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THE PLACE OF ECOLOGY IN THE RUSSIAN-UKRAINIAN WAR

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INTRODUCTION

2022 was supposed to be a year of new discoveries, scientific achievements, creative achievements and the beginning of personal victories for every Ukrainian. But everything changed in one day. On February 24, 2022, the occupying power launched a full-scale invasion of Ukraine by sea, land and air, using heavy weapons. The aggression has already resulted in significant casualties among the civilian population of Ukraine and caused damage to natural resources, ecological systems, the environment and natural heritage.

The main tragedy of the armed conflict is its consequences. Today, Ukrainians are already suffering significant losses: human, infrastructural, and economic. Environmental consequences of war are usually not given much attention[1]. However, we should not forget about the «silent victim» of hostilities – ecology. The war mercilessly destroys all nature – air, water, land, plants and animals suffer.

Explosions, detonation of shells, use of artillery weapons, aerial bombs cause fires and lead to air pollution with dangerous substances[2]. In nature, everything is closely connected and is in a constant cycle, so pollution of the atmosphere is simultaneously pollution of water. Destruction of sewage treatment facilities and dams poses a great threat to water resources and damages fertile lands – tens of hectares are currently flooded. The destruction of wells and pollution of artesian waters poses a serious danger to the local ecology. Mechanical damage to landscapes, flora and fauna, the ingress of chemical products of the explosion reaction into the atmosphere and into the soil worsen the dynamics of biota development[3].

An important aspect is physical intervention in nature. Military equipment moves over open terrain, often over natural landscapes, including the

[1] Пацева І.Г., Алпатова О.М., Демчук Л.І., Кірейцева Г.В., Левицький В.Г. Сучасний стан навколишнього природного середовища в умовах впливу війни. *Науково-практичний журнал*. 2022. № 302. С. 19–22.

[2] Вплив війни на повітря в Україні. The Village Україна. 2022. URL: https://www.the-village.com.ua/village/city/city-news/325533-vpliv-viyni-na-povitrya-v-ukrayini-mozhna-porivnyati-z-rokom-roboti-metalurgiynogo-pidpriemstva (дата звернення 30.09.2022).

[3] Кондратенко А. Ф. Вплив військових дій в Україні на природне середовище та фітотехнології для його відновлення // Редакційна колегія. Екологія Донбасу: уроки історії та виклики сьогодення. 2017. № 485. С. 20–24.

territories of national parks, along the emerald network, which is accordingly accompanied by the destruction of natural biotopes as habitats of various species of animals and plants, including those listed in the Red Book of Ukraine, up to their direct destruction. Rare and endemic species of plants and animals are at risk of extinction, in particular those whose localities are located in the zone of active hostilities[4].

During the entire war, which was unleashed by the Russian Federation on the territory of Ukraine, irreparable damage was caused to the ecology of the largest country in Europe. According to experts, since the beginning of the large-scale invasion, more than a thousand crimes against the environment have been recorded, the consequences of which we will have to overcome for more than one decade. The actions of the occupiers are ecocide, crimes against the environment. Fields mutilated by shells and bombs, burned forests, dangerous air for people due to fires at oil depots, pollution of the Black and Azov seas – all these are environmental crimes of the terrorist state.

Recording these crimes is an important task for the state and international organizations. Ukraine is a participant in environmental programs that contribute to the recording of crime data and the development of measures to restore Ukraine's natural resources.

Russian troops deliberately and systematically destroy objects that are not military targets. The aggressor destroys the ecosystem of Ukraine and threatens the whole world. This is environmental terrorism, which should have no place in the 21st century. The initiative of foreign experts calls on the International Criminal Court, UN human rights bodies, and UNEP (UN Environment Program) to investigate and monitor possible violations of international environmental legislation and human rights law, as well as to ensure accountability for violators.

After the Win, Ukraine will demand that Russia be held accountable for these crimes.

