

THE ENVIRONMENT IN CRIMEA: CHANGES AND LOSSES DURING THE FULL-SCALE WAR



CRIMEA
SOS

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We would also like to express our sincere gratitude to everyone who contributed to the publication of this study, but must remain anonymous for security reasons.

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PREFACE

This study provides a comprehensive overview of all available information regarding the environmental changes observed in specific areas of the Autonomous Republic of Crimea and the city of Sevastopol between 2022 and 2024 during the ongoing full-scale invasion of Ukraine by Russian forces.

The Crimean Peninsula has been used by the Russian Federation (RF) as a key staging ground for military operations. It served as a base for preparing the full-scale invasion of Ukraine, as well as for amassing military equipment and personnel. Subsequently, Crimea became a site for ground-based missile systems, aircraft, and helicopters — many of which launched missile strikes on mainland Ukraine. In the first six months alone, 750 cruise missiles were fired from Crimea at targets in Ukraine¹. Since 2022, ships and submarines launching attacks on Ukraine have been based and repaired in Crimea. After 2023, when Ukrainian forces destroyed part of the Russian Black Sea Fleet, several ships were relocated to occupied Georgian territory and other Russian seaports.

The study examines the environmental degradation in Crimea, driven by decisions and actions — or in some cases, inaction — by both Russian federal authorities and the occupation authorities in Crimea².

This degradation includes the destruction of natural habitats and the appropriation of natural resources under the guise of economic development during the full-scale invasion, actions which violate international law. These activities have diminished the standard of living on the peninsula and harmed its recreational and resort appeal. Moreover, these actions infringe on fundamental human rights, including the constitutional right to a safe and healthy environment.

The study draws from open sources, as well as the authors' prior knowledge of Crimea's environment before the Russian occupation. Some of the findings and calculations presented rely on satellite data analysis.

The issues covered were selected based on the authors' expertise on Crimea's environmental challenges, the impacts of military activity on the region, and the availability of satellite imagery for analysis.

The study directly examines the environmental consequences of Crimea's occupation, focusing on the region's militarization, including its use for specific military operations. Key issues highlighted include groundwater salinization, the emergence of new sources of soil, water, and air pollution, the drying up of rivers, sea pollution, deforestation, destruction of natural areas due to quarry development, changes in the status of protected areas, urban development of coastal zones, and even the extinction of certain species.

While the study covers a wide range of environmental problems, it acknowledges that the full scope of issues in Crimea is broader. Global factors such as climate change, the threat posed by the Black Sea's hydrogen sulfide layer, the spread of invasive plant species, and the introduction of non-native marine species are also affecting the region. However, these issues

¹ <https://www.ukrinform.ua/rubric-ato/3556386-rosia-vipustila-po-ukraini-z-okupovanogo-krimu-750-krilatih-raket-zelenskij.html>

² Hereinafter, all state bodies of the Russian Federation on the territory of the occupied Crimea and their representatives are mentioned with the reservation that they are under the control of the occupying Russian authorities and are not legitimate from the point of view of Ukrainian and international law.

extend over decades or centuries and reflect global trends. The study aims to be objective, avoiding political considerations, and focuses solely on the environmental damage and its impact on the living standards of Crimea's residents. Some issues were excluded from the analysis due to the current impossibility of accessing Crimea for on-site investigation, leaving many environmental losses unquantifiable at this time.

This study serves several key audiences: Crimean residents, who can use the information to protect themselves from harmful environmental effects; law enforcement and regulatory agencies, who can use the findings as a basis for calculating the damage caused to Ukraine and pursuing claims against the Russian Federation; human rights activists, who can expand their efforts to protect the rights of Crimean residents; and scientists, who may use the collected data for further research. Ultimately, the study aims to inform efforts to mitigate environmental damage and address harmful impacts once Ukrainian authorities resume control of Crimea.

The authors encourage the dissemination of the report's findings and welcome its use by governmental and public institutions, provided proper citation is given.

INTRODUCTION

Environmental and wildlife situation of the Crimean peninsula prior to Russia's full-scale invasion of Ukraine

In 2014, Russia's aggression and subsequent annexation of Crimea and military actions in the Donetsk and Luhansk Oblasts of eastern Ukraine directly violated the UN Charter³ and a number of international law and principles, in particular, the threat and non-use of force, the inviolability of state borders, the territorial integrity of states, and the fulfillment of international obligations in good faith⁴. The international community, led by a UN General Assembly resolution, refused to recognize the legitimacy of Crimea's referendum on joining Russia or its subsequent incorporation into the Russian Federation⁵.

Ukrainian law designates Crimea, Sevastopol, the internal sea waters and territorial sea waters adjacent to the Crimean peninsula, as well as the subsoil beneath them as temporarily occupied territory⁶. However, Russia installed its own governing body, the so-called "Council of Ministers of the Republic of Crimea," which issues decisions considered legitimate by the Russian Federation but rejected by countries opposing the annexation and subsequent full-scale invasion of Ukraine. Despite international non-recognition, these illegitimate decisions are being implemented on the ground by the occupying authorities.

A 2021⁷ report by CrimeaSOS provided a comprehensive overview of Crimea's environmental conditions after seven years of Russian occupation. This study documented the state of the environment and instances of wildlife destruction on the peninsula. The report serves as a crucial baseline, allowing for the differentiation between pre-existing environmental issues and new developments arising from the full-scale invasion. Understanding this context is essential for accurately assessing the current environmental situation in Crimea. The pre-invasion state of the peninsula's ecosystems and wildlife populations, already under considerable stress from years of occupation, forms the backdrop against which new environmental challenges must be evaluated. This historical perspective enables a more nuanced analysis of how the ongoing conflict is impacting Crimea's natural resources and biodiversity.

³ United Nations Charter, Art. 2 (4), adopted on 26 June 1945 <https://www.un.org/en/about-us/un-charter/full-text>

⁴ Declaration on Principles of International Law concerning Friendly Relations and Cooperation among States in accordance with the Charter of the United Nations, adopted by the UN General Assembly Resolution 2625 (XXV) on 24 October 1970, A/RES/2625(XXV) [https://undocs.org/Home/Mobile?FinalSymbol=A%2FRES%2F2625\(XXV\)&Language=E&DeviceType=Desktop&LangRequested=False](https://undocs.org/Home/Mobile?FinalSymbol=A%2FRES%2F2625(XXV)&Language=E&DeviceType=Desktop&LangRequested=False); Helsinki Final Act, done at the 1st CSCE Summit of Heads of State or Government on 1 August 1975 <https://www.osce.org/helsinki-final-act>

⁵ Territorial integrity of Ukraine, Resolution adopted by the General Assembly on 27 March 2014. A/RES/68/262 <https://undocs.org/Home/Mobile?FinalSymbol=A%2FRES%2F68%2F262&Language=E&DeviceType=Desktop&LangRequested=False>

⁶ Law of Ukraine "On Ensuring the Rights and Freedoms of Citizens and the Legal Regime in the Temporarily Occupied Territories of Ukraine" dated 15 April 2014, p. 3 <https://zakon.rada.gov.ua/laws/show/1207-18#Text>

⁷ <https://krymsos.com/ru/doslidzhennya-dovkillya-krymu-zminy-i-vtraty-za-chas-okupacziyi-chastyna-i-znyshennya-dykoyi-pryrody/>, <https://krymsos.com/doslidzhennya-dovkillya-krymu-zminy-i-vtraty-za-chas-okupacziyi-chastyna-ii-zabrudnennya-dovkillya-ta-vysnazhennya-pryrodneyh-resursiv/>

BRIEF OVERVIEW OF THE FACTORS INFLUENCING THE STATE OF ENVIROMENTAL PROTECTION IN CRIMEA IN 2014 — 2021:

Loss of the Nature Reserve Fund

During the Russian occupation of Crimea, some pre-existing protected areas were eliminated by the occupation authorities to accommodate activities incompatible with nature protection. In the remaining areas, construction or logging has begun, and some territories have lost their nature conservation status or been downgraded. Additionally, nature reserves were subordinated to the so-called “Republican Forestry Committee,” resulting in the loss of the scientific component as a defining feature of the reserves. Finally, Ukraine’s Nature Reserve Fund in Crimea suffered a severe blow with the forced closure of administrations — products of decades of conservation work — overseeing six nature reserves and the Charivna Havan National Nature Park.

Status of rare species of flora and fauna in Ukraine

The annexation of Crimea has negatively impacted the protection of rare and endangered species listed in Ukraine’s Red Data Book. The Russian Federation’s Red Data Book contains significantly fewer species than those protected in Ukraine. As a result, unique and valuable species found exclusively in Crimea are not included in Russia’s Red Data Book, effectively stripping them of their protected status. There have been instances of the listed Stankevych pine being cut down and sold at New Year’s fairs. Additionally, a rare species of mollusk and its habitats have been completely destroyed.

Tree felling

During the seven years following the annexation (2014-2021), tree felling in forests and parks felling was not too extensive. Instead, tree cutting was more frequently employed to clear land for construction or recreational purposes. There were incidents of felling junipers listed in the Ukrainian and Russian Red Data Books, as well as the destruction of a pistachio grove in Sevastopol.

Fires

Between March 2014 and 1 January, 2021 NASA satellites detected 12,805 fires⁸ across Crimea. These fires occurred with relatively uniform intensity throughout the occupation period, affecting both forested and steppe regions. The majority of recorded fires, regardless of season, were concentrated on arable land and former rice paddies. These areas had become overgrown with natural vegetation following the cessation of water supply from the North Crimean Canal.

Fire clusters were also observed near solar power plants, in the vicinity of quarries, and in zones where military exercises took place. The overall increase in fire incidents may be attributed to demographic shifts on the peninsula, particularly the influx of Russian military

⁸ <https://earthdata.nasa.gov/earth-observation-data/near-real-time/firms>

personnel and migrant workers. These newcomers, accustomed to the practice of uncontrolled grass burning in Russia's natural areas, may have contributed to the rise in fire occurrences.

State of the waters around the Crimean Peninsula

The waters surrounding the Crimean peninsula have faced significant environmental challenges, exacerbated not only by military exercises but also by unchecked industrial activity. Research indicates a sharp rise in fishing by Russian companies, with the volume of fish caught in the Azov-Black Sea basin climbing from 30,100 tons in 2013 to 74,300 tons in 2019. The peak catch occurred in 2016, when it soared to 103,000 tons⁹.

Wastewater pollution presents another critical issue for the Crimean waters. In 2019, a major discharge failure occurred in Balaklava Bay¹⁰, where deep-sea wastewater infrastructure sustained damage at a depth of 35 m. This resulted in the leakage of up to 70% of untreated sewage¹¹ into the coastal waters. The contamination led to a ban on the use of several popular beaches¹², including Fiolent, Balaklava, Kozacha, and Holuba Bay¹³. The Rosprirodnadzor (Federal Service for Supervision of Natural Resource Use) later extended these restrictions to beaches in Alushta¹⁴.

Adding to the problem, around 500 mini-hotels were disconnected from the centralized water supply and sewerage system¹⁵, leading to inadequate wastewater management. Multiple sewer line accidents have since been reported, notably in the city of Sudak¹⁶ and the village of Vidradne¹⁷.

Oil spills have further compounded the environmental degradation surrounding Crimea. Spills were recorded in 2015¹⁸, 2016¹⁹, 2019²⁰, and 2020²¹, with the most severe incident occurring in January 2020. Satellite monitoring on 21 January revealed a ship-related oil discharge, covering an area of 86.1 km² and stretching 55.1 km in length, about 140 km off the coast near Feodosiia. The slick's center was located at the coordinates 35° 24', 43° 42'²².

Man-made disasters and accidents on the Crimean Peninsula (2014 to the full-scale invasion)

Between 2014 and 2021, the Crimean peninsula faced significant environmental damage due to a series of man-made disasters and accidents. A notable incident occurred in 2018 at the Crimean Titan Plant in Armiansk, with repercussions that echoed in subsequent years. The plant's acid storage pond was allowed to dry out, leading to the formation of sulfur dioxide crystals — a highly volatile substance that can be easily carried by the wind. These particles settle on surfaces, vegetation, and the skin of animals and humans, and when they come into contact with moisture, they turn into sulfuric acid. This corrosive compound can severely damage the respiratory tract and other mucous membranes, causing diseases in both humans and animals, while also decimating vegetation and small wildlife. The effects of the

⁹ <https://www.blackseanews.net/read/169319>

¹⁰ <https://ru.krymr.com/a/news-glava-sevastopol-opublikoval-foto-stokov-kanalizaciyi-v-more/30095174.html>

¹¹ <https://nts-tv.com/news/vybros-nechistot-kos-yuzhnye-v-goluboy-bukhte-20018/>

¹² <https://ua.krymr.com/a/na-plyazhah-kryma-zapretile-kupatsa/29442009.html>

¹³ <https://primechaniya.ru/sevastopol/novosti/na-bolshinstve-plyazhej-sevastopolya-zapretili-kupatsya-iz-za-vybrosa-nechistot-socseti>

¹⁴ <https://ru.krymr.com/a/news-krym-pljaz-alushta-sevastopol-rospotrebнадzor/30093516.html>

¹⁵ <https://ua.krymr.com/a/28435435.html>

¹⁶ <https://ua.krymr.com/a/news-sudak-more-stichni-vody/30071674.html>

¹⁷ <https://ru.krymr.com/a/stoki-v-more-u-beregov-kryma/29987022.html>

¹⁸ <https://sevastopol.su/news/v-sevastopole-proizoshel-razliv-nefteproduktov>

¹⁹ <https://ua.krymr.com/a/news/27726846.html>

²⁰ <https://www.currenttime.tv/a/podlodka-utonula-krym-sevastopol/30326459.html>

²¹ <https://sevastopol.su/news/pilshchik-korabley-ustroil-ekokatastrofu-v-sevastopolskoy-bukhte>

²² <https://ua.krymr.com/a/news-nafta-bilya-beregiv-krymu/30394956.html>

contamination were felt over a distance of up to 120 km., impacting not only Crimea but also Ukrainian territories that were under government control before the full-scale invasion. Natural areas protected under Ukrainian and international laws were among the affected regions.

Following Crimea's annexation, the occupying authorities addressed the peninsula's energy needs by exploiting the resources of Ukrainian oil and gas fields in Crimean waters. In 2018, the Tavriia Thermal Power Plant (TPP) was brought into operation with a total capacity of 470 MW, and in March 2019, the Baklava TPP, with similar capacity, followed. Plans were also made to construct additional power plants at Dzhankoi (24 MW) and Chornomorsk (16 MW)²³. Alongside the development of these facilities, large-scale imports of diesel generators were made to the peninsula. These measures transformed what was once one of Ukraine's cleanest air regions into one of the most polluted, making it the only area dominated by the environmentally harmful thermal power sector.

Depletion of natural resources and deterioration of water supply

Following the onset of Crimea's occupation, the peninsula experienced a severe water crisis due to the cessation of water supply from the North Crimean Canal. Between 2015 and 2020, Crimea lost more than 85% of its natural water reserves. By April 30, 2020, when the highest volume of floodwaters is typically expected after snowmelt, all reservoirs combined held only 90 million m³ of water. The situation worsened at the beginning of 2021, with reservoir levels even lower than in the previous year. In addition, some mountain rivers dried up entirely.²⁴

The unresolved water supply issues before the full-scale invasion created widespread repercussions. Crimea's agricultural sector, particularly hard-hit by the 2019-2020 drought, faced a critical decline. The cultivation of water-intensive crops like rice, soybeans, grain, and fodder plants such as alfalfa became nearly impossible. This led to a sharp decrease in acreage for these crops, which in turn affected livestock numbers, reduced meat and milk production, and caused the dairy industry to grind to a halt due to a shortage of raw milk. The agricultural sector struggled in the first five years of the annexation, causing the price of housing in the steppe regions to plummet to just \$1,500-\$2,000 per house. Once densely populated, these areas were mostly left to elderly women over the age of 70, as the lack of job opportunities made living there untenable²⁵.

In an attempt to support enterprises, eight wells were drilled in 2015. Krymskyi Titan (Crimean Titan) was granted a permit to extract up to 48,000 m³ of water per day, while Krymsoda (Crimean Soda Plant) received approval to withdraw up to 9,000 m³ daily. However, water quality tests revealed increasing levels of mineralization. A previous study cited experts from the Ukrainian Ministry of Environmental Protection and Natural Resources, who warned that if water consumption from underground sources in Crimea continued at the current rate, the peninsula could face a complete depletion of drinking water reserves within five to fifteen years, depending on the specific region of Crimea.

By 2021, the drinking water situation had also deteriorated. Problems included poor water quality, hardness levels exceeding acceptable standards, and insufficient treatment at purification plants.

²³ <https://rk.gov.ru/rus/index.html/news/296790.htm>

²⁴ <https://ru.krymr.com/a/news-krym-vodohranilistcha-mertvyj-objom/31048451.html>

²⁵ <https://ru.krymr.com/a/28135720.html>

Uncontrolled subsoil use

According to Chornomornaftogaz, a company relocated to Kyiv, Russian companies extracted over 11 billion m³ of gas from the Crimean peninsula, as well as the Black and Azov Seas, between the start of the occupation and 2020. In blatant violation of Ukraine's international obligations regarding the demarcation of its waters, the Russian-controlled authorities issued licenses for the extraction of oil, gas, and other hydrocarbons in Ukraine's exclusive economic zone. These resources were illegally exploited, with the extracted materials subsequently supplied to the Russian Federation and other third-party countries.

Development of natural areas and infrastructure

During the years of annexation, uncontrolled construction on the Crimean peninsula expanded rapidly. This surge began after Ukraine lost control of Crimea and continued throughout the present study period. Large-scale construction projects, particularly infrastructure development, fueled an increased demand for building materials, triggering widespread extraction of natural resources. One prominent example is the construction of the Tavryda highway, which led to the opening of more than 160 quarries for sand extraction. Natural sites, including the Bakal Spit, were destroyed, groundwater reserves were heavily tapped, and unauthorized sewage discharges occurred both into the sea and across natural landscapes on land.

A significant portion of the environmental damage stems from the large-scale construction of military infrastructure and recreational facilities for Russian military personnel. Among the most high-profile projects were the developments of the Laspi Rocks area, originally planned by Ukraine as a nature reserve²⁶, and the Cape Mehanom development project²⁷, launched in 2020. Plans were also made to improve the Ai-Petri plateau²⁸ and build a golf club in Tykha Bukhta²⁹. Additionally, in 2020, the occupation authorities revealed intentions to develop land in the Baidar Valley³⁰.

Construction activity also impacted Crimea's beaches. In Sevastopol alone, the number of beaches shrank from 50 to 34³¹ between 2015 and 2020. In some cases, landowners along the coast erected fences around their properties, blocking both access and views of the sea³². The study further noted the construction of extensive concrete embankments along Crimea's western coastline³³, which marred the natural landscape.

Illegal landfills of solid waste

The issue of waste disposal in Crimea, already a concern before the occupation, worsened dramatically between 2014 and 2021.

By the publication time of a previous study, more than 5 million m³ of waste had accumulated at the Haspra landfill. Over time, the sheer weight of the landfill caused it to slowly slide down a mountain slope³⁴. This movement disrupted the stable mountain slopes within the landfill area, causing numerous fractures, pressure ridges, and rock displacements. A landslide

²⁶ <https://ru.krymr.com/a/news/28757921.html>

²⁷ <https://ru.krymr.com/a/pod-sudakom-prodoljaetsa-zastroika-zapovednogo-mysa-meganom/30906661.html>

²⁸ <https://www.blackseanews.net/read/128693>

²⁹ <https://www.blackseanews.net/read/133628>

³⁰ <https://sevastopol.su/news/v-sevastopole-sud-reshaet-sudbu-baydarskoy-doliny>

³¹ <https://ru.krymr.com/a/kak-rossiya-lishayet-krymchan-dostupa-k-plijam/30710354.html>

³² <https://ru.krymr.com/a/29266495.html>

³³ <https://ru.krymr.com/a/plyazhi-krym-otdyh-zastroika/31044321.html>

³⁴ <https://ru.krymr.com/a/28868173.html>

developed in the frontal section, creating what locals call a “drunken forest” — towering pine trees tilted in the direction of the landslide as it continued its slow descent³⁵.

The occupation years also saw a sharp rise in illegal landfills. Dump sites emerged in several environmentally sensitive areas, including the Yalta Mountain and Forest Reserve³⁶, near the city of Yalta³⁷, and alongside the Salhyr River in Simferopol³⁸. The Haspra landfill itself posed a severe environmental threat, as it contains cattle burial sites that could potentially contaminate groundwater throughout the Yalta Raion (District)³⁹. Unauthorized dumps also appeared along city streets, such as in Sevastopol⁴⁰.

