

Assessment of Surface Water Quality in Belarus

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Abstract : Belarus is not short of water. However, there is a problem of water quality. Its pollution has both natural and man-made origin. This research is based on data from State Water Cadastre of the Republic of Belarus registered from 1994 to 2014. We analyzed changes in such hydro-chemical criteria as concentration of ammonium ions, suspended matter, dissolved oxygen, oil-products, nitrites, phosphates in water, dichromate value, water impurity index, 5-day biochemical oxygen demand (BOD). Pollution of water with ammonium ions was observed in Belarus rivers of the Western Dvina, Polota, Schara, Usha, Muhavets, Berzina, Plissa, Svisloch, Pripiat, Yaselda in 2006-2014. The threshold limit value (TLV) was 1.5-3 times as much. Concentration of ammonia in the Berzina exceeded 3 - 5 times the TLVs in 2006-2010. Maximum excess of TLV was registered in the Svisloch (10 km downstream of Minsk) in 2006-2007. It was over 4 mg/dm³ whereas the norm is 0.39 mg/dm³. In 1997 there were ammonia pollution spots in the Dnieper, the Berzina, and the Svisloch Rivers. Since 2006 we have observed pollution spots in the Neman, Ross, Vilia, Sozh, Gorin Rivers, the Osipovichi and Soligorsk reservoirs. Dichromate value exceeds the TLVs in 40% cases. The most polluted waters are the Muhavets, Berzina, Pripiat, Yaselda, Gorin Rivers, the Vileyka and Soligorsk reservoirs. The Western Dvina, Neman, Viliya, Schara, Svisloch, and Plissa Rivers are less polluted. The Dnieper is the cleanest in this respect. In terms of BOD, water is polluted in the Neman, Muhavets, Svisloch, Yaselda, Gorin Rivers, the Osipovichi, Zaslavl, and Soligorsk reservoirs. The Western Dvina, Polota, Sozh, Iputs Rivers and Lake Naroch are not polluted in this respect. This criterion has been decreasing in 33 out of 42 cases. The least suspended matter is in the Berzina, Sozh, Iputs Rivers and Lake Naroch. The muddiest water is in the Neman, Usha, Svisloch, Pripyat, Yaselda Rivers, the Osipovichi and Soligorsk reservoirs. Water impurity index shows reduction of this criterion at all gauge stations. Multi-year average values predominantly (66.6%) correspond to the third class of water quality, i.e. moderately polluted. They include the Western Dvina, Ross, Usha, Muhavets, Dnieper, Berzina, Plissa, Iputs, Pripyat, Yaselda, Gorin Rivers, the Osipovichi and Soligorsk reservoirs. Water in the Svisloch River downstream of Minsk is of the fourth quality class, i.e. most polluted. In the rest cases (33.3%) water is relatively clean. They include the Lidea, Schara, Viliya, Sozh Rivers, Lake Lukoml, Lake Naroch, Vileyka and Zaslavl reservoirs. Multi-year average values range from 7.0 to 9.5 mg O₂/dm³. The Yaselda has the least value - 6.7 mg O₂/dm³. A shortage of dissolved oxygen was found in the Berzina (2010), the Yaselda (2007), the Plissa (2011-2014), the Soligorsk reservoir (1996). Contamination of water with oil-products was observed everywhere in 1994-1999. Some spots were found in the Western Dvina, Vilia, Usha, Dnieper in 2003-2006, in the Svisloch in 2002-2012. We are observing gradual decrease of oil pollutants in surface water. The quality of 67 % surface water is referred to as moderately polluted.

Keywords : belarus, hydro-chemical criteria, water pollution, water quality

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