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COALITION

# SUMMARY OF THE ANALYTICAL REPORT

## “PRELIMINARY ENVIRONMENTAL AND LEGAL ANALYSIS THE BREACH OF THE KAKHOVKA DAM AND ITS IMPACTS”



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## Introduction

The analytical report<sup>1</sup> contains a preliminary environmental and legal analysis of the breach of the Kakhovka dam and its impacts after the June 6, 2023 explosion. Based on the collected information, a study was conducted of the circumstances associated with the events of June 6, 2023, the environmental impacts of the destruction of the Kakhovka dam, the international legal qualification of the actions of the parties to the armed conflict, possible individual criminal liability based on the Rome Statute of the International Criminal Court and the Criminal Code of Ukraine.

In the end, a brief overview of the problems of the methodology for assessing the environmental damage caused by the armed conflict in the context of the Kakhovka dam breach is provided.

An exhaustive analysis of all aspects of the presented study is currently impossible since the consequences of environmental damage caused by the undermining of the Kakhovka dam have not yet fully manifested themselves and are not possible to the full extent due to the lack of access to the territory of Ukraine temporarily occupied by the Russian Federation. Individual criminal liability for actions related to the Kakhovka dam breach depends significantly on the assessment of mens rea. It can be established only within the framework of individual criminal cases.

The Kakhovka dam breach became one of the large-scale environmental disasters in Europe in the XXI century. It was the result of the Russian Federation's aggression against Ukraine. The consequences of this catastrophe will manifest for decades and still affect more than one generation of Ukrainian residents and the Azov-Black Sea region.

## General characteristics of the Kakhovka hydroelectric power plant and its impact on the Azov-Black Sea region ecosystems in Ukraine

The Kakhovka hydroelectric power plant (HPP) and dam were built between 1950 and 1956 and put into commercial operation on October 19, 1959. They were the basis for filling the Kakhovka reservoir, one of Ukraine's largest artificial reservoirs. The reservoir is upstream of the Dnipro, located on the territory of the Kherson, Zaporizhzhya, and Dnipropetrovsk regions.

Kakhovka reservoir was the most significant water intake node of the Dnipro cascade of hydroelectric power plants. As the lowest reservoir, it discharged all waste upstream of the Dnipro, particularly from oil processing, metallurgical, chemical, and mining industries. Kakhovka reservoir belongs to the category of reservoirs with high nutritional value and great importance for fishing.

The Kakhovka HPP and dam formed the character of the Dnipro River downstream, which, together with the Southern Bug River, was the basis of the existence of the Dnipro-Buzhsky River mouth and the largest estuarine ecosystem of southern Ukraine at the regional level. The vast majority of the territories around the Kakhovka reservoir and downstream of the Dnipro are included in the nature reserve fund.

<sup>1</sup> Preliminary ecological and legal analysis of the breach of the Kakhovka dam and its impacts: analytical report / Coalition "Ukraine. 5 AM"; NGO "Fund Support for Fundamental Research"; Resource & Analysis Center "Society and Environment". - Kyiv, 2023. - XXX p. Research team: Andrushevych A., Korotkyi T., Marushevskiy G., Medvedieva M., Polovyi M., Tropin Z., Hendel N.

The Kakhovka reservoir and the Kakhovka HPP were of great importance for the social and economic development of the southern region of Ukraine, were the basis of the Kakhovka reclamation complex, provided the possibility of agriculture in large areas, and formed the ecosystem in the south of Ukraine.

## Context and following events of the breach of the Kakhovka dam

Armed forces of the Russian Federation took control over the Kakhovka dam on February 24, 2022. They seized its administrative buildings and structures and took the personnel hostage. Following Article 42 of the 1907 Hague Regulation and Article 2 of the 1949 Geneva Conventions, the occupation regime has expanded to this territory since February 24, 2022, and the norms of international humanitarian law have obliged the Russian Federation as the Occupying Power. So, since February 24, 2022, and before the breach of the Kakhovka dam on June 06, 2023, at the time of the breach and after it, the Kakhovka dam was located in the temporarily occupied territories of Ukraine and was under the control of the Russian Federation.

After capturing and establishing control over the Kakhovka dam, the Russian armed forces seized the administrative buildings and structures of the Kakhovka HPP, used them for military purposes, made it impossible for the power plant to function normally, and did not take measures to ensure the proper condition of the Kakhovka dam. Since September 2022, Ukrhydroenergo personnel have been unable to service the station. On September 5, 2022, the occupation authorities turned off the Kakhovka dam. In February 2023, the Occupying Power deliberately discharged water from the Kakhovka reservoir in significant volumes.

Active hostilities took place near the Kakhovka dam. The Russian armed forces controlled the power plant and used it for military purposes. The Armed Forces of Ukraine carried out attacks on military targets with precautions.

Before and after the breach of the Kakhovka dam, various experts analyzed the strength of the dam and the likelihood of its destruction during the hostilities. In addition, they concluded that the dam could not be destroyed if conventional ammunition was used, and that it could be destroyed if a significant amount of explosives was used.

