



Sloviansk

Severodonetsk

Shchastia

Kramatorsk

Popasna

Alchevsk

Luhansk

Toret'sk

Horlivka

Debaltseve

Donetsk

Makiivka

Antratsyt

Ministry of Ecology
and Natural Resources of Ukraine

ENVIRONMENTAL DAMAGE IN EASTERN UKRAINE AND RECOVERY PRIORITIES

Armed Russian aggression in Eastern Ukraine affect lands and terrain, surface and underground waters, vegetation, and wildlife in a number of ways. Hostilities significantly increase the risks of incidents at industrial and infrastructural facilities.



Prior to the Russian military aggression, the Donetsk and Luhansk Regions were home to some 4,500 potentially hazardous businesses.

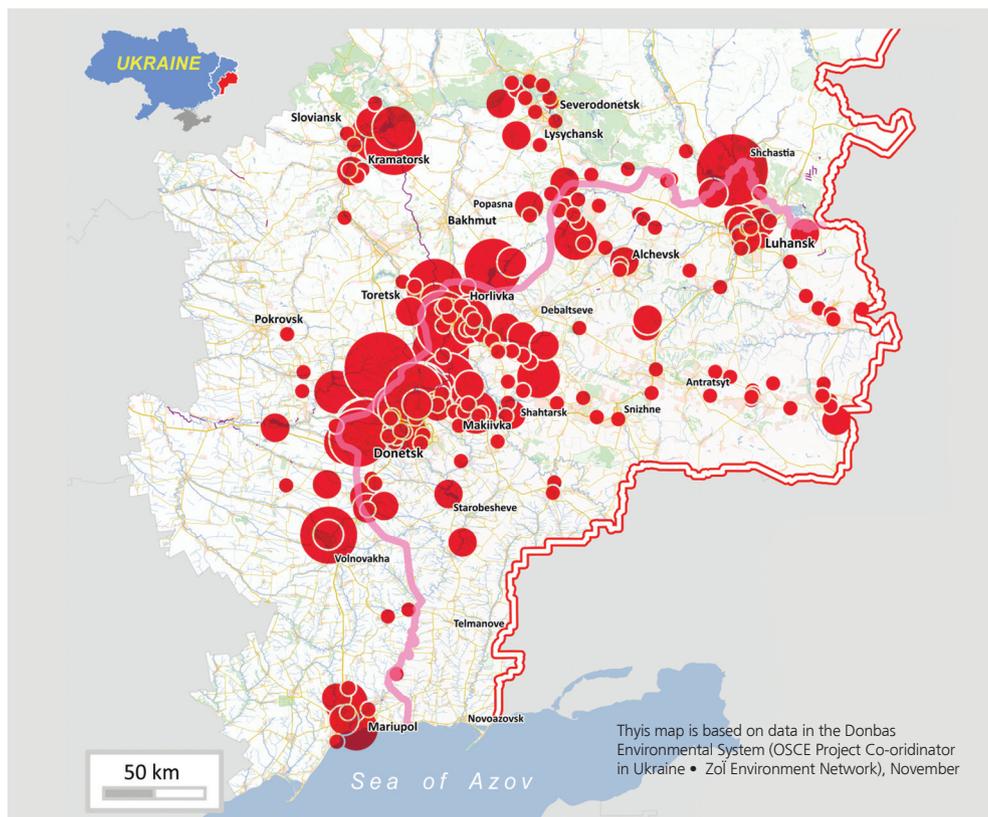
The main danger, under conflict conditions, is related to the possibility of environmental pollution due to major operational disruptions and incidents at the region's industrial and other facilities. Prior to the Russian military aggression, the Donetsk and Luhansk Regions were home to some 4,500 potentially hazardous businesses. From 2014 to 2017, the region's companies recorded over 500 cases of operational disruptions and incidents, some of which were fraught with potential hazards to the population and the environment.

FIRE DENSITY ACCORDING TO MODIS SATELLITE DATA, JULY - AUGUST 2014

- State border
- Contact line
- Roads
- Towns
- Canals
- Rivers
- Water reservoirs
- Forests

Number of disruptions

- More than 25
- From 10 to 25
- From 6 to 10
- From 3 to 5
- Less than 3



The list industrial facilities damaged by hostilities also includes the most environmentally hazardous enterprises: Yasynivka, Avdiivka, and Yenakiiie Coke Plants; Yenakiiie, Makiivka and Donetsk Metallurgical Plants; Toretsk Ferroalloy Plant, Alchevsk Metallurgical Plant; Lysychansk Oil Refinery; Donetsk State-Owned Plant of Chemical Materials, Chemical Plants "Azot" and "Styrol", Slovyansk, Luhansk, Vuhlehirsk and m Myronivka Termal Power Stations.

