ASSESSMENT OF DAMAGE TO NATURE RESERVE AREAS DUE TO MILITARY AGGRESSION BY RUSSIA

student-driven citizen science project

European universities supporting legal and community capacities for Ukraine's environmental recovery

GROMADA ERASMUS+ Project 2023-1-SE01-KA220-HED-000151848

2025

GROMADA

This project is a citizen science initiative inspired by GROMADA, which engages local communities in collecting data on microplastics along the beaches of Odesa. It not only supports scientific research but also promotes public involvement in environmental monitoring.

GROMADA works to strengthen cooperation between European universities and build legal and civic capacity for environmental recovery in Ukraine. In response to the environmental damage caused by war, the project highlights the legal aspects of citizen science and empowers communities to take part in environmental protection and peacebuilding efforts.

PROJECT GOAL

The project aimed to assess the extent of damage to the nature reserve fund as a result of the military aggression of russia. The project team searched for and analyzed information on the loss of certain species of flora and fauna and changes in the original state of the protected areas. The data obtained can be used to calculate the damage caused by the loss of protected areas, as well as the costs of restoring the objects of the nature reserve fund. The results obtained are the basis for recovering environmental damage from russia.

RESEARCH OBJECTS

Within the framework of this research project, we examine the state of Ukraine's nature reserve fund using two significant sites as case studies — the Tuzly Lagoons National Nature Park and the Kamianska Sich National Nature Park. Since the onset of Russia's full-scale war against Ukraine in 2022, these territories have suffered substantial impacts, both directly from military actions and indirectly through ecological imbalance, environmental pollution, a decrease in biodiversity, and increased anthropogenic pressure.

The research covers the period from 2022 to the present and is based on the analysis of both open sources and field data collected through direct inquiries made to the nature reserves themselves. The study sites are located in the southern regions of Ukraine — the Tuzly Lagoons in Odesa Oblast and Kamianska Sich in Kherson Oblast.

DEFINING THE RESEARCH PROBLEM

Both of which are unique in terms of their natural and biogeographical significance. These parks are not only of high ecological value but also serve as crucial hubs for biodiversity conservation.

Our team has thoroughly examined every aspect of the war’s impact on these territories — from losses among plant and animal species to the physical destruction of natural habitats. Through cartographic analysis, eyewitness accounts, scientific assessments, and official reports, we are constructing a comprehensive picture of the damage. This will contribute to a deeper understanding of the scale of the environmental catastrophe and highlight the urgent need for a systematic approach to restoring Ukraine’s nature reserve fund.

RESEARCH METHODS

The following methods were used to collect and analyze information:

- Systematization methods (number of destroyed trees, plants, animals, area of damaged land, etc.).
- Calculation methods (determination of the total number of destroyed flora and fauna, determination of the amount of ecological damage, etc.).
- Application of analytical methods for assessing the total damage caused to objects of the nature reserve fund.

OUR TEAM: ONU STUDENTS

Anna Zakhlevska,
ONU*

Oleksandra Velshynevska,
ONU*

Liliia Diakova,
ONU*

Yelyzaveta Trufanova,
ONU*

Daria Kovtun,
ONU*

Artem Smyrnov
ONU*

Mariia Pryimak,
ONU*

Alina Skrypko
ONU*

*ONU - Student at the Economics and Law Faculty at Odesa I.I.Mechnikov National University, Ukraine (Law)

OUR TEAM:
STUDENTS FROM UNIES OTHER THAN ONU

Yeva Pustovit
Master student at the Institute of International Relations, Taras Shevchenko National University of Kyiv, Ukraine
(International Public Law)

Severine Ly
Master Student at Paris Nanterre University, France
(Geopolitics)

Anna Romanovych
PhD candidate at the University of Padua, Italy

OUR TEAM: THE TEACHERS

The project was supervised by:

Olena Tolkachenko,
Associate Professor
Department of Civil
Law Disciplines,
ONU Mechnikov

Angelina Chuhai,
Professor, Head of the
Department of Ecology and
Environmental Protection,
ONU Mechnikov

Vladyslav Veremchuk
Senior Lecturer,
Department of Civil
Law Disciplines,
ONU Mechnikov

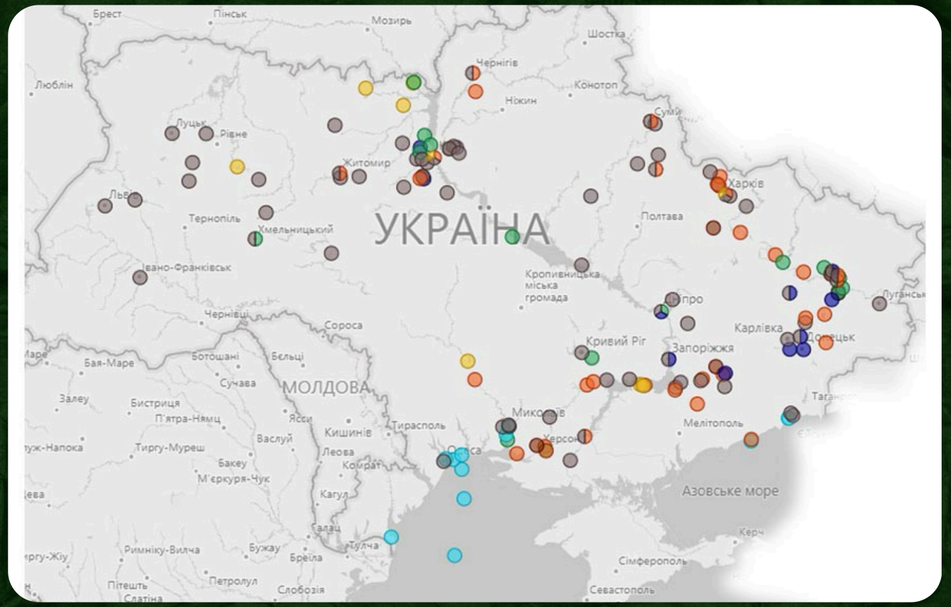
COMMENCEMENT OF WORK

At the outset of the project, the team focused on collecting up-to-date information regarding the damage inflicted on objects within the nature reserve fund (NRF). Particular emphasis was placed on analyzing existing data concerning the scale of damage, calculations of losses, and regulatory frameworks, specifically the methodological guidelines issued by the Cabinet of Ministers of Ukraine for calculating damage to the NRF.

At one stage, students from other universities working on similar topics joined the team, significantly enriching the study. They shared their experiences, methods, and data, which broadened the research scope, improved understanding of legal aspects, prompted revisions of earlier hypotheses, and helped identify weaknesses.

To discuss the collected data, the team held regular meetings via Zoom, enabling prompt information exchange and adjustments to research directions. During the preliminary analysis stage, the decision was made to concentrate on examining three categories of NRF objects:

1. Objects located in occupied territories.
2. Objects that have been de-occupied.
3. Objects that have not been subjected to occupation.