1. Aspects of ecology in the conditions of the Russian-Ukrainian war of 2022 and their impact on the future

The impact of war on the environment starts long before it begins. Creating and maintaining a military force consumes a huge amount of resources. These can be common metals or rare earth elements, water or hydrocarbons. Maintaining combat readiness means training, and training consumes

[4] На межі виживання: знищення довкілля під час збройного конфлікту на сході України / А. Б. Блага, І. В. Загороднюк, Т. Р. Короткий, О. А. Мартиненко, М. О. Медведєва, В. В. Пархоменко; за заг. ред. А. П. Бущенка / Українська Гельсінська спілка з прав людини. – К.:, КИТ, 2017. – 88 с. з іл. ISBN 978-966-2279-66-5

resources. Military vehicles, aircraft, ships, buildings and infrastructure require energy, and most often that energy is oil.

The military also needs large areas of land and sea, whether for bases and facilities, or for testing and training. Military lands are estimated to occupy between 1 and 6% of the world's land area. In many cases, these are ecologically important territories. Military training produces emissions, disrupts landscapes, terrestrial and marine habitats, and creates chemical and noise pollution from the use of weapons, aircraft and vehicles [5].

In the conditions of open hostilities, one should distinguish between direct and indirect consequences of the impact of war on the environment and the loss of opportunities:

1. Direct impacts include explosions that destroy ecosystems. Destruction of the environment and noise pollution of residential areas have a negative effect on the course of the reproduction period. In addition, the direct impact of shells and pollution by burnt military equipment completely destroys the ecosystem. Bursting cartridges, non-metallic parts of military equipment that burn, pollute the soil and water with heavy metals and toxic elements. Not to mention the large amount of scrap metal scattered across the plantations.

2. Indirect consequences of hostilities against the environment do not come from fires or shell explosions, but from, for example, power outages in mines that have to pump out water. Without electricity, the pumps would not work and the mines would be flooded with toxic and radioactive waste that could seep into the groundwater. A large amount of military equipment was destroyed during the war. Fuel that enters the soil and atmosphere damages the surrounding natural environment. After the explosion, more than 0.5 kg of sulfur remains from the emission of «hail» that falls into the soil. And from the contact of sulfur with water, all living things simply burn with sulfuric acid. In addition, after the explosion, many particles enter the atmosphere, polluting not only Ukraine, but the entire globe.

War, as a rule, requires and consumes a huge amount of fuel, which leads to huge emissions of CO_2 and contributes to climate change. Large-scale vehicle movements can cause extensive physical damage to sensitive landscapes and biodiversity, as can the heavy use of explosive munitions. The use of explosive weapons in urban areas creates huge amounts of debris and debris that can cause air and soil pollution. Pollution can also be caused by damage to light industry and environmentally sensitive infrastructure such as water treatment plants. The loss of energy reserves can have resonant negative

[5] Ukraine invasion: rapid overview of environmental issues. Conflict and Environment Observatory. 2022. URL: https://ceobs.org/ukraine-invasion-rapid-overview-of-environmental-issues/ (дата звернення 30.09.2022).

consequences for the environment, closing treatment plants or pumping systems, or can lead to the use of more polluting fuels or household generators[6].

Serious incidents of pollution can be caused by a deliberate attack on oil or energy facilities, accidental damage or disruption of operations. In some cases, deliberate attacks on oil or industrial facilities are used as weapons of war to contaminate large areas and spread terror.

Other methods of scorched earth include the destruction of agricultural infrastructure such as canals, wells and pumps and the burning of crops. Such tactics threaten food security and livelihoods, increasing the vulnerability of rural communities. These large-scale pollution incidents can lead to transboundary effects through air pollution or through pollution of rivers, aquifers or the sea. In some cases, they can even influence the weather or global climate.

Weapons and military equipment used during conflicts also leave an environmental legacy[7]. Landmines, cluster munitions and other explosive remnants of war can limit access to agricultural land and contaminate soils and water sources with metals and toxic energetic materials. During major conflicts, large volumes of military scrap can be produced or left behind, which can contain a range of polluting materials, contaminate soils and groundwater, exposing those who work on it to acute and chronic health risks. Wrecked or damaged ships, submarines and offshore oil infrastructure can cause marine pollution.