During the Russian military aggression, multiple records were made of damaging the infrastructure and power outages at coal mining facilities, which lead to shut downs of the mine waters draining, and

in a number of cases caused complete mine flooding. Today water drainage is virtually non-functional in the entire territory between the towns of Horlivka to Yenakiiie, in Pervomaysk Districts, partly in Donetsk, Makiivka, Shahtarsk and Toretsk. Over 36 of the region's mines are under a flooding threat or have been flooded completely, and cannot be operated any further. Some of the damaged or shut down mines in the Donbass have been dismantled.

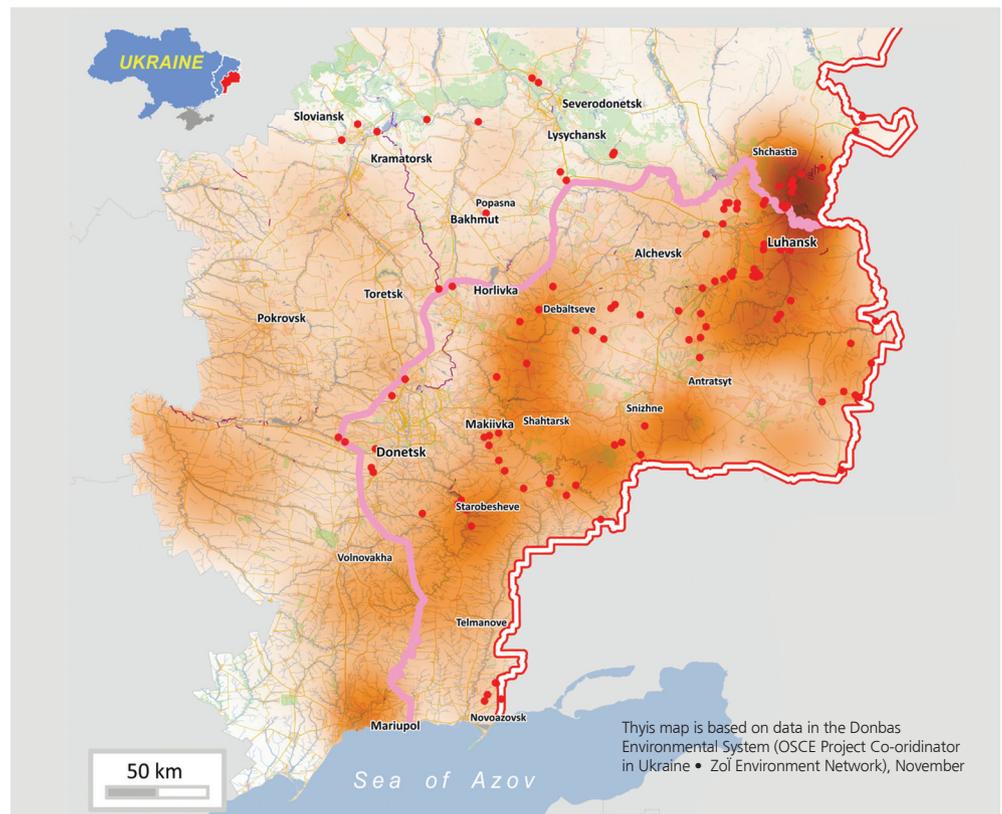
Special danger is posed by submergence of the mines which were used as waste storages. Such danger exists, first and foremost, for the mines "Oleksandr-Zahid", "Vuhlehirska". Radiation contamination

FIRE DENSITY ACCORDING TO MODIS SATELLITE DATA, JULY - AUGUST 2014

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-  Roads
-  Towns
-  Canals
-  Rivers
-  Water reservoirs
-  Forests
-  Location of hostilities in July - August 2014