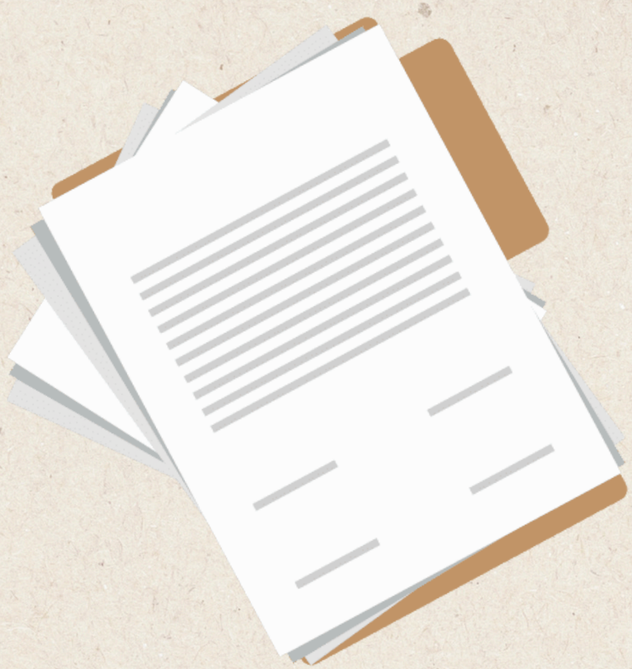


SELECTION OF OBJECTS

Subsequently, after analyzing the Cabinet of Ministers' methodological guidelines for calculating losses, it became evident that the team lacked access to the necessary detailed data to independently assess the damage. This prompted the team to reach out to official representatives of the nature reserves, requesting the relevant information. Despite the initial refusal, the team persistently submitted a follow-up request, thoroughly justifying it based on legislative requirements regarding access to public information. For a more comprehensive understanding and deeper immersion into the topic, we also decided to send inquiries to several nature reserves, as we were concerned that we might not be granted full access to the information regarding the damages. Eventually, a report containing the necessary data was obtained, marking a significant step forward in the research.

Following a subsequent meeting, it was decided to focus on a more in-depth analysis of only two objects:

- Kamianska Sich — a nature reserve that was de-occupied and suffered significant damage.
- Tuzly Lagoons — an object that was not occupied but was affected by shelling.



This decision allowed the team to narrow the research focus and proceed with a detailed data analysis. The team organized the information by time periods, documenting key data on large-scale shelling, significant events, occupation and de-occupation, as well as their consequences for the selected objects.

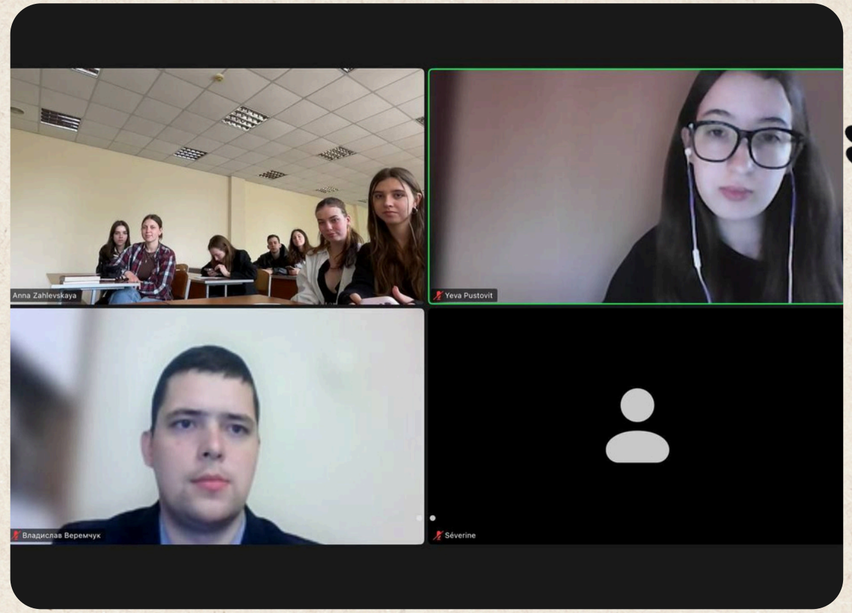
WORKING ON A PROJECT

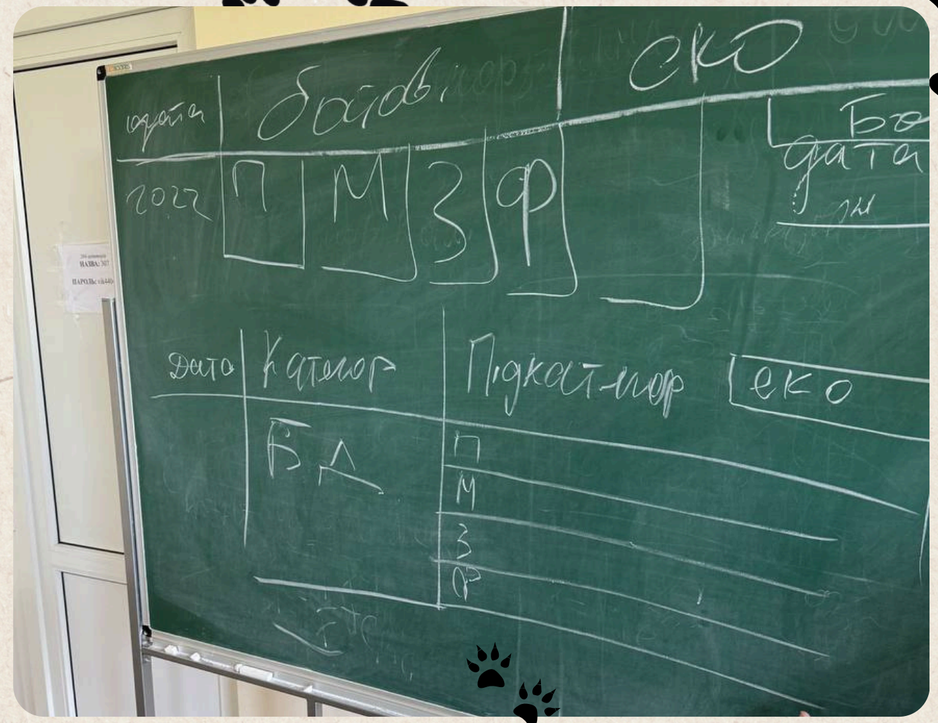
Throughout the work, the team actively communicated via a Telegram group, where participants exchanged ideas and suggestions for improving the project. This fostered a constant flow of new solutions and maintained the working rhythm.