In Ukraine, in February 2022, the first two days of hostilities were characterized by Russia shelling Ukrainian military infrastructure, including many in close proximity to civilian areas[8]. Among them: ammunition depots, airfields and fuel storage tanks, naval facilities. This led to fires, which led to harmful air pollution. Large columns of smoke spread over civilian areas. They consist of toxic gases and solid particles. There will also be significant soil and water contamination at these sites, and the degree to which these pollutants may migrate from military installations will vary by location. Where firefighting efforts have been made, contamination may include residual firefighting foam. Damaged marine objects can cause pollution of the

[6] How does war damage the environment? Conflict and Environment Observatory. 2022.URL: https://ceobs.org/how-does-war-damage-the-environment/ (дата звернення 30.09.2022).

[7] Mannion A.M., 2003, The Environmental Impact of War and Terrorism, Geographical paper No 169, Department of Geography, University of Reading, Whiteknights, UK.

[8] Випадки потенційної шкоди довкіллю, спричинені російською агресією [Інтерактивна мапа]. URL: https://ecoaction.org.ua/ warmap.html (дата звернення 30.09.2022).

coastal zone. Where facilities have been in operation for many years, this new contamination may be based on existing military contamination.

Active hostilities at sea cause man-made disasters and seriously affect the ecosystems of the Black and Azov Seas[9]. Bombardment, movement of equipment, explosions of acoustic bombs in the sea and the landing of landing forces during Russian exercises have disfigured local coasts, meadows and estuaries. Underwater marine ecosystems are also affected by military operations. Sunken ships and missile debris, anchoring, and munitions explosions wreak havoc on underwater groups that live on the ocean floor. Wrecks can create new habitats and artificial reefs where aquatic organisms can colonize, but the long-term damage from sunken mechanical pollution far outweighs the potential benefits.

The sinking of warships, aircraft and other military equipment is toxic to marine life and can lead to oil spills that can pollute the marine environment for decades.

In nature, everything is closely connected and is in a constant cycle, so pollution of the atmosphere is simultaneously pollution of water. The greatest damage is due to the destruction of treatment facilities, dams and the failure of service organizations that were engaged in water supply and wastewater treatment. The destruction of dams causes great damage to fertile lands – dozens of hectares are currently flooded. As a result of hostilities and destruction of wells, artesian waters are polluted – a serious danger for the local ecology, because these waters were previously conserved and considered a strategic reserve of the state. One contact of the pathogen is enough, which spreads over the entire horizon and makes the water unfit for consumption. Mechanical damage to landscapes, flora and fauna, the ingress of chemical products of the explosion reaction into the atmosphere and into the soil worsen the dynamics of biota development.[10].

Military actions also have a significant impact on the landscape. Fires in the Black Sea Biosphere Reserve destroyed trees and unique bird habitats in Ukraine's largest reserve. According to the estimates of the Ukrainian authorities, 900 protected natural areas of Ukraine have been affected by Russia's military activities, and approximately 1.2 million hectares, or about 30% of all protected areas of Ukraine, suffer from the consequences of the war. Forests have been destroyed by fires due to shelling and misuse by

[9] Малько Л., Ніколаєнко Д. Економічна оцінка екологічних наслідків військової агресії Російської Федерації проти України (2014–2022). URL: https://www.researchgate.net/publication/361285296_Voenna_ekologia_novini_2022 (дата звернення 30.09.2022).

[10] Малько Л., Ніколаєнко Д. (2022) Військова екологія: новинки 2022 року та оцінка екологічних наслідків агресії Росії проти України. Препринт 14.06.2022.

Russian forces, and many are littered with destroyed or abandoned military vehicles. The actions of the occupying army not only cause man-made and ecological disasters, but also destroy the habitats of rare species of organisms that are now in danger of extinction.[11].

