Identification of measures intended for achieving WFD objectives in Slovenia: Results for Sava River Basin

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1. Introduction

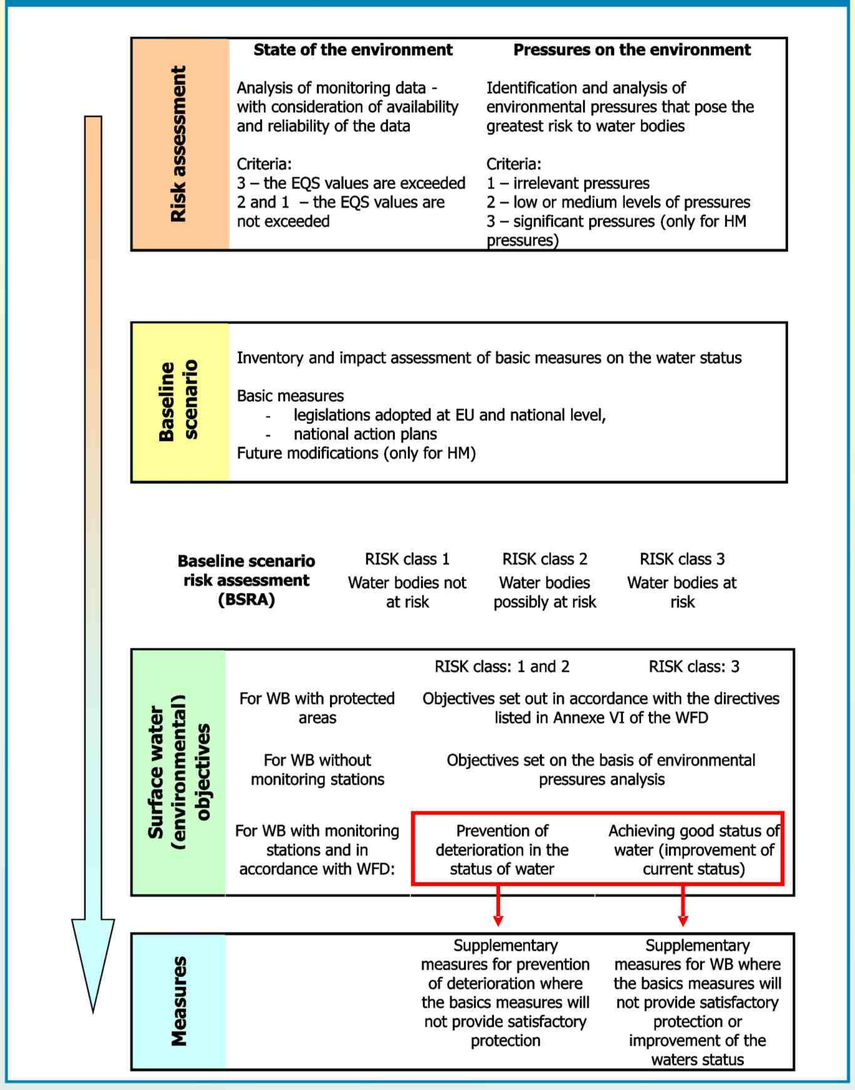
The EU Directive 2000/60/EC (Water Framework Directive, hereinafter called WFD) provides national and local authorities with a legislative basis for the maintenance and recovery of surface and ground waters with the aim to achieve good ecological and chemical status and to promote the sustainable use of water by 2015.

Slovenia is developing river basin management plans for two river basin districts i.e. Danube and Adriatic see. The Danube river basin districts combines Mura, Drava and Sava river basins (hereinafter called RB). River basin management plans include program of measures, which are defined on the basis of impacts and pressures analysis. The WFD directive states that each programme of measures shall include the 'basic' measures, and, where necessary, 'supplementary' measures. The basic measures consist of European and national legislation demands while supplementary measures are those measures designed in addition to the basic measures, with the aim of achieving the WFD objectives till 2015.

2. Methodology

In order to identify supplementary measures necessary to achieve WFD objectives, several steps have been taken (Figure 1). The first step included risk assessment which combined the state of the environment and analysis of different pressures considering their negative impacts on environment. In the scope of the latter key management issues of organic pollution, nutrient enrichment, hazardous substance pollution and hydromorphological alterations were addressed. The second step included identification of basic measures that are going to be implemented till 2015 on each water body (hereinafter called WB). In the baseline scenario primarily action plans for the implementation of Urban Waste Water Directive (Directive 91/271/EEC) and Nitrate Directive (Directive 91/676/EEC) and national legislation originated from implementation of Directive on Integrated Pollution Prevention and Control (Directive 96/61/EC) were considered. Possible improvement of the state of environment due to these measures was evaluated for this time period. Foreseen future hydromorphological modifications were also considered in this scope. The third step included the projection of current risk assessment to the year 2015, hereinafter called baseline scenario risk assessment (BSRA). This step is taking into account improvements due to basic measures implementation. For WB's, which are considered to be still at risk in 2015 despite implementation of basic measures, supplementary measures were considered.

Figure 1: The process of identifying measures for archiving good water status in Slovenia



Legend: EQS - Environmental Quality Standards; HM - hydromorphological alterations; WB - water body

In general the objectives differ for WB with or without monitoring station and for WB with protected areas. For the latter objectives and subsequently measures were summarized from directives listed in Annex VI of the WFD. For WB with monitoring stations the final step of identification of potential measures for achieving good status/of water and for prevention of deterioration in the status of water was made. For WB without monitoring stations and where significant pressures were identified in the catchment area, additional analysis will be needed.