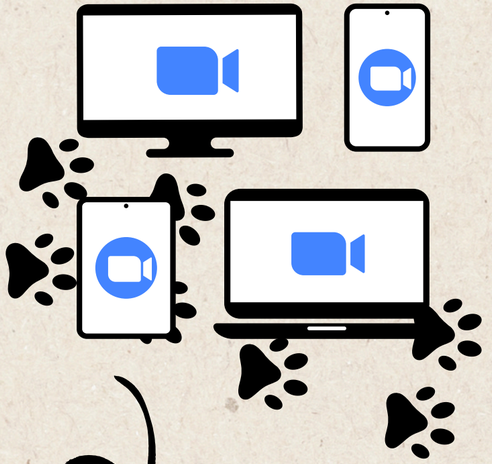
Additionally, the team began organizing offline meetings within the university premises. These meetings were particularly useful for in-depth discussions of the collected information and for joint work on data tables. The university auditorium became a sort of headquarters for the team, where members could discuss research findings, adjust action plans, and outline priority areas for further work. This format promoted more effective interaction, as face-to-face communication facilitated task coordination and the prompt resolution of work-related issues.

Thus, despite numerous challenges and difficulties, the team managed to systematize a large volume of data, formulate a clear vision of the final outcome, and make a substantial contribution to the study of damage inflicted on natural reserve fund objects.

TEAM WORKING SESSIONS







THE HISTORY OF THE KAMIANSKA SICH NATIONAL NATURE PARK

Our research began with an examination of the National Historical and Cultural Reserve "Kamianska Sich," located on the right bank of the Kakhovka Reservoir near the village of Respublikanets in the Beryslav district of Kherson region. This site holds both cultural and natural significance. In the 18th century, it was home to one of the Zaporizhian Siches, which played a vital role in the formation of Ukrainian statehood. Today, the area encompasses unique natural and landscape complexes.

With the full-scale invasion of Ukraine by the Russian Federation in 2022, the territory of Kamianska Sich came under temporary occupation. The occupying forces caused considerable damage to both the natural environment and the historical and cultural heritage: parts of the infrastructure were destroyed, museum objects were damaged, and cases of looting were recorded. However, in November 2022, the territory was liberated thanks to the Armed Forces of Ukraine. Currently, the process of assessing the damage is ongoing, along with the development of measures for the restoration, preservation, and promotion of Kamianska Sich as an important symbol of Ukrainian statehood and the struggle for freedom.

THE FLORA AND FAUNA OF THE KAMIANSKA SICH

The National Nature Park encompasses part of the steppe zone in southern Ukraine, home to its characteristic flora and fauna. Rare animal species such as the steppe polecat, grey crane, imperial eagle, eagle owl, and the marmot — one of the symbols of the steppe — once inhabited this area.

The plant life of Kamyanska Sich included several endangered species listed in the Red Book of Ukraine, such as Ukrainian feather grass, Schrenck's tulip, delta carnation, dwarf iris, and rare medicinal herbs. This natural heritage forms a valuable ecological environment that requires special protection.

DATA SYSTEMATIZATION (KAMIANSKA SICH)

losses

Category	Description	Notes
Damages	550 046,50 UAH	Office, equipment destroyed, machinery stolen

y

Category	Description	Notes
Statistics of tourists	460 tourists	
	5900 tourists	
	0 tourists	The park is currently closed to visitors.
	0 tourists	
	0 tourists	
	0 tourists	
Revenue from tourism	0	For almost half of its existence, the park has been in a state of active war. The park was occup Federation from March 9, 2022 to November 9, 2022. It is currently in the red zone of active h by the occupiers from the left bank of the Dnieper. There was no income fi

National Nature Park "Kamenskaya Sich"

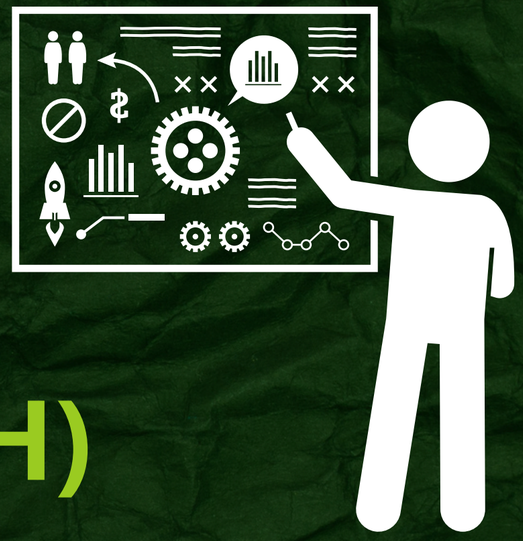
Damage due to hostilities

Date	Category	Description	Notes	
2023	Fires	The shelling by the occupiers caused 29 fires(total area1252.35hectares)	Damages partially calculated from 18 fires in the amount of 33,685,339,863 UAH 80 kopecks.	
2024		The shelling by the occupiers caused 29 fires (total area 1,814.66 hectares)		
2022 (8 months of occupation)	Illegal tree felling	Park employees discovered illegal felling of trees by occupiers	The amount of losses is 49,904,631 UAH 20 kopecks.	
2022-2023	Mining	145 tons	Total (2022-2023-2024-2025) - 158,201 tons	
2024		12,501 tons		
2025		0,7 tons		
2022-2023	Pollution of the territory with solid household waste	220 tons of garbage	Total (2022-2023-2024-2025) - 236.9 tons	
2024		15,7 tons of garbage		
2025		1,2 tons of garbage		
2022 (8 months of occupation)	Soil cover disturbance	The approximate area of fortifications in the Park is - 13,680 m²; 35,000 m³.	The ground surface was disturbed as a result of the dropping of bombs, shells, and the creation of fortifications (dugouts, dugouts, anti-tank ditches, etc.) by the occupiers during the occupation.	

Losses of ecosystem and biodiversity

Date	Category	Description	Notes	
05.06.2023	Water bodies	The area is 8,174.27 hectares.	The area of the Park's water bodies, after the destruction of the Kakhovka hydroelectric complex, decreased approximately four times and has a dynamic nature, which is probably due to the high water level of the Dnieper River in different seasons and the operation of the reservoir cascade.	
13.09.2023		The area is 2,014.88 hectares.		
30.10.2023		The area is 2,406.05 hectares.		
24.03.2024		The area is 4,715.80 hectares.		
10.05.2024		The area is 3,516.61 hectares.		
2022 - 2025	Petrophyte steppes	The steppes are a habitat for rare and endangered plant species listed in the Red Book of Ukraine and international conservation lists.	This biotope type is protected at the European level, as it is part of the broader type E1.2 Perennial calcareous grassland and basic steppes / Perennial calcareous grasslands and basic steppes, included in Resolution 4 of the Bern Convention	
(8 months of occup	Continental reservoirs and watercourses	Completely destroyed or significantly altered, these areas have suffered a catastrophic depletion of aquatic biological resources. The destruction of these biotopes due to drainage has disrupted the integrity of natural water systems, reduced biodiversity, and significantly weakened the ecosystem resilience of the region	Included in Resolution No. 4 of the Berne Convention	
	Grassy wetlands			
	Forest waterholes			
	Meadow biotopes			
2023	Fish	Death of 2,593 individuals	At the time of the terrorist attack, the Kakhovka Reservoir and the bays that are part of the Park's territory counted more than 50 species of fish. Among them, 15 species were included in the nature conservation lists: 6 species in the CCU and 1 species in the Bern Convention	
2024		Death of hundreds of individuals, including 1,953 silver carp (580 kg)		
2022 (8 months of occupation)	Benthic vegetation	Complete destruction of an area of 7761.76 hectares	It formed the basis of the aquatic ecosystem and performed critically important ecosystem functions, including: regulation of oxygen balance in the aquatic environment; filtration of organic and inorganic impurities; creation of conditions for fish spawning and the existence of aquatic invertebrates; stabilization of bottom sediments.	