Fire density in July - August 2014

-  Highest
-  Lowest



ENVIRONMENTAL RISK ASSESSMENT IN THE CONFLICT ZONE

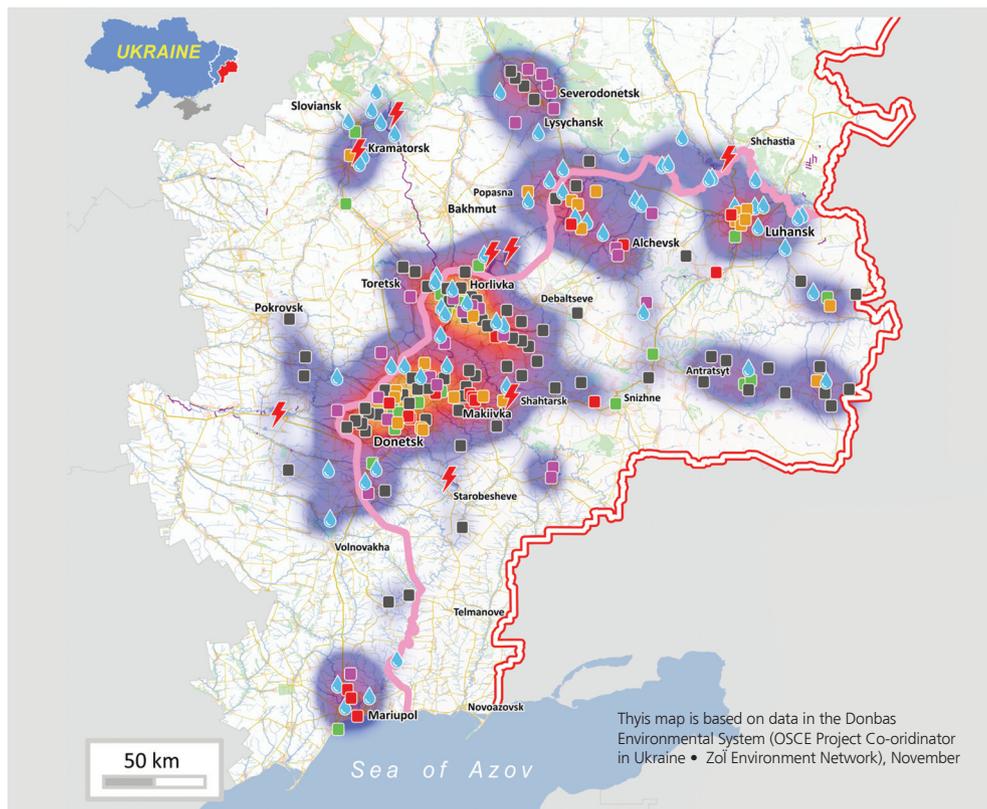
-  State border
-  Contact line
-  Roads
-  Towns
-  Canals
-  Rivers
-  Water reservoirs
-  Forests

Environmental risk caused by potential damage to facilities

-  Highest
-  Lowest

Industrial and municipal enterprises

-  Metallurgy
-  Chemical and coke industry
-  Machine building
-  Coal-mining industry
-  Power plants
-  Other industries
-  Water supply and sanitation



of the underground waters may cause flooding of the mine “Yunyi Komunar”, where in 1979 an underground nuclear explosion was carried out.

Large-scale mine flooding will inevitably cause flooding of the surrounding territories and surface subsidence, which will put buildings, structures, and communication systems out of operation, including underground gas lines, sewage and waterline systems. Mine flooding will cause pollution of surface and ground waters with iron, chlorides, sulfates, other mineral salts and heavy metals.

During the aggression, reports have been made on multiple disruptions in the operation of the water supply and water disposal systems and facilities, including with accident discharges of pollutants

NATURE DAMAGES

-  State border
-  Contact line
-  Roads
-  Towns
-  Canals
-  Rivers
-  Water reservoirs
-  Forests

Damage to natural protected areas

-  Fires caused by hostilities
-  Damage caused by hostilities
-  Construction of fortifications
-  Illegal use of natural resources
-  Loss of assets, operational damage ect.