Each detonation of a projectile or missile is not only the release of a chemical cocktail into the environment, but also the complete destruction of all animals, plants and microorganisms in the radius of damage. Usually, active and mobile animals are able to sense danger in advance and react to it in time. In contrast, sedentary animals or plants do not have such an advantage, so their survival is random. When an explosion occurs, all substances undergo complete oxidation, and the products of the chemical reaction (carbon dioxide and water vapor – harmful greenhouse gases) are released into the atmosphere. In the atmosphere, oxides of sulfur and nitrogen can cause acid rain, which changes the pH of the soil and causes plant burns, to which conifers are especially sensitive. Acid rain has a negative effect on mammals and birds, affecting the condition of mucous tissues and respiratory organs.[12].

The build-up of military forces, short-term and long-term consequences of hostilities will lead to greenhouse gas emissions. Reconstruction, when it happens, will be an additional and significant carbon emitter[13].

Although the damage to the environment is obvious, its scale is difficult to measure. Pollution caused by military activities goes unreported because monitoring systems have been disrupted or destroyed, and such damage continues to accumulate.

Serious negative consequences inevitably arise from the use of weapons, which can cause acute and long-term environmental health effects. Direct risks to public health are caused by exposure to hazardous substances contained in munitions residues, through which toxic substances leach into the soil and affect the quality of surface and groundwater. Risks come from ammunition-related heavy metals, energetic compounds such as trinitrotoluene, hexane, and rocket fuel. A large number of abandoned or damaged military vehicles contain toxic materials that pose a danger to

[11] Екологія в умовах війни: бомба уповільненої дії. URL: https://armyinform.com.ua/2022/06/05/ ekologiya-v-umovah-vijny-bomba-upovilnenoyi-diyi/ (дата звернення 30.09.2022).

[12] Broomandi, Parya & Guney, Mert & Kim, Jong & Karaca, Ferhat. (2020). Soil Contamination in Areas Impacted by Military Activities: A Critical Review. Sustainability. 12. 10.3390/su12219002.

[13] Ініціативи УНП 2022: Реформи довкілля для післявоєнного відновлення України. Національна платформа Форуму громадянського суспільства Східного партнерства. 2022. URL: http://eap-csf.org.ua/2022/07/23/initsiatyvy-unp-2022-reformy-dovkillia-dlia-pisliavoiennoho-vidnovlennia-ukrainy/ (дата звернення 30.09.2022).

civilians and the environment and require careful handling during collection and disposal.

Russia's use of heavy explosive weapons in urban areas was widespread, including rocket launchers. Because precision weapons are relatively scarce, further intensification is feared to have devastating consequences for people, the built environment, and the critical infrastructure that serves it.

The use of explosive weapons in populated areas led to a sharp increase in the amount of waste. This includes damaged or abandoned military vehicles and equipment, shell debris, civilian vehicles, construction debris, or uncollected household or medical waste. Some of these wastes are toxic, including shell fragments, medical waste or construction waste containing asbestos and heavy metals, and require special handling, transport and disposal. An increase in the amount of waste can lead to soil and groundwater contamination due to damage to sewer pipes. Pollution threats can increase if light industries or facilities such as gas stations are located in close proximity to residential areas.

Other contaminants include weapons remnants such as metals and explosives. In addition to missiles and artillery, there is evidence that Russia has also used banned cluster munitions in cities.

2. Prospects of green reconstruction of Ukraine

Environmental consequences have never been a top priority during wars. However, crucially, the environmental impact of war can greatly increase the number of people affected by military action[14]**.**

Of all types of human activity, war has the worst and most extensive impact on the environment: on the one hand, military actions have a negative impact on the environment, and on the other hand, the resources that go to war could be spent on preserving the environment or on resource-efficient technologies.