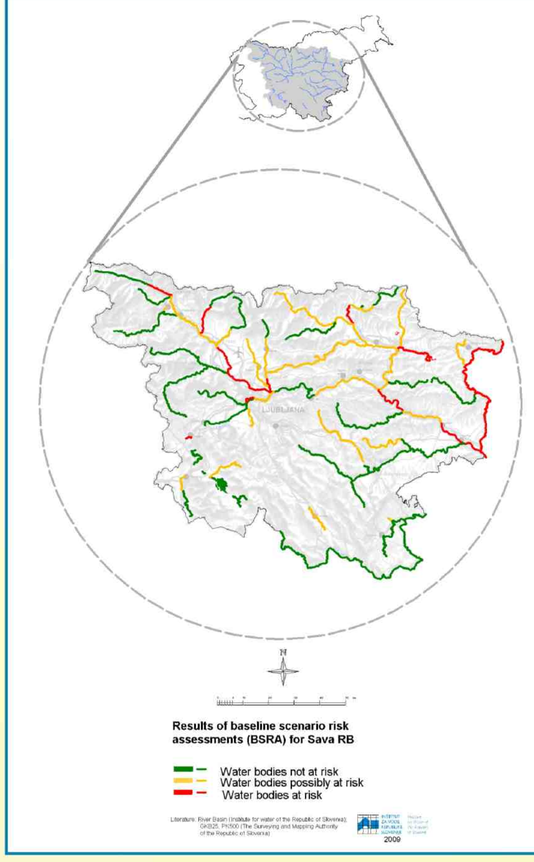
Table 1: Number of water bodies in Sava RB, which may not achieve WFD objectives till 2015 (data from 2004/2005) and the sources of pressures causing the failure of these objectives

Total no. of WB in Sava RB	83
Total no. of WB at risk (RISK class 3)	18
No. of WB with monitoring sights at risk because of	
priority substance pollution – chemical status	1
organic pollution – ecological status	/
nutrient enrichment – ecological status	/
hazardous substance pollution – ecological status	10
hydromorphological alterations – ecological status	8

3. Results

The stated procedure was employed for all 155 surface water bodies in Republic of Slovenia. The outcome of BSRA for Sava RB (Figure 2), which is a part of Danube river basin districts, is presented in more details (Table 1). The results serve as a basis for the proposal of possible supplementary measures. BSRA analysis shows that 22 % of WBs present in RB in question are at risk of falling the environmental objectives till 2015. The main cause for possible failing of the WFD objectives could be priority substance pollution (1 WB), hazardous substance pollution (10 WB) and hydromorphological alterations (8 WB).

Figure 2: Results of baseline scenario risk assessment (BSRA) for Sava RB in Slovenia



3.1 Water pollution

Impacts and pressures analysis shows that the risk of pollution with priority substances could originate from manufacture of other non-metallic mineral products. Further detailed analysis revealed that the concentration of lead in surface water diminishes from year 2004 to 2007 and that the national legislation covering the manufacture in question obligates the manufacturer to reduce the quantity of lead in outflows. On the basis of these facts no supplementary measures would be needed for the achievement of WFD objectives.

Risk of hazardous substance pollution was identified for 12 % of WB in Sava RB. The parameters causing the ppollution are phenol, adsorbable organic halogens (AOX), detergents, copper, zinc and metolachlor. The last three stated parameters could be associated with pollution from agriculture. For these WB the basic measure of »Appropriate use and handling of plant protection products« could be emphasized. Pollution with detergents could be associated with outflows from agglomerations without urban waste water treatment plants. We estimate that the concentration of detergents in surface waters will be reduced with the full implementation of basic measures for urban waste water treatment. For the remaining two parameters which exceeded environmental quality standards, i.e. phenol and AOX, the source of pollution was not found and basic or supplementary measures could therefore not be defined.

3.2 Hydromorphological alterations

From hydromorphological point of view Sava RB is denoted mostly with numerous water abstractions for small hydropower plants and fish farms, large impoundments, sediment abstractions and locally with impervious urban area, hydro-melioration systems and river regulations. There is 10 % of total number of WB that are "at risk" because of hydromorphological alterations. All of them are delineated as candidates for heavily modified water bodies or artificial water bodies. Since there is no action plan for hydromorphological improvement, list of measures was prepared on the basis of national legislation on environmental protection and measures specified in WFD. The major part of measures is referred to prevention of status deterioration. One of the most important measures for improvement of water status till 2015 is definition of ecological acceptable flow for all water abstractions, while other relevant measures on WB are momentarily in discussion.

4. Conclusions

The process of BSRA and subsequent setting of environmental objectives and measures provides a good way to identify supplementary measures needed for the achievement of good chemical and ecological status of waters till 2015. The final results presented only for Sava RB show that at this stage only basic measures will be stated in the final program of measures. Only after the upgraded results based on additional monitoring results for chemical and ecological status with higher confidence level, the proposal of supplementary measures could be prepared.

5. Uncertainties and gaps

The results of risk assessment are based on monitoring data from years 2004 and 2005. Before the final proposal of supplementary measures will be prepared, new monitoringa data will be included and trends will be considered. These review especially referrers to impacts of hydromorphological alterations, because the first monitoring results, addressing also this element, will be provided in year 2009.

The BSRA show that for prevention of organic pollution and nutrient enrichment only basic measures will be sufficient for achieving of the WFD environmental objectives. If this is true or not we will be able to see only after the full implementation of urban waste water and nitrate directives.

In the process of assessing the pressures and impacts the actual effect of pressures on surface water ecosystems and synergistic effect of several pressures were not taken into account yet.

6. References

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