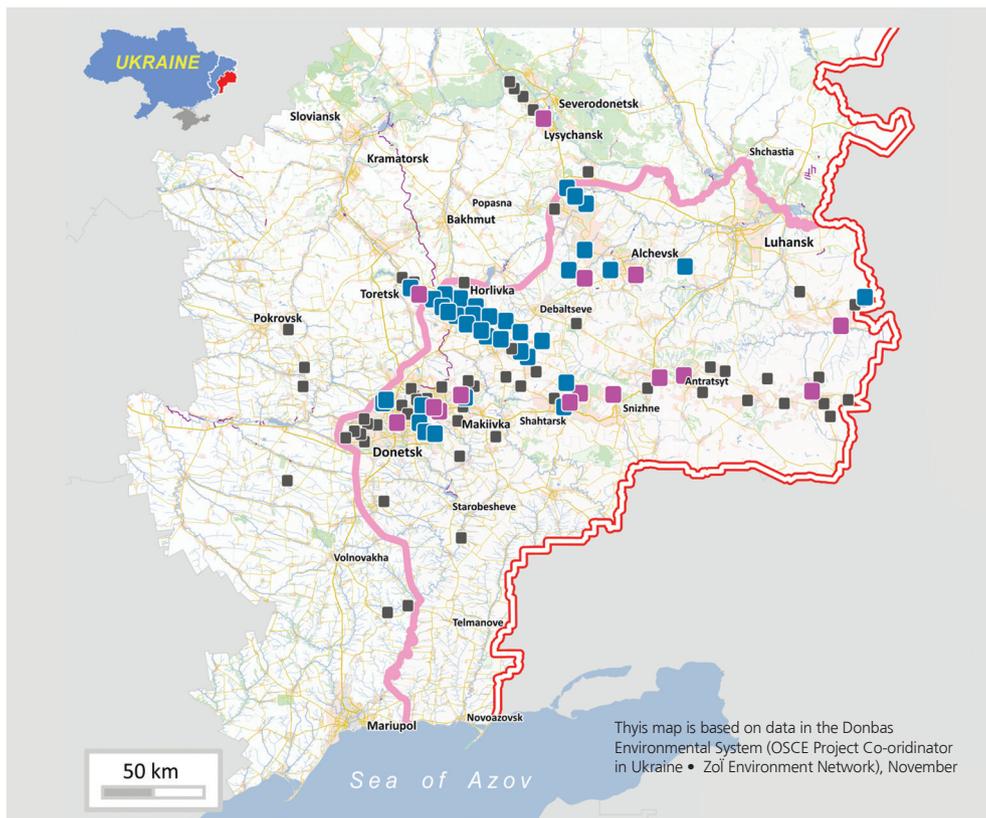
into water bodies. The results of the conducted studies showed increased concentrations of nitrogen and phosphorus in the waters of the Siverskiy Donets, Kleban-Byk, Kalmius and Kalchyk rivers, which may be interpreted as a result of the violation of the operation of municipal wastewater treatment facilities.

The bottom sediments of the artificial lakes Karlivske and Kleban-Bykske showed significant, compared to the 2008 data, pollution with non-radioactive strontium and barium, these substances are

used industry and also known as standard munitions components. Systematic exceeding by the factor of 1.1-1.3 was recorded for mercury, vanadium, cadmium, non-radioactive strontium, and gamma-radiation. By individual indicators the background was typically exceeded as a maximum 1.2-2 times and only in several cases it was exceeded 7-17 times. According to other organizations, including for the samples taken in the shell craters, different indicators and their combinations exceeded the average regional background level 1.2-12 times. The aggression challenged the solid

NATURE DAMAGES

-  State border
-  Contact line
-  Roads
-  Towns
-  Canals
-  Rivers
-  Water reservoirs
-  Forests
-  Partially or fully flooded mines
-  Other conflict-affected mines and mining enterprises
-  Mines with operational water drainage



household waste management, especially in the communities along the contact line. The traditional household waste is exacerbated by the remains of the military equipment, buildings, structures, and infrastructural elements, whose disposal requires additional capacities and is impossible without prior territory demining and cleaning of unexploded munitions.

Combat maneuvers, military exercises, construction of fortifications, explosions, and combustion of munitions disturb the topsoil. The use of lands damaged by hostilities will be challenged by the need to re-cultivate, demine, and dispose of munitions.



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Significant forest area and a large number of windbreak strips have been lost due to forest fires, mechanical damage, and illegal deforestation related to the ongoing conflict in Eastern Ukraine. This will critically decrease forestation in the Donetsk and Lugansk Regions and reduce the field-protective, soil-protective, water-protective, and recreational functions of the forests and green spaces.

