

===== METHODS OF SUSTENANCE AND RESERVATION OF ECOSYSTEMS =====  
AND THEIR COMPONENTS

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**INTEGRATED METHODOLOGY AND ITS APPLICATION FOR ASSESSING  
THE PROTECTION OF GROUND AND CONFINED SUBTERRANEAN WATERS  
FROM VARIOUS POLLUTANTS AND THEIR VULNERABILITY TO POLLUTION  
IN THE KALUGA REGION IN THE RADIOACTIVE TRACE  
FROM THE ACCIDENT AT THE CHERNOBYL NPP**

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The object of our research is groundwater and confined subterranean waters in the territory of the Kaluga Region, most affected by the accident at the Chernobyl Nuclear Power Plant. Our aim was to develop a complex methodology to assess the level of protection and vulnerability of groundwater and confined subterranean water against various pollutants, including radionuclides.

The methodology was tested in the territory of the Kaluga Region, in its zone of the radioactive contamination zone from the Chernobyl Accident.

Our earlier studies that assessed protection and vulnerability of subterranean waters began almost immediately after the accident and were carried out according to the original methodology, developed by the authors of this article. They were fully focused on groundwater only or, more specifically, on the first aquifer under the ground surface. However, this research studies both groundwater and confined subterranean water, located below the groundwater aquifer.

Depending on the location of pollution source, two approaches are considered to solve our main aim. The first option involves a pollution source placed on the ground surface, the way it was observed right after the Chernobyl Accident. The second option involves a pollution source located directly in the groundwater or spreading over a large area, in which case the number of study objects decreases, and it becomes a specific case of the first option.

The results of our research and the methodology we offer for the further use can be applied for assessment of the ecological state of subterranean waters in different country territories, at different scales; for design and construction of fresh subterranean water intakes for drinking purposes; for design and organization of subterranean water monitoring in the areas affected by the Chernobyl Accident. The results of our research are new and significant for further studies.

*Keywords:* groundwater, subterranean confined water, pollutant, subterranean water protection from pollution, subterranean water vulnerability to pollution, radionuclides, sorption, migration period.

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