DISTRIBUTION OF LOSSES BY CATEGORY (KAMIANSKA SICH)



Having received the official report from Kamianske Park, it was decided to examine in more detail the damages caused by the Russian Federation. Our team worked diligently on creating a table, organizing all damages into specific categories for clarity and convenience, namely:• Damage resulting from military actions

- Loss of ecosystems and biodiversity
- Infrastructure losses
- Tourism-related impacts

DAMAGE RESULTING FROM MILITARY ACTIONS (KAMIANSKA SICH)

According to official data from the Kamianske Nature Reserve, significant damage has been inflicted on the reserve as a result of the Russian Federation's aggression in recent years. These damages can be conditionally divided into several main categories:

1. Fires

In 2023 and 2024, 29 fire incidents were recorded each year due to enemy shelling. The total area affected by fire amounted to 1,252.35 hectares in 2023 and 1,814.66 hectares in 2024. The partially assessed damages from these fires total 33,685,339,863.80 UAH.

2. Illegal Logging

During the eight-month occupation in 2022, cases of illegal tree felling by occupying forces were recorded. The total estimated damage amounts to 49,904,631.20 UAH.

3. Landmine Contamination

Between 2022 and 2023, 145 tons of explosive devices were discovered within the reserve's territory. In 2024, an additional 12.501 tons were identified, and in 2025, another 0.7 tons of explosive remnants were found. The total volume of contamination from 2022 to 2025 amounts to 158.201 tons.

4. Pollution with Solid Household Waste

In 2022–2023, 220 tons of waste were found. In 2024, 15.7 tons were added, followed by another 1.2 tons in 2025. The total volume of pollution with solid household waste over this period amounts to 236.9 tons.

5. Soil Disturbance

As a result of the eight-month occupation in 2022, significant damage to the soil surface was recorded due to the construction of fortifications (trenches, dugouts, anti-tank ditches, etc.). The estimated damaged area ranges from 13,680 m² to 35,000 m², accompanied by the disposal of explosive devices and intensive engineering activity within the park.

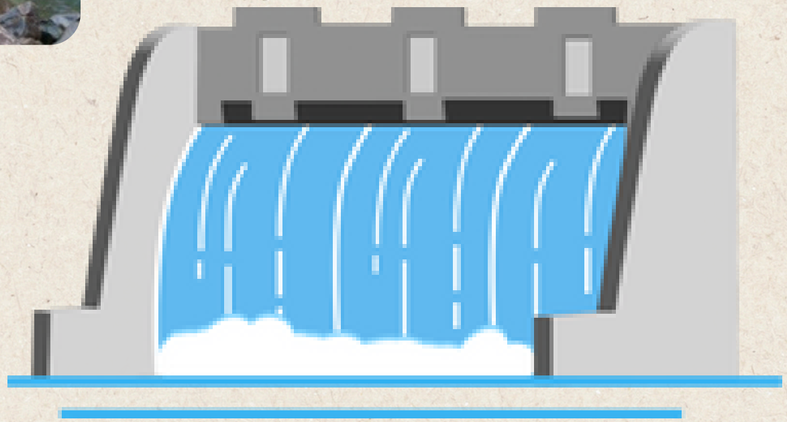
LOSSES OF WATER BODIES (KAMIANSKA SICH)

1.Aquatic Ecosystems

Between June 2023 and May 2024, the surface area of water bodies within the Park significantly decreased following the destruction of the Kakhovka Hydroelectric Power Plant. Substantial water losses were recorded on several dates:

- 8,174.27 ha (June 5, 2023)
- 2,014.88 ha (September 13, 2023)
- 2,406.05 ha (October 30, 2023)
- 4,715.80 ha (March 24, 2024)
- 3,516.61 ha (May 10, 2024)

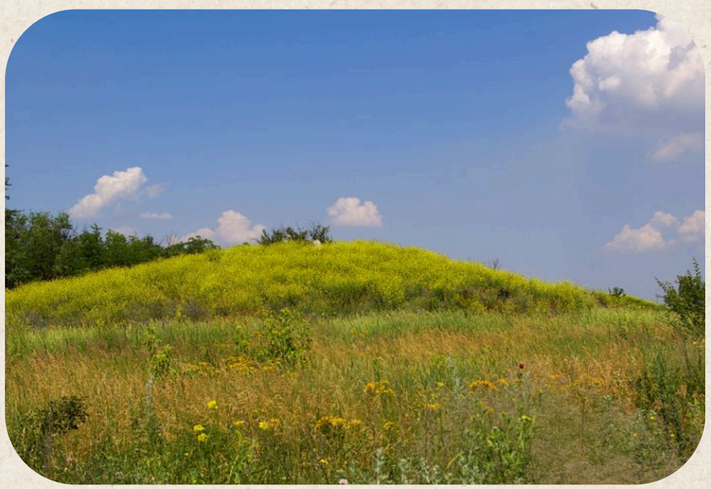
The total surface area of water bodies diminished by nearly fourfold. This process is dynamic in nature, likely linked to the variability in the Dnipro River’s discharge, seasonal fluctuations, and reservoir operations.



ECOSYSTEM LOSSES (KAMIANSKA SICH)

2.Petrophytic Steppes (2022–2025)

These steppe habitats are home to rare and endangered plant species listed in the Red Book of Ukraine and international conservation registers. They are protected across Europe and are classified under type E1.2 (Perennial calcareous grassland and basic steppes). These biotopes are included in Resolution No. 4 of the Bern Convention.