In addition to household waste, the amount of construction debris in these landfills grew significantly during the occupation period. Instead of rehabilitating the dumpsites, some were set on fire. For instance, in 2017, the Simferopol landfill in Kamianka⁴¹ caught fire, followed by a major blaze at the Feodosiia landfill, located within city limits⁴², in 2018.

By the beginning of 2021, activists had identified 1,595 illegal landfills within Sevastopol alone. Of these, 1,332 were legally contested, and 692 were actually eliminated.

Plowing of land

From the start of Crimea’s annexation to the full-scale invasion, there was a marked increase in the plowing of previously untouched virgin lands, especially the steppes. Many of these areas had either been granted protected status or were slated by Ukraine for future designation as protected zones. Between 2014 and 2021, approximately 20,700 ha of steppe, which had remained untilled at the beginning of the occupation, were plowed. This activity was concentrated mainly on the Kerch and Tarkhankut Peninsulas, as well as in the northern regions of Crimea. Additionally, large areas of fallow land — previously cultivated but left to regenerate for decades — were also plowed during this period, significantly altering the landscape and ecosystem.

³⁵ <https://ru.krymr.com/a/27377926.html>

³⁶ <https://ru.krymr.com/a/27992376.html>

³⁷ <https://ru.krymr.com/a/29228552.html>

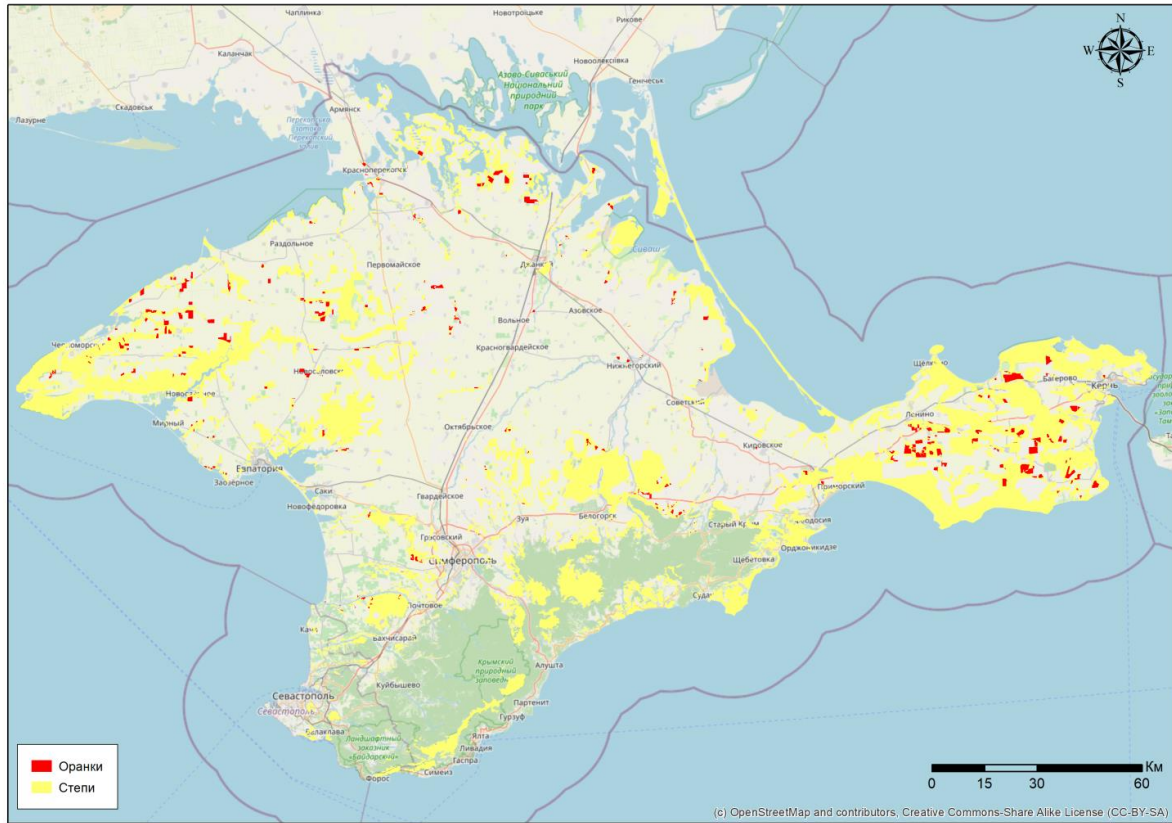
³⁸ <https://ru.krymr.com/a/pochemu-krym-utopaet-v-musore/29561867.html>

³⁹ <https://ru.krymr.com/a/29228552.html>

⁴⁰ <https://ru.krymr.com/a/28395997.html>

⁴¹ <https://ru.krymr.com/a/28760187.html>

⁴² <https://ru.krymr.com/a/pochemu-krym-utopaet-v-musore/29561867.html>



Identified cases of plowing of steppe territories in 2014-2020 according to satellite imagery (authors: O.V. Vasiliuk, H.O. Kolomytsev)

It should be noted that the extensive plowing of new lands, along with the intensified use of pre-existing fields, suggests that Crimea has effectively adapted to the absence of water from the Dnipro River.

The occupation authorities in Crimea have not given up on their plans to reforest the Crimean steppes. In 2019, 107 ha of “forest” were planted in former steppe areas⁴³, and in 2020, 101 ha were handed over to the Razdolnenskiy Forestry⁴⁴. Similar reforestation initiatives have been planned for other regions, including the Simferopol, Starokrymsk, Bakhchisarai, Yevpatoriia, Bilohirsk, and Sudak Forestries, which also encompass steppe areas^{45 46}.

Nevertheless, the occupation leadership of Crimea’s “Ministry of Nature” publicly announced that by 2024, 1,600 ha of new forests would be planted in the region as part of the national “Ekologiya” project. They also provided an overview of previous reforestation efforts in Crimea: in 2015, 173 ha were planted; in 2018, the figure rose to 214 ha; in 2019, it was 222.5 ha. By the end of 2020, up to 250 ha were expected to be reforested⁴⁷.

Militarization of Crimea

The militarization of Crimea has become a significant threat to Crimea’s environment. The substantial increase in military personnel, the deployment of heavy weaponry, and frequent

⁴³https://meco.rk.gov.ru/uploads/txteditor/meco/attachments//d4/1d/8c/d98f00b204e9800998ecf8427e/phpU6PVuv_4.pdf

⁴⁴https://meco.rk.gov.ru/ru/structure/2020_11_06_14_49_proekty_sozdaniia_lesnykh_kultur_na_2020_god

⁴⁵https://meco.rk.gov.ru/ru/structure/2019_11_26_11_01_proekty_lesnykh_kultur_na_2019_god

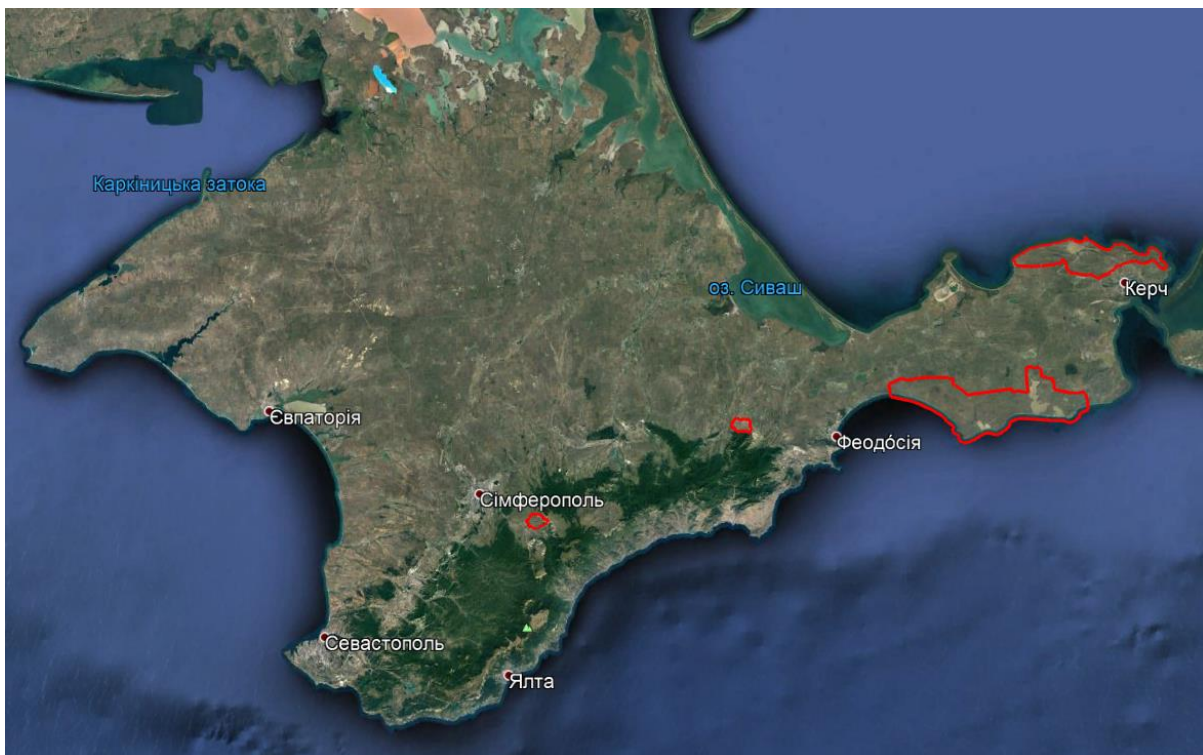
⁴⁶<https://rg.ru/2019/10/17/reg-ufu/v-krymu-vysadiat-222-gektara-lesa.html> <https://rg.ru/2019/10/17/reg-ufu/v-krymu-vysadiat-222-gektara-lesa.html>

⁴⁷http://www.stoletie.ru/ekonomika/krym_pora_prirastat_lesami_796.htm

military exercises have marked every year of the occupation. The largest of these, the “Caucasus-2016” exercises, took place around Capes Chauda and Opuk, beginning in 2016 when the training grounds were officially incorporated into the Southern Military District of the Russian Federation⁴⁸. That same year, movements of Russian armed forces units outside designated military zones were recorded, including incursions into the Charivna Havan National Park⁴⁹. In August 2020, another round of large-scale exercises, “Caucasus 2020,” was conducted simultaneously across seven training grounds in the Southern Military District of the Russian Federation⁵⁰, including in occupied Crimea.

An analysis of open-source information revealed that between 2014 and 2019, approximately 89 military exercises, maneuvers, and training sessions took place at the Opuk training ground. The steppe massifs in the area were entirely scorched during these exercises⁵¹. Satellite imagery shows significant degradation of vegetation at the Opuk site, with some areas of the Kerch Peninsula so heavily bombarded that craters from ammunition explosions merged into a continuous mass of damaged soil, stretching hundreds of meters and rendering them impossible to count.

The targets, representing an imaginary enemy during these exercises, were located both on land within the training grounds and in the surrounding sea. This has led to an equally destructive impact on marine biodiversity. The Russian military shelled some of the most ecologically valuable and biodiverse shallow coastal waters along Crimea’s southern coast, causing considerable harm to marine life.



Several military training grounds in Crimea that were actively used for exercises of the Russian armed forces in 2014-2020. From left to right: Anharskiyi, unknown training ground, Chauda and Opuk training grounds (joint outline), Baherovskiyi (Source: Google Earth)

⁴⁸ https://function.mil.ru/news_page/country/more.htm?id=12083710@egNews#txt

⁴⁹ <https://www.pravda.com.ua/news/2016/11/30/7128425/>

⁵⁰ <https://stv92.ru/novosti/obshchestvo/voennye-kryma-i-sevastopolya-vydvinulis-v-yuzhnye-regiony-rossii-dlya-podgotovki-k-kavkaz-2020/>

⁵¹ <https://www.blackseanews.net/en/read/160584>

It is important to highlight that the Chauda, Opuk, and Baherovskyi military training grounds, located on the Kerch Peninsula, are fully integrated into the European Emerald Network. The Opuk training ground overlaps with the Opuk Nature Reserve, while the Baherovskyi training ground entirely encompasses the Karalar Regional Landscape Park. Moreover, the Karalarskyi, Opuk, and Chauda military training grounds are among the last areas in Ukraine where rare species of steppe birds — such as the steppe crane, blackbird, lapwing, and meadowlark — have been observed. These species are listed in Ukraine’s Red Data Book and are protected under the Bern Convention on the Conservation of European Wildlife and Natural Habitats.

Given that military exercises do not necessitate environmental destruction, in a previous study, we concluded that the Russian Federation has repeatedly violated several international agreements through its actions in Crimea. These include the Protocol Additional to the Geneva Conventions of 12 August 1949 (relating to the Protection of Victims of International Armed Conflicts), the World Charter for Nature, the Rio Declaration on Environment and Development, and UN General Assembly Resolution A/RES/47/37 on the Protection of the Environment in Armed Conflict⁵².

During the years of occupation, the state of Crimea’s environment has deteriorated to an unprecedented low. At no other point in Crimea’s recorded history has the environment suffered so severely from negative human impacts. This decline extends to the surrounding seas as well, which have also been affected.

With this understanding, we now offer an overview of environmental protection and natural resource management in Crimea during the Russian Federation’s full-scale invasion of Ukraine.

⁵² Protection of the environment in times of armed conflict, Resolution adopted by the UN General Assembly on 25 November 1992, A/RES/47/37
<https://undocs.org/Home/Mobile?FinalSymbol=A%2FRES%2F47%2F37&Language=E&DeviceType=Desktop&LangRequested=False>

2022-2024

EXPLOITATION OF PROTECTED TERRITORIES

Under Ukrainian law, the Crimean peninsula and its adjacent waters contain 196 Nature Reserve Fund sites, covering 220,000 ha⁵³ (8.41% of the Autonomous Republic of Crimea). In Sevastopol, 12 Nature Reserve Fund sites cover 26,241 ha, representing 30.27% of the city's area⁵⁴. As of July 2024, the occupation so-called "Council of Ministers of the Republic of Crimea" (per amendments as of 10 January 2024) reports 192 regional "Specially Protected Natural Areas"⁵⁵ in Crimea, or 204 sites in total when including areas of federal, regional, and local significance⁵⁶. These Specially Protected Natural Areas⁵⁷ cover 96,000 ha. Sevastopol, under occupation, now claims 12 natural areas covering 23,789 ha. Most of these were "inherited" from decisions made by the Verkhovna Rada of the Autonomous Republic of Crimea and resolutions of the Council of Ministers of the Ukrainian SSR. Six new sites have been created since the occupation began.

A comparison of protected areas in Crimea between Ukrainian documents and those of the occupation authorities and the Russian Federation (as of 1 August 2024) reveals a significant reduction in protected land. Many areas established before the occupation have been re-approved by occupation authorities with reduced boundaries. Of the 196 protected areas recognized by Ukraine, 16 now have slightly expanded boundaries, adding 1,333 ha, while 42 areas have been reduced, losing a total of 14,241.6 ha. Additionally, 22 protected areas have been removed from the lists entirely, with a total area of 2,684.6 hectares lost (only two decisions for elimination are documented).

The most significant losses occurred in Crimea's key nature reserves, including Kazantip, Karadazh, Opuk, and the Yalta Mountain and Forest Reserves, which collectively lost 1,129.43 ha. These areas, which hold the highest level of protection and ecological value, have been significantly diminished. Furthermore, the Crimean Nature Reserve has been downgraded to a national park, which permits development, while only the Cape Martian Nature Reserve, covering 240 ha, remains unchanged.

Several of Ukraine's protected areas in Crimea were downgraded in status following the occupation, including Charivna Havan National Park and the Cape Martian Nature Reserve,

⁵³ <https://pzf.land.kiev.ua/pzf-obl-1.html>

⁵⁴ Further in the text, all statistical summaries are given for the whole of Crimea (i.e., the Autonomous Republic of Crimea and the city of Sevastopol).

⁵⁵ <https://docs.cntd.ru/document/413905458>

⁵⁶ <https://www.pnp.ru/social/v-krymu-nakhoditsya-pochti-100-tys-ga-osobo-okhranyaemykh-prirodnikh-territoriy.html>

⁵⁷ After the occupation of Crimea, the local authorities began adhering to the Russian Federation's law "On Specially Protected Natural Areas", replacing the Ukrainian law "On the Nature Reserve Fund of Ukraine." Under this Russian law, Specially Protected Natural Areas are categorized into federal, regional, and local significance. Nature reserves and national parks fall under federal protection, while most other areas are considered regional. Consequently, nature reserves and national parks are now directly managed by the Russian Federation's Ministry of Natural Resources, while the remaining protected areas are under the jurisdiction of the federal subject, specifically the so-called state bodies of the "Republic of Crimea."

which were reclassified to regional significance. This change also affected nearly all reserves and natural monuments of national significance, with only two exceptions, as their status was similarly downgraded to regional.

The occupation “Council of Ministers of the Republic of Crimea” eliminated two Nature Reserve Fund sites through separate decisions. Order No.69-p, “On Approval of the List of Specially Protected Natural Areas of Regional Significance of the Republic of Crimea” dated 5 February 2015 was amended by a new document, Order No. 1571-p, issued by “Crimea’s Council of Ministers on 12 December 2018. This new order removed two sites from the list of protected areas: the Pivdennoberezhni Dibrovyy Reserve (10.8 ha) and the park-monument of landscape art — Malyi Livadiysky Park (9.6 ha). Other protected areas simply “disappeared” from the lists without explanation.

Some of the protected areas that vanished from the occupation lists were located within larger protected zones, which might explain their elimination. However, this does not mean they retained their protected status. By eliminating small reserves within larger parks, the occupying authorities effectively destroyed the specific protections tailored to individual sites. For example, a unique tree in a natural monument could lose its specific protection and become just another tree, vulnerable to destruction through sanitary logging or landscaping. Similarly, the elimination of a coastal reserve within a national park opens the door for beach development and construction. Not all eliminated protected areas were part of larger zones either; at least 17 of the 22 eliminated sites stood alone, including the vast botanical reserve Male Filoforme Pole (38,500 ha). The reasons for their elimination remain unstated in any known documents.

While official reasons for the elimination of these protected areas are not mentioned, the changes since their elimination provide indirect clues. For instance, the Yevpatoriyskiy Dendrological Park of local significance (3.2 ha) and parks-monuments of landscape art — Salhyrka Park (42 hectares) and Morskiy Prybii Sanatorium Park (9 ha) were eliminated due to recreational development. The sanatorium, notably, has been owned by Russian billionaire Arkadiy Rotenberg⁵⁸ since 2019. In other cases, military motives are clear. The geological natural monument Cape Chauda (5 ha) was located on a military training ground, Putin’s dacha⁵⁹ was built on the site of the botanical reserve Pivdennoberezhni Dibrovyy (20 ha), and the landscape reserve Pivnichno-Skhidni Okolytsi of Lake Donuzlav (800 ha) now hosts one of Russia’s largest military bases in Crimea.

Many protected areas in Crimea were not eliminated but significantly reduced in size, with 42 sites losing a total of 14,241.18 ha. In each case, specific reasons were provided for the reductions, though the absence of detailed information on land use of the small areas that were removed as protected territories suggests that activities incompatible with the protected status of Nature Reserve Fund sites are either already occurring or planned for these areas.

One of the most prominent examples of such exploitation is the Kazantip Nature Reserve. Its area was halved by the occupation authorities, and a glamping site⁶⁰ was constructed on the remaining land, actively promoted as a “recreational spot by the sea”⁶¹.

⁵⁸ <https://www.svoboda.org/a/31198978.html>

⁵⁹ <https://www.unian.ua/world/dacha-putina-dlya-putina-kupili-dachu-brezhnyeva-v-okupovanomu-krimu-povidomlyaye-vidannya-proekt-foto-video-novini-svitu-11316017.html>

⁶⁰ https://glampi.ru/catalog/glompings/glamping_ekzosfera/

⁶¹ https://www.tripadvisor.ru/Hotel_Review-g4583735-d23793889-Reviews-Zapovedny_Mys_Glamping-Shcholkin.html



“Glamping” built in the Kazantip Nature Reserve.

https://www.tripadvisor.ru/Hotel_Review-g4583735-d23793889-Reviews-Zapovedny_Mys_Glamping-Shcholkine.html#/media/23793889/564818269:p/?albumid=101&type=0&category=101

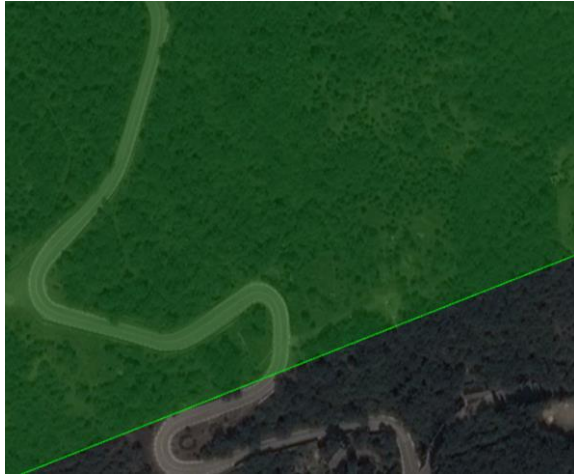
It is also worth noting that recreational activities, which were prohibited under Ukrainian law, are now being developed within protected areas that have retained their official status. For instance, the website for the Yalta Mountain and Forest Reserve offers information on recreational services⁶² and features a downloadable map of routes for GPS or smartphones⁶³. A comparison of the occupation version of the reserve’s boundaries with the official Ukrainian ones reveals significant differences. Large portions of land, including traditional infrastructure facilities that were historically part of the reserve, have been removed as protected areas.