The study of the state of the natural environment shows that industrial enterprises, in particular, nuclear power plants, ports, hazardous waste warehouses (mineral fertilizers, polyurethane foam, paints, fuel and lubricants, etc.), chemical and metallurgical enterprises are currently in the zone of active hostilities. Fires have been recorded at oil depots, gas stations, and landfills, and there are facts of damage to heat and water supply facilities (sewage pumping stations, filter stations, water pumps). A completely realistic

[14] Інформація про наслідки для довкілля від російської агресії в Україні 24 лютого – 9 березня 2022 року. Міністерство захисту довкілля та природних ресурсів України. URL: https://mepr.gov.ua/news/39028.html (дата звернення 30.09.2022).

assessment of the damage caused will become possible after the end of active hostilities, and Ukrainians will feel the consequences years later.

It is important to emphasize that crimes against the natural environment have an imperceptible impact, and in the future will have rather sad and large-scale consequences[15].

The existence of international agreements on the protection of the natural environment is an extremely important element and one of the most effective mechanisms in matters of cooperation between states and international organizations in preventing harm to nature and human health.

It is important to establish the illegality of causing environmental damage as a result of hostilities, and more broadly – the armed conflict, and even more broadly – the aggression of the Russian Federation against Ukraine, and the definition of the applicable law – international humanitarian law, international criminal law, the law of international responsibility, the domestic law of Ukraine, the limits of responsibility various subjects, both individuals and the aggressor state. The determination of the legal mechanisms of prosecution and compensation (international legal or national: the application of civil, disciplinary, administrative and criminal liability) depends on the resolution of these issues.

The Ministry of Environment of Ukraine is negotiating to suspend Russia's participation in international agreements (for example, in the UN Framework Convention on Climate Change). The Rome Statute of the International Criminal Court provides for the definition of crimes against the environment – «the intentional commission of an attack, when it is known that such an attack will cause [...] long-term and serious damage to the surrounding natural environment, which will be clearly incompatible with a specific and immediately expected overall military advantage.»

The consequences of a full-scale war against Ukraine are already incredibly difficult for Ukraine. In addition to thousands of lost lives and human destinies, thousands of residential buildings and production facilities, industrial and infrastructure facilities were destroyed, direct damage was caused to our environment – forests, steppes, water bodies, plants and animals.

Ukraine should already be preparing for post-war recovery, which should be based on the main and main principles of environmental preservation and reproduction, climate neutrality, which are decisive in the current development of the EU's Green Deal policy[16].

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[15] Bilousova, Natalia. (2022). The specifics of the work of global pharmaceutical companies in the context of Russia's aggression against Ukraine. Preprint 12.06.2022. 10.13140/RG.2.2.22104.98569

[16] Garry, S & Checchi, F. (2019). Armed conflict and public health: Into the 21st century. Journal of public health (Oxford, England). 42. 10.1093/pubmed/fdz095.

Environmental NGOs strive to ensure that the restoration of Ukraine meets the standards of sustainable development and the European policy of the Green Deal. The European Green Deal is the most comprehensive and ambitious climate and environmental protection program launched by the EU.

The mission of the new «Green Agreement» is a balance between the interests of the public, business and the environment, because it is necessary to talk not only about reconstruction, but also about creating an ecologically clean future for future generations.

Public organizations emphasize the importance of the ecological dimension of the planned reconstruction and development measures so that the new Ukraine is a comfortable, safe, healthy and prosperous home for every Ukrainian[17].

It is this approach that will contribute to the reconstruction of a successful, modern Ukraine, its entry into the EU as an equal partner that adheres to European environmental values.

Since the early days of the war, the government has launched several tools to document environmental damage. This is, in particular, the information panel with data on the impact of the war on the environment «EcoZagroza» and the work of the State Environmental Inspectorate, which recorded more than 250 facts of crimes against the environment and more than 1200 facts of damage to the environment as a result of aggression. The Ministry of Environmental Protection and Natural Resources of Ukraine collects data on environmental threats caused by the occupiers and develops a plan for their further elimination. Special units collected physical evidence, including photo, video and satellite images, and, where possible, air and soil samples for laboratory tests. Work has begun on the development of methods for calculating the monetary value of damages caused to the environment.

