

reaches 64% of its territory, such an impact will lead to a significant decline in the quality of agricultural products and the withdrawal of agricultural land from circulation. increase in emissions of harmful substances, as well as large-scale spillage and combustion of fuels and lubricants is soil contamination in fairly large areas. Given that the area set aside for arable land, for example, in the Donetsk region, reaches 64% of its territory, this impact will lead to a significant decline in the quality of agricultural products and the withdrawal of agricultural land from circulation. increase in emissions of harmful substances, as well as large-scale spillage and combustion of fuels and lubricants is soil contamination in fairly large areas. Given that the area set aside for arable land, for example, in the Donetsk region, reaches 64% of its territory, this impact will lead to a significant decline in the quality of agricultural products and the withdrawal of agricultural land from circulation.

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#### **MAIN TECHNOGENIC AND ENVIRONMENTAL RISKS IN THE AREA OF THE JOINT FORCE OPERATION**

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**ОСНОВНІ ТЕХНОГЕННО-ЕКОЛОГІЧНІ РИЗИКИ У ЗОНІ ПРОВЕДЕННЯ ООС**

The ecological situation in Eastern Ukraine even before the start of hostilities is possible describe as a crisis that has developed over a long period use of natural resources and negative impact directly for all objects of environment. Low level of ecological consciousness of society, lack of sufficient treatment of discharges and emissions, lack of civilized waste management, especially extremely hazardous, lack of integrated approach to solving environmental problems, led to a significant environmental degradation of Eastern Ukraine, excessive surface pollution and groundwater, air, land resources. The situation with intense air pollution was developing for decades in the process of formation and development of industry Eastern Ukraine. The biggest air pollutants air steel enterprises of the coal industry, ferrous metallurgy, chemical industry, thermal energy.

In particular, most methane released into the atmosphere in cities and areas where coal mines are located enterprises and reach about 70% of total emissions. The main pollutants of water bodies were the enterprises of the metallurgical industry, the coal industry and energy. In a number of cities, sewage treatment plants are morally and physically obsolete. Water resources of Donetsk and Luhansk areas are characterized by a high concentration of salts. The reason for this there is a discharge into water bodies of highly mineralized mine waters, with which year gets more than 1 million tons of various salts. Industrial waste also had a significant man-made impact on the environment. By 200 years of development of coal deposits of Donetsk and Luhansk regions about 1260 heaps were formed. Due to the lack of modern landfills and enterprises for disposal and processing of hazardous waste, storage of hazardous waste is carried out on the territory of enterprises, which is not always the case environmental requirements. Given that before the military aggression, there was a significant anthropogenic pressure on the environment in the eastern regions of Ukraine due to extraction of coal, ore and other minerals, metallurgical production, the formation of a significant amount of waste, the presence hazardous chemicals used in industry, the damage done to the environment today is multiplying, it is enormous and unlikely to be offset in the near future.



a)



b)

**Figure 1.** Infrastructure objects affected by the fighting: a - Donetsk International Airport, b - Lysychansk CHP.

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### **ENVIRONMENTAL RISKS FOR RESERVED TERRITORIES IN THE ZONE OF MILITARY ACTION**

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### **ЕКОЛОГІЧНІ РИЗИКИ ДЛЯ ЗАПОВІДНИХ ТЕРИТОРІЙ У ЗОНІ ВІЙСЬКОВИХ ДІЙ**

Elimination of unprofitable mines in Donetsk and Luhansk regions has exacerbated environmental problems and created a new ecological and geological situation under the influence of hydrogeological, engineering-geological and hydrogeochemical factors. On the territory of the environmental protection zone and near the demarcation line there are important objects of the nature reserve fund on critical infrastructure. Ecological problems of Donbass concern disturbance of ecosystems and natural territories. The use of modern weapons in the Donbass has already led to the destruction of natural landscapes, high levels of air pollution, land, water resources. The reserves "Provalsky Steppe", "Three Rocks", "Holy Mountains" National Nature Park, branches of the Ukrainian Steppe Reserve "Kalmiuske" and "Cretaceous Flora", regional landscape park "Donetsk Ridge", "Slavic Resort" were destroyed. In the anti-terrorist operation zone, significant volumes of protected areas are built up with trenches and fortifications. In the national nature parks "Meotida", reserves "Provalsky steppe" and "Khomutovsky steppe" administrations were seized by militants, landscape parks "Donetsk ridge", "Zuevsky" and "Kleban-Byk" ceased to function. Current problems in the field of ecology relate to uncontrolled fires, which, according to available data, covered 17% of forests and 24% of steppes in the ATO zone, causing significant damage due to shelling of a number of important environmental sites: Holy Mountains National Park, Ukrainian Steppe Reserve. "Kalmiuske" and "Cretaceous flora", regional landscape parks "Donetsk ridge", "Slavic resort". The destruction of industrial and environmentally hazardous facilities leads to the ingress of dangerous toxic substances into the air, water and land. Due to the lack of proper state control over man-made hazardous facilities, the number of cases of hazardous toxic substances of industrial and municipal origin entering water bodies is increasing. causing significant damage due to shelling of a number of