Areas removed from the Yalta Mountain and Forest Reserve. Green — current Ukrainian borders; yellow — borders according to the occupation authorities of Crimea

⁶² <https://zapovedcrimea.ru/yaltinskiy>

⁶³ <https://nakarte.me/#m=14/44.51065/34.13006&l=O>



Northern outskirts of Oliva village, satellite image a) 2013, b) 2024. Source: Google Earth



Section of the reserve turned into a parking lot for the Mriya Resort & Spa. Satellite image a) 2013, b) 2024. Source: Google Earth

It should be acknowledged that development, including recreational activities, has historically existed within the Yalta Mountain and Forest Nature Reserve. However, these areas were not officially withdrawn from the reserve's boundaries.

To summarize: under the conditions of occupation and the full-scale war, the occupation authorities have reduced the total area of the Nature Reserve Fund by 16,925.78 ha. This includes 22 natural sites that were completely eliminated and 44 whose boundaries were reduced. Meanwhile, 15 new protected areas, covering a total of 3,005.9 ha, have been created by the occupation authorities. Despite these additions, there is a net loss of 17,000 ha of protected land — areas now subject to construction or Russian military activities.

Why did the occupation authorities make such detailed changes to the structure of the Nature Reserve Fund? The answer likely lies in federal subsidies. Funded by the federal budget, an inventory was conducted, during which areas inconvenient to the occupiers were excluded as protected zones — places where violations were either already occurring or planned. Some of these areas were re-designated for Putin's residences and dachas, while others were removed

to facilitate Russian military training. Additionally, areas located in the sea, now occupied by the navy, were also excluded because they were unsuitable for subsidy use. As a result, the so-called “Specially Protected Natural Areas” in Crimea and Sevastopol were left intact only where no illegal activities were planned or where violations were less apparent, allowing the authorities to justify federal funding for “maintenance,” “reconstruction,” “infrastructure,” and even “tick control.”

The absence of Ukrainian state control over the occupied Crimean peninsula creates conditions where adherence to environmental legislation becomes irrelevant, as there is no authority to enforce compliance. Most of the protected areas established before the annexation have been reapproved under Russian law⁶⁴, but this reapproval primarily serves the interests of the occupying forces. Unfortunately, since the full-scale invasion, the exploitation of these protected areas has only intensified, as noted in the past by CrimeaSOS. Therefore, the formal reclassification of these protected zones under Russian law has not only failed to protect them but has led to their degradation.

For instance, in late 2022, Russian troops conducted shooting exercises in the Kalynivskiy Regional Landscape Park in Crimea⁶⁵, disregarding the protected status of the land. This area had previously been used as a military training ground during Soviet times but ceased operations after the collapse of the USSR. In 2000, a regional landscape park covering 12,000 ha was established to safeguard migratory and wintering bird populations. However, Russian troops, prioritizing military needs, now use this territory as an active training ground while still listing it as a protected area in formal reports.

The recreational exploitation of Crimean territories has become increasingly significant, with a focus on attracting Russian vacationers to the peninsula. To cater to this influx, authorities have begun improving protected areas, a practice that would be prohibited under Ukrainian law. These valuable natural zones are being transformed into recreation areas, with landscaping measures that are destructive to biodiversity and environmentally unsound.

For instance, the occupation Ministry of Natural Resources and Environment reported that in 2022, it extensively engaged in enhancing excursion routes and eradicating ticks in protected areas⁶⁶. It is crucial to note that the acaricide drugs used have a general nerve-paralytic effect, harmful not only to ticks but to all insects and other invertebrates, including the most endemic species found within Crimea’s protected areas. Consequently, these actions were not aimed at preserving wildlife, but rather at its destruction. This impact extends to the vast majority of terrestrial and ground fauna species in the region.

A particularly noteworthy development in 2022 was the initiation of active efforts to create new protected areas in occupied Crimea. However, despite the promotional campaigns and grandiose rhetoric, these new protected areas were established solely for further recreational use.

⁶⁴ THE ENVIRONMENT IN CRIMEA: changes and losses during the occupation. Part I. Destruction of wildlife K.: CrimeaSOS, 2021. 128 p.

⁶⁵<https://www.facebook.com/GeneralStaff.ua/posts/pfbid02dyWDxtc9M1aFg8A2eaYYRM36vJaRhoG3o9iSe6T2q2xeWLLLnRty36YbGGPNA9wgl>

⁶⁶ <https://meco.rk.gov.ru/structure/f07e5959-297d-4272-9091-7998d9a6852c>

Throughout the year, several protected areas of regional significance were created in Crimea by decisions of the occupation authorities⁶⁷:

- the M.V. Pechinkin Dendrological Park, spanning 55.54 ha; situated in Simferopol Raion near the Simferopol Reservoir⁶⁸.
- the natural monument Malyi Salhyr Stone Mushrooms, covering 9.27 ha; situated in the Malyi Salhyr river valley, near the Dobrovskiyi village settlement in Simferopol Raion⁶⁹.
- the Kalamitskiy State Nature Reserve, covering 81.6 ha; situated near Saksyiyi Raion⁷⁰.
- the Chukular monument of park and landscape art in Yalta, covering 14.625 ha⁷¹; established on 10 January 2024. More commonly known as the Rossiya Sanatorium Park⁷², its creation is reportedly linked to the perceived “need” for federal reconstruction funds.
- Sevastopol has seen the designation of several natural monuments:
 - Fistashki u Kruglaya Bay, a 5.97-ha site in Gagarin Raion⁷³, established on 21 April 2022.
 - Pallas’s plane tree in Ternivka village and Fistashki u sela Kamyshly in Nakhimovskiyi Raion, both covering 0.01 ha⁷⁴; established on 7 July 2022⁷⁵.
 - the Ozernyye Duby in Ozerne village, Balaklava Raion⁷⁶, and the Duby Strazhi Belbeka in Dalne village, Nakhimovskiyi Raion, each covering 0.02 ha; established on 14 December 2023⁷⁷.

The Kalamitskiy Reserve, established in Saksyiyi Raion, occupies a stretch of the Black Sea coast spanning the Orikhivske and Novofedorivka rural settlements. Its southern border aligns with Novofedorivka, situated 4.5 km. southwest of Saki. The reserve partially encompasses lots 10, 11, and 12 of the Saksyiyi district forestry within the Yevpatorian forest. The official cadastral description of the site fails to mention any specific animal or plant species. Instead, the reserve’s regulations are replete with information about its recreational purpose and provisions for leasing land for leisure activities, according to documents available to the authors.

In an ironic twist, the territory where the occupying self-proclaimed authorities have established this reserve is, in fact, ecologically significant. It harbors populations of the extremely rare plant – sea bindweed (*Calystegia soldanella*)⁷⁸. The Red Data Book of Ukraine (2009) had previously listed this species as “disappeared in nature.” However, recent discoveries of several habitats along different parts of the Crimean coast have led to an updated

⁶⁷ <https://meco.rk.gov.ru/structure/f07e5959-297d-4272-9091-7998d9a6852c>

⁶⁸ Resolution of the Council of Ministers of the Republic of Crimea No.185 dated 30 March 2022 “On the creation of a specially protected natural territory of regional significance of the Republic of Crimea – the M.V. Pechenkin Dendrological Park of regional significance of the Republic of Crimea. <https://meco.rk.gov.ru/documents/57b41122-251d-404d-bb7c-12dea8aabfb2>

⁶⁹ Resolution of the Council of Ministers of the Republic of Crimea No.186 dated 30 March 2022 “On the natural monument of regional significance of the Republic of Crimea - Stone Mushrooms of Maly Salgir”. <https://docs.cntd.ru/document/578184519>

⁷⁰ Resolution of the Council of Ministers of the Republic of Crimea No.282 dated 27 April 2022 “On the creation of a specially protected natural territory of regional significance of the Republic of Crimea – the Kalamitskiy state nature reserve of regional significance of the Republic of Crimea. <https://meco.rk.gov.ru/documents/930e652b-3c52-43c5-b1f3-0923ceeb89a8>

⁷¹ <https://docs.cntd.ru/document/407067848?marker=64U0IK>

⁷² <https://sanrossiya.hotel.iaspi.com/about>

⁷³ Resolution of the Government of Sevastopol No.160-ПП dated 21 April 2022 “On declaring blunt-leaved pistachio plants a natural monument of regional significance - Pistachios at Kruglaya Bay. <https://docs.cntd.ru/document/406015081#64U0IK>

⁷⁴ <https://docs.cntd.ru/document/406143868#64U0IK>

⁷⁵ <https://docs.cntd.ru/document/406143876#64U0IK>

⁷⁶ <https://docs.cntd.ru/document/407023404#64U0IK>

⁷⁷ <https://docs.cntd.ru/document/407023403#64U0IK>

⁷⁸ <https://redbook-ua.org/item/calystegia-soldanella/>

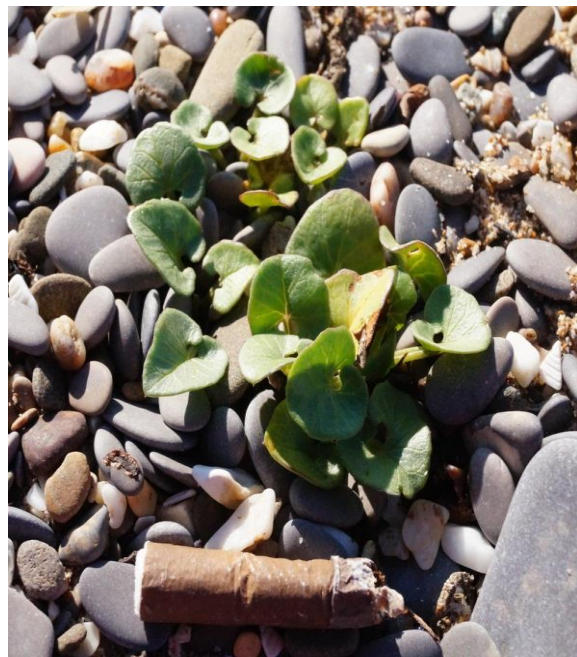
status of “endangered.” Notably, two of these critical habitats are located within this very reserve.

(<https://www.inaturalist.org/observations/62710310>; <https://www.inaturalist.org/observations/62771905>).

Unfortunately, the occupying authorities appear unaware of this ecological treasure. The reserve’s passport and description lack any mention of rare species, focusing instead on recreational development. This oversight poses a significant threat, as increased human activity in the area could lead to the death of the last remaining individuals of this rare plant species.



Map of the Kalamitskiy Nature Reserve (source: regulations on the reserve)



Sea bindweed (*Calystegia soldanella*) in the reserve
<https://www.inaturalist.org/observations/62771905>

Following the establishment of the reserve, tourist portals across occupied Crimea began extensively promoting recreational opportunities⁷⁹ within its boundaries. Our research indicates that such leisure activities in Crimea’s protected areas come at a premium price. Additionally, these portals have been advertising large-scale beach clean-up events in the reserve⁸⁰. Of course, the promotion of these clean-ups has raised eyebrows among observers, who note the apparent hypocrisy of inviting local residents to voluntarily tidy the area, only for the occupation authorities to subsequently lease it at high rates. More concerning still is the potential threat these activities pose to the rare plant species in the area. There’s a significant risk that clean-up participants could trample or uproot these precious specimens while “clearing” the beach of debris.

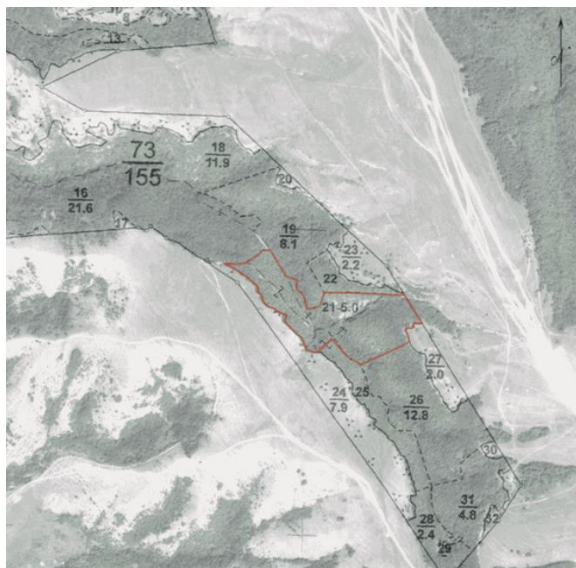
The Malyi Salhyr Stone Mushrooms natural monument has been established in lot 11 (allotments 21, 25, 26) of the Simferopol Forestry. This site is situated near Druzhne village in the Trudovske rural settlement of Simferopol Raion. As with the Kalamitskiy Reserve, the

⁷⁹ <https://travelcrimea.com/priroda/20220211/2187814.html>

⁸⁰ <https://crimea-news.com/other/2022/05/25/926806.html>

regulations governing this natural monument are heavily focused on recreational purposes and land leasing opportunities, according to documents available to the authors.

Notably, the territory of this reserve created by the occupation authorities is home to at least one genuinely rare endemic plant species – the fountain saxifrage (*Saxifraga irrigua*) (<https://www.inaturalist.org/observations/74345906>). This species is known to exist only in Crimea, underscoring its status as a true endemic.



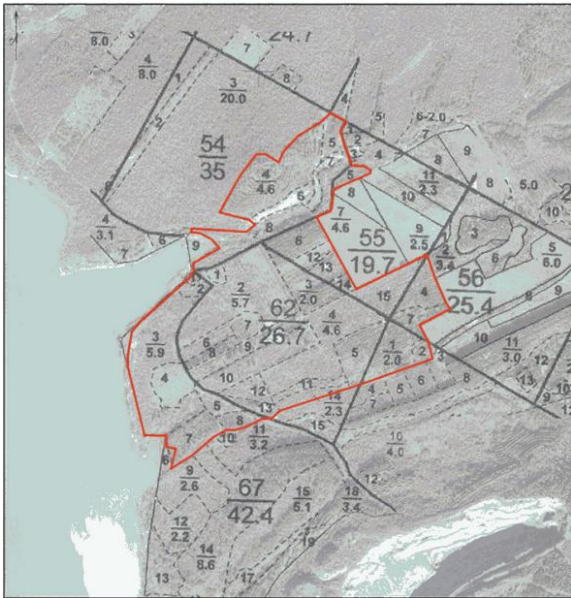
Map of the Malyi Salhyr Stone Mushrooms natural monument (source – regulations on the reserve)



https://yandex.ru/maps/org/kamennyye_griby_v_ivanovoy_balke/110655858028/

The M.V. Pechinkin Dendrological Park is situated in Simferopol Raion, 1.4 km northwest of the village of Fersmanove, on the eastern bank of the Simferopol Reservoir, covering lots 54, 55, 56, 62, 63, and 67 of the Simferopol Forestry. After its designation as a protected area, mass invitations for recreational visits began to surface⁸¹.

⁸¹ <https://visitsimferopol.ru/around/dendropark-im-m-v-pechyonkina/> ; <http://simadm.ru/press/government/30903/> ; <https://гвардсовет.рф/на-особо-охраняемых-природно-территориях-парк-им-м-в-печенкина-установили-первый-граничный-знак/>



Map of M.V. Pechinkin Dendrological Park, source – regulations on the reserve)



https://yandex.ru/maps/org/dendropark_m_v_pechyonkina/56050194127/?ll=34.166865%2C44.922141&z=16

Despite its protected status, various recreational activities are actively promoted within the arboretum, including those explicitly prohibited under Ukrainian law, such as riding all-terrain vehicles (ATVs)⁸².



ATVs in the protected territories of Crimea (prohibited by Ukrainian legislation) Source:

https://yandex.ru/maps/org/dendropark_m_v_pechyonkina/56050194127/gallery/?ll=34.166865%2C44.922141&photos%5Bbusiness%5D=56050194127&photos%5Bid%5D=urn%3Ayandex%3Asprav%3Aphoto%3AL3-AWqT5tBmg4dEbyMCW62s6UDYU2PY&z=13

⁸²https://yandex.ru/maps/org/dendropark_m_v_pechyonkina/56050194127/gallery/?ll=34.166865%2C44.922141&photos%5Bbusiness%5D=56050194127&photos%5Bid%5D=urn%3Ayandex%3Asprav%3Aphoto%3AL3-AWqT5tBmg4dEbyMCW62s6UDYU2PY&z=13

In 2024, the occupation authorities in Crimea plan to declare several new protected areas. These include the Limenska Valley, a juniper grove near Simeiz, part of the Beliaus Spit⁸³, and the Morskyi Prybii Monument Park⁸⁴ in Yalta. Additionally, funds have been allocated for further surveys to establish new reserves and dendroparks (arboretums). However, the lack of detailed descriptions in the official documents of these newly designated reserves and monuments raises suspicion. This suggests potential budget misappropriation, as large sums are spent on surveying these territories, yet the reports fail to mention any specific plant or animal species. A similar pattern can be observed with the allocation of significant funds — up to 252 million rubles (approximately 2.5 million euros!⁸⁵) per park — for the “improvement” of landscape art monuments.

The overall conclusion is troubling: the occupation authorities in Crimea appear to be using the creation of protected areas as a means to launder federal funds, rather than genuinely pursuing environmental goals. After establishing nature reserves, arboretums, and natural monuments, they lease land in these areas at higher rates for recreational purposes. This practice also funnels significant funds into park “improvements.” Consequently, the creation of protected areas, which are heavily marketed to vacationers, often results in increased recreational pressure, negatively impacting local species and habitats.

Between 2014 and 2023, during the years of occupation, the Crimean authorities made other moves to establish protected areas. In 2021, several “state” nature reserves were created, including Chervona Zoria (328.7 ha), Aunlar⁸⁶, Achi Lakes and Kamyshynskyi Luh (1,043.3 ha), Parpachskyi Hrebin (417.4 ha), and Lake Barakol (243.3 ha). Additionally, the Oiburskyi Landscape and Recreation Park (620.3 ha), and a unique category absent from Ukrainian legislation, the “*natural area of local significance*,” was created to “protect” the Tavrida Cave (0.1 ha).⁸⁷

These locations are well-known tourist spots, often associated with recreation or health benefits. Some of these areas are even highlighted in scientific publications, suggesting that experts may have been involved in proposing them as protected areas⁸⁸. However, the significant focus on promoting recreational services in these regions, along with rules permitting the leasing of land “for recreation,” suggests that these designations prioritize tourism over nature conservation. Furthermore, all of the newly created protected areas are situated in attractive recreational spots, rather than in more remote or ecologically fragile locations, such as the rugged mountains or dry steppe regions in the central and northern parts of the peninsula.

Looking ahead, the de-occupation of Crimea will raise complex issues regarding these nine protected areas. Since the decisions to create them were made under illegitimate authority, they hold no legal weight under Ukrainian law. Nonetheless, preliminary analysis indicates that these areas do possess natural value and merit preservation. After

⁸³<https://forpostsevastopol.ru/ekologija/v-2024-godu-v-krymu-sozdadut-kak-minimum-tri-osobo-ohranjaemye-prirodnye-territorii>

⁸⁴<https://gazetacrimea.ru/news/qde-v-krymu-povavyatsya-novye-oopt-kakoy-zapovednik-populyaren-u-turistov-i-mozhno-li-nudistam-otdykh/>

⁸⁵<https://gazetacrimea.ru/news/qde-v-krymu-povavyatsya-novye-oopt-kakoy-zapovednik-populyaren-u-turistov-i-mozhno-li-nudistam-otdykh/>

⁸⁶ https://rk.gov.ru/file/pub/pub_371360.pdf

⁸⁷ <https://crimea-news.com/society/2024/01/25/1287159.html>

⁸⁸ Amelichev H.N., Epihin D.V., Prokopov H.A. AUNLAR AS A POTENTIAL OBJECT OF THE NATURE RESERVE FUND OF CRIMEA. Scientific notes of the V. I. Vernadsky Taurida National University. Series “Geography”. Volume 27 (66), #1.2014., p.11-21.