3.Continental Water Bodies and Streams (2022, during occupation)

Entire biotopes were either destroyed or significantly transformed. The catastrophic depletion of aquatic biological resources disrupted natural hydrological systems, reduced biodiversity, and substantially weakened the ecological resilience of the region. Affected biotopes include:

- Herbaceous watercourses
- Forest watercourses
- Meadow biotopes

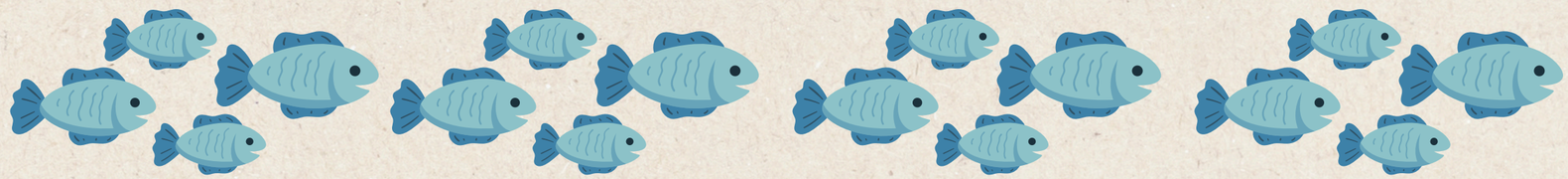
All of which are also listed under Resolution No. 4 of the Bern Convention.

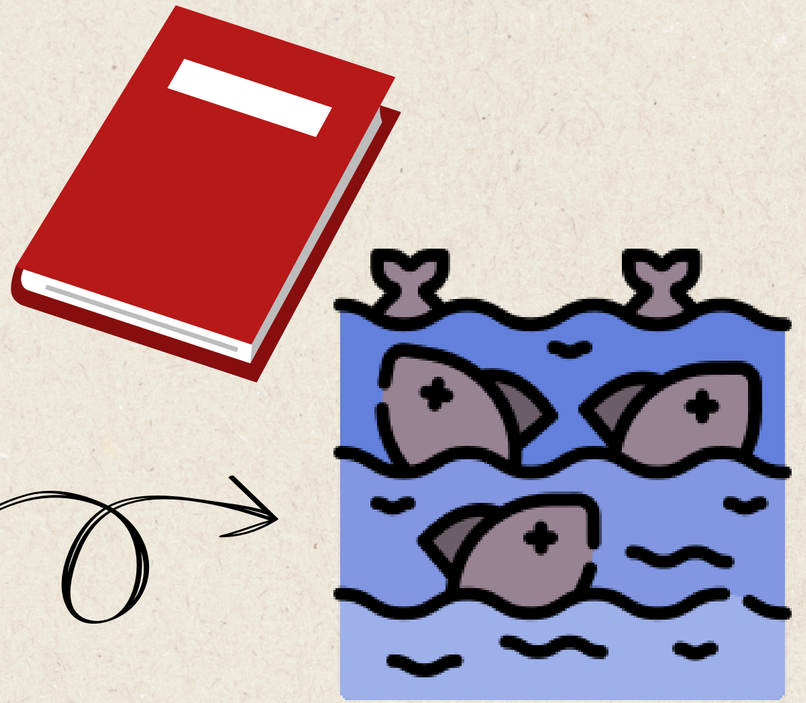
CONVENTION DE BERNE
BERN CONVENTION

LOSSES OF BIODIVERSITY (KAMIANSKA SICH)

4.Fish

- In 2023, 2,593 individuals were recorded dead.
- In 2024, hundreds more perished, including 1,953 silver carps (amounting to 580 kg).
- At the time of the terrorist attack, the Kakhovka Reservoir and its bays hosted around 50 fish species. Among them, 15 were on protected lists, including 6 species in the Red Book of Ukraine and 1 species listed in the Bern Convention.





5.Benthic Vegetation (2022, during occupation)

A total of 7,761.76 ha of benthic vegetation was completely destroyed. This vegetation formed the basis of aquatic ecosystems and fulfilled critical ecological functions, including:

- water filtration and sedimentation control;
- habitat formation for aquatic fauna;
- stabilization of bottom sediments;
- creation of spawning grounds for fish.

INFRASTRUCTURE LOSSES (KAMIANSKA SICH)

Infrastructure Losses (2022–2025)

Between 2022 and 2025, infrastructure damages were recorded in the amount of 550,046.50 UAH. During this period, administrative offices and technical equipment were destroyed, and some assets were looted. These losses critically affected the Park’s operational capacity, limiting its ability to conduct scientific monitoring, management, and conservation measures.

TOURISM ACTIVITY LOSSES (KAMIANSKA SICH)

Tourism Activity (2020–2025)

Before the onset of full-scale war, the Park saw steady growth in tourism:

- In 2020 — 460 tourists
- In 2021 — 5,900 tourists

Since 2022, tourist activity has ceased completely, with zero visitors recorded from 2022 to 2025. The main cause was the occupation of the Park by Russian military forces from March 9 to November 9, 2022. Currently, the Park lies within a red zone of active hostilities and is under constant artillery threat from the left bank of the Dnipro River. The territory is closed to visitors, and no tourism services are being provided.

Economic Losses from Tourism

Due to the complete halt of tourism from 2022 to 2025, the Park received no income from this sector. Thus, for nearly half of its operational lifetime, it has existed under conditions of active warfare, which has entirely paralyzed its recreational potential.

TUZLY LAGOONS

The Tuzly Estuaries National Nature Park, located on the Black Sea coast in the Odesa region, is one of Ukraine's most valuable wetlands. The park comprises a complex of over a dozen interconnected brackish lagoons, covering a total area of more than 27,000 hectares. Historically, these lagoons have been crucial sites for bird migration, fish spawning, and the preservation of unique flora and fauna.

The park was officially established in 2010 and has since served as an example of the fragile balance between land and sea—a hotspot of biodiversity shaped over centuries by both natural processes and human influence. The lagoons are also culturally and economically significant for the local population, particularly due to traditional fishing and salt harvesting.

Since the start of Russia's full-scale invasion in 2022, the Tuzly Estuaries have suffered serious environmental consequences. The coastal area has been damaged by military actions, including the destruction of protective dams and contamination caused by missile strikes. Disruption of water exchange between the lagoons and the Black Sea has led to a decline in water quality, threatening aquatic life and bird populations that rely on this ecosystem.

Moreover, environmental monitoring and conservation efforts have been severely hampered, as the region has become dangerous for researchers and ecologists. The war threatens not only human lives but also one of Europe's most important natural reserves. The Tuzly Estuaries are a powerful example of how war can devastate ecosystems that took centuries to form and protect.