According to available information, starting from April 2022, the Russian armed forces mined the Kakhovka hydroelectric power plant, including mining locks and supports, in October 2022. During the autumn of 2022, it became known about the Russian Federation's intentions to destroy the Kakhovka dam to prevent the summer-autumn campaign of the Armed Forces of Ukraine in southern Ukraine. Also, in October 2022, Russian agents began to create informational conditions for provocations at the Kakhovka dam in an attempt to accuse Ukraine.

A week before the Kakhovka dam breach, the Russian authorities issued a government decree No. 873 of May 30, 2024, which canceled the effect of some federal laws of the Russian Federation on safety at hydraulic structures and exempted them from investigating accidents at hazardous facilities in the temporarily occupied territories of Ukraine. Such a resolution may serve as indirect evidence of the preparation of the Russian Federation to undermine the Kakhovka hydroelectric power plant.

Since the capture of the Kakhovka dam, the Russian side has neglected the safety rules and the prevention of the environmental consequences of hostile use/actions against the Kakhovka dam. It manifested in transforming the station into a military facility, mining it, and

removing the station personnel from ensuring its operation and security. The actions of the Occupying Power concerning the Kakhovka hydroelectric power plant threatened the flooding of settlements, and the Russian military prevented the repair of hydraulic units. By exercising control over the Kakhovka dam, the Russian military demonstrated the possibility of creating an artificial disaster using dangerous forces.

From the moment the Kakhovka dam was captured until the beginning of October 2022, the Ukrainian plant personnel tried to ensure its safety and functioning. Despite the lack of control over the Kakhovka HPP due to the temporary occupation of the Russian Federation, Ukraine made every effort to ensure its safety in the context of possible threats to the civilian population and the environment.

## Breach of the Kakhovka dam and its impacts

The explosion on June 6, 2023, destroyed the Kakhovka dam, which was about 200 m long. The circumstances of the explosion and independent expert studies indicate that the Kakhovka dam was breached from the inside. Analysis of the facts given in the report may indicate that agents of the Russian Federation prepared and executed the breach of the Kakhovka dam.

The undermining of the Kakhovka dam and the drainage of the Kakhovka reservoir led to the destruction and damage of a considerable number of energy infrastructure facilities, the cessation of electricity supply to a significant number of civilians, the creation of threats to cooling systems at Zaporizhzhya nuclear power plant and large-scale losses for Ukraine.

Russian propaganda spread contradictory versions of the breach of the Kakhovka dam. The shelling from the multiple-launch rocket system of the Armed Forces of Ukraine, with which Russian propaganda is trying to explain the dam breach, is unable to cause such damage. The scale of the destruction and the circumstances of the explosion indicate the only possibility of breach and destruction due to mining a significant amount of explosives located in specific dam elements. Available facts and information indicate the probable cause of the breach and subsequent destruction of the Kakhovka dam - its deliberate undermining by the Russian armed forces.

The Occupying Power inconsistently and insufficiently reacted to the flood due to undermining the Kakhovka dam in the temporarily occupied territories. It almost didn't assist the civilian population affected by the breach of the Kakhovka dam, didn't carry out organized evacuation measures, in some cases purposefully preventing civilian attempts to leave the flood area, and used civilians as human shields. The Russian armed forces shelled the evacuation and humanitarian aid measures carried out by the Ukrainian authorities in the unoccupied territory.

As confirmed by the facts and further developments, Ukraine actively took measures to organize the evacuation of the civilian population affected by the breach of the Kakhovka dam and to provide operational assistance to the affected areas. Ukraine provided humanitarian access to civilians and areas affected by the destruction of the Kakhovka dam. Ukraine carried out activities to restore the region and ecosystem after the breach of the Kakhovka dam.

Ukraine's statements contain information on the circumstances of the undermining of the Kakhovka dam, the involvement of the Russian Federation in the undermining, and its impacts, which are confirmed in the actual events and further investigations. During 2022-2023, Ukraine repeatedly reported on the mining and possible breach of the Kakhovka dam by the Russian side.

An assessment of the environmental impacts was launched after the Kakhovka dam's destruction. Ukraine has repeatedly called for and carried out measures to investigate the undermining of the Kakhovka dam and bring those responsible to justice, in particular for the crime of ecocide.

The breach of the Kakhovka dam provoked a considerable reaction from the international community, condemning the Russian Federation and calling for bringing the aggressor State to justice.

## Environmental impacts of the breach of the Kakhovka dam

The breach of the Kakhovka dam had a considerable negative impact on the environment of the Azov-Black Sea region. A large flood caused the loss of natural habitats and plant communities, flooding of plant and animal species habitats, pollution, and clogging on a large scale.

The shallowing of the Kakhovka reservoir turned a mature and fully functioning water ecosystem into a river ecosystem at the initial stage of development. Radically altered water conditions have already caused long-term effects that will only intensify. Most negative impacts on the Kakhovka reservoir and surroundings are likely irreversible.

