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ASSESSMENT OF POLLUTION SOURCES DETECTED IN THE UKRAINIAN PART OF THE WESTERN BUG BASIN

Abstract. A number of factors influence the spread of pollution that can lead to environmental disasters. It becomes necessary to classify pollution sources to identify the factors of maximum influence. To solve the problem, the inverted Floyd-Warshall algorithm is used, which allows not only to identify potential pollution sources, but also to comprehensively assess the impact of all types of pollution on any river systems.

It is well known that most of the Polish-Ukrainian border area is located in the so-called "green lungs of Europe". However, the environmental infrastructure in this area is not always adequate. This happens due to a number of factors influencing the spread of pollution that can lead to environmental disasters. Lack of central sewerage and sewage treatment plants in many small settlements is one of these. There is also lack of modern waste collection, storage and disposal systems. The infrastructure needs to be expanded and improved in agriculture [4].

Therefore, we need to classify the sources of pollution detected in the Western Bug basin to identify factors of maximum impact. This makes it possible to take into account additional interval estimates in simulation and the formation of combined indirect features in making operational management decisions to assess the current environmental condition of monitoring objects under uncertainty, which is caused by insufficient information or time constraints [1].

In order to establish the factors of the greatest influence on pollution we suggest that inverted Floyd-Warshall algorithm should be used. At the initial stage, a matrix of coefficients of combinatorial influence in the interaction of factors and the object was created. First of all, we analyzed and classified the sources of pollution, which include two types of landfills: authorized and natural, dumps and settling tanks – fuel waste and settling tanks, ash dumps, settling tanks of the food industry, dumps

of synthetic fiber plants, farmlands and unsewered settlements. A weighted oriented graph was constructed for the main indicators of pollution (in accordance with statistics), which let us assess the degree of relationship between the indicators and is a means of visualizing the relationships between certain objects. The advantage of this algorithm is that it can be used to find the optimal paths between all vertices of the weighted oriented graph, and by inverting it we can estimate the degree of influence on the spread of contaminants [2, 3].

Analysis of the results showed that all factors definitely affect pollution, but factors such as food industry settling tanks and synthetic fiber dumps have the greatest impact on pollution in the Ukrainian part of the Western Bug basin, their rate is 0.7 (at maximum value 1), and agricultural land and unsewered settlements influence the pollution the least and are equal to 0.3 and 0.4 respectively.

This approach allows not only to identify potential sources of pollution, but also to comprehensively assess the impact of all types of pollution on any river systems and to synthesize new features while forming the vector of initial data in the simulation.

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