DATA SYSTEMATIZATION (TUZLY LAGOONS)

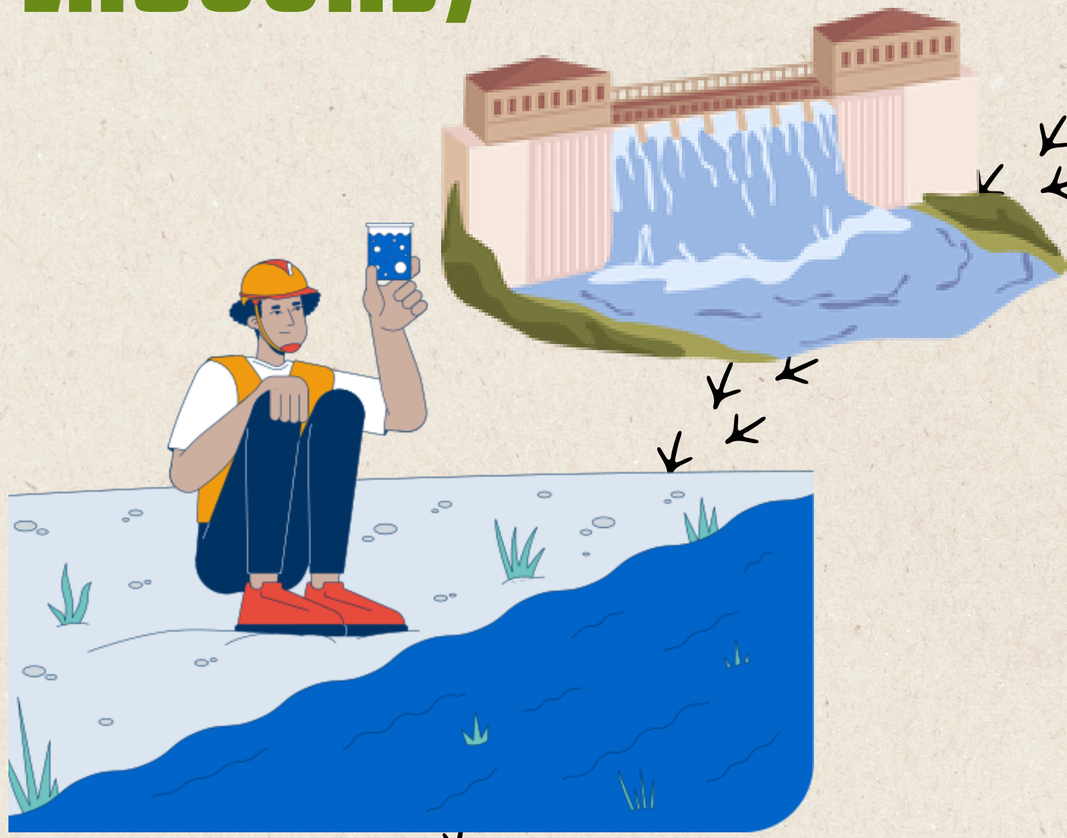
Tuzly Lagoons National Nature Park

Date	Category	Subcategory	Type of damage	Description of damage	Notes
2022	Water resources	Lagoons	Partially renewable	Five out of thirteen estuaries have dried up due to disrupted water exchange with the sea	
2022	Fauna	Living environment	Partially renewable	Hostile shelling left behind missile and mine fragments, causing a technogenic impact on the geological environment, disrupting bird nesting, and damaging natural landscapes	subject to demining
2022	Soils & geological features	Geological environment	Partially renewable	Missile and mine fragments, along with the threat of landmines, have caused a technogenic impact on the soil, including the formation of craters from explosions.	demining and land reclamation are required
2023	Flora	Plants	Irreversible	Fires destroyed plant communities (Anisantha tectorum, Artemisia austriaca, etc.) over an area of 311.2 hectares	Damage: 5.83 billion UAH"
2023	Water resources	Lagoons	Відновлювальне	A new channel has formed at the 2nd kilometer of the sandy spit (Burnas estuary) due to storms, which supports water exchange and the migration of hydrobionts.	
2024	Flora	Plants	Irreversible	Seven fires over an area of 31.61 hectares destroyed forest and steppe vegetation.	Amount of damage: 3.74 billio UAH"
2024	Water resources	Lagoons	Renewable	The channel at the 36th kilometer (Dzhantsheyskyi estuary) was functional in spring, silted up in summer, and was restored in November in cooperation with the Kiliya Water Management	
01.09.2020	Water resources	Lagoons	Partially renewable	Five out of thirteen estuaries dried up due to disrupted water exchange with the Black Sea, leading to the formation of salt deposits.	
01.03.2021	Water resources	Lagoons	Renewable	A natural channel (80 meters long, 12 meters wide, and 2 meters deep) has restored water exchange between the estuaries and the Black Sea.	
01.07.2022	Fauna	Animals	Irreversible	Four dead cetaceans were found (three Azov dolphins and one white-beaked dolphin) due to acoustic trauma caused by sonar and explosions.	
01.09.2022	Fauna	Animals	Irreversible	Eight dead cetaceans were found (three Azov dolphins and two white-beaked dolphins) due to the impact of Russian sonar. The overall estimate is over 5,000 dolphins killed in the Black Sea.	
01.03.2023	Fauna	Animals	Renewable	The appearance of a small pod of bottlenose dolphins indicates the beginning of population recovery after the shelling.	
01.12.2023	Water resources	Lagoons	Renewable	The channel provides an inflow of 50 cubic meters per second of seawater, up to 5 million cubic meters per day, which contributes to the replenishment of the estuaries.	
01.05.2024	Fauna	Animals	Partially renewable	Mass poaching: 16,973 sand smelts, 803 European flounders, and 3,052 shrimp were confiscated.	
01.05.2024	Fauna	Animals	Partially renewable	Mass poaching: 16,973 sand smelts, 803 European flounders, and 3,052 shrimp were confiscated.	(depends on poaching control)
01.12.2024–2025	Fauna	Animals	Renewable	Large flocks of wild geese, displaced from the Kherson region and Crimea due to occupation, migrated to the Alibey, Khadzhider, Solony, Dzhantsheysky, and Maly Sasyk estuaries.	(temporary change of range)
2022–2024	Tourism	Recreational areas	Renewable	Prohibition of visiting the coast and watercraft due to martial law	

THE WATER RESOURCES (TUZLY LAGOONS)

The water resources of the Tuzly Lagoons have suffered considerable degradation since the onset of the full-scale Russian invasion. Some lagoons have been partially or fully restored, while others remain damaged due to destroyed dams and interrupted hydrological exchange with the Black Sea. These disruptions have led to ecosystem degradation and a significant decline in water quality, adversely affecting the region's biodiversity.

- 2022: Connection between 13 lagoons and the sea was disrupted; partial restoration occurred.
- 2023: A natural channel between the lagoon and the sea re-opened, improving ecological balance.
- 2024: Gradual recovery of channels and water exchange resumed.
- 2020–2021: Partial restoration; artificial barriers had interrupted the hydrological flow.
- 2023–2024: Coastal shelling led to further ecological and hydrological disruptions.



FAUNA (TUZLY LAGOONS)

The fauna of the Tuzly Lagoons has been severely impacted by war-related destruction, including missile strikes, pollution, and habitat fragmentation. These pressures have led to massive declines in bird and animal populations, with unprecedented cases of poaching and wildlife mortality.

- 2022: Wildlife casualties from explosions and disrupted habitats.
- 2023–2024: Widespread poaching — 16,973 birds, 803 flounders, 3,052 crucians were recorded.
- 2024: Loss of amphibians and mammals due to disrupted breeding and feeding grounds.
- 2023: Deaths of turtles and birds due to plastic waste and land mines.