The destruction of the Kakhovka dam flooded more than 75 000 hectares of land, leading to soil degradation. Drainage of the reservoir and cessation of irrigation will likely lower groundwater levels. Soil dehydration will lead to loss of vegetation and an increase in harmful toxic substances in the soil. All these factors will lead to soil salinization, reduced soil productivity, and degradation of arable land.

The breach of the Kakhovka dam left 94% of irrigation systems in Kherson without a water source, 74% - in Zaporizhzhya, and 30% - in Dnipropetrovsk regions. Interruptions in the water supply for irrigation canals are likely to impact agriculture in the region negatively.

Due to the destruction of the Kakhovka dam and the subsequent flooding, many pollutants, including large quantities of oil products, flowed into the Dnipro River. A total of 134 facilities were identified as potentially affected by the flooding, including 24 hazardous industrial enterprises with large quantities of hazardous substances on their territory. The flooding of these facilities has led to serious environmental and sanitary-epidemiological risks that may have both short- and long-term consequences. The flooding also caused mines, ammunition and other weapons systems to be washed away from contaminated areas. Downstream of the Kakhovka hydroelectric power plant, there is significant contamination with unexploded ordnance, including anti-personnel and anti-vehicle mines, which were carried away by the water after the dam was blown up.

The destruction of the Kakhovka dam led to catastrophic pollution of the Black Sea. Water from the Kakhovka Reservoir, contaminated with oil products, chemicals, organic matter, sewage, and fertilizers, entered the sea. Within the first week after the explosion, the contaminated river water spread to the Danube, covering more than 7 300 km<sup>2</sup> of the north-western Black Sea shelf. As of June 15, 2023, about 1 500 km<sup>2</sup> were affected by large-scale algal blooms. The area of areas with heavy pollution by oil products and organic substances amounted to about 6 000 km<sup>2</sup>. Shellfish and fish have significantly exceeded the maximum permissible levels of harmful substances.

As a result of flooding, populations of 251 wild animals and plants with different environmental statuses under national or international red lists or protected within international

law are threatened. Due to the breach of the Kakhovka dam, there was a catastrophic impact on the populations of endangered species of mammals - more than 20 thousand wild animals and 160 thousand birds were threatened with death. In the flood zone, important nesting sites of wetland and coastal water birds were destroyed. Some birds lost their breeding colonies and can recover their population in 3-7 years.

The draining of the Kakhovka Reservoir and floods in the Lower Dnipro floodplains led to a catastrophic loss of fish fauna, including freshwater commercial fish species. It will take at least 7-10 years to restore this part of the ecosystem. The blowing up of the Kakhovka dam caused the leaching and partial destruction of benthic invertebrate biomass downstream of the Dnipro. Bottom benthic biocenoses, the planktonic groups, floodplains and riparian vegetation along the main channel and the most important mouths of the delta, as well as a significant part of the Dnipro-Bug estuary, were almost completely destroyed (washed away or covered with sediment) by water flows within the first 4 days.

As of June 12, 2023, 64,428 hectares of forests in the Kherson and Mykolaiv regions were flooded and partially destroyed. In total, 333 000 hectares of protected areas were affected. The impacts of the dam breach directly affected 59 nationally designated nature conservation areas of various protection categories and other areas of international importance. In particular, ten territories of special conservation interest (the territories of the Emerald Network, created under the Convention on the Protection of Wild Flora and Fauna and Natural Habitats in Europe (Bern Convention), five wetlands of international importance designated under the Ramsar Convention on Wetlands and Biosphere Reserve "Askania-Nova" under the auspices of UNESCO (intergovernmental program "Man and the Biosphere (MAB)").

The destruction of the Kakhovka dam has had widespread environmental consequences that extend far beyond the affected regions of Ukraine. The explosion and subsequent aftermath have already caused significant damage to the coherence and ecological connectivity of the Pan-European Ecological Network (PEEN), of which the Kakhovka reservoir was a part.

Almost all ecosystem services in the affected region have been impacted. The Kakhovka reservoir will no longer be able to provide essential ecosystem services such as resource supply, regulatory, supporting, and cultural and recreational services, etc.

## Violation by states of their obligations under international agreements on environmental protection

According to international humanitarian law, the Occupying Power is fully responsible for the management of the occupied territory and for damage to the environment and natural resources caused by the failure to properly fulfill its obligations. The Occupying Power is also obliged to ensure compliance with international treaties, including environmental treaties, applicable to the occupied territory. These treaties remain in force even during an armed conflict.

The Russian Federation, as the Occupying Power, was obliged to prevent environmental damage from activities under its jurisdiction and control. This obligation was grossly violated when the Kakhovka dam was blown up by the Russian military. According to environmental conventions, Russia was obliged to take measures to prevent the pollution of water resources, the destruction of flora and fauna and their habitats, and to protect and restore all environmental components in the affected areas. Russia bears full responsibility to Ukraine for violating its obligations under international law.