<https://cyberleninka.ru/article/n/urochische-aunlar-kak-potentsialnyy-obekt-prirodno-zapovednogo-fonda-kryma>

Crimea’s de-occupation, it may be worthwhile for the Ukrainian government to consider officially recognizing these reserves and natural monuments.

Protected areas created by the occupation authorities of Crimea in 2021:



Aunlar Reserve

<https://ru.m.wikipedia.org/wiki/%D0%90%D1%83%D0%BD%D0%BB%D0%B0%D1%80>



Parpachskyi Hrbn Reserve

<https://xn----ttbgfagn8f.xn--p1ai/oopt-rk-3/gosudarstvennyj-prirodnyj-zakaznik-parpachskij-greben/>



Oiburskyi Landscape and Recreation Park

<https://xn----ttbgfagn8f.xn--p1ai/oopt-rk-3/landshaftno-rekreacionnyj-park-regionalnogo-znachenija-ojburgskij/>



Lake Barakol Reserve

<https://xn----ttbgfagn8f.xn--p1ai/oopt-rk-3/gosudarstvennyj-prirodnyj-zakaznik-regionalnogo-znachenija-ozero-barakol/>

In addition to addressing these territories, which will need to be formally declared protected under Ukrainian law to prevent uncontrolled recreation, the creation of new protected areas in Crimea should also be considered. Current national and international standards outline the required area for protected regions. Specifically, the Law of Ukraine “*On the basic principles (strategy) of the state environmental policy of Ukraine for the period up to 2030*”⁸⁹ mandates the expansion of the country’s Nature Reserve Fund to cover 15% of its total territory.

At present, however, only 6.8% of Ukraine's territory is classified as protected, less than half of the required standard.

⁸⁹ <https://zakon.rada.gov.ua/laws/show/2697-19#Text>

In practice, efforts to expand Crimea's nature reserve fund came to a halt in 2014 following the occupation. Plans that had been previously announced for future reserves (outlined in the table below) were left unrealized.

NRF as of 1 January 2013	Planned for 1 January 2017	Planned for 1 January 2021
https://zapovedcrimea.ru/yaltinskiy		
8.3%	14%	23%
216,000 ha	365,100 ha	599,900 ha

LOSS OF SPECIAL STATUS FOR RED DATA BOOK SPECIES

The Crimean peninsula is one of Ukraine's key regions for rare and endemic species of plants and animals. The Red Data Book of Ukraine serves as the primary and only legal mechanism for protecting such species. According to the Law of Ukraine "On the Red Data Book of Ukraine," the purpose of this legislation is to regulate societal relations concerning the protection, use, and reproduction of rare and endangered flora and fauna listed in the Red Data Book, aiming to prevent their extinction and preserve their genetic diversity. The current list of species included in the Red Data Book was approved by the Ministry of Environmental Protection and Natural Resources of Ukraine in 2021⁹⁰.

For nearly half of the species listed in the Book, Crimea represents the only region in Ukraine where they are found. Additionally, 44 plant species, one lichen species, and 19 animal species are endemic to Crimea, meaning they exist nowhere else in the world.

The inclusion of a species in the Red Data Book automatically assigns a specific value to the damage caused by the destruction of that species or its habitat. The calculation of these damages follows the rates established by the Cabinet of Ministers of Ukraine in Resolution No.1030 dated 7 November 2012 "On the amount of compensation for illegal hunting, destruction or damage to species of flora and fauna listed in the Red Data Book of Ukraine, as well as for destruction or deterioration of their habitat." This compensation is collected alongside fines imposed under Article 90 of the Code of Administrative Offenses of Ukraine, ("Violations of the protection requirements for species of animals and plants listed in the Red Data Book of Ukraine.")

The occupation of Crimea has led to the breakdown of protection measures previously afforded under Ukrainian environmental legislation, leaving many species once safeguarded without any legal protection. This loss is particularly significant for species that were exclusively protected under Ukrainian law. The chances for continued protection now exist only for species that are simultaneously listed in both Ukraine's Red Data Book and the Russian Federation's Red Data Book.

The Russian Red Data Book includes a total of 435 animal taxa⁹¹ and 676 species of plants and fungi⁹² — far fewer than those protected in Ukraine. Considering that Russia's territory is 28 times larger than Ukraine's, species from across the entire Russian Federation were selected for inclusion in the Red Data Book. However, the criteria for species protection in Russia differ significantly from those used in Ukraine, making it clear that many unique species found only in Crimea have not been, and cannot be, included in Russia's Red Data Book. This means that some of Crimea's most valuable biodiversity has lost its protective status under Russian law.

⁹⁰ <https://zakon.rada.gov.ua/laws/show/z0370-21#n17>, <https://zakon.rada.gov.ua/laws/show/z0260-21#Text>

⁹¹ Red Data Book of the Russian Federation (animals) / RAS; Editor-in-chief.: V.I. Danilov-Danylyan et al. - Moscow: ACT: Astrel, 2001 - 862 p.

⁹² Red Data Book of the Russian Federation (plants and fungi) / Ministry of Natural Resources and Ecology of the Russian Federation; Federal Service for Supervision of Natural Resources; RAS; Russian Botanical Society; Lomonosov Moscow State University: Editor-in-Chief: Yu.P. Trutnev et al.; Co-editor-in-Chief: R.V. Kamelin et al. - Moscow: Society of scientific editions KMK, 2008. – 885 p.

Some species in Russian Federation's Red Data Book coincide with species in Ukraine's Red Data Book.⁹³ A notable example of species protected under both Ukrainian and Russian legislation are junipers. Among the three juniper species found in Crimea, two are listed in the Red Data Book of Ukraine: the Greek juniper (*Juniperus excelsa*) and the stinking juniper (*Juniperus foetidissima*). While these junipers are widespread throughout the Mediterranean region, in Ukraine they grow only in limited areas of the Crimean Mountains.

These junipers are well-known to many Ukrainians and Russians, largely due to the popular souvenirs made from their aromatic wood. Juniper plaques, slices of trunk, and even scented pillows filled with juniper sawdust have become sought-after items⁹⁴. The essential oils released by the wood make it a prized raw material for souvenir production. However, junipers grow exceptionally slowly, with an average lifespan of around 600 years. In Crimea, some junipers have been found to be between 1,000 and 2,000 years old.

One of the oldest specimens of Greek juniper was discovered near Cape Sarych, on the Gugerdzhin peak. This ancient tree, estimated to be 2,000 years old, boasts a trunk circumference of 4.9 meters and a height of 15 meters. Experts consider it the oldest tree in both Ukraine and Europe⁹⁵. Nearby, in the Batylyman area, 16 more juniper trees over 1,000 years old have been identified. Among these, one tree is 1,400 years old, two are 1,300 years old, and several others are at least 1,000 years old, with trunks ranging from 2.5 to 3.45 m in girth and heights between 8 and 12 m. In this 4-hectare area of the Batylyman area, a unique concentration of ancient trees aged 1000-1400 years continues to grow⁹⁶.

Following the occupation of Crimea, these junipers retained their protected status, as they are also listed in the Red Data Book of the Russian Federation. However, the experience of occupation has shown that this protection is largely symbolic. Both Crimean⁹⁷ and Russian⁹⁸ sources continue to promote Crimea as a tourist destination, advertising juniper souvenirs and touting their antiseptic properties.

A meter-long piece of juniper trunk can fetch up to 20,000 Russian rubles⁹⁹, and despite the full-scale invasion, the destruction of these ancient trees has continued¹⁰⁰. With an influx of tourists from across the Russian Federation, lured by propaganda promoting Crimea as a "unique resort," the local souvenir trade has expanded significantly. In some cases, juniper trunks are deliberately sawed to let the trees dry out, or gasoline is poured around the roots to accelerate their death¹⁰¹.

Although this destruction is largely carried out by local residents without official sanction, it persists despite the introduction of criminal penalties for harming Red Data Book species — not just in occupied Crimea but across all regions of the Russian Federation¹⁰².

The controlling bodies of the occupation regime in Crimea, including their Ministry of Natural Resources and Environment, are undoubtedly aware of the ongoing destruction of the region's ancient junipers. Interestingly, in 2023, a public relations campaign was launched, ostensibly aimed at preserving these rare trees¹⁰³. This move underscores the pressing need to

⁹³ Details: THE ENVIRONMENT IN CRIMEA: changes and losses during the occupation. Part I. Destruction of wildlife, Kyiv: CrimeaSOS, 2021. 128 p.

⁹⁴ <http://xn--80aaomhbaceambtgxeuu8n.xn--p1ai/catalog/aromaterapiya/825977/>

⁹⁵ www.ukrinform.ua/rubric-society/1092421-naystarshiy_u_vrop_valvets_roste_v_krimu_963371.html

⁹⁶ https://www.conifers.org/cu/Juniperus_excelsa.php

⁹⁷ <https://ok-crimea.ru/krym/stati/2020/6393/prirodnyie-antiseptiki-kryima-mojjevelnik/>

⁹⁸ <http://www.russia-open.com/regions/south/1459/suvinir/2017/03/31/Suveniriy-iz-mozhzhhevelnika-irakushek.phtml>

⁹⁹ <https://www.youtube.com/watch?v=ADcQwZh8TNM>

¹⁰⁰ <https://kerch.fm/2023/05/21/vyrubku-mozhzhhevelnika-v-krymu-pomozhet-ostanovit-novyj-zakon-mnenie.html>

¹⁰¹ <https://crimea.mk.ru/politics/2019/02/15/kto-zashhitit-krym-ot-vyrubki-mozhzhhevelnikov.html>

¹⁰² <https://meco.rk.gov.ru/articles/a6bd290d-cf36-43e4-a67a-3fb5c3ede158>

¹⁰³ <https://crimea-news.com/society/2024/06/04/1384731.html>

protect the remaining junipers in Crimea, yet the approach taken by the occupying Ministry of Natural Resources and Environment reveals a troubling mix of incompetence and populism.

In 2022, an “indefinite environmental campaign” titled “Let’s save the junipers of Crimea”¹⁰⁴ was initiated, aimed at raising awareness about the importance of junipers in forest ecosystems and the need to preserve them. As part of the campaign, the Starokrymske Forestry and Forest Hunting Enterprise took steps to replant a juniper grove that had been devastated by a forest fire. They planted seedlings of a Cossack juniper and a prickly juniper¹⁰⁵.

While this might sound impressive to the general public, the reality is far different. Instead of focusing on the protection and preservation of the endangered millennia-old wild junipers, the Ministry of Natural Resources and Environment of the Russian Federation chose to finance the creation of a plantation of ornamental juniper species commonly used in landscaping. These ornamental species bear no relation to the ancient, slow-growing trees that are at risk of disappearing. As with many initiatives under the occupation, this action was funded by the federal budget of the Russian Federation.

There are numerous other examples of destruction and negligence toward species listed in the Red Data Book of Ukraine in occupied Crimea. Efforts to profit from natural resources, especially rare species, have spread across the region, from top officials to local actors. One striking instance occurred in 2023, when the illegal sale of an Aphin dolphin — protected under both the Red Data Book of Ukraine and the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic area (ACCOBAMS) — was documented. Neither of these protections are enforced in occupied Crimea¹⁰⁶.

Further highlighting the exploitation of wildlife, the financial collapse of a local, albeit illegal, business likely led to the deaths of dolphins held in captivity. In 2022, the owner of a Sevastopol dolphinarium released the dolphins into the sea, citing a lack of funds to care for them. Having been kept in captivity, the dolphins were unable to adapt to the wild and faced almost certain death. Tragically, they did not swim away but approached humans, seeking food, which led to injuries.¹⁰⁷

In our previous study conducted in 2021, concerns were raised that several endemic species — those found only in Crimea and nowhere else in the world — were at risk of extinction due to the diversion of Crimean rivers. Redirecting mountain rivers to the plains has deprived mountain ecosystems of essential water sources. Without the natural flow of water, riverbeds will no longer be washed by floods, springs will dry up, and the Crimean mountain ecosystem will face increasing drought. This will inevitably diminish biodiversity and significantly raise the threat of forest fires. The loss of water in Crimean rivers will not only impact common species but will also threaten endemic species, many of which are listed in the Red Data Book of Ukraine, pushing them closer to extinction. They are as follows:

Freshwater fish:

The Crimean shemia *Alburnus mentoides* is an endemic fish species native to the Chorna, Kacha, Belbek, and Alma rivers in Crimea. It was once found in the Sahyr and Biiuk-Karasu rivers but is now extinct in those areas. The main reasons for its decline are poaching and the

¹⁰⁴<https://xn----9sbmlieoffcycw7c0esa.xn--p1ai/upload/iblock/60c/fxqg1x9phz094r9e5nlc3gq8q9t959ar.pdf>

¹⁰⁵ <https://meco.rk.gov.ru/structure/f07e5959-297d-4272-9091-7998d9a6852c>

¹⁰⁶<https://crimea.ria.ru/20230526/iz-kryma-nezakonno-prodali-afalinu--delom-zanyalsya-rosprirodnadzor-1128986936.html>

¹⁰⁷ <https://t.me/c/1172830166/47661>

destruction of its natural habitat, largely caused by changes to the hydrological regimes of these rivers¹⁰⁸.

The small fish *Vimba tenella* is endemic to both the western part of the South Caucasus and Crimea. In Ukraine, it once thrived in the mountain rivers of the Crimean peninsula, including the Chorna, Salhyr, and Biiuk-Karasu rivers. However, the shallowing of rivers, particularly near coastal areas, along with water pollution and overfishing, have contributed to its significant decline.

The Crimean mackerel *Barbus tauricus* is endemic to rivers along the Black Sea coast and can be found in Turkey, Bulgaria, and Russia. In Ukraine, its habitat includes the middle and lower reaches of the Alma, Kacha, Aian, Belbek, Chorna, Salhyr, and Uchan-Su rivers, as well as several reservoirs like Bakhchisarai, Almin, Simferopol, Aian, Bilohirsk, Mykhailivske, and Feodosiia. The species is in decline due to poaching and habitat destruction, exacerbated by changes to the hydrological conditions in its native rivers.

Amphibians:

The newt *Triturus karelinii* is found in Ukraine's mountainous forest and foothill regions of the Crimean peninsula, ranging from Sevastopol in the west to Alushta in the east, and extending north to approximately Simferopol¹⁰⁹.

This species is listed in Appendix II of the Convention on the Conservation of European Wildlife and Natural Habitats (1979) (strictly protected fauna species) and is also included in the Red Data Book of the International Union for Conservation of Nature.

Insects:

The damselfly *Calopteryx splendens taurica* is an endemic species found in the mountainous and foothill regions of Crimea, as well as along the southern coast of the peninsula. It typically inhabits areas near water bodies and along the banks of mountain streams. The species likely has a two-year generation cycle, with adults emerging in May — June. It is a predator that feeds on small insects, while its larvae, which live in water, feed on aquatic insects. Its population is decreasing due to anthropogenic pressures such as river pollution and hydro-technical construction.

The *Heptagenia samochai* is found in Ukraine only in Crimea, specifically in the foothill areas of the Chorna, Salhyr, and Biiuk-Karasu rivers. Like other species, its population is declining under the strain of river pollution and hydro-technical developments.

The *Ecdyonurus solus* is another species that exists solely in Crimea, in the foothills near the Chorna and Alma rivers. It is unknown outside of Crimea, and its endemic population is similarly threatened by pollution and construction projects impacting the rivers.

The period following the full-scale invasion coincided with increased exploitation of rivers to meet the water needs of the population, a topic covered in this study's "Water Supply" section. Among the species at risk from river diversions, only the Crimean mackerel *Barbus*

¹⁰⁸ <http://www.fishbase.org/summary/65056>

¹⁰⁹ [https://uk.wikipedia.org/wiki/%D0%97%D0%B5%D0%BC%D0%BD%D0%BE%D0%B2%D0%BE%D0%B4%D0%BD%D1%96_%D0%A3%D0%BA%D1%80%D0%B0%D1%97%D0%BD%D0%B8_\(%D0%BA%D0%BD%D0%B8%D0%B3%D0%B0\)](https://uk.wikipedia.org/wiki/%D0%97%D0%B5%D0%BC%D0%BD%D0%BE%D0%B2%D0%BE%D0%B4%D0%BD%D1%96_%D0%A3%D0%BA%D1%80%D0%B0%D1%97%D0%BD%D0%B8_(%D0%BA%D0%BD%D0%B8%D0%B3%D0%B0))

*tauricus*¹¹⁰, newt *Triturus karelinii*¹¹¹, and Crimean damselfly *Calopteryx splendens taurica*¹¹² have confirmed evidence of their continued existence. However, since 2014, and particularly in 2022-2024, no evidence has been found of the remaining endemic species dependent on Crimean rivers. While this does not definitively confirm their extinction, it remains a distinct possibility.

POACHING

The promotion of “recreation in Crimea” among the Russian population has, regrettably, expanded to include the opportunity for paid hunting. To facilitate this, a simplified process for obtaining hunting permits has been introduced, even through a web application!¹¹³ Rustam Shafriev, head of the occupation’s hunting department within the Ministry of Natural Resources and Environment, explained the system in an interview with RIA Novosti:

*“You can use the Gosuslugi resource. We have recently worked on it, and now there is a separate button in the Crimean bank’s personal account. You can pay 650 rubles with just one click. So, everything has become much faster and easier.”*¹¹⁴

Meanwhile, the control bodies of the occupation authorities reported about 362 violations related to hunting and conservation were recorded in 2020. 188 offenders were apprehended in 2021, and 170 cases of illegal hunting were registered in 2022¹¹⁵. There have also been reports of unauthorized paid hunting organized by employees of forestry and hunting areas¹¹⁶, with poaching even occurring in protected zones, such as the Baidarskyi Reserve¹¹⁷.

In addition, the ongoing militarization of the peninsula, including the establishment of military bases and frequent military exercises, undoubtedly leads to numerous cases of animal deaths caused by military activities. However, these incidents are likely going unreported by the occupation’s controlling authorities.

DEFORESTATION

According to the occupation Ministry of Natural Resources and Environment, logging continued in the forests of Crimea during the full-scale invasion, despite the fact that these forests have historically been primarily recreational rather than operational. However, the

¹¹⁰[https://www.gbif.org/uk/occurrence/map?taxon_key=5207147&year=2014,2024&geometry=POLYGON\(\(33.29345%2043.9625,35.36193%2043.9625,35.36193%2045.71221,33.29345%2045.71221,33.29345%2045.22284,33.29345%2043.9625\)\)](https://www.gbif.org/uk/occurrence/map?taxon_key=5207147&year=2014,2024&geometry=POLYGON((33.29345%2043.9625,35.36193%2043.9625,35.36193%2045.71221,33.29345%2045.71221,33.29345%2045.22284,33.29345%2043.9625)))

¹¹¹ https://www.gbif.org/uk/occurrence/map?taxon_key=2431890&year=2014,2024

¹¹² <https://www.inaturalist.org/observations/138393766>

¹¹³<https://crimea.ria.ru/20230902/v-krymu-uprostili-protseduru-polucheniya-razresheniya-na-okhotu-1131108449.html>

¹¹⁴<https://crimea.ria.ru/20230902/v-krymu-uprostili-protseduru-polucheniya-razresheniya-na-okhotu-1131108449.html>

¹¹⁵ <https://sevastopol.su/news/lesa-kryma-zapolnili-lovushki-i-rastyazhki-brakonerov>

¹¹⁶<https://sevastopol.bezformata.com/listnews/organizoval-nezakonnuyu-okhotu-na-zhivotnih/123528694/>

¹¹⁷<https://crimea.ria.ru/20230313/v-zakaznike-pod-sevastopolem-brakonery-zastretili-kabana-1127510434.html>

demand for timber has pushed Crimean forestry enterprises to justify logging under the guise of “sanitary measures.” In 2022, the area subjected to continuous sanitary felling amounted to 88.6 ha, exceeding the planned figure of 50 ha by 77.2%¹¹⁸. A closer look at these reports reveals that what is labeled as “sanitary felling” is, in reality, indistinguishable from industrial logging in terms of its impact on the environment.

Logging has also been rampant outside of forested areas. For instance, in 2022, the occupation Ministry of Natural Resources and Environment in Crimea approved the removal of 30,076 green spaces¹¹⁹. This means over 30,000 trees in urban areas and municipal forests were legally cut down! To put that in perspective, the same number of trees can be found in three central raions (districts) of Kyiv — Pecherskyi, Shevchenkivskyi, and Podilskyi combined¹²⁰. Meanwhile, local occupation authorities occasionally launch investigations into illegal logging, as reported by regional media outlets¹²¹.

The deforestation linked to the construction of the Sevastopol bypass road is visible through Global Forest Watch¹²², a remote monitoring tool. Deforestation for military-related infrastructure, such as roads, is a growing concern and is explored further in the section on transport infrastructure development.

