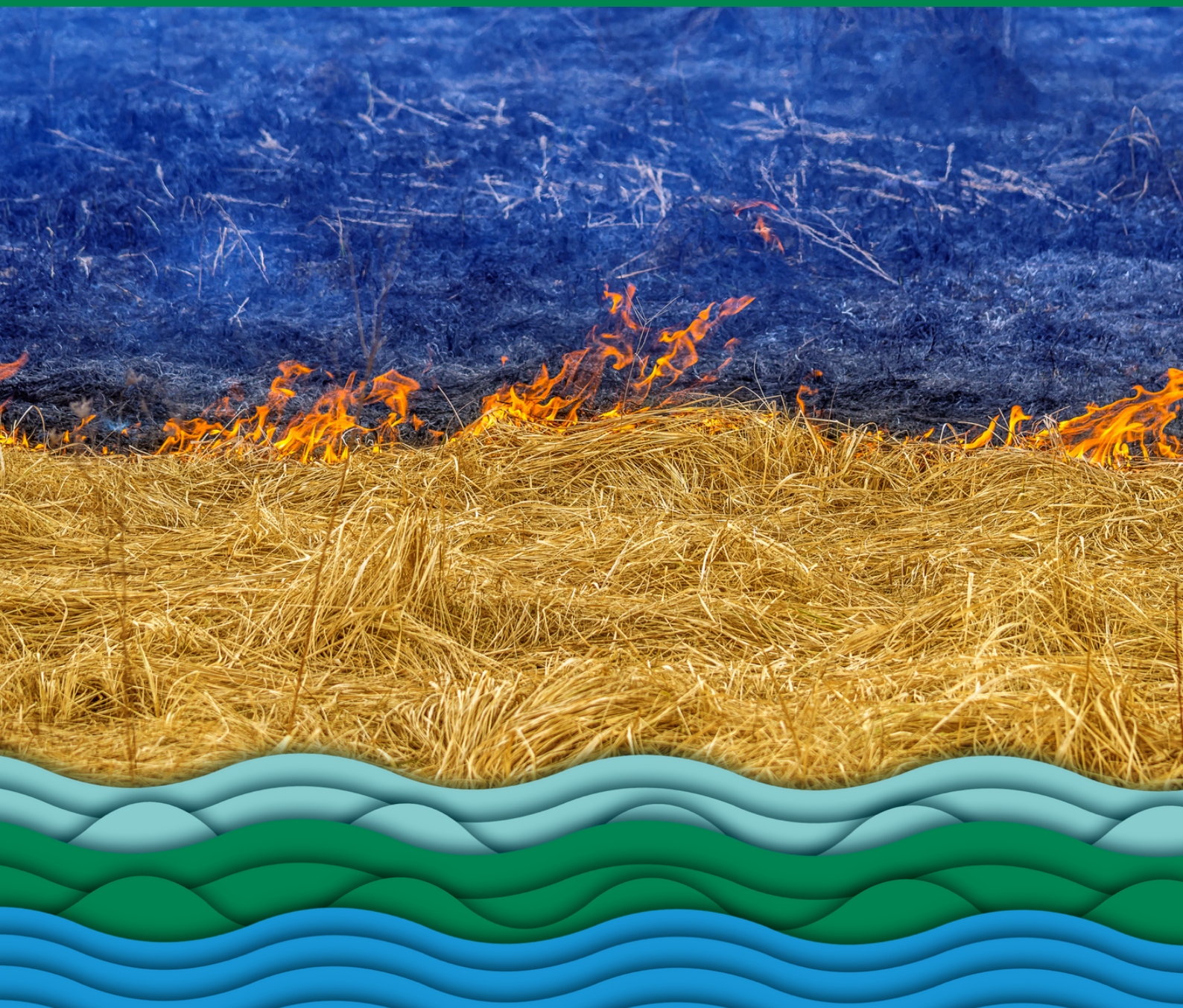




**ENVIRONMENT  
PEOPLE LAW**

The rule of law for the protection of the environment

# **IMPACT OF MILITARY ACTION ON THE ENVIRONMENT OF UKRAINE**



# **Impact of military action on the environment of Ukraine (summary)**

## **Issue 1**

From the first days of the invasion, Russian troops began deliberately destroying critical infrastructure with both high-precision missiles and jet artillery. Definitely, the aim of such actions was to weaken the supply of Ukrainian cities with fuel, resources for reconstruction and to cause maximum economic damage. However, some cases recorded by us indicate that the purpose of some shelling was to worsen the environmental situation in settlements. We do not rule out that this goal was partly pursued by large-scale fires in flammable warehouses and large construction supermarkets. Explosions of ammonia storage facilities, as well as the deliberate creation of a nuclear threat (in various forms simultaneously) have signs of terrorism – threatening to use nuclear and chemical substances that are harmful to the population, in order to force the leadership of Ukraine to accept conditions of the ultimatum given by the invading country. Therefore, we are convinced that one of the tasks of the "special operation" of the Russian army is the large-scale deterioration of the environment in Ukraine.