By destroying the dam of the Kakhovka hydroelectric power plant by the Russian military, the Russian Federation violated the obligations imposed on it by such international treaties:

1. Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Agents of 1977 (ENMOD Convention) (Art. I, IV).
2. 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UNECE) (Art. 2, 3).
3. 1982 United Nations Convention on the Law of the Sea (UNCLOS).
4. 1992 Convention on the Protection of the Black Sea against Pollution and its 2007 Protocol on the Conservation of the Biodiversity and Landscapes of the Black Sea.
5. 1992 Convention on Biological Diversity (CBD) (Art. 8, 10, 14).
6. 1999 Protocol on Water and Health to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Art. 1, 4).
7. 1971 Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention).
8. 1992 UN Framework Convention on Climate Change (Art. 4).
9. 2015 Paris Agreement on the Protection of Greenhouse Gas Sinks and Storage (Art. 5).
10. 1994 UN Convention to Combat Desertification.
11. 1994 Convention on Nuclear Safety (note: the Convention is not applicable to Ukraine). The explosion of the Kakhovka HPP and the subsequent consequences could have caused radiation hazards, an accident at the Zaporizhzhya NPP with radiological consequences, etc.).

Also, the Russian Federation's actions can be considered a violation of the customary principles of international environmental law, such as the principle of prevention of transboundary environmental damage.

The Russian Federation can be held accountable for violating international environmental treaties regarding the undermining of the Kakhovka dam by initiating the process of terminating its participation in the bodies of these agreements. This will deprive the aggressor state of the ability to influence decision-making under international environmental treaties, limit its access to financial and technical cooperation instruments, and lead to significant reputational losses.

## Possible individual criminal responsibility for the breach of the Kakhovka dam within the International Criminal Court

The International Criminal Court establishes two criteria for a crime to fall under the Court's jurisdiction: the criterion of the case's seizure and the principle of complementarity, as provided for in Article 17 of the Rome Statute of the ICC. In particular, the latter must be met by Ukraine's transfer of criminal proceedings for the undermining of the Kakhovka dam against individuals to the International Criminal Court.

Given the strategic importance of the Kakhovka dam, its destruction couldn't be carried out without the corresponding order of at least the highest military leadership of the Russian Federation. The circumstances of the breach of the Kakhovka dam, taking into account the clause mentioned above on complementarity, meet the general criteria for the case's admissibility for consideration by the International Criminal Court.

The conditions of the destruction of the Kakhovka dam (the breach was carried out in the context of a counteroffensive by the Ukrainian defense forces) and the evidence available in open sources are sufficient to assert that the destruction of the Kakhovka dam was carried out in connection with an international armed conflict and was connected with conducting hostilities. Thus, the contextual element of the breach of the Kakhovka dam as a war crime under the ICC Rome Statute is present. Considering the events of the destruction of the Kakhovka dam, it is evident that the act took place in the context of an international armed conflict, and the persons involved in its commission were aware of the existence of this conflict.

The circumstances of the destruction of the Kakhovka dam meet the general requirements for the admissibility of cases for consideration by the ICC (with the issue of complementarity resolved), the general requirements for the admissibility of war crimes, and the general characteristics of the mental element.

The breach of the Kakhovka dam should be considered in two aspects: i) as an attack directly on the Kakhovka dam and ii) as an attack on the Armed Forces of Ukraine downstream of the Dnipro. However, the second statement needs additional confirmation (in particular, in interviewing witnesses and persons involved in the detonation).

Any events related to the blowing up of the Kakhovka hydroelectric power station dam may be qualified as war crimes committed in international armed conflict under Articles 8(2)(a) and 8(2)(b) of the Rome Statute of the ICC. Of the entire list of crimes provided for by these provisions, the most likely qualification is under the following corpus delicti provided for in Art. 8(2)(a)(iv), Art. 8(2)(b)(ii), Art. 8(2)(b)(iv) and iv) of Art. 8(2)(b)(xiii).

Considering the results of the research, the breach of the Kakhovka dam following the Rome Statute of the ICC can be considered in two aspects: 1) actions directed directly against the Kakhovka dam and 2) actions directed against other property destroyed as a result of the breach of the Kakhovka dam. As for the actions against the Kakhovka dam, the actions of the representatives of the Russian Federation generally correspond to the elements of such crimes provided for by the ICC Rome Statute in Article 8(2)(a)(iv), 8(2)(b)(ii) and 8(2)(b)(xiii).

In the actions of the representatives of the Russian Federation in the form of an attack on the Armed Forces of Ukraine by the breach of the Kakhovka dam and flooding of the territories, all the elements of the composition provided for by Art. 8(2)(b)(iv) of the ICC Rome Statute in terms of causing collateral death or injury to civilians, causing damage to civilian objects, as well as large-scale, long-term and severe damage to the surrounding natural environment to the extent that is clearly excessive in compared to the specific and immediate overall military advantage expected to be gained.