During the war, Ukraine was included in the European LIFE program, which finances projects in the field of ecology (climate and environment) and has huge budgets. By joining the LIFE programme, Ukraine will be able to benefit from funding to help rebuild its environment after the devastation caused by the Russian invasion, be it pollution, ecosystem destruction or other long-term effects, for example, river restoration, conservation fund development, bird rehabilitation centers and wild animals, renaturalization of ecosystems.

The EU Copernicus program is another comprehensive program for observing the Earth using a system of satellites and ground systems, as well as a set of derivative software products and services for the application of data in everyday life – from environmental and agricultural problems to security

[17] Economic reasons for a green reconstruction programme for Ukraine. // VoxUkraine. – 2022.

and emergency response. Accordingly, the European Commission (EC) will help in the processes of monitoring the state of the environment and ecological consequences of the war based on satellite data of the Copernicus system: forest fires, illegal logging, soil pollution, air quality, the ecological state of the sea, radiation monitoring.

The Ecodia Center for Environmental Initiatives is a public organization that unites experts and activists around the idea of preserving the environment through influencing decision-making. The NGO is fighting for energy efficiency, renewable energy, combating climate change, for clean air for everyone, and the development of sustainable transport and agriculture in Ukraine. From February 24, 2022, it tracks cases of potential environmental damage caused by the Russian invasion. Their goal is to inform residents about the potential impact of the war on the environment and population of Ukraine and to help the Ukrainian authorities gather facts that will be used in the future to obtain compensation from the occupying power.

Crimes against the environment are part of war crimes. Evgenia Zasyadko, head of the climate department of the NGO «Ekodiya» talks about crimes against the environment (ecocide) as follows: «This is not only about harming nature, but also about people. This war can cause many deaths in the future due to water and soil pollution, due to landmines.» . According to the statute of the Geneva Convention, it is forbidden to use methods aimed at causing large-scale, serious and long-term damage to the surrounding natural environment during war. In addition, the convention states that during hostilities care must be taken to protect the natural environment from any harm. Such protection includes the prohibition of the use of means of warfare which are intended to cause or may be expected to cause damage to the natural environment and thereby to the health or survival of the population.

The same position is laid out in the Declaration of Rio de Janeiro on the environment and development, which establishes the basic principles of environmental law. The principle of this Declaration states that war inevitably has a destructive effect on the process of sustainable development, so states must respect international law that ensures the protection of the environment during armed conflicts. Today, the Ministry of Environmental Protection and Natural Resources of Ukraine, environmental public associations and a number of international organizations are collecting information about the negative environmental consequences of the invasion. At the same time, both state bodies and civil society are not able to record the negative consequences and begin to solve problems in the occupied territories and in the zones of active hostilities.

Environmental security and human security are inextricably linked, and the conflict in Ukraine is causing environmental damage that threatens to

persist long after any agreement is signed[18]. Environmental destruction has already been recognized by the International Criminal Court as a war crime and sanctioned by law, existing legal protections are inadequate and inconsistent. This makes it even more important to monitor and collect evidence of Russia's criminal actions against the people, environment, cities and infrastructure of Ukraine in order to hold Moscow accountable.

Combat actions on the territory of Ukraine pollute the air, poison water bodies and soils, destroy flora and fauna and in the long run will cause colossal damage not only to the Ukrainian, but also to the world ecosystem, taking this into account the actions of the aggressor country must be qualified in accordance with the norms of international law, including , such as crimes against the environment and ecocide.