Automatic forest loss detection by Global Forest Watch provides revealing statistics: in 2022, Sevastopol lost one hectare of forest, while the Autonomous Republic of Crimea lost two hectares. In 2023, Sevastopol lost 18 ha and Crimea 49 ha. Compare: since 2014, Sevastopol has seen 130 ha of forest vanish, with significant losses in 2018 when 79 ha were cleared for the construction of the Tavrida highway, and 27 ha in 2021 across various locations. In the Autonomous Republic of Crimea, 258 ha of forest have been lost since 2014, with the most significant deforestation occurring in 2021, when 63 ha were cleared.

These figures account only for clear-cutting, which results in the total eradication of forest ecosystems. The actual loss is likely much higher, as selective logging of individual trees cannot be captured by remote sensing methods.

EXPLOITATION OF NATURAL RESOURCES IN CRIMEA

The data presented in earlier sections of our study indicate that the occupation authorities see Crimea primarily as a resource for profit, continuously seeking ways to bolster the budget — beyond federal subsidies — through the sale of Crimea’s natural assets or rights to access them. This assertion is supported by the information we collected for 2022.

Subsoil exploitation: In 2022 alone, the occupation Ministry of Natural Resources of Crimea granted:

¹¹⁸ <https://meco.rk.gov.ru/structure/f07e5959-297d-4272-9091-7998d9a6852c>

¹¹⁹ <https://meco.rk.gov.ru/structure/f07e5959-297d-4272-9091-7998d9a6852c>

¹²⁰ <https://www.village.com.ua/village/city/city-news/333597-zapustili-onlayn-mapu-derev-tsentra-kieva>

¹²¹ <https://vesti-k.ru/tv/2024/06/28/v-krymu-provodyat-rassledovanie-po-faktu-nezakonnoj-vyrubki-derevev/>

¹²² <https://www.globalforestwatch.org/>

- 8 mining allotments for the development of common mineral deposits.
- 36 technical projects for deposit development.
- 4 certificates recognizing the discovery of common minerals.
- 127 licenses for subsoil use¹²³.

Bioresource trade: In 2022, the occupation Ministry of Natural Resources of Crimea granted:

- 12 permits for the removal of flora species listed in the so-called “Red Data Book of the Republic of Crimea”, which are not included in the Red Data Book of the Russian Federation (indicating that Red Data Book-listed animals are being removed!).
- 2 permits for breeding flora listed in the “Red Data Book of the Republic of Crimea” and absent from the Red Data Book of the Russian Federation.
- 2 permits for collecting non-timber plant resources.
- 22 permits for the removal (demolition or destruction) of green spaces, excluding urban forests.

In total, the occupation authorities of Crimea received 45,461,877 Russian rubles (over 450,000 euros) from these activities in 2022 alone¹²⁴.

Lease of natural areas for hunting and recreation

The occupation Ministry of Natural Resources and Environment provided the following figures in its 2022 report:

- 23 lease agreements were signed for forest plots covering a total of 818.2 ha. These areas were leased for recreational activities, hunting, construction, reconstruction, the operation of linear facilities, and agricultural purposes.
- An additional 14.7 ha (comprising six forest plots) were handed over to subordinate state institutions of the Russian Federation for similar purposes, primarily recreation, as well as for the creation and operation of forest nurseries.
- The lease of these forest plots generated revenues of 1.808 million Russian rubles for the federal budget in 2022. This amount will be transferred annually to the budget of the occupation authorities for the duration of the 49-year lease agreements¹²⁵.
In terms of hunting, the “Ministry” reported discouraging statistics for 2022:
- Targeted shooting of wild boars was conducted, reducing their population to just one animal per 4,000 ha of hunting grounds within the municipal district! Revenues from auctions for the right to sign hunting agreements in the Alushta (Yaltynskiy Raion) and Sudak (Feodosiiskiy Raion) totaled over 65 million rubles, a figure twice as high as the proceeds from similar auctions in 2021. Additionally, more than 11 million rubles were generated from hunting fees.
- As of early 2023, the publicly accessible hunting grounds in Crimea spanned 609,300 ha, representing just over a quarter of the total area designated for hunting by the

¹²³ <https://meco.rk.gov.ru/structure/f07e5959-297d-4272-9091-7998d9a6852c>

¹²⁴ <https://meco.rk.gov.ru/structure/f07e5959-297d-4272-9091-7998d9a6852c>

¹²⁵ <https://meco.rk.gov.ru/structure/f07e5959-297d-4272-9091-7998d9a6852c>

occupation authorities. In 2022, more than 17,000 permits were issued for hunting on these grounds¹²⁶.

The occupation authorities in Crimea are positioning the peninsula as an attractive destination for recreation, including hunting, while profiting from leasing these territories to enterprises and private tenants from Russia. As previously mentioned, recreational activities are also permitted within protected areas, with fees based on newly introduced tariffs. Destructive “landscaping” projects are being carried out under the guise of development, funded by federal subsidies from the Russian Federation.

The Russian-backed occupation government is using federal funds to alter the natural landscape of Crimea and promote the region as a tourist destination to attract Russian visitors and businesses. It is important to note that, under current political circumstances, both recreation and business ventures in Crimea are exclusively available to Russian citizens, with the ultimate financial benefits flowing back to the Russian Federation.

REFORESTATION OF NATURAL ECOSYSTEMS

In a continuation of Soviet-era efforts to reshape nature, tree planting projects have been undertaken in the steppe regions near Feodosiia. Some of the mountainous slopes in this area were reforested during the Soviet period, though most of these plantings failed to take root, allowing the natural steppe vegetation to gradually recover over the past few decades.

However, these lands remain under the management of forestry enterprises, which has enabled these entities to once again apply for public funds to plant trees “within forest territory.” Unfortunately, such initiatives often lead to the destruction of valuable natural ecosystems. A recent example of this occurred in the steppe areas near the western outskirts of Ordzhonikidze, a location on Crimea’s southern coast, where similar actions were carried out, harming the local environment¹²⁷.

¹²⁶ <https://meco.rk.gov.ru/structure/f07e5959-297d-4272-9091-7998d9a6852c>

¹²⁷ <https://rutube.ru/video/f1f37fa4b5902f49586ed0b20a868404/>



“Planting forests” near the town of Ordzhonikidze. In the screenshot from the television story, we see that the steppe herbage areas were plowed over to destroy the local vegetation for planting.

Source: <https://rutube.ru/video/f1f37fa4b5902f49586ed0b20a868404/>

In 2023, official reports¹²⁸ claimed that young trees were planted across approximately 295 ha in Crimea, while media reports cited a figure of 6,000 trees¹²⁹. However, these numbers appear to be inconsistent. Typically, about 5,000 young trees are planted per hectare of new pine culture, which means 295 ha would require far more than 6,000 seedlings — closer to 1.5 million. The areas being plowed for these demonstrative reforestation projects are often habitats for rare species.

It is crucial to understand the cause-and-effect relationship between plowing the steppe, which invariably precedes tree planting, and its subsequent transformation into a desert. The steppe ecosystem, characterized by a certain moisture deficit, specific biochemical composition of herbaceous plants, and associated soil alkalization, facilitates humus accumulation at a rate faster than its decomposition. This process allows the steppe to maintain its character through continuous humus accumulation in the soil. No other natural mechanism can so effectively and extensively accumulate atmospheric carbon dioxide and preserve it in the soil. This process is essential for mitigating the greenhouse effect and global climate change impacts.

However, when steppe vegetation is destroyed, the black soil begins to erode and deteriorate, decomposing under microbial influence or washing away. Chernozems (rich black soil), with their heavy and medium grain size distribution, accumulate humus not only due to moisture deficit but also through moderate air exchange. Plowing the sod exposes it to extensive air contact, rapidly promoting aerobic bacterial growth that accelerates organic matter decomposition (oxidation). This plowing-induced process has led to the near-complete degradation of the chernozems over the past 50-100 years, despite these soils having accumulated humus since the last glaciation. This phenomenon encapsulates the essence of desertification: humus mineralization, soil degradation and erosion, and the disappearance of small rivers, culminating in fertility loss and increased aridity.

¹²⁸ <https://crimea-radio.ru/za-2023-god-v-krimu-derevy-a-visadili-na-plo/>

¹²⁹ <https://rutube.ru/video/f1f37fa4b5902f49586ed0b20a868404/>

In the vicinity of Ordzhonikidze, where artificial forest planting attempts have occurred, at least 47 species of animals and plants listed in the Red Data Book of Ukraine have been documented at various times¹³⁰:

Birds:

1. *Aquila heliaca* (Savigny, 1809)
2. *Buteo rufinus* (Cretzschmar, 1827)
3. *Circus cyaneus* (Linnaeus, 1766)
4. *Falco peregrinus* (Tunstall, 1771)
5. *Grus grus* (Linnaeus, 1758)

Reptiles:

6. *Dolichophis caspius* (Gmelin, 1789)
7. *Zamenis situla* (Linnaeus, 1758)

Insects:

8. *Libelloides macaronius* (Scopoli, 1763)
9. *Carabus bessarabicus* (Fischer von Waldheim, 1823)
10. *Leucomigus candidatus* (Pallas, 1771)
11. *Pseudophilotes bavius* (Eversmann, 1832)
12. *Tomares callimachus* (Eversmann, 1848)
13. *Euchloe ausonia* (Hubner, 1804)
14. *Cryptocheilus rubellus* (Eversmann, 1846)
15. *Bolivaria brachyptera* (Pallas, 1773)
16. *Saga pedo* (Pallas, 1771)

Plants:

1. *Anacamptis morio* (L.) R.M. Bateman, Pridgeon & M.W. Chase
2. *Galanthus plicatus* M.Bieb.
3. *Sternbergia colchiciflora* Waldst. & Kit.
4. *Astrodaucus littoralis* (M.Bieb.) Drude
5. *Prangos trifida* (Mill.) Herrnst. & Heyn
6. *Rumia crithmifolia* (Willd.) Koso-Pol.
7. *Arum orientale* M.Bieb.
8. *Centaurea sarandinakiae* Illar.
9. *Onosma polyphylla* Ledeb.
10. *Crambe aspera* M. Bieb.
11. *Crambe koktebelica* (Junge) N.Busch
12. *Crambe maritima* L.
13. *Cleome ornithopodioides* L.
14. *Colchicum triphyllum* Kunze
15. *Astragalus arnacantha* M.Bieb.
16. *Astragalus reduncus* Pall.
17. *Onobrychis pallasii* (Willd.) M.Bieb.

¹³⁰ GBIF.org (24 March 2024) GBIF Occurrence Download <https://www.gbif.org/occurrence/download/ad/0023491-240321170329656>

18. *Crocus angustifolius* Weston
19. *Crocus pallasii* Goldb.
20. *Salvia scabiosifolia* Lam.
21. *Tulipa biflora* Pall.
22. *Linum pallasianum* Schult.
23. *Nitraria schoberi* L.
24. *Neotinea tridentata* (Scop.) R.M. Bateman, Pridgeon & M.W. Chase
25. *Orchis punctulata* Steven ex Lindl.
26. *Orchis purpurea* Huds.
27. *Paeonia tenuifolia* L.
28. *Stipa capillata* L.
29. *Stipa pulcherrima* K.Koch
30. *Atraphaxis replicata* Lam.
31. *Adonis vernalis* L.

Another 36 species of plants and animals found in the vicinity of Ordzhonikidze are listed under international conventions and the Red List of the International Union for Conservation of Nature.

FOREST AND STEPPE FIRES

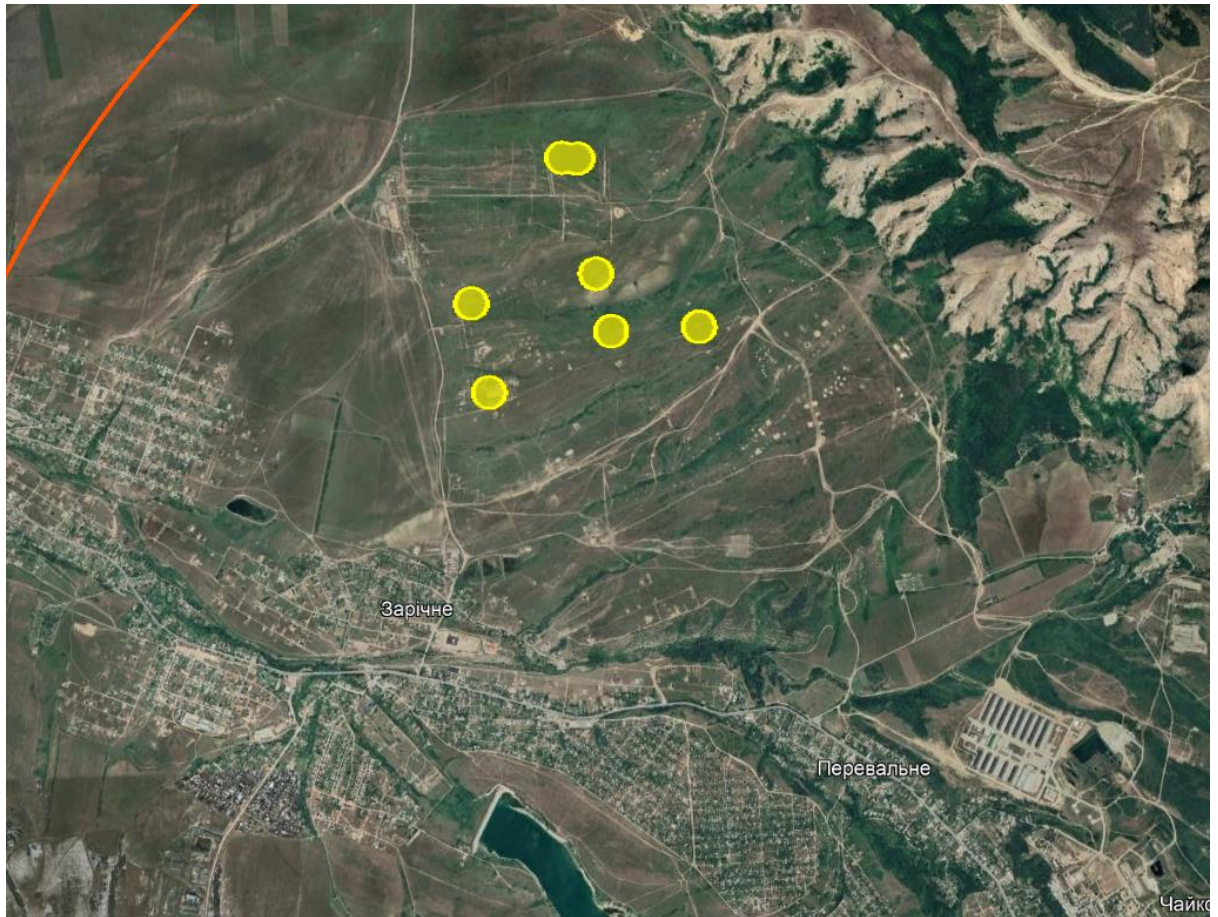
According to the occupation Ministry of the Environment of the Republic of Crimea, 14 forest fires have been recorded across the peninsula since 2022, affecting a total area of 19.5 ha. Official reports from the occupying authorities claim that all of these fires have been successfully extinguished¹³¹. News outlets frequently report on firefighting efforts, including incidents such as a fire covering just 0.015 ha in the Cape Aia Nature Reserve on 10 October 2023¹³².

However, extinguishing fires in mountainous areas has always been a significant challenge, suggesting that the actual extent of these fires could be far larger than reported. Moreover, media focus on minor fires may divert attention from more dangerous incidents.

Additionally, fires frequently break out in the steppe landscapes during missile launches, from air defense systems, or as a result of blazes at military facilities. These occurrences, however, appear to be of little concern to the occupation authorities.

¹³¹ <https://meco.rk.gov.ru/structure/f07e5959-297d-4272-9091-7998d9a6852c>

¹³² <https://vesti-k.ru/news/2023/10/10/pod-sevastopolem-gorel-zapovednyj-les>



Satellite image of localized fires on the territory of air defense systems in the central part of the Crimean mountains. The outskirts of the village of Perevalne, May 2024

WATER SUPPLY

Throughout all stages of Russian aggression, the issue of water supply to Crimea has been strategically significant for both Russia and Ukraine. After Russia’s annexation of the peninsula, the cessation of water deliveries from the Dnipro River via the North Crimean Canal sparked debate among international law experts¹³³ and even led some politicians to consider revisiting¹³⁴ the “water blockade” decision.

In the period just before¹³⁵ and immediately after¹³⁶ Russia’s full-scale invasion, many international experts viewed “Russia’s desire to restore water access to Crimea” as a key motivating factor behind the escalation of aggression. Water supply was also seen by some as a potential tool for “peacekeeping.” Following the invasion, Russia made efforts to restore the

¹³³ <https://onlinelibrary.wiley.com/doi/abs/10.1111/reel.12316>

¹³⁴ https://24tv.ua/ru/novoe_ukrainskoe_pravitelstvo_vystupaet_za_postavku_vody_v_krym_n1293050

¹³⁵ <https://tdhj.org/blog/post/crimea-water-disaster/>

¹³⁶ <https://www.newsecuritybeat.org/2022/03/hydropolitics-russian-ukrainian-conflict/>

water flow to Crimea through the North Crimean Canal, but this was abruptly halted when the Kakhovka Reservoir dam¹³⁷ — crucial to the canal’s operation — was destroyed.

Today, discussions are emerging in Ukraine about post-occupation scenarios. Some argue that water from the Dnipro should once again flow¹³⁸ to Crimea to enable the “normal” functioning of its economy.

However, we believe it is important to move beyond military and political rhetoric and focus on the changes that have occurred in Crimea’s water sector. For the first time since the 1960s, the peninsula has undergone an unplanned experiment in climate adaptation, facing a decade of water scarcity on an arid steppe with less than 400 mm of rainfall¹³⁹ annually. Our findings suggest a more optimistic outlook than the notion that “Crimea cannot survive without Dnipro water.”

The North Crimean Canal’s construction began in the 1960s after the Kakhovka Reservoir was filled. This marked one of the last large-scale projects aimed at transforming nature, designed to create an irrigation system for southern Ukraine, including Crimea. There were even plans for a second canal to irrigate southern Zaporizhzhia and Donetsk Oblasts (Regions), though that project was never realized.

Europe’s largest canal stretches over 400 km from Nova Kakhovka to Crimea, with five main branches, known as the “rice canals”: Azovskiy, Rozdolnenskiy, Chervonohvardiyskiy, Chornomorskiy, and Sakskiy. From the outset, the construction of the North Crimean Canal neglected filtration protection, meaning it ignored the inevitable, massive water losses that would occur. Instead, the priority was to extend the canal to Kerch¹⁴⁰ as quickly as possible. Water conservation and rational resource use were not key considerations in the project’s construction design.

At the time of construction, the project faced no significant criticism. The Soviet Union had no large-scale environmental movement, and the issue of global climate change wasn’t yet on the radar. It wasn’t until the early 1970s, when the canal was already operational, that Western scientists began raising concerns about climate change. In fact, the canal’s construction was driven by the ideology of transforming nature to maximize economic output, with little regard for environmental considerations. The focus was on reshaping nature to meet the economy’s needs, not adapting the economy to environmental limits. This led to ambitious plans for large-scale rice cultivation in the arid steppes, a decision that, given today’s understanding of climate and sustainability, seems almost incomprehensible. Ukraine, one of the most water-scarce countries in Europe¹⁴¹, shares this distinction with Moldova and Hungary. The idea of creating rice plantations in the country’s driest zone would be considered reckless by modern standards.

¹³⁷<https://uwecworkgroup.info/after-the-deluge-one-year-on-can-the-ecosystems-disrupted-by-the-destruction-of-the-kakhovka-dam-recover/>

¹³⁸ <https://ru.krymr.com/a/ukraina-kakhovskaya-hes-razrusheniye-damba-yug/32980593.html>

¹³⁹ <https://crimea-is-ukraine.org/svitytsa/znevodnene-desyatelittya>

¹⁴⁰ Плачинда С. Плотина // Літературна Україна. – 1967. – 7 жовтня. (Plachynda S. Plotina // Literary Ukraine. – 1967. – October 7.)

¹⁴¹<https://openknowledge.fao.org/server/api/core/bitstreams/e4876f54-8e55-49e2-a4d9-365b1ed0bc0b/content>



North Crimean Canal route and water-dependent sites in Crimea¹⁴²

With global climate change worsening, arid zones in Ukraine have expanded¹⁴³, and moisture deficits have grown. This highlights the stark contradiction between the Soviet-era system of irrigated agriculture and the principles of sustainable development. As the climate becomes increasingly dry, irrigation systems, which already use water inefficiently, become even more vulnerable.