## Responsibility for the destruction of the Kakhovka dam under the criminal law of Ukraine

The breach of the Kakhovka dam, committed during the international armed conflict caused by the aggression of the Russian Federation against Ukraine, violates the norms of international humanitarian law and falls under the criminal jurisdiction of Ukraine as a territorial sovereign under Article 6 of the Criminal Code of Ukraine. The relevant norms of

international humanitarian law and the criminal legislation of Ukraine are applicable for the qualification of events related to the breach of the Kakhovka dam and its impacts.

Destruction of the Kakhovka dam is a crime under Article 438 of the Criminal Code of Ukraine, in the presence of (1) violation of norms of international humanitarian law (“customary IHL”); (2) violation of an international agreement, the binding consent of which was granted by the Verkhovna Rada of Ukraine; (3) of a severe nature. The breach of the Kakhovka dam, followed by the flooding of a large area, led to the loss of life, the devastation, and destruction of property on an extensive scale, large-scale, long-term, and severe damage to the environment, and significant material losses. Such actions with corresponding impacts are violations of international humanitarian law, characterized by seriousness, and correspond to the objective side of the composition of the criminal offense provided for in Article 438 of the Criminal Code of Ukraine.

Circumstances related to the actions of the Russian Federation at the Kakhovka dam, particularly of the armed forces of the Russian Federation, testify to the deliberate destruction of the Kakhovka dam by the Russian armed forces on June 6, 2023. Beyond a reasonable doubt, the Russian armed forces personnel who carried out the detonation at the Kakhovka dam and/or gave the order to do so were aware of the actual impacts regarding the existence of an international armed conflict between the Russian Federation and Ukraine, caused by the aggression of the Russian Federation, during which the norms are applicable international humanitarian law.

These actions violated the norms of international humanitarian law regarding the prohibitions provided for in Articles 23 and 56 of the Hague Regulations on the Laws and Customs of War on Land to the 1907 Hague Convention (IV) on the Laws and Customs of War on Land; Article 53 and 147 of the 1949 Geneva Convention on the Protection of the Civilian Population in Time of War (GC IV); Articles 35(3), 52, 54, 55(1) and 56 of the Additional Protocol I (AP I) to the 1949 Geneva Conventions IV.

Destruction of the Kakhovka dam is a criminal offense provided for in Article 438 of the Criminal Code of Ukraine in the form of “other violations of the laws and customs of war provided for by international treaties, consent to the binding nature of which has been granted by the Verkhovna Rada of Ukraine”, as well as in the form of “issuing an order to commit such actions”. Other violations in this situation should be understood as actions aimed at large-scale destruction of property, not caused by military necessity, and committed illegally and arbitrarily (senselessly), a severe violation of international humanitarian law (Article 147 of the Civil Code IV). In particular, such actions are a violation of Art. 23(g) and 56 of the 1907 Hague Regulations, Art. 53 GC IV, Art. 35(3), and Art. 55(1) of the DP I to 1949 GC regarding the prohibition on the use of methods or means of warfare.

Also, other qualifications are possible regarding the breach of the Kakhovka dam, which can be used to qualify the actions of the agents of the Russian Federation under Article 438 of the Criminal Code of Ukraine in the form of deliberately directing attacks against civilian objects, that is, objects that are not military targets; intentionally committing an attack with the knowledge that such an attack would result in the collateral death or injury of civilians, or damage to civilian objects, or widespread, long-term and severe damage to the surrounding natural environment, which would be manifestly excessive in comparison with a specific and immediate overall military advantage, which was expected to be received; destruction or capture of enemy property, except when such destruction or capture is urgently required by military necessity.

The actions of the armed forces of the Russian Federation and the occupation authorities after the destruction of the Kakhovka dam, namely the shelling of civilian evacuation measures, shelling of humanitarian personnel and humanitarian aid facilities, non-fulfillment of the occupying power’s obligations to provide aid to the civilian population in the

occupied territory, contain possible components of the criminal offense provided for in Article 438 of the Criminal Code of Ukraine in the form of intentional targeting of attacks on the civilian population as such or on individual civilians who do not directly participate in military operations, deliberately targeting personnel, facilities, materials, units, or vehicles involved in the provision of humanitarian assistance. They violate the relevant norms of international humanitarian law, particularly Articles 16 and 55 GC IV, Articles 51, 52, 57, 62, 69, and 85 of the DP I to 1949 GC.

Also, the breach of the Kakhovka dam led to catastrophic consequences on a regional scale for the natural environment, which corresponds to the object of the criminal offense provided for in Article 441 “Ecocide” of the Criminal Code of Ukraine. In particular, the breach of the Kakhovka dam led to the destruction of flora and fauna over a large area, including, probably, the complete disappearance of certain species of animals or plants, the destruction of specific ecosystems, which meets the criteria of “massiveness” in the sense of Article 441 of the Criminal Code of Ukraine, i.e., destruction of the flora and/or fauna of a particular region of the Earth or partial, but such that it extends to a large number (multiple) of plants and/or animals. Such destruction in terms of scale corresponds to the signs of the onset of an ecological disaster for the qualification of a criminal offense under Article 441 of Ukraine in the form of the objective side in the form of mass destruction of flora and fauna.

