



## **DESTRUCTION OF THE NATURAL ENVIRONMENT CAUSED BY THE WAR IN UKRAINE: IMPACT ON LAND, WATER, AND FOREST ECOSYSTEMS**

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### **Abstract**

The most powerful destructive factor affecting the settlements, infrastructure and natural environment of Ukraine is the full-scale invasion of the armed forces of the RF, which began on February 24, 2022. From the first months of this tragic period in the history of Ukraine, we focused our attention on registration and assessment of the impact of military activity on the natural environment, which in some cases had catastrophic consequences. The purpose of this study is to determine the specifics of the impact of military operations on the land surface, vegetation and water bodies of the affected territories based on the field research, remote monitoring and analysis of available published data. Examination of affected areas and analysis of available information makes it possible to identify at least three main forms of damage to the natural environment. These are the following.

Pollution and clogging of the atmosphere, lithosphere, hydrosphere and biosphere. Polluting substances - products formed as a result of ammunition explosions, damage to industrial and infrastructure facilities, maintenance and operation of military equipment, etc. As a rule, each recorded incident had an impact on several components of the environment. At the same time, atmospheric air pollution has a temporary, dynamic nature, while soil pollution, in particular, by oil products, has long-term consequences. A special form of littering a large part of the territory where hostilities took place, as well as the occupied territories, is their mining.

Physical destruction of natural and anthropogenic landscapes. Explosives of munitions on agricultural lands cause the formation of deep craters and destruction of the soil cover with long-term recovery. In addition to this impact, fires occurred in forest ecosystems, which caused emissions of significant amounts of combustion products into the atmosphere and complete or partial destruction of biotopes. Only in the Drevliansky National Park, fires destroyed more than 2,000 hectares of protected forests. The destruction of natural ecosystems also occurred as a result of their flooding or dehydration after the destruction of water resources management infrastructure.

Indirect (remote) consequences. This is a special form of influence associated with the synergistic impact of a number of factors. An illustrative example is the decrease of groundwater in the region of the Kakhovka Reservoir after its dewatering as a result of the detonation of the dam.

Paper describes case studies of the incidents and demonstrates specifics of the assessment of different forms of environmental damages.

### **Keywords**

Military impact on the environment; pollution of air, soil and water resources; fires in ecosystems; landscapes destruction