The arrival of Dnipro water to northern Crimea in the 1960s had a profound impact not only on agriculture but also on the region's natural ecosystems. One of the most significant ecological changes was the development of vast reed beds, which displaced much of the native wetland vegetation in northern Crimea. Before the canal's construction, Lake Syvash was the primary water body on the peninsula, known for its highly saline waters. The introduction of freshwater ecosystems, however, dramatically altered the area's flora and fauna.

This shift in the water's salinity also triggered a redistribution of wildlife, particularly birds, across southern Ukraine¹⁴⁴. For example, the desalination of the salt lakes in Syvash and the creation of new wetlands, including extensive reed beds, made the region more appealing to migratory wetland birds. However, the expansion of these freshwater ecosystems came at the expense of Crimea's natural steppe landscapes. As a result, many steppe bird species have

¹⁴²[https://www.hidropolitikakademi.org/uploads/editor/images/RUSSIA's%20WATER%20WAR%20ON%20UKRAINE\(1\).pdf](https://www.hidropolitikakademi.org/uploads/editor/images/RUSSIA's%20WATER%20WAR%20ON%20UKRAINE(1).pdf)

¹⁴³ <https://landlord.ua/wp-content/page/pid-udarom-stykhii-iak-mihruut-klimatychni-zony-v-ukraini/>

¹⁴⁴https://www.researchgate.net/publication/331688521_Irrigacionnoe_zemledelie_i_problemy_sohranenia_biologicheskogo_raznoobraziya_Dzankojnskogo_rajona_Avtonomnoj_respubliki_Krym

disappeared from the region. Species such as steppe cranes, great bustards, and little bustards saw their populations significantly decline.

From the time the canal was built until 2014, Crimea relied on Dnipro water to meet up to 85% of its water needs, with an annual average of 1.5 km³ transferred via the North Crimean Canal. According to official data from the Autonomous Republic of Crimea in 2013, only half of the water that flowed through the canal was used for household purposes. The rest was lost along the way due to evaporation and filtration (see Table).

Table. Water supply and sanitation in Crimea. Dimension: million m³ per year¹⁴⁵

Name of the water site	Total water withdrawn from natural sites	Water used	Discharge to surface water sites	
			Total	including polluted return waters
Total, including	1553.78	768.56	208.5	93.17
Water from the North Crimea Canal	1346.3	596.5	—	—
Local run-off	136.38	113.37	132.7	84.38
Ground water	68.54	56.13	—	—
Sea water	2.56	2.56	(into the Black and Azov Seas) 75.8	8.79

The year 2013 marked the last time Ukraine could maintain consistent statistical reports on water consumption in Crimea, as it was also the final year water flowed to the peninsula through the North Crimean Canal. In that year, agriculture consumed the majority of Crimea's water supply — 590.18 million m³ (77%). Housing and communal services used 125.3 million m³ (16.4%), while industry accounted for 50.64 million m³ (6.6%). Water losses during canal transportation were substantial, amounting to 695 million m³, or around 50% of the total supply. This high loss rate reflected a long-term trend of increasing inefficiency, observed between 2000 and 2012¹⁴⁶.

In agriculture, 90% of water was used for irrigation, with a significant portion — 60%, or at least 350 million m³ — dedicated to rice fields. This water-intensive crop, along with the expansion of grain production on irrigated lands, was introduced in the 1960s despite not being well-suited to the local environment. By 2013, only 140,000 hectares of the 400,000 ha of Soviet-era irrigated land remained¹⁴⁷ in use. Traditional farming methods such as viticulture

¹⁴⁵ https://web.archive.org/web/20150427215527/https://meco.rk.gov.ru/rus/file/doklad_eco_2013.pdf

¹⁴⁶ https://meco.rk.gov.ru/rus/file/doklad_eco_2013.pdf

¹⁴⁷ <https://tdhj.org/blog/post/crimea-water-disaster/>

required far less water, highlighting the inefficiency of agricultural expansion driven by the construction of the North Crimean Canal.

Crimea's own water resources are far more modest, typically estimated at up to 1,000 million m³ per year. Following the annexation, estimates of Crimea's water capacity ranged from 800 million to 1,200 million m³ annually. Our most conservative estimates, reflecting extreme drought conditions¹⁴⁸, put the guaranteed runoff from all Crimean rivers at 371 million m³ per year. Because the peninsula's water resources follow a seasonal cycle, reservoirs are vital to storing water for municipal and agricultural use. Crimea has 23 reservoirs¹⁴⁹ that provide centralized water supply; eight were filled by the North Crimean Canal, contributing up to 145 million m³, while the remaining 15 relied on surface runoff from mountain rivers, storing up to 245 million m³.

These reservoirs are critical not only for municipal needs but also for supporting Crimea's tourism and recreational infrastructure, which underpins the local economy. The availability of virtually free water from the Dnipro River led to inefficient and wasteful water use, as Crimea had little incentive to improve efficiency in its water management practices.

The blocking of the canal in 2014 by Ukraine presented a significant challenge for the peninsula, especially for its agricultural sector, which had been heavily dependent on Dnipro water supplied by the North Crimean Canal. Irrigated agriculture faced a severe decline. By 2022, only 17,000 ha of irrigated grain crops remained¹⁵⁰. The previously inefficient agricultural practices could no longer function in Crimea's dry climate, leading to the collapse of rice cultivation¹⁵¹ and other water-reliant farming activities after the canal was blocked.



View of the acid accumulator of the Crimean Titan Plant, 2018¹⁵²

¹⁴⁸<https://sciencejournals.ru/view-article/?j=vodres&y=2022&v=49&n=4&a=VodRes2204011Kositskii#R14>

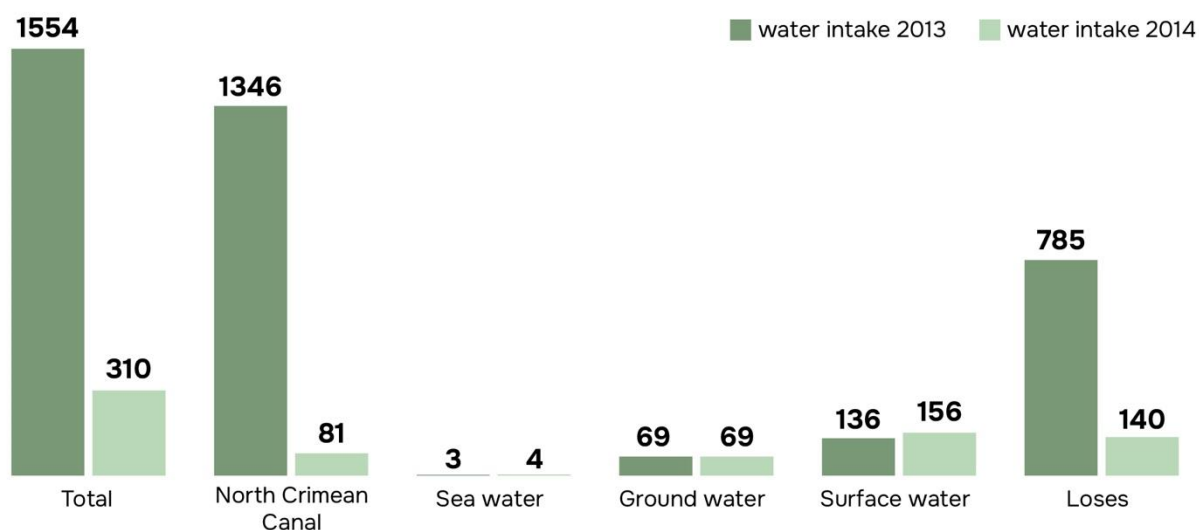
¹⁴⁹<https://vestnikapk.ru/articles/portret-regiona/roman-zakharov-nashi-glavnye-prioritety-v-rabote-nadezhnost-i-razvitie/>

¹⁵⁰ <https://www.newsecuritybeat.org/2022/03/hydropolitics-russian-ukrainian-conflict/>

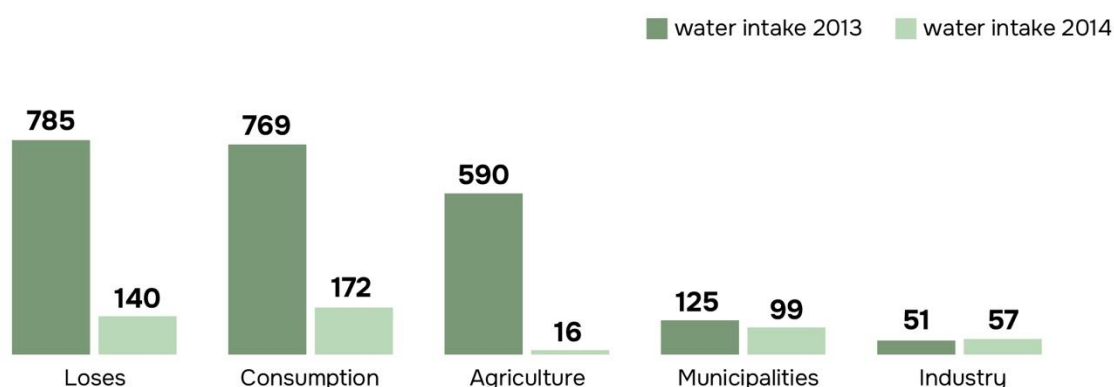
¹⁵¹ <https://ru.krymr.com/a/25375450.html>

¹⁵² <https://www.proekt.media/narrative/voda-krym/>

The industrial sector in Crimea was equally unprepared for the sudden loss of Dnipro water. One of the most affected was the Crimean Titan Plant, which had to scale back production and lay off a portion of its workforce¹⁵³ due to the water shortage. The lack of water¹⁵⁴ at the plant also contributed to severe environmental pollution, culminating in an ecological disaster in Armiansk¹⁵⁵ in 2018. This disaster was triggered by the evaporation of the contents of an acid accumulator, where the plant's waste had been stored.



Water supply for the needs of Crimea in 2013-2014. Data for 2013 — the so-called “Republican Committee for Nature of the Republic of Crimea”¹⁵⁶. Data for 2014 — Institute of Economics and Organization of Industrial Production of the Russian Academy of Sciences¹⁵⁷.



Water use in Crimea in 2013-2014. Data for 2013 — the so-called “Republican Committee for Nature of the Republic of Crimea”¹⁵⁸. Data for 2014 – Institute of Economics and Organization of Industrial Production of the Russian Academy of Sciences¹⁵⁹.

¹⁵³ <https://ru.krymr.com/a/krymskiy-titan-uvolneniya-profsoyuz/31008108.html>

¹⁵⁴ <https://ru.krymr.com/a/dneprovskaya-voda-v-krym-severo-krymskiy-kanal/31832738.html>

¹⁵⁵ <https://eprostir.org/2020/01/13/armiansk-zona-bedstvyia/>

¹⁵⁶ web.archive.org/web/20150427215527/https://meco.rk.gov.ru/rus/file/doklad_eco_2013.pdf

¹⁵⁷ <https://dictaphone.org.ua/2020/06/04/kak-kr-m-ostalsia-bez-vod-rassledovanye-ekateryn-reznykovoy/>

¹⁵⁸ web.archive.org/web/20150427215527/https://meco.rk.gov.ru/rus/file/doklad_eco_2013.pdf

¹⁵⁹ <https://dictaphone.org.ua/2020/06/04/kak-kr-m-ostalsia-bez-vod-rassledovanye-ekateryn-reznykovoy/>

For the occupation authorities, the most pressing issue — largely for political reasons — was ensuring water access for both residents and tourists. Between 2019 and 2021, many towns and villages reliant on reservoirs previously filled by canal water faced scheduled water rationing. During the driest months, water was available for only a few hours each day, typically in the morning and evening. By 2020-2021, the occupation authorities had adjusted to these new conditions and began planning long-term solutions for the water crisis. Prior to this, efforts had been largely disorganized, with a chaotic scramble for water sources. However, the onset of the full-scale invasion derailed even the Russian government’s own plans for securing Crimea’s water supply.

Despite the fivefold reduction in water supply from the Dnipro River, water losses in Crimea still amounted to 45% in 2014 — 140 out of 310 million m³ never reached consumers (see the diagram above). To address the growing water deficit, the Russian government approved¹⁶⁰ the “*Comprehensive plan for ensuring reliable water supply to the Republic of Crimea and the City of Sevastopol*” only in October 2020. This plan allocated over \$600 million for a broad range of measures aimed at improving the efficiency of existing water resources and developing new ones.

One key goal of the plan was to reduce water losses in supply networks, which was projected to save 12 million m³ annually. Another 10 million m³ per year were expected from improving the operation of existing water intake structures. The diversion of water from the Belbek River to the dry Mizhhirskiy Reservoir was projected to contribute 15 million m³ annually, while the exploration and development of new underground water sources could add another 25 million m³ per year. Additionally, the plan proposed for the first time in the region the construction of desalination plants¹⁶¹ with a combined annual capacity of 15 million m³.

In their water management program, innovators went as far as including the reuse of purified sewage from Sevastopol for technical purposes. In total, the priority measures were expected to yield an additional 112 million m³ of water per year, which could address most water supply issues, though not enough to revive large-scale irrigated agriculture from the Soviet era. However, despite these ambitious plans, the number of accidents in sewage systems continued to rise throughout the years of occupation. For example, in June 2024, a major accident left 100,000 residents of Feodosiia without water and caused pollution in the Black Sea¹⁶².

However, even the most promising Russian programs were consistently undermined by poor management and widespread corruption. An investigation conducted in 2021 by the Russian opposition outlet “Diktofon”¹⁶³ revealed that most of the planned projects in Crimea had not even begun by that year. Much of the allocated money disappeared into the pockets of developers with little to show for it. When Dnipro water was once again released into Crimea via the canal, efforts to develop desalination plants¹⁶⁴ were abruptly abandoned — despite the funds having already been spent.

¹⁶⁰ <http://publication.pravo.gov.ru/document/0001202010200016>

¹⁶¹ <https://rg.ru/2021/03/31/reg-ufo/rossijskie-uchenye-predlozhili-krymu-ekologichnye-i-kompaktnye-opresniteli.html>

¹⁶² <https://tsn.ua/ukrayina/mayzhe-sto-tisyach-meshkanciv-okupovanoyi-feodosiyi-zalishilisy-bez-vodi-u-kranah-485998.html>

¹⁶³ <https://dictaphone.org.ua/2020/06/04/kak-kr-m-ostalsia-bez-vod-rassledovanye-ekateryn-reznykovoy/>

¹⁶⁴ <https://www.pnp.ru/news/v-krymu-otkazalis-ot-idei-stroitelstva-opresnitelnykh-ustanovok.html>

Some water supply projects, such as the Beshterek-Zuiskyi water intake for Simferopol and the Belbek River water intake for Sevastopol, have been completed¹⁶⁵ and are operational. Construction is also progressing on a 200-kilometer underground pipeline that will transport water from 38 newly drilled wells to the eastern cities of Feodosia and Sudak. Additionally, a seven-kilometer tunnel is being built under Mount Ai-Petri to supply water to the resort city of Yalta. According to sources from the occupation authorities, the tunnel project under Mount Ai-Petri is one of the largest infrastructure developments in Crimea, with an estimated cost of around 9 billion rubles. The tunnel, which extends more than 7.2 km with a diameter of 3.5 m, has been carved through the mountain's rock. The plan is for water to flow by gravity from the "Schaslyve-2" reservoir, located to the north of the mountain range, to treatment facilities, and then be distributed as drinking water to Yalta and surrounding villages. The system is designed to provide a capacity of up to 100,000 m³ of water per day¹⁶⁶. In addition, projects for pipelines have been initiated to supply water to Feodosiia and Kerch, reducing the losses typically caused by evaporation¹⁶⁷.

Interestingly, the occupation authorities have prioritized the most capital-intensive projects while delaying critical infrastructure work, such as the widespread replacement of deteriorating pipes. This approach is consistent across all sectors examined in this report, revealing a strategy aimed at maximizing funding from the Russian federal budget for new initiatives in Crimea that exploit natural resources.



¹⁶⁵ <https://ru.krymr.com/a/simferopol-vodovod-zapusk-krym/31160755.html>

¹⁶⁶ <https://www.vedomosti.ru/society/news/2023/11/18/1006510-krimu-proburili>

¹⁶⁷ <https://c-pravda.ru/news/2023-12-21/feodosiya-i-kerch-zhdut-vodu>

“Patriotic” design of a water intake structures for Sevastopol on the Belbek River (average water supply — 50 cubic meters per second)¹⁶⁸



On February 26, 2022, just days into the full-scale invasion, Russian military forces demolished the dam blocking the North Crimean Canal in Kherson Oblast. Video evidence of this destruction¹⁶⁹ circulated widely in media outlets, framed as a significant victory by Russian occupation authorities. Throughout the annexation period, the Dnipro water issue had been weaponized to stoke anti-Ukrainian sentiment, even finding its way into illegal “Crimean court” proceedings¹⁷⁰. Russia

portrayed the restoration of Crimea’s water supply as both a major military achievement and the fulfillment of a promise to the peninsula’s residents.

The seizure of Kherson’s left bank and the subsequent reopening of the North Crimean Canal to Crimea in February 2022 was hailed as a long-awaited “revenge” by Russian authorities. However, this triumph was tempered by the occupiers’ evident lack of preparedness¹⁷¹ to implement their planned autonomous water supply measures for Crimea. By March 2022, the Russian Government of Crimea had already backtracked¹⁷² on plans to construct desalination plants, requesting their removal from state programs. Simultaneously, projects focused on wastewater treatment and reuse were put on hold.

A mere month after the onset of the full-scale invasion, the head of the occupying Ministry of Agriculture announced their readiness to irrigate 40,000 ha of land¹⁷³. This figure, however, represented only one-third of the irrigation system’s capacity from the North Crimean Canal¹⁷⁴. Earlier, in 2019, the Crimean “authorities” approved the “State program for the development of agriculture and regulation of the markets of agricultural production, raw materials and food of the Republic of Crimea”¹⁷⁵. Under this program, irrigation was slated to cover a mere 13,100 ha, relying solely on water from internal runoff sources.

On 16 October 2020, the Government of the Russian Federation approved Order No.2668 — the “Complex plan for ensuring a reliable water supply to the Republic of Crimea and the City of Sevastopol”. The plan encompasses a wide range of initiatives, including efforts to reduce water loss in consumption networks, conduct geological exploration of groundwater resources, and construct the Beshterek-Zuiskyi water intake. It also proposes the development of reservoir utilization plans, water transfer from the Kadykskyi quarry, the construction of a water intake on the Belbek River, redirection of the Salhyr River flow to Mizhhirnyi hydraulic

¹⁶⁸<https://rg.ru/2021/03/18/reg-ufo/v-sevastopole-zapustili-v-eksploataciiu-vodozabor-na-reke-belbek.html>

¹⁶⁹ <https://t.me/UkraineNow/2838> <https://www.reuters.com/world/europe/russian-forces-unblock-water-flow-canal-annexed-crimea-moscow-says-2022-02-24/>

¹⁷⁰ <https://www.rbc.ru/politics/25/10/2023/6538ef179a7947817ac2b35b>

¹⁷¹ <https://ria.ru/20220227/krym-1775119286.html>

¹⁷² <https://www.pnp.ru/news/v-krymu-otkazalis-ot-idei-stroitelstva-opresnitelnykh-ustanovok.html>

¹⁷³ <https://crimea-news.com/society/2023/04/29/1065740.html>

¹⁷⁴ <https://www.blackseanews.net/read/139841>

¹⁷⁵ <https://msh.rk.gov.ru/structure/b8d0dd47-5a47-4012-95dc-bfef2fc11e56>

units and construction of desalination plants and treatment facilities, etc. Financially, the plan foresees a total allocation of 48,005.2 million Russian rubles (approximately 480 million euros). Notably, only 4.4% of this funding is set to come from local budgets, with the vast majority sourced from the federal budget.

Anticipating a steady water supply from the Kakhovskiy Reservoir, Crimean “authorities” have initiated the restoration of the irrigation system, focusing particularly on clearing reclamation channels. However, only formal statistics regarding fund utilization are available, leading to our speculation that the channel clearing efforts may have been primarily aimed at securing financing, potentially for money laundering purposes. Official reports indicate that in 2023, nearly 1,300 m³ of sediment were removed from reclamation channel beds, and 105.7 km of pipelines were prepared.

By 1 April 2023, the goal was to prepare irrigation systems for 56,44 thousand ha of agricultural land¹⁷⁶. This target marked a dramatic increase compared to previous years. Between 2014 and 2018, only 4,961.8 ha of reclaimed land were put into operation, with just 2,058.8 ha prepared in 2018¹⁷⁷. The leap to 23 times more land prepared for irrigation in 2023, especially given the intense militarization of Crimea, raises serious questions about the feasibility of such an achievement. It seems unlikely that the efficiency of the work increased to such an extent, particularly as original plans to restore irrigation systems were projected for completion by 2025, before the full-scale invasion even began.