The content of the concept of “ecological disaster” can be established through specific criteria of damage to the environment (spatial, temporal, seriousness of consequences) used in other normative legal acts, including international treaties ratified by the Verkhovna Rada of Ukraine, which are part of national legislation (Art. 9 of the Constitution of Ukraine), first of all, DP I and the ENMOD Convention. Based on the documented data, the damage caused to the environment due to the destruction of the Kakhovka dam meets the criteria of “large-scale, long-term and serious damage to the environment” in the sense of Article 35(3) and 55(1) of the DP I to 1949 GC significantly exceeds the level of prohibitions established in the ENMOD Convention.

## **The problem of assessment of environmental damage (losses) as a result of the Russian aggression against Ukraine in the context of the breach of the Kakhovka dam**

The key processes of documenting and assessing the damage caused by the state bodies of Ukraine to some aspects of the environment as a result of military actions and Russian aggression, in general, are the recording and assessment of damages, which is carried out (according to various methods) by the State Environmental Inspection of Ukraine and during the pre-trial investigation of criminal offenses, related to the environment.

The tools and methodologies used in Ukraine to assess damage caused by water or air pollution have no analogues in international practice, which calls into question the feasibility of such efforts. Instead, international practice is based on the cost of environmental restoration (cleanup) and monitoring of the environment and public health. Although the general approach to collecting evidence of environmental damage can be flexible enough (to cover all possible types of environmental damage that can be compensated for, according to international practice), in practice, efforts should be focused on the rational use of available resources and the prospects for compensation for such damage.

In order to effectively document, assess and investigate environmental crimes committed as a result of Russian aggression, it is proposed to conduct strategic planning and coor-

dinate the efforts of the State Environmental Inspectorate and the Office of the Prosecutor General of Ukraine. This will allow for the rational use of available resources, in particular, focusing on recording and documenting environmental damage, conducting pre-trial investigations of criminal offenses in this area, and applying the methods that are most likely to provide compensation for the damage caused, bringing Russia to international responsibility, and ensuring criminal liability of those responsible for these crimes.

One step in the direction of such strategic planning can be a preliminary assessment of the current practice of calculating environmental damage given (in comparison with) the international practice of compensation for such damage. Based on such an assessment (analysis), it is possible to prioritize both the process of documenting and assessing environmental damage in general and for individual criminal proceedings.

Types of environmental damage and approaches to its assessment can differ significantly and are of significant importance when solving the issue of its compensation. At the same time, there are no examples of denial of compensation solely because the claims relate to environmental damage as such. Analysis of international practice shows that the amount and fact of payment of compensation directly depends on the quality of documentation and justification of such damage.

Proving and documenting environmental damage must consider (1) the specific type of environmental damage to be proven in the future and (2) the redress mechanism under which such proof will be used.

## Conclusions

The Kakhovka dam, hydroelectric power plant, and reservoir played an essential socio-economic role in the south of Ukraine:

1. The central part of the Kakhovka hydroelectric system and the basis for filling the Kakhovka reservoir.
2. A significant contribution to the energy system of Ukraine.
3. A source of drinking water supply for a large population of three regions of Ukraine.
4. The basis of water supply in the arid areas in southern Ukraine.
5. The basis of feeding the reclamation complex in south Ukraine.
6. The basis for conducting fisheries.
7. Great recreational value.

The Kakhovka dam and hydroelectric power plant ensured the existence of the Kakhovka reservoir with its own ecosystem and the surrounding coastal ecosystems, some of which were part of the nature reserve fund and shaped the character of the Dnipro River downstream, which, together with the Southern Bug River, was the basis for the existence of the Dnipro-Bug Estuary and the largest estuarine ecosystem in southern Ukraine.

The Kakhovka dam also is one of the objects containing dangerous forces of nature, given the volume of the Kakhov Reservoir and the significant height difference between the reservoir and the Dnipro.

Russia took control of the Kakhovka HPP on February 24, 2022. The Russian Armed Forces seized the administrative buildings and facilities of the Kakhovka HPP and took the staff hostage, thus making it impossible for the hydroelectric power plant to function in a normal

mode, and finally, they carried out a series of explosions of the North Crimean Canal facilities. According to Article 42 of the Regulations on the Laws and Customs of War on Land to the 1907 Hague Convention and Article 2 of the 1949 Geneva Conventions, from February 24, 2024, the occupation regime and international humanitarian law norms regarding the obligations of the Russian Federation as an Occupying Power will apply to this territory.

Since the beginning of the temporary occupation, the Russian armed forces have used the facilities of the Kakhovka HPP for military purposes, in particular, after the seizure of the plant, command posts were placed at the station, including the command post of the Southern Military District of the Russian Federation, and the Kakhovka HPP itself was mined. In addition, the Russian Armed Forces did not take the necessary measures to ensure the proper condition of the HPP, which posed a threat of an environmental disaster. By exercising control over the Kakhovskaya HPP, the Russian military demonstrated the possibility of creating an artificial disaster using dangerous forces. Such actions violate Articles 35(3) and 55 of the DP I to 1949 GC and the 1976 Convention on the Prohibition of Military or Any Other Hostile Use of Means of Influence on the Natural Environment.