FLORA (TUZLY LAGOONS)

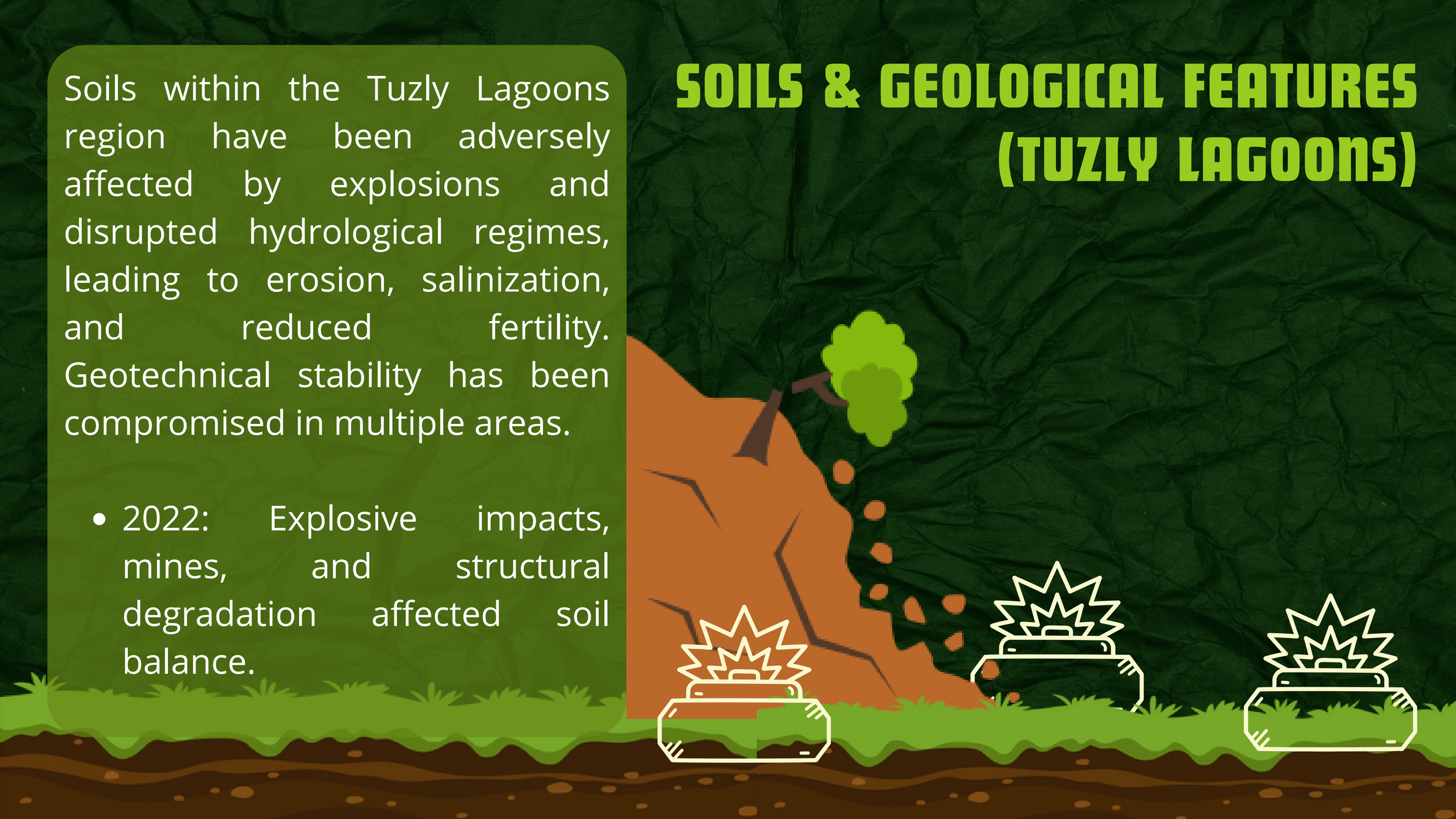
The park’s flora has also suffered from altered hydrological conditions and direct military impacts. Rare plant species have been replaced by invasive ones, and vital steppe and forest vegetation has been degraded or destroyed.

- 2022: Loss of territories populated by Anisantha tectorum, Artemisia species.
- 2023: Expansion of invasive weeds that replace native flora.
- 2024: Significant changes over 31.61 hectares of forest and steppe vegetation.

SOILS & GEOLOGICAL FEATURES (TUZLY LAGOONS)

Soils within the Tuzly Lagoons region have been adversely affected by explosions and disrupted hydrological regimes, leading to erosion, salinization, and reduced fertility. Geotechnical stability has been compromised in multiple areas.

- 2022: Explosive impacts, mines, and structural degradation affected soil balance.



TOURISM (TUZLY LAGOONS)

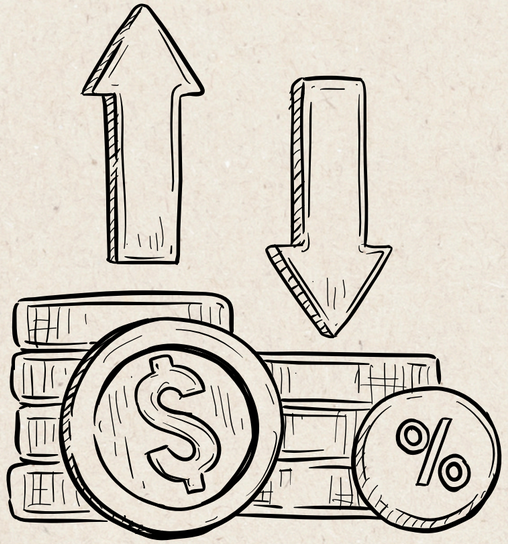
Tourism and recreation in the Tuzly Lagoons area have declined sharply due to martial law, movement restrictions, and general insecurity. Tourist trails, campsites, and beaches have been rendered inaccessible or destroyed.

- 2022–2024: Tourism suspended; recreational infrastructure deteriorated due to ongoing conflict.

THE ECONOMIC IMPACT (TUZLY LAGOONS)

The economic impact is staggering: in one documented case, environmental damages were estimated at over 3.7 billion UAH.

Simultaneously, the estimated cost of restoring specific natural components exceeds 5.8 million UAH. These figures not only reflect the scale of the ecological crisis but also point to the long-term and resource intensive efforts that will be required from the government, the scientific community, and international partners.