Even the photographs published on the “Krymvodhosp” website suggest that the work carried out was merely a formality, hinting at potential money laundering schemes.



Clearing of canals — just for show — in the north of occupied Crimea
<https://crimeamvh.ru/index.php/1661-razdolnenskij-filial-ochistka-kanala-rrk>

The total funds allocated to the development of Crimea’s water management and reclamation systems are estimated at 14.6 billion Russian rubles (approximately 146 million US dollars), according to media outlets controlled by Russian censorship. Despite this, from 2021 to 2023, the only reported work was the clearing of debris, blockages, and sediment from 21 riverbed sections, totaling 152.26 km in length¹⁷⁸.

¹⁷⁶<https://crimea.ria.ru/20230207/kilometry-trub-i-desyatki-stantsiy-kak-krym-gotovitsya-k-sezonu-poliva-1126832621.html>

¹⁷⁷<https://msh.rk.gov.ru/uploads/msh/attachments/documents/d4/1d/8c/d98f00b204e9800998ecf8427e/640af9d2c8b915.81707880.pdf>

¹⁷⁸ <https://gkvod.rk.gov.ru/articles/85569cd5-7627-4691-8981-953e72c5cef3>

Most of the money for these so-called land reclamation projects comes from the Russian federal budget. Some speculate that the significant expenditure on ostensibly incomplete projects may in fact be directed toward military purposes. As a result, Russian-controlled utilities and occupation authorities are compelled to provide superficial reports, supported by inconclusive photographic evidence, to justify federal spending.

One specific issue that requires attention is the water supply to the Crimean Titan Plant. Access to fresh water is critical for the facility, as a shortage could lead to another ecological disaster similar to the one that occurred in 2018-2019¹⁷⁹.

In the summer of 2023, reports surfaced regarding the evacuation of areas surrounding a key industrial enterprise¹⁸⁰. It remains unclear whether this was due to the mining of the facility or an environmental threat similar to the crisis of 2018-2019.

Despite the uncertainty, several significant construction contracts for alternative water supply systems had already been secured by influential figures, allowing parts of these projects to continue beyond 24 February 2022.

Officials were also tasked with managing substantial funds for the modernization of the North Crimean Canal and the extensive network of “rice” canals, which had by then fallen into disrepair. Based on past experiences with large-scale land reclamation projects, it is evident that the clearing, “improvement,” and “reconstruction” of watercourses, canals, and riverbanks constitute one of the most common ways to allocate and utilize budgetary resources.



The location of the North Crimean Canal water intake from the upstream side of the Kakhovka HPP Dam (southern part of the Kakhovka Dam) before and after the dam was blown up. **Source:** earthobservatory.nasa.gov

¹⁷⁹ <https://ru.krymr.com/a/titan-krym-katastrofa-udobreniya-podryv-2023/32463483.html>

¹⁸⁰ <https://ru.krymr.com/a/news-krymskiy-titan-podryv-gur-krym/32455400.html>

In June 2023, the Russians detonated the Kakhovka Dam, leading to a dramatic drop in the water level of the Kakhovka Reservoir, which rendered water intake for the North Crimean Canal impossible. This event prompted the Russians to return to discussions and efforts aimed at achieving Crimea’s water autonomy. By August 2023, the occupying “head of the Republic of Crimea,” Sergey Aksyonov, declared¹⁸¹ that “*if irrigated agriculture is not taken into account, the peninsula no longer needs Dnipro water.*”

Today, the occupation authorities assert¹⁸² that the available 240 million m³ of water will be sufficient to meet the Crimean economy’s needs for a year. This may be true, but it is worth noting that this reserve was accumulated during a period of abundant water. Should a drought¹⁸³ occur, additional measures for water supply will be required, many of which were already included in the comprehensive plan for Crimea’s “autonomous” water supply program.



Current state of the North Crimean Canal, 2024

A rapid decrease in the water levels of European rivers brings into question the availability of water in the Dnipro River, especially for needs defined during the Soviet era in the early 1930s. Therefore, it is essential to explore modern water supply options, taking into account current environmental conditions, socio-economic priorities, and advances in technology. This issue is particularly relevant in the context of Ukraine’s post-war recovery, which will also include the restoration of Crimea.

In 2022, prominent water management expert I. Zonn published¹⁸⁴ an insightful article comparing water management in Crimea with that of Israel — a country that receives less

¹⁸¹ <https://rg.ru/2023/08/01/reg-ufo/aksenov-krym-gotov-k-zhizni-bez-vody-iz-dnepra.html>

¹⁸² <https://news.mail.ru/society/61348618/>

¹⁸³ <https://sevastopol.su/news/zapasy-vody-v-krymu-prodolzhayut-sokraschatsya>

¹⁸⁴ <https://cyberleninka.ru/article/n/kross-tehnologicheskoe-sravnenie-resheniy-vodnyh-problem-respubliki-krym-i-gosudarstva-izrael>

rainfall than Crimea but has nearly the same amount of natural water resources. Despite these challenges, Israel has managed to become a water-sufficient state with a thriving agricultural sector, even exporting water. Zonn's article attributes this success to the effective integration of innovative water management practices and cutting-edge technologies.

The article suggests that Crimea could benefit from adopting several Israeli practices. These include large-scale use of treated wastewater for irrigation, advances in technology and breeding techniques to enhance agricultural productivity, economical desalination plants, and modern innovations in water resource management policies. Additionally, Crimea should consider implementing more efficient drip irrigation systems and addressing corruption in the execution of water management programs.

In Crimea, water loss has been a persistent issue. Significant losses occur not only along the route of the North Crimea Canal, which evaporates nearly half of the water, but also within municipal water systems. There is, however, enormous potential for water conservation. Currently, 50-70% of already treated water¹⁸⁵ supplied to consumers is lost due to inefficiencies in the communal infrastructure. The deterioration of sewage networks is also a growing problem, with wear and tear rates between 50% and 70%. For example, in Simferopol, only 55% of the water supplied by the municipality reached consumers in 2013; by 2018, that figure had dropped to just 43%.

By radically modernizing infrastructure and introducing¹⁸⁶ metering systems for both water consumption and wastewater, alongside raising water prices and imposing fines for pollution, substantial savings can be achieved. Additionally, a fundamental shift in the structure of agricultural production is necessary. One potential solution is the artificial recharge of groundwater during periods of high water levels, which would help prevent evaporation and ensure the resource is available during droughts¹⁸⁷. Some experts and officials also consider the development of groundwater under the sea to be a promising option, particularly in the Azov region, where a rich freshwater aquifer lies beneath the shallow waters of the Arabat Spit¹⁸⁸. However, other experts warn that tapping into these aquifers could cause saltwater intrusion from the sea¹⁸⁹.

In the 2020s, the occupation authorities actively sought ways to exploit groundwater in Crimea. In 2022, Crimea's so-called Ministry of Natural Resources launched a project called "Geological exploration of the subsoil to identify new deposits of drinking groundwater in the Republic of Crimea," which led to the drilling of 28 new wells, including one in the town of Baherove. These efforts are being carried out by the Krymgeologiya enterprise¹⁹⁰.

All of this points to numerous well-established opportunities to improve water use in Crimea, the most immediate of which is reducing water loss. Currently, water needs, including losses due to inefficiencies, amount to 240 million m³ annually. If losses were reduced by half (from 50% to 25%), the demand would drop to less than 180 million m³. This is far below even the most conservative estimate of the peninsula's guaranteed water resources and less than 20% of the generally accepted annual volume.

However, all these considerations will need to be reassessed after the de-occupation of Crimea. The water demands of 2024 will likely change, as one of the largest current consumers

¹⁸⁵ <https://rg.ru/2020/02/26/reg-ufo/eksperty-ocenili-poteri-v-setiah-vodosnabzheniia-kryma.html>

¹⁸⁶ <https://ecologyofrussia.ru/chistaya-voda-dlya-kryma-vzglyad-eksperta/>

¹⁸⁷ <https://ecologyofrussia.ru/chistaya-voda-dlya-kryma-vzglyad-eksperta/>

¹⁸⁸ <https://www.stoletie.ru/print.php?ID=654323>

¹⁸⁹ <https://ru.krymr.com/a/28135720.html>, <https://ru.krymr.com/a/28361893.html>

¹⁹⁰ <https://meco.rk.gov.ru/structure/f07e5959-297d-4272-9091-7998d9a6852c>

of water in Crimea is the occupying military forces. Since 2014, the militarization of Crimea has led to a surge in water consumption, and this has only intensified with the full-scale invasion, as more water is required to service military personnel and equipment.

The future of agriculture in Crimea after de-occupation is another open question. It is doubtful that the restoration of Soviet-style agricultural systems, even after billions are invested in restoring water supplies and modernizing the nearly destroyed infrastructure, will be economically viable. Irrigated rice farming, for example, is unlikely to remain a priority for either Crimea or Ukraine. Under favorable circumstances, tourism will likely continue to be the backbone of the peninsula's economy, with the famous Crimean wine industry playing a key role in agriculture.

In a post-occupation Crimea, the most sensible approach would be to focus on agricultural sectors best suited to the dry steppe climate of the region.

CONSTRUCTION OF TRANSPORT INFRASTRUCTURE

The construction of transport infrastructure, initiated during the occupation, continued following the full-scale invasion. This development likely has dual motivations: military objectives on one hand and the interest of local contractors in securing federal budget subsidies on the other.

Officially, the justification for the new infrastructure includes the creation of a “road to Yalta, bypassing Alushta and Simferopol.” These roads, financed by the central Russian budget, are labeled as being of federal significance. However, this designation seems particularly odd in the case of the small stretch of the Donske-Perevalne¹⁹¹ highway, which is near the Aianskyi reservoir and has also been classified as a federal highway. Local residents, notably, have opposed the construction in this area¹⁹².

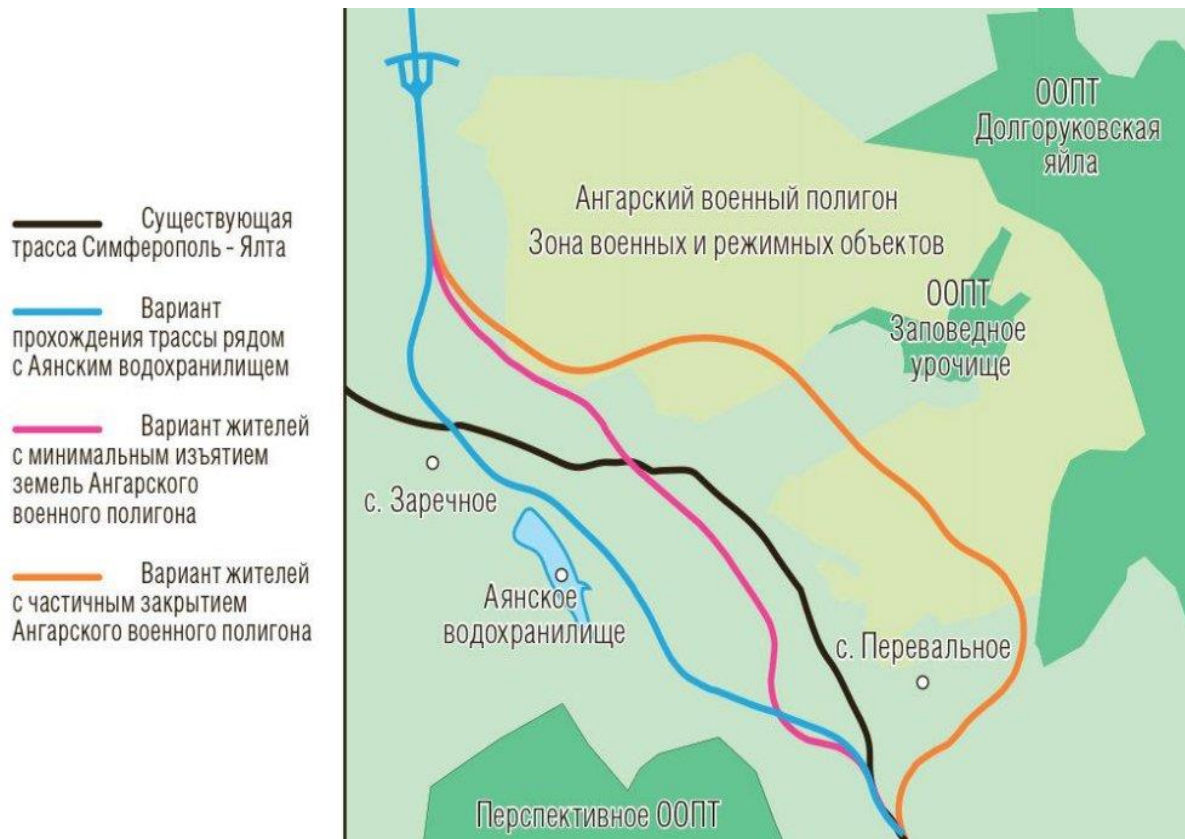
The public rationale behind the new road projects is a reduction in travel time to the coast, framed as a sort of “federal gift” for tourists¹⁹³. However, even a basic geographical analysis of the road sections reveals a more strategic purpose. The routes provide efficient access from the Kerch Bridge, along the Tavrida highway, to locations that house missile systems targeting Ukraine. These key points include the outskirts of Yalta, where an airfield — an important military facility — lies, as well as the Anharskyi training ground. The road network is clearly being expanded around these military hubs, enhancing access to critical sites in Crimea¹⁹⁴.

¹⁹¹ https://www.transecoproject.ru/projects/786/?clear_cache=Y

¹⁹² <https://rg.ru/2020/09/30/reg-ufo/krymchane-vystupili-protiv-obezdnoj-dorogi-u-vodohranilishcha.html>

¹⁹³ <https://www.crimea.kp.ru/daily/27452.5/4655601/>

¹⁹⁴ <https://www.crimea.kp.ru/daily/27452.5/4655601/>

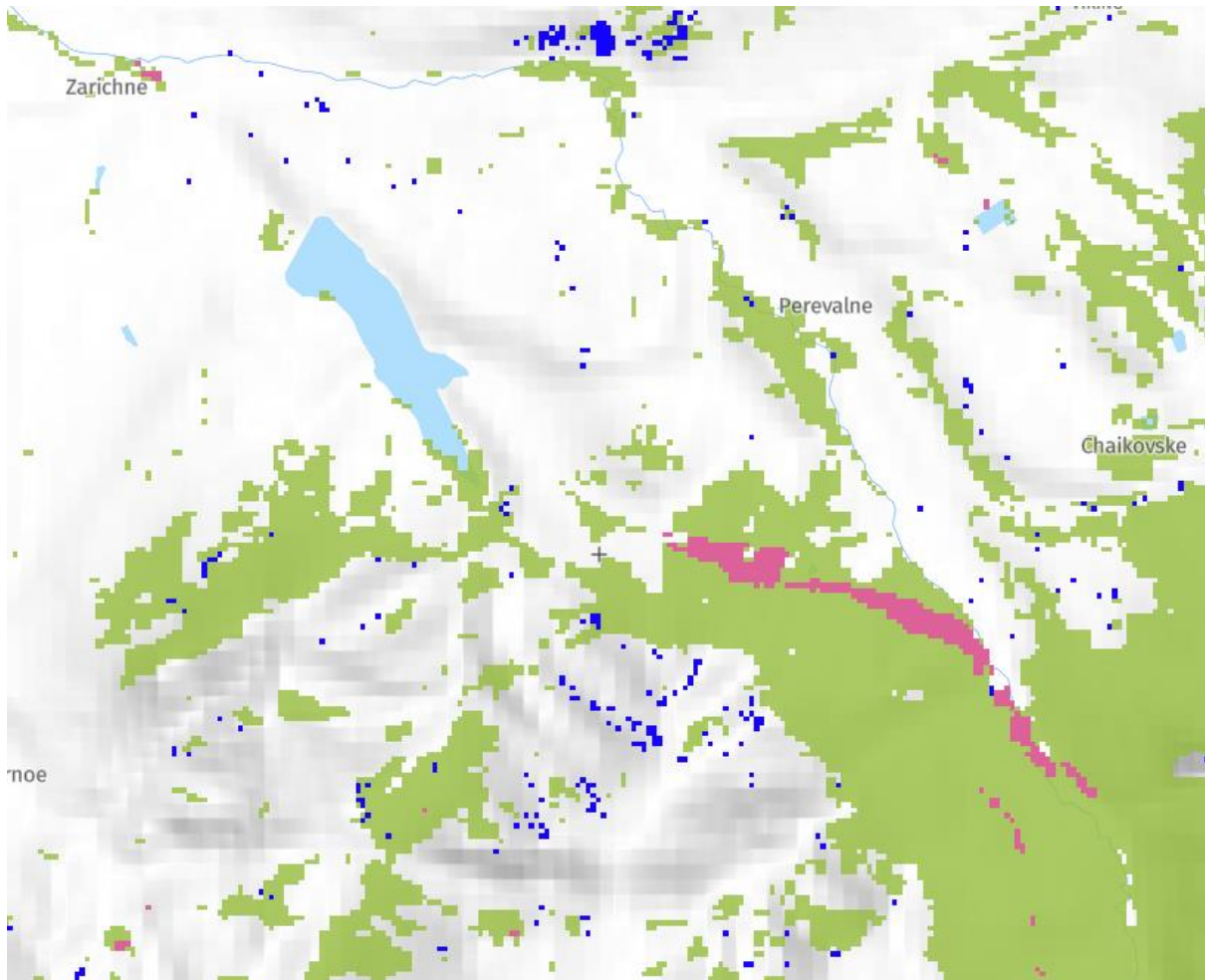


Scheme of options for the new route (option 2 in “blue” is being implemented). Source ¹⁹⁵

Deforestation linked to the construction of this road section is visible via the Global Forest Watch remote monitoring system¹⁹⁶. This deforestation can also be observed along other parts of the same road, particularly near the villages of Lavanda and Verkhnia Kutuzovka, located south of the main section. In total, the construction of these roads — including a section of the Simferopol ring road — led to the clearing of 11 ha of forest in 2022 and 27 ha in 2023, according to Global Forest Watch’s automated calculations.

¹⁹⁵<https://rg.ru/2020/09/30/reg-ufo/krymchane-vystupili-protiv-obezdnoj-dorogi-u-vodohranilishcha.html>

¹⁹⁶ <https://www.globalforestwatch.org/>



Loss of forest cover near Perevalne village in 2021-2023. Pink color shows areas where forests were lost, green — existing forest plantations, blue — spontaneous overgrowth of territories. Source: <https://www.globalforestwatch.org/map/?map=eyJjZW50ZXIiOmsibGF0Ijo0NC44MzMzNjU4Mzg0ODUxMSwibG5nIjozNC4zMDA5MjY4NzExNjQ4Mn0sInpvc20iOjE5Ljc5NDk2Mzc3MzMzOTc2OH0%3D>

This road project continues the “tradition” of the Tavrida highway, cutting through important natural and tourist areas while destroying archaeological sites¹⁹⁷.



Construction of new roads through the natural territories of Crimea
<https://www.crimea.kp.ru/daily/27452.5/4655601/>

Construction of new roads through the natural territories of Crimea
https://www.youtube.com/watch?time_continue=459&v=-ytwNP44YiU&embeds_referring_euri=https%3A%2F%2Froads.ru%2F&source_ve_path=MzY4NDIsMTM5MTE3LDEzOTExNywyODY2Ng&feature=emb_log

¹⁹⁷ <https://gazetacrimea.ru/news/na-kakom-etape-stroitelstvo-dorogi-donskoe-perevalnoe/>

Additionally, road construction suitable for military equipment has been underway in the Kherson Oblast¹⁹⁸, a key route for transporting military supplies to areas of active combat. This section of road, construction of which began in 2023, has a budget of 3 billion Russian rubles for a 7.8-kilometer stretch.

CONSEQUENCES OF UNCONTROLLED CONSTRUCTION

The mass migration of Russians to Crimea — both tourists and domestic migrants — has driven the need for extensive new construction. As of 2021, according to Russian-controlled Krymstat, 205,559 Russians had relocated to Crimea since 2014, with 117,114 moving to the Autonomous Republic of Crimea and 88,445 settling in Sevastopol¹⁹⁹.

Meanwhile, the Office of the Prosecutor General of Ukraine reports that by 2021 nearly 48,000 people had left Crimea since Russia’s annexation of the peninsula²⁰⁰. Estimates suggest that since 2014 around 800,000 Russian citizens have illegally moved to the occupied peninsula, while more than 100,000 Ukrainian citizens have been forced to leave²⁰¹. The scale of new housing developments and settlement expansions can be inferred from statements made by pro-Russian Crimean media and “public” sources within the occupation authorities.