Available facts and information indicated the intention of the Russian Federation to destroy the dam of the Kakhovka HPP to interfere with the summer-autumn campaign of the defense forces of Ukraine in the south of Ukraine. In February 2023, while maintaining control over the Kakhovka HPP, the occupation authorities purposefully discharged water from the Kakhovka reservoir in significant volumes. A week before the explosion at the Kakhovka HPP, the Russian government issued a resolution exempting it from investigating accidents at hazardous facilities in the temporarily occupied territories of Ukraine. This resolution may serve as indirect evidence of Russia's preparations to blow up the Kakhovka HPP.

As a result of the explosion on June 6, 2023, the dam of the Kakhovka HPP was destroyed with a length of approximately 200 meters. The scale of the destruction and the circumstances of the explosion indicate that the only possibility of explosion and destruction was due to mining with a significant amount of explosives located in specific elements of the dam. Additionally, before the explosion of the Kakhovka dam, Russian occupation forces jammed communications in the Kherson region and virtually abandoned the coastal territory of Nova Kakhovka. The available facts and information indicate the probable cause of the explosion and subsequent destruction of the Kakhovka HPP dam: deliberate undermining by the Russian armed forces.

The breach of the Kakhovka dam had a significant negative impact on the state of the environment of the Azov-Black Sea region as a result of the uncontrolled discharge of water and the flooding of territories in a large area, which led to:

1. A large-scale flood, which caused the loss of natural habitats, plant communities, flooding of habitats species of plants and animals;
2. Soil degradation over a large area, with the prospect of desertification and destruction of vegetation;
3. Pollution and clogging (oil products, hazardous substances, fertilizers, bottom sediments, biomass, consequences of military activity) of river waters;
4. A significant decrease in the groundwater level in the area around the former reservoir;
5. Threats of desertification as a result of the reduction of the area of the water table;
6. The cessation or significant reduction of water supply for irrigation canals is likely to have a significant negative impact on agriculture;



7. Large-scale pollution, silting, and desalination of the Black Sea, unicellular algae blooms;
8. Contamination of flooded territories with destruction waste and remnants of military activity;
9. Negative impact on biodiversity, threat of destruction of plant and animal populations;
10. Mass death of fish, loss of fish stocks, destruction of spawning grounds, and loss of young fish;
11. Threat of death of birds, destruction of nesting places of birds in the wetland complex;
12. Deaths of terrestrial animals;
13. Destruction of benthic invertebrates;
14. Radical transformation of the water ecosystem;
15. Destruction of water and wetland ecosystems;
16. Threat of destruction of vulnerable habitat types;
17. Flooding and loss of forests in large areas;
18. Significant negative consequences for ecosystem services;
19. Destruction or damage of considerable nature conservation areas, which led to irreversible consequences for their biodiversity and loss of many ecosystem services;
20. Negative consequences for the natural reserve fund, destruction of habitats;
21. Violation of ecological communication along the Dnipro environmental corridor.

As a result of Russian agents blowing up the Kakhovka dam, the Russian Federation violated its obligations under numerous environmental conventions.

The use of dispute resolution mechanisms provided for in environmental agreements is unlikely due to the following factors:

- The Russian Federation will not agree to a negotiation mechanism where it is listed as the only or one of the possible means of dispute resolution, nor will it agree to the establishment of conciliation commissions, consultation or conciliation mechanisms.
- When acceding to environmental agreements, neither Ukraine nor the Russian Federation made declarations on the choice of certain means of dispute resolution (other than UNCLOS), which means that Ukraine cannot file a lawsuit against the Russian Federation in an international court or arbitration over the events related to the blowing up of the Kakhovka hydroelectric power station dam.
- The absence of proven facts of industrial accidents caused by the dam destruction (under the 1992 Convention on the Transboundary Effects of Industrial Accidents), real damage to the safety of the Zaporizhzhia NPP (under the 1994 Convention on Nuclear Safety) or desertification on the territories of Ukraine (under the 1994 UN Convention to Combat Desertification).

We consider it necessary to include the justification of the Russian Federation's violation of the provisions of the analyzed environmental conventions regarding environmental damage caused by the breach of the Kakhovka dam in the text of the future reparations

agreement or documents related to the establishment and functioning of the international compensation mechanism. Creating a special compensation commission similar to the UN Compensation Commission is considered one of the most effective tools for ensuring total compensation for damages caused by the Russian Federation, including environmental damage.