### **1. Territories and objects of the nature reserve fund**

As of March 30, 2022, about 44% of the area of objects of the nature reserve fund (nature and biosphere reserves, national nature parks) are in the war zone, or under the temporary occupation of Russian troops. Massive use of artillery and aircraft in battlefields leads to numerous fires and damage to vegetation. However, wildlife is even more endangered, because in addition to fires, it is also threatened with poaching by the military, the noise of military vehicles and fighting. Small animals (insects, etc.) that are in anabiosis during this period burn together with vegetation. These factors are particularly dangerous now because of the beginning of the spring migration of birds. Many species will fly to nest on the Azov-Black Sea coast, where fighting continues and will not be able to give birth to a new generation due to disturbance. Some of the birds will return to their nesting places in Polissya affected besides the hostilities by incredibly strong fires. Moreover, many millions of birds of various species will have to fly through Ukraine in transit returning to nesting sites in Northern Europe. However, at this point it is difficult to predict whether they will be able to fly over the zone of hostilities and fires. Thus, for many species of birds, the hostilities can lead to a global reduction of population across Europe. This relates also to globally endangered species.

In the occupied reserves and national parks where large numbers of animals are kept (such as Askania-Nova Biosphere Reserve) and zoos, there is a real threat of mass death of these animals due to problems with the purchase and delivery of food, as well as with veterinary care.

Construction of fortifications, ammunition explosions and the passage of tanks within protected areas also lead to the destruction of natural ecosystems.

Spills of fuel and lubricants from damaged equipment pose a long-term threat to biodiversity. This also applies to rivers and sea water areas where downed planes and helicopters get and warships sink.

In total, at least 3 biosphere reserves, 13 national parks, 4 nature reserves in the south, east and north of Ukraine are currently under temporary occupation.

## **2. Fires at technogenic objects**

According to preliminary estimates, since the beginning of the full-fledged Russian invasion of Ukraine, the shelling has caused large-scale fires in at least 10 oil depots, more than ten large warehouses of flammable and fuel materials, at least 6 construction hypermarkets in various cities (thousands of tons of construction materials including plastics) have burnt down and several gas pipelines have been damaged.

Open air combustion of petroleum products causes release of carbon monoxide, oxides of sulfur and nitrogen. The latter are acid gases, which when in reaction with water produce acids that can irritate the mucous membranes when inhaled. In addition, a large number of aromatic compounds, aldehydes, ketones, which are harmful to the human body, are released. Also, typical black smoke during fires at oil depots and warehouses is a sign of significant emissions of soot microparticles, which is the most dangerous carcinogen of all that can be found in everyday life.

## **3. Radiation hazard**

During the first week of the hostilities, the occupiers seized the Chernobyl and Zaporizhzhya nuclear power plants (NPPs), as well as all adjacent facilities for the management of radioactive waste and spent nuclear fuel. The attack on Zaporizhzhya NPP with the aim to seize it was accompanied by artillery shelling of the station. Although the reactors have sufficient protection to prevent shelling destruction of the reactor's core, each day of occupation increases the risk of a serious radiation accident, comparable to the 1986 Chernobyl explosion and in the worst case it can be 6 times worse. The nuclear terror is accompanied by other intentional actions: removal of equipment from nuclear power plants, which could lead to an accident similar to the Chernobyl accident; disconnection of the Chernobyl NPP from energy supply, which will most likely lead to the destruction of the nuclear waste repository and prevent further functioning of the Chernobyl nuclear power plant; holding NPP employees as hostages. Eventually, at least 45,000 Russian troops, as well as all the equipment involved in the invasion, entered Ukraine through the Chernobyl Exclusion Zone, where they had stayed for several months in the Belarusian part of the zone and then invaded Ukraine, moving through the most radiation-contaminated areas. Currently, contaminated equipment and weapons have become a source of contamination and spread radiation beyond the zone over long distances.

