $COD_{Cr}$ ) were identified in river basins.