Comparative characteristics of environmental losses

«Kamianska Sich» VS « Tuzly Lagoons»

Category	Kamianska Sich	Tuzly Lagoons
Direct War-Related Damage	- Systematic artillery shelling, mining, construction of military fortifications. - Flooding due to the explosion of the Kakhovka hydroelectric power station: losses > 3.5 billion UAH. - Total losses: > 4.9 billion UAH. - Loss of > 2,000 tons of soil, destruction of plant cover, landscape disturbance.	- Missile strikes, mining, mass poaching. - Ecological damage due to disruption of hydrological processes in estuaries. - Damages: > 9.5 billion UAH.
Biodiversity Losses	- Destruction of ecosystems on an area of > 714 hectares. - Mass death of animals, including Red Book species. - Sharp decrease in water levels, destruction of floodplain systems, isolation of landscapes.	- Fires, dolphin deaths, bird migration, extinction of geese, shrimp, flounder. - 8 cases of cetacean deaths. - Weakening of estuarine ecosystems as key migration sites for birds and marine fauna.
Infrastructure and Recreational Losses	- Offices, machinery, and equipment worth UAH 550,000 were destroyed.	- Temporary ban on visiting the coastal zone due to martial law. - Restrictions on tourist and scientific activities.

SIGNS OF ECOCIDE IN RELATION TO PROTECTED NATURAL AREAS

Element of the Crime of Ecocide (Under Ukrainian criminal law)
A necessary element of the crime of ecocide is the extent of the environmental harm. Such harm is characterised by the notions of “mass destruction” and “ecological catastrophe”.
Research object No. 1: Kamianska Sich National Nature Park
Research object No. 2: Tuzly Lagoons National Nature Park

Note: To establish the degree and nature of the damage inflicted, it is necessary to carry out annual monitoring to assess whether ecosystem recovery processes are occurring or not. This task is complicated by such factors as ongoing military operations on the park's territory, the presence of landmines, and restricted access to a significant portion of its area, rendering it impossible to precisely account for damaged or lost ecosystems. The sources refer to the term “significant changes”, which requires further clarification.

COMPENSATION BY RUSSIA FOR ENVIRONMENTAL DAMAGE RESULTING FROM ACTS OF ECOCIDE

1)Petrophytic steppes are the most ecologically valuable natural complexes of the Kamianska Sich National Nature Park and are included in Resolution 4 of the Bern Convention. These biotopes are habitats of rare and endangered species listed in the Red Book of Ukraine and international conservation lists.
Numerous violations of ecosystem integrity have been documented, including contamination by explosive remnants of war, destruction of soil and vegetation cover, steppe fires, damage caused by fortifications and heavy military equipment, and spills of petroleum products.

2)Large-scale transformation of biotopes occurred due to the abrupt drop in the water level of the Kakhovka Reservoir, resulting in the complete destruction or significant alteration of aquatic and riparian communities. The majority of these biotopes are included in Resolution 4 of the Bern Convention, notably: continental standing waters and watercourses; herbaceous biotopes; and forest biotopes. The area of aquatic habitats within the Park decreased nearly four times following the destruction of the Kakhovka Hydroelectric Complex — from 8,174.27 hectares (as of 05.06.2023) to 3,516.61 hectares (as of 10.05.2024).

3)Complete destruction of benthic aquatic vegetation over an area of 7,761.76 hectares, including the following community types (according to EUNIS):

- E2.1A – submerged macrophyte communities in eutrophic standing waters (Potamogeton, Elodea, Myriophyllum, Characeae algae);
- E2.1B – rooted floating-leaf macrophytes (Nuphar lutea, Nymphaea alba);
- E3.1A – submerged macrophyte communities in slow-flowing waters (bays and channels of the reservoir);
- C3.21 – riparian reedbeds with submerged components.

Although these plant communities are widespread in Ukraine and do not possess unique status, their mass destruction as a result of reservoir desiccation has disrupted the ecological integrity of the region, reduced biodiversity levels, and significantly weakened the overall resilience of the ecosystem.

conclusion

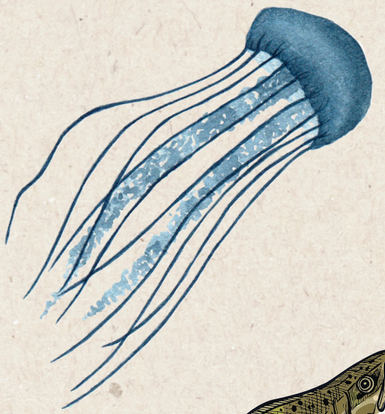
During the full-scale war, the national nature parks Kamianska Sich and Tuzly Lagoons experienced devastating consequences that qualify as indicators of ecocide.

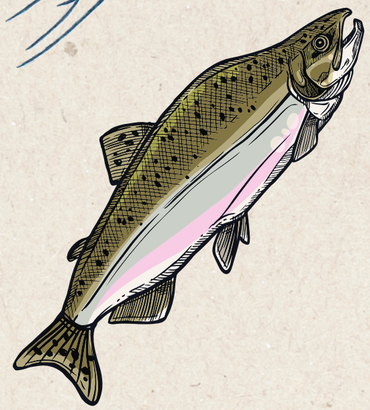
Kamianska Sich suffered primarily from direct hostilities: shelling, landmines, establishment of military positions, and massive flooding after the destruction of the Kakhovka Hydropower Plant. The park lost over 714 hectares of ecosystems, 2,000 tonnes of soil, and faced destruction of rare species habitats and tourism infrastructure. Total damages exceed UAH 4.9 billion.

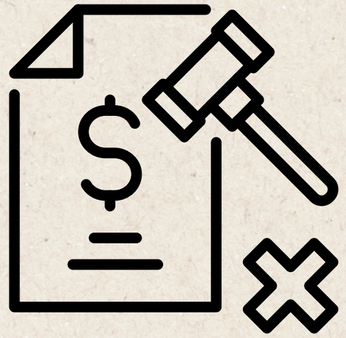
Tuzly Lagoons underwent extensive hydroecological degradation: mass poaching, fires, pollution, disrupted water exchange, and mass wildlife mortality. At least eight cetacean deaths were recorded, over 311 hectares of vegetation were destroyed, and critical migratory routes of birds and fish were severely disturbed. Total damages exceed UAH 9.5 billion.

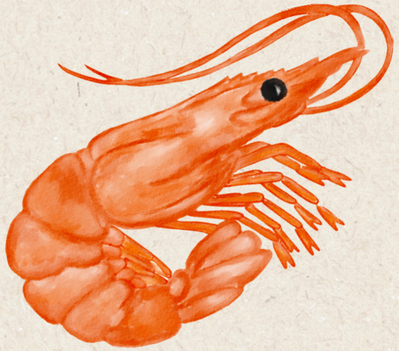
The scale and nature of the destruction in both parks correspond to the internationally recognized definition of “mass destruction”, a key indicator of ecocide. These actions constitute serious violations of international humanitarian law, including the Geneva Conventions and the Rome Statute of the International Criminal Court.

Therefore, the documented evidence provides a sound legal basis for holding Russia accountable and demanding reparations for acts of ecocide committed against Ukraine’s protected natural areas.









Link

Link to the table we developed:
https://docs.google.com/spreadsheets/d/1xeJKzjmA12W-qf07wJXG1DhJpQFlTQ-I2oeW_mVjfTo/edit?usp=sharing

THANK YOU FOR YOUR ATTENTION!