Russia's responsibility for the harmful consequences of the destruction of the Kakhovka dam on the environment of Ukraine will arise on the grounds regulated by customary international law. Still, the specific mechanism of such responsibility will not be implemented within the framework of an international court process. It seems promising to apply the following measures on the part of the Ukrainian side:

1. Convening of the Advisory Committee of Experts of the ENMOD Convention to find out and assess the actual circumstances and consequences of undermining the Kakhovskaya HPP dam for the natural environment.
2. Ukraine's submission of a complaint against Russia to the Committees on Compliance with the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes and its Protocol.
3. The use of diplomatic means of pressure to have environmental treaty bodies adopt decisions to limit or terminate Russia's participation in them, such as Resolution XIV.20 of the Conference of the Parties to the 1971 Ramsar Convention on Wetlands and the adoption of collective statements condemning the actions of the Russian Federation.
4. Implement the «Aggressor Refunds» initiative within the Paris Agreement 2015.
5. The creation of a compensation commission that will have the authority to consider and satisfy complaints related to environmental damage.
6. Conclusion of an agreement on reparations, in particular in terms of compensation for damage to the environment, after the end of the armed conflict.

Considering the stipulation regarding complementarity, the events of the breach of the Kakhovka dam meet the general criteria for the case's admissibility for consideration by the International Criminal Court. The circumstances of the destruction of the Kakhovka HPP, its consequences, and the evidence available in open sources are sufficient to assert that the undermining of the Kakhovka HPP dam was committed in connection with an international armed conflict, is related to the conduct of hostilities, and may constitute a war crime within the meaning of the Rome Statute of the ICC. Considering the available information and the conducted research, the destruction of the Kakhovka dam should be considered as two actions: (i) as an attack directly on the Kakhovka dam, and (ii) an attack on the Armed Forces of Ukraine downstream of the Dnipro River. It is most likely that the events of the breach of the Kakhovka dam correspond to the components of the crimes provided for in the following articles of the ICC Rome Statute Article 8(2)(a)(iv), 8(2)(b)(ii), 8(2)(b)(iv), and iv) Article 8(2)(b)(xiii). Considering the results of the research, the undermining of the Kakhovka dam under the ICC Rome Statute can be considered in two aspects: (1) the actions are directed directly against the Kakhovka dam, and (2) the actions are directed against other property destroyed as a result of the explosion of the Kakhovka dam.

According to the conducted research, in terms of the actions against the Kakhovka dam, the actions of the agents of the Russian Federation generally correspond to the elements of the following crimes provided for by the ICC Rome Statute Article 8(2)(a)(iv), 8(2)(b)(ii), and 8(2)(b)(xiii). The possibility of applying a specific article in one or another case will depend on additional data that can be established only within the limits of individual cases.

According to the conducted research, the actions of the representatives of the Russian Federation in the form of an attack on the Armed Forces by destroying the Kakhovka dam and flooding the territories contain all the elements of the crime provided for in Article 8(2) (b)(iv) of the Statute of the International Criminal Court in terms of causing collateral death or injury to civilians persons, damage to civilian objects, and extensive, severe and long-lasting damage to the surrounding natural environment, to the extent that is clearly excessive in comparison with the specific and immediate overall military advantage expected to be obtained.

The breach of the Kakhovka dam is a likely severe violation of the norms of international humanitarian law, in particular Article 53 and 147 GC IV in the form of large-scale destruction of property, which was not caused by military necessity and was committed illegally and arbitrarily, Article 35 (3) and 55(1) of the DP I to the 1949 GC regarding the task of widespread, long-term, and severe damage to the natural environment, and Article 54(2) of the DP I to the 1949 GC regarding the destruction, removal, or rendering unusable objects necessary for the survival of the civilian population, such as food stocks, agricultural areas producing food, crops, livestock, facilities for providing drinking water and its reserves, as well as irrigation facilities specifically to prevent their use by the civilian population or the opposing party as a means of maintaining existence, as well as other violations related to the impacts of the breach of the Kakhovka dam, providing assistance to the civilian population. Such actions correspond to the content of Article 438(1) of the Criminal Code of Ukraine, “other violations of the laws and customs of war provided for by international treaties, the binding consent of which has been given by the Verkhovna Rada of Ukraine”, and “issuing an order to commit such actions”, and is a criminal offense the Russian agents probably committed.

The breach of the Kakhovka dam, which led to the mass destruction of flora and fauna and caused an ecological disaster, constitutes the criminal offense provided for in Article 441 “Ecocide” of the Criminal Code of Ukraine. Agents of the Russian Federation, allegedly guilty of this criminal offense, are subject to criminal liability under Article 441 “Ecocide” of the Criminal Code of Ukraine.

It is worth carrying out strategic planning and coordination of the efforts of the State Environmental Inspection and the Prosecutor General Office of Ukraine, which will make it possible to focus available and limited resources on recording (documenting) environmental damage and pre-trial investigations in those areas (cases) and methods that have the highest chances of receiving compensation and prosecution to the responsibility of the relevant persons or the Russian Federation as a whole. One of the steps in the direction of such strategic planning can be a preliminary assessment of the current practice of calculating environmental damage, given the international practice of compensation for such damage. Proving and documenting environmental damage must consider (1) the specific type of environmental damage to be proven in the future and (2) the redress mechanism under which such proof will be used.