Russian fascists also tried to seize another nuclear power plant, the South Ukrainian NPP, but the Ukrainian Armed Forces successfully repulsed the attempt. The occupiers constantly damaged power lines around the NPP, which proves that first of all they made attempts to disrupt nuclear safety and create an emergency situation, and also they made attempts to cause a shortage of electricity in Ukraine.

## **4. Forest fires**

As mentioned above, active use of artillery and aircraft during the hostilities causes mass fires in natural ecosystems, particularly in forests. Analysis of recent satellite images shows that the total area of the radiation-contaminated area that has been burning or has recently been covered by fire is more than 7,600 hectares. Fires and

secondary releases of radionuclides in forests in the most polluted parts of the Chernobyl Exclusion Zone can be another cause of radioactive contamination. And while the experience of 2020 shows that the consequences of such fires cannot be compared to a serious accident at a facility handling radioactive materials, this danger cannot be ignored.

### **5. Explosions of missiles, air bombs and artillery shells**

Massive use of various types of weapons not only leads to large casualties among civilians but also causes emissions of toxic substances during explosions of ammunition and burning of rocket fuel, as well as leads to soil pollution.

Serious environmental pollution is caused by cruise missile shelling (totally about 1500 hits). Some types of missiles have not only toxic components in the charge, but also highly toxic fuel, which creates some contamination along the entire path of the missile to the target or place where the missile was shot down by air defense. Thus, the pollution spreads throughout the flight of the missile.

### **6. Mass burial and cremation of corpses outside the basic sanitary norms**

Due to heavy losses and problems with logistics, the Russian army is unable to bury and cremate dead soldiers in compliance with the necessary norms, even adjusted for the conditions of war. For example, in Sednev, Chernihiv region, the burning of corpses of the occupiers takes place in starch furnaces at low temperatures, and therefore causes emissions of a number of toxic substances. Delays in removing corpses from battlefields, often in the middle of settlements, also create risks of spreading infectious diseases among the inhabitants of the occupied territories and the occupiers themselves, and thus in the territories controlled by Ukraine.

In addition, it is worth mentioning a number of factors that will have long-term effects and lead to deterioration of the environment in the near future.

- In many cities in eastern Ukraine, the chemical and metallurgical industries, which are the biggest polluters, have been destroyed, landfills and municipal sewage treatment plants have been damaged, and waste will continue to get freely into the air, rivers and seas. The release of contaminants will progress over time.
- For the purposes of technogenic safety, the water level in the reservoirs of the Dnipro Cascade has been reduced, which will prevent the spawning of most industrial fish species. Accordingly, in the coming years there will be a crisis of domestic fisheries.
- The loss of 32% of arable land due to occupation, mining and hostilities will destabilize the world food market on the one hand and destroy many valuable natural ecosystems (pastures and hayfields) in the accessible part of Ukraine, which will be ploughed up in hope to compensate for lost agricultural land. Unfortunately, among such areas there are a large number of those that are habitats of rare species of plants and animals.

### **Recommendations**

1. To launch as soon as possible the Compensation Commission affiliated to a reputable international body. As a sample can serve the Compensation Commission on Kuwait <https://uncc.ch/who-we-are>
2. It is also important to have an information about the type of missiles (rockets) and their modifications, which Russia used in Ukraine. The same is true for the launch locations and places where the missiles exploded (the route of the missiles). This data is needed to calculate the emissions of toxic substances released as a result of fuel burning and missile explosion, as well as to model the distribution of these substances over Ukraine
3. To establish cooperation with NASA for prompt professional analysis of environmental impact of the war.
4. To establish the State Fund for Environmental Monitoring and develop a specialized methodology of environmental monitoring in conditions of hostilities, including a prompt testing system implemented by certified laboratories.
5. To develop modern methods of calculating the damage caused by hostilities on the territory of Ukraine.
6. To develop and adopt new regulations on approval of modern methods of calculating the damage caused to all components of the environment as a result of hostilities.
7. To develop methods for complex restoration of the environment affected by hostilities, in particular the restoration of natural ecosystems, as well as the development of compensatory measures for damaged natural ecosystems and ecosystem services derived from them.
8. To perform detailed analysis of international environmental, humanitarian, and criminal law through the prism of environmental issues and include the environmental component into Ukraine's international lawsuits against Russia.