All reports of war crimes must be sent to the Operational Headquarters of the Ministry of Environmental Protection and Natural Resources for the formation of claims to the International Courts of the United Nations for compensation for the damage caused by the aggressor country. You can fix them yourself. Together with the Ministry of Environmental Protection and Natural Resources of Ukraine, SaveEco developed a Telegram bot about environmental crimes in Ukraine during the war. With the help of the Internet through the online portal SaveEcoBot is the only environmental chatbot in Ukraine, which combines data on pollution, pollutants and environmental protection tools in the relevant categories: water pollution, hazardous military waste, industrial accidents, damage to radiation-hazardous environments. facilities, soil pollution and damage to green spaces. [19]. This portal already has certain statistics created in accordance with accepted applications.

Documenting and investigating Russia's criminal actions, which violate not only national, but also international law, call on the world community not to be indifferent, to do everything possible to hold Russia accountable for ecocide on the territory of Ukraine, because the damage caused to the Ukrainian environment will further violate the world environmental safety.[20].

The incredible nature of Ukraine is the treasure and strength of our people. Environmental genocide can be stopped only by joint efforts.

[18] День охорони довкілля в умовах війни. Українська правда. 2022. URL: https://www.pravda.com.ua/columns/2022/06/5/7350341/ (дата звернення 30.09.2022).

[19] Schillinger, Juliane & Ozerol, Gül & Güven, Şermin & Heldeweg, Michiel. (2020). Water in war: Understanding the impacts of armed conflict on water resources and their management. WIREs Water. 7. 10.1002/wat2.1480

[20] Becker, T. *et al* (2022), A Blueprint for the Reconstruction of Ukraine, Centre for Economic Policy Research, London

CONCLUSIONS

Currently, our country is in a state of war, which is quite a difficult situation for all the things we are used to, including environmental security. In the midst of hostilities, it is really difficult to know the true extent of the state of the environment and the level of its pollution.

After the war, we will observe the results of hostilities – destruction of ecosystems, soil pollution, reduction of biodiversity, increase in the number of pests in forests, emissions of greenhouse gases. Attacks on forests, terrestrial and marine ecosystems, industrial facilities, transport infrastructure and homes, as well as water, sanitation and waste management infrastructure have caused serious damage with immediate and long-term consequences for human health and ecosystems in the future.

Everyone is now actively following unpleasant news and understands that while military operations are being conducted on our territory, we are in ecological danger, because the enemy does not neglect its actions and violates all applicable norms of international law regarding nature protection, sustainable development, humanitarian law, basic norms morality and principles of human coexistence.

Considering the amount of damage done to our environment, it is already necessary to think about effective and modern methods of improving the ecological situation in the country and in every city. In order to achieve this, many Ukrainian and foreign organizations were created to help record, collect and investigate the military environmental acts of the terrorist state. All of them have a single common opinion – that it is expedient after the war to take care of an effective system of monitoring the state of the environment. Which would record the true extent of environmental damage and allow effective measures to be taken to avoid further deterioration and to restore ecosystems to a safe state for both humans and wildlife.

SUMMARY

The monograph describes the role of ecology in the Russian-Ukrainian war. It has been found that military actions have a negative impact on the surrounding natural environment, namely: the impact of shells and pollution from military equipment that has burned down completely destroys the ecosystem; bursting and burning cartridges pollute the soil and water with heavy metals and toxic elements; the fuel of the destroyed equipment, which enters the soil and atmosphere, causes damage to the surrounding natural environment; artillery and occupation are the risks of toxic waste emissions from Ukrainian industrial enterprises; the invasion of the Chornobyl and Zaporizhia nuclear power plants caused serious environmental problems, which are accompanied by a large number of mines and wires, and the

radiation background is exceeded several times; sunken ships, missile debris, anchor use, and munitions explosions can cause damage to underwater groups that live on the ocean floor. Accordingly, it is necessary to immediately record terrorist crimes against the environment of Ukraine. Thanks to the numerous developments of Ukrainian ecologists and programmers, it is possible to commit a Russian crime in any place, anywhere, and thereby help bring the occupiers to justice. Therefore, the Russian invasion caused a large-scale ecosystem catastrophe, the consequences of which will have to be overcome for years, so now it is necessary to consider really effective and modern ways of improving the ecological state of the entire state.

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