The aggression in Eastern Ukraine has affected about 60 Natural Reserve Fund sites in the Donetsk and Lugansk Regions. Today, their protection and rehabilitation are threatened. The region has been experiencing changes in biological diversity, including the disappearance of some species, as well as the uncontrolled dispersion and population growth of others, including those that threaten the sanitary and epidemiological condition of the territory and its agriculture.

At the same time, growing environmental protection expenditures in the government-controlled territories has allowed for the gradual restoration of the environmental protection system. Specific initiatives to restore the monitoring, water supply, and sanitation systems, waste management, forest protection, and NRF development have been included in regional plans and implemented by local administrations and under the Draft of the governmental targeted reconstruction and peace building program of the Ministry of Temporarily Occupied Territories and Internally Displaced Persons of Ukraine.

The recent positive changes, however, still lack a systemic, long-term approach, which requires a comprehensive analysis of the environmental situation and environmental protection needs in the conflict zone, as well as their coordination with strategic areas of the national and international policy in the sphere of environmental protection and sustainable development.

The proposed recommendations are based on the analysis of the environmental issues in Eastern Ukraine contained in additional studies by the OSCE Project Co-ordinator in Ukraine, comments and proposals expressed during round-table discussions with the government authorities on 4 September 2017, as well as proposals from other publications and processes related to environmental issues and future spheres of environmental rehabilitation of Eastern Ukraine. The recommendations are subdivided into four categories.



“YESTERDAY”:

ACTIONS REQUIRED AS THE BASIS FOR SOLVING THE OTHER ISSUES, IMPLEMENTATION OF WHICH SHOULD HAVE BEGUN OR HAS TO BEGIN SHORTLY

- Systematize the available data on the environmental situation and sources of environmental hazard in the conflict zone and arrange broad distribution of the data and access to it for decision-making
- Take inventory of the gaps in the information on the environmental situation and sources of environmental hazards in the conflict zone and arrange targeted research to fill the gaps, including
- Make arrangements for unimpeded access to the information on the condition of the environment and natural resources in the Donetsk and Lugansk Regions



“TODAY”:

ACTIONS, REQUIRED FOR DECREASING THE LEVEL OF ENVIRONMENTAL RISKS, IMPLEMENTATION OF WHICH IS REQUIRED IN THE NEAR FUTURE:

- Regularly specify and update the inventory of the industrial and communal facilities which have become sources of major environmental hazard or may become such sources in the aftermath of the hostilities
- Implement urgent measures to reduce the risk from the largest industrial and communal sources of the environmental hazard, including maintaining of sufficient means and resources to respond to emergencies in hazardous areas
- Political measures to preclude hostilities in the areas of high environmental hazard sources, international situation monitoring, and required preventive measures in relation to high-hazard sources



“TOMORROW”:

ACTIONS, REQUIRED FOR RESTORATION OF ENVIRONMENTAL ACTIVITY IN THE REGION, WHICH ARE TO BECOME PART OF THE GOVERNMENT MID-TERM ACTIONS:

- Restore and build up organizational and legislative foundations of the environmental protection activities
- Restore, expand, and automate pollution monitoring and control, and environmental reports in the conflict zone
- Restore and upgrade industrial and communal waste management systems
- Modernize the use and protection of the region’s surface waters based on the basin approach in line with the international experience, restore and modernize the water supply and water disposal system
- Arrange for the operation of the Nature Reserve Fund sites with account for the need of rehabilitating their areas disturbed by the hostilities
- Restore disturbed lands of other categories, water bodies, forests and windbreak strips
- Respond to impacts of mine water redistribution and quality deterioration, modernize the principles and practice of mine operation, closure and recultivation
- Expedite implementation of the principles and methods of reducing the environmental impact of the defense activities of the Armed Forces of Ukraine and National Guard divisions deployed in the region
- Expand awareness-raising activities on environmental protection in the conflict zone



“DAY AFTER TOMORROW”:

ACTIONS ON “GREENING” DONBAS ADVISABLE (AND REQUIRED) TO BE TAKEN IN A MORE DISTANT FUTURE

- Develop a comprehensive concept for the economic rearrangement of the Donbass considering
- Broad discussion of the concept with the central and regional authorities, local governments, representatives of the industry, business, and public

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