In Crimea, the occupation government initiated the regional project “Housing under the national housing and urban environment” initiative. Local officials annually report surpassing previous “records” for the number of new housing constructed. In 2022, a total of 855,000 m² of housing was commissioned²⁰².

By 2023, the so-called government of the “Republic of Crimea” reported exceeding its housing construction target of 930,000 m² by 31.1%²⁰³. That year, 1,219,572 m² of housing were commissioned in the Autonomous Republic of Crimea, including more than 315,000 m² in apartment buildings – “a record in terms of housing commissioning since 2014,” according to local reports.

Looking ahead, the same sources note plans to commission 994,000 m² of housing in 2024. As part of the ongoing regional Russian project “Housing”, 597,300 m² had already been completed between January and May 2024.

Housing construction in Crimea is not limited to the Russian Federation’s state project. A comparison between the total number of newly commissioned housing units and the “official” data from the “Housing” program reveals discrepancies. Kryminform reports that

¹⁹⁸<https://crimea.ria.ru/20240611/serpantina-ne-budet-dorogu-na-yaltu-vypryamlyayut-i-sglazhivayut-1138040479.html>

¹⁹⁹ <https://ru.krymr.com/a/news-krym-pereselenie-rossiyan/31036011.html>

²⁰⁰ <https://ua.krymr.com/a/news-krym-pereiekhalo-800-tysiach-rosian-ukrainska-khelsynkska-hrupa/32719627.html>

²⁰¹ <https://t4pua.org/2106>

²⁰² <http://alupka.stroy-krim.org/encyclopedia/news/ploshchad-vvedennogo-v-ekspluataciyu-v-krymu-zhilya-po-itogam-2022-goda-sostavila>

²⁰³ <https://www.c-inform.info/news/id/109655>

nearly one million m² of housing is expected to be completed in 2024²⁰⁴, while other sources estimate a higher figure — 1.22 million m²²⁰⁵. Much of this new housing is aimed at boosting the tourism sector, as it is concentrated near resort towns.

According to Nikita Tarasov, the occupation Minister of Housing Policy and State Construction Supervision of Crimea, most of the construction is happening in Yevpatoriia, Simferopol, and along the southern coast, particularly in Yalta and Alushta. Of the projected 1.22 million m², about 800,000 m² are for individual housing construction, with the remainder consisting of apartment buildings²⁰⁶.

The rapid expansion of Crimean cities has begun encroaching on natural areas, which often surround urban centers. In many cases, urban densification is causing the destruction of these ecosystems, as illustrated by the controversial Foros Park development²⁰⁷.

Beyond environmental destruction, this surge in new construction is straining Crimea's municipal infrastructure. The region's already inadequate wastewater treatment system is being overburdened, exacerbating longstanding issues with solid waste management and dumps.



A

²⁰⁴ <https://www.c-inform.info/news/id/109655>

²⁰⁵ <https://dzen.ru/a/Zk4neleaFzkPPwXm>

²⁰⁶ <https://ruinform.com/page/v-kakih-gorodah-kryma-bolshe-vsego-strojat-zhilja>

²⁰⁷ <https://ua.krymr.com/a/zabudova-park-foros-krym-protest-zvernennia-do-putina/31654165.html>



B

Western outskirts of Yalta. A — 2014, B — 2024. The outlines show the buildings that emerged during the annexation and the full-scale war. The image shows an increase in the construction of houses, parking lots and garages, as well as construction waste dumps. Source: Google Earth.

GARBAGE AND WASTE

During the years of full-scale war, the occupation authorities have engaged in highly publicized waste management efforts aimed more at generating media attention than solving the underlying issues. These activities include symbolic gestures, such as planting grass over closed landfills and issuing performative bans on unauthorized waste dumping, yet the question of what to actually do with the waste remains unresolved.

According to reports from the occupying Ministry of Natural Resources and Environment, in 2022, grass was planted at two key sites under the programs “Reclamation of the solid waste disposal facility in Sudak” and “Reclamation of the solid waste disposal facility in Bilohirsk”. Officials also pledged to rehabilitate ten more former landfills in a similar manner. Additionally, the authorities claimed progress in eliminating unauthorized dumpsites, stating that 49 dumps outside settlements were cleared, reducing the affected area by 302,800 m². Within urban areas, 73 dumpsites were reportedly removed, reducing the impacted area by 92,800 m² ²⁰⁸.

While these figures suggest a total of 122 unauthorized dumpsites were eliminated, this number pales in comparison to the 700 dumpsites reported in 2019, as documented by local media²⁰⁹. In reality, it is difficult to imagine that nearly 40 hectares of dumpsites were fully cleared in a single year! The actions appear to be largely symbolic, with formal bans presented as evidence of “dumpsite elimination” rather than meaningful environmental cleanup.

At the end of 2022, residents of the Chornomorskyi Raion in northwestern Crimea began voicing concerns over the proposed construction of a waste incinerator in their area. “Ahentsiia z povodzhennia z vidkhodamy” LLC (Waste Management Agency LLC), a previously unknown entity, announced plans to build the facility just one kilometer from Lake Panske, in a former quarry near a road leading from the district center through Snizhne to the north. The project, aligned with Russia’s national “Ekolohiia” initiative, aims to achieve 100% waste treatment and at least 50% utilization of solid waste between 2022 and 2024. In addition to this facility, three more waste treatment and disposal sites were planned in Crimea’s Bilihirskyi, Sakskyi, and Leninskyi Raions²¹⁰.

However, controversy erupted when it became clear that the Waste Management Agency LLC (the Crimean branch of a company active across various Russian regions) was recruiting workers for pyrolysis plants, which are used for the thermal decomposition of waste. This information, brought to light in local media by a local activist, sparked public outrage. In response, the self-proclaimed local administration declared that the company would not be granted permits for such activities. Despite this, funds had already been allocated for what was initially intended to be a waste recycling plant, but plans had shifted toward building an incinerator instead.

The proposed facility in the former quarry included plans to install a pyrolysis furnace from a Crimean manufacturer, whose equipment had reportedly passed a “state environmental impact assessment.” The plant was set to process third- and fourth-class hazardous waste, including diesel fuel, gasoline-contaminated sand, manure, poultry droppings, tobacco dust,

²⁰⁸ <https://meco.rk.gov.ru/structure/f07e5959-297d-4272-9091-7998d9a6852c>

²⁰⁹ <https://c-pravda.ru/news/2019-06-22/musornoe-igo-kryma>

²¹⁰ <https://sevastopol.su/news/krymchan-napugal-proekt-musoroszhigatel'nogo-zavoda-vblizi-morskogo-poberezhya>

furniture scraps, street and road debris, glass, food waste, and packaging materials. Pyrolysis, however, is an expensive technology that requires strict adherence to operational standards. For effective waste decomposition, the temperature inside the plant must remain between 800 and 1,000 degrees Celsius. Failure to maintain these conditions can result in the release of dioxins and other toxic substances into the atmosphere instead of their safe decomposition.

There are precedents where poorly managed waste treatment initiatives have led to harmful consequences. In Simferopol, for example, a company that had obtained a license for environmentally safe waste treatment simply burned waste in a metal barrel, leaving expensive, high-quality equipment unused.

The proposed incinerator has raised concerns about potential environmental and health risks to local residents. For now, the project has been stalled, thanks to public resistance²¹¹.

MILITARY INCIDENTS IN CRIMEA

One of the most significant environmental impacts during full-scale military operations is the use of various types of ammunition. Although ground combat in occupied Crimea was largely absent as of June 2024, with some exceptions^{212 213 214 215}, the peninsula has been heavily involved in military activities since February 2022. In particular, Crimean airfields have been used to launch missile strikes against Ukraine, and missile systems are stationed at military facilities in the region.

In response, Ukrainian Defense Forces have targeted Russian military installations in Crimea using missiles, unmanned aerial vehicles (UAVs), and unmanned underwater vehicles (UUVs). An analysis of open sources reveals at least 136 publicly reported cases of damage to facilities in Crimea since July 31, 2022²¹⁶ (Appendix 2). These incidents involve missile strikes, UAVs, or combined attacks.

Open sources cannot provide a complete list of these incidents or an accurate count of the missiles, UAVs, and air defense systems used, which are also rockets. For our study, each reported case represents a military activity in Crimea mapped over time. This data is critical for assessing the environmental impact of these incidents.

Additionally, there have been several accidents caused by the Russian armed forces' own personnel. These include the accidental shooting down of Russian SU-22²¹⁷ and SU-34²¹⁸

²¹¹<https://sevastopol.su/news/krymchan-napugal-proekt-musorosozhigatel'nogo-zavoda-vblizi-morskogo-poberezhya>

²¹² <https://www.pravda.com.ua/news/2023/08/24/7416880/>

²¹³ <https://www.rbc.ua/rus/news/feodosiyi-potuzhna-pozhezha-chornim-dimom-1702280314.html>

²¹⁴<https://unn.ua/news/atesh-provely-rozvidku-na-aerodromi-v-yevpatorii-de-okupanty-remontuiut-litaky>

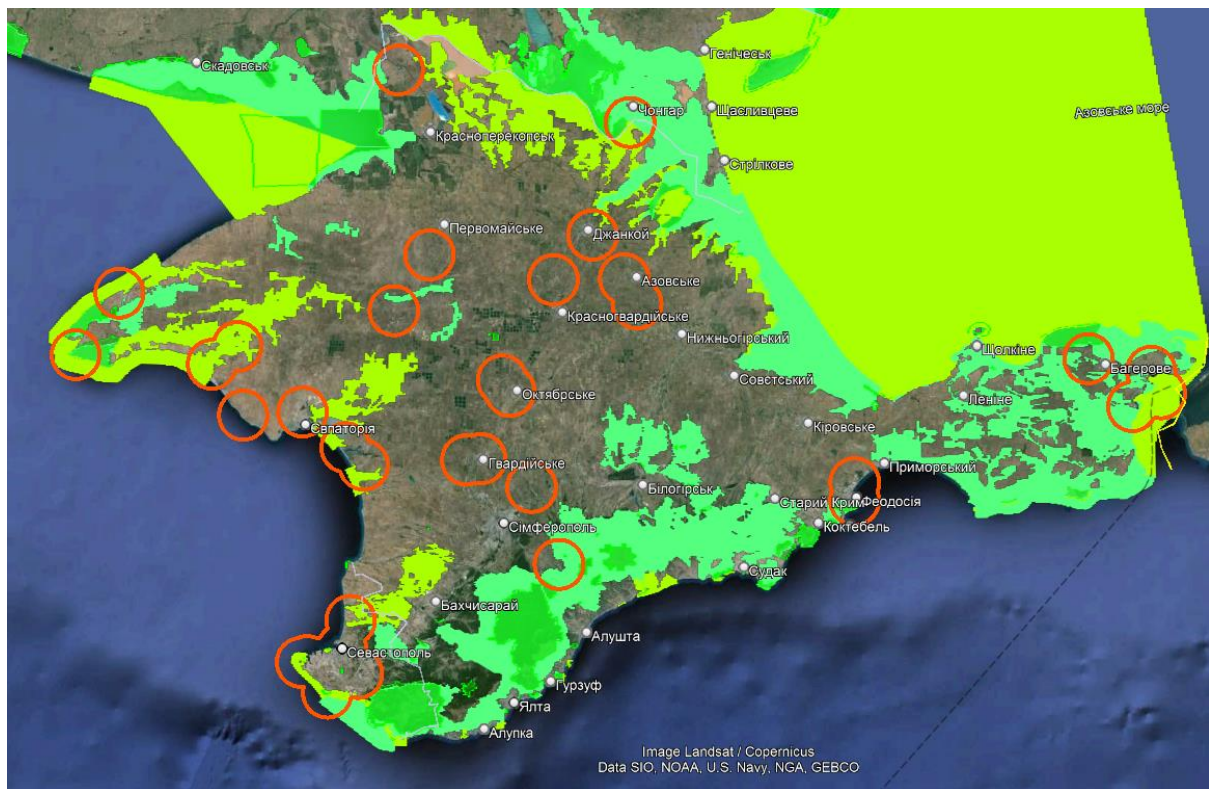
²¹⁵ https://lb.ua/society/2024/04/02/606447_up_vnochi_gur_pidirvalo.html

²¹⁶<https://mil.in.ua/uk/news/shtab-rosijskogo-chornomorskogo-flotu-v-sevastopoli-atakuvaly-bezpilotnykom/>

²¹⁷ <https://twitter.com/uaweapons/status/1569302325533020160>

²¹⁸ <https://mil.in.ua/uk/news/rosiyany-jmovirno-zbyly-vlasnyj-su-34-v-krymu/>

bombers by Russian air defense forces, explosions of aircraft during takeoff in 2022²¹⁹, crashes of Mi-28 helicopters²²⁰ in 2023, and multiple fires within military units²²¹.



Localization of “military incidents” on the territory of Crimea from 24 February 2022 to 1 July 2024. The sites of “military incidents” are outlined in red, territories of the Nature Reserve Fund are shown in dark green, approved territories of the Emerald Network — in turquoise, territories nominated by Ukraine for inclusion in the Emerald Network — in yellow-green.

These areas of military activity are also situated within several nature protected zones, which means that natural environments are being negatively impacted. Using our own evaluative criteria, we established conditional “impact zones” with a 7-kilometer radius around each military activity center identified through open sources.

Within these “impact zones,” natural ecosystems are being affected by noise, light, and ammunition explosions, as well as the chaotic discharge of Russian air defense shells. As a result, Russian military activities have directly harmed the ecosystems of numerous nature protected areas in Crimea.

²¹⁹<https://focus.ua/uk/voennyie-novosti/563041-prichina-ukrajinskih-trivog-shcho-vidomo-pro-rosiyski-vinishchuvachi-mig-31-ta-mig-31k>

²²⁰<https://www.rbc.ua/rus/news/krimu-stavsya-vibuh-aerodromi-poshkodzheno-1684589975.html>

²²¹<http://surl.li/tywwz>

Table. Nature protected sites within the “impact zones” of military activity

Territories of the Emerald Network of Europe	Territories of the Nature Reserve Fund
in the vicinity of Novofedorivka	
<ul style="list-style-type: none"> • Saksnyi (SiteCode: UA0000378)²²² • Kyzyl-Yar (SiteCode: UA0000380)²²³ 	
in the vicinity of Myrnyi village	
<ul style="list-style-type: none"> • Donuzlavskiy (SiteCode: UA0000379)²²⁴ 	
on the Tarkhankut Peninsula	
<ul style="list-style-type: none"> • Tarkhankut (SiteCode: UA0000376)²²⁵, • Charivna Havan National Nature Park (SiteCode: UA0000130)²²⁶ • Marine area along the Tarkhankut Peninsula and Karadzha Lake (SiteCode: UA0000388)²²⁷ 	<ul style="list-style-type: none"> • Charivna Havan National Nature Park • Atlesh regional landscape park • Balka Velykyi Kastel protected area • Dzhanhul landscape reserve • Hydrological natural monument — Coastal aquatic complex near the Dzhanhul coastal landslide • Hydrological natural monument — Coastal aquatic complex near Cape Atlesh
in the vicinity of Voikove village	
<ul style="list-style-type: none"> • Sary-Bash (SiteCode: UA0000353)²²⁸ 	
in the vicinity of Feodosiia	
<ul style="list-style-type: none"> • Tepe-Oba (SiteCode: UA0000155)²²⁹ 	<ul style="list-style-type: none"> • Tepe-Oba Mountain Range botanical reserve of local significance • Tykhha Bukhta regional landscape park of local significance
in the vicinity of Dzhankoi	
<ul style="list-style-type: none"> • Eastern Syvash 	

²²² <https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=UA0000378>

²²³ <https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=UA0000380>

²²⁴ <https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=UA0000379>

²²⁵ <https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=UA0000376>

²²⁶ <https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=UA0000130>

²²⁷ <https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=UA0000388>

²²⁸ <https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=UA0000353>

²²⁹ <https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=UA0000155>

(SiteCode: UA0000131) ²³⁰ • Crimean coast of Syvash (SiteCode: UA0000411) ²³¹	
in the vicinity of Armiansk	
• Zatoky (SiteCode: UA0000214) ²³²	
on Chonhar Peninsula	
• Chonharskyi (SiteCode: UA0000213) ²³³ • Azovo-Syvaskyi National Nature Park (SiteCode: UA0000027) ²³⁴	• Azovo-Syvaskyi National Nature Park
in the vicinity of Perevalne village	
• Bilohirskyi (SiteCode: UA0000128) ²³⁵ • Bakhchysaraisko-Alushtynskyi (SiteCode: UA0000127) ²³⁶	• Kyzil-Koba geological monument of national significance • Tyrke botanical reserve of local significance • Krymskyi nature reserve of national significance
on the Kerch Peninsula	
• Karalarskyi (SiteCode: UA0000129) ²³⁷ • Kerch strait (SiteCode: UA0000381) ²³⁸ • Kerch peninsula (SiteCode: UA0000377) ²³⁹	• Karalarskyi regional landscape park of local significance
in Sevastopol	
• Herakleyskyi (SiteCode: UA0000462) ²⁴⁰ • Black Sea Dolphins (SiteCode: UA0000148) ²⁴¹ • Sevastopolskyi (SiteCode: UA0000126) ²⁴² • Eski-Qislav and Buranchi-Echi (SiteCode: UA0000431) ²⁴³	• Kozacha Bay general zoological reserve of national significance • hydrological natural landmark of local significance — Coastal Aquatic Complex near Cape Fiolent • Maksymova Dacha regional landscape park of local significance

²³⁰ <https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=UA0000131>

²³¹ <https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=UA0000411>

²³² <https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=UA0000214>

²³³ <https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=UA0000213>

²³⁴ <https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=UA0000027>

²³⁵ <https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=UA0000128>

²³⁶ <https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=UA0000127>

²³⁷ <https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=UA0000129>

²³⁸ <https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=UA0000381>

²³⁹ <https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=UA0000377>

²⁴⁰ <https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=UA0000462>

²⁴¹ <https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=UA0000148>

²⁴² <https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=UA0000126>

²⁴³ <https://natura2000.eea.europa.eu/Emerald/SDF.aspx?site=UA0000431>

- hydrological natural landmark of local significance — Coastal Aquatic Complex near Chersonesus Tavriiskiyi
- Ushakova Balka botanical natural monument of local significance
- Baidarskiy landscape reserve of national significance

A preliminary analysis reveals that the majority of protected areas, particularly those within the Emerald Network of international significance, were established to safeguard migratory birds and preserve fragile coastal and aquatic ecosystems. Since most shelling by the Russian armed forces occurred in autumn and winter, often at night, the greatest impact has been on wintering and migratory bird populations. This is particularly concerning for mass bird wintering areas around the Syvash lake complex, where significant military activity has concentrated near the Chonhar Peninsula and the city of Dzhankoi.

A certain correlation can also be observed between satellite fire-tracking data and the locations of these “centers of military activity.” For instance, we detected and identified repeated fires in steppe vegetation near the villages of Zarichne and Perevalne, directly linked to the firing of Russian missile launchers.

CONSTRUCTION OF FORTIFICATIONS

The Russian side is taking the threat of a Ukrainian counteroffensive and the potential de-occupation of Crimea very seriously, as evidenced by the extensive network of engineering fortifications being constructed. These defensive lines span the isthmus areas connecting Crimea to mainland Ukraine, the western coast of the peninsula, and the Arabat Spit.

A defensive line is being built along the western coast of the peninsula. The fortifications include trenches, anti-tank “dragon’s teeth,” and minefields. The first reports of trenching on Crimea’s coast surfaced on 9 December 2022²⁴⁴, signaling Russia’s anticipation of a Ukrainian counteroffensive. Similar reports followed from multiple locations, such as Chornomorske²⁴⁵, Mizhvodne²⁴⁶, Molochne²⁴⁷, and between Solone and Konrad lakes²⁴⁸. In all cases, the aim was to strengthen coastal defenses where significant Russian military facilities are located, especially areas housing anti-aircraft missile systems²⁴⁹.

²⁴⁴<https://www.svoboda.org/a/krymskaya-normandiya-kak-rossiya-gotovit-anneksirovannyj-poluostrov-k-voyne/32195716.html>

²⁴⁵ <https://t.me/Crimeanwind/17666>

²⁴⁶ <https://t.me/Crimeanwind/18323>

²⁴⁷<https://gur.gov.ua/content/okupanty-v-krymu-hotuiutsia-vidbyvaty-ataky-ukrainskykh-syl-oborony.html>

²⁴⁸ <https://yandex.ru/maps/-/CCUnb0ghdA>

²⁴⁹<https://www.currenttime.tv/a/video-%D0%BA%D0%B0%D0%BA-%D0%B2-%D0%BE%D0%BA%D0%BA%D1%83%D0%BF%D0%B8%D1%80%D0%BE%D0%B2%D0%B0%D0%BD%D0%BD%D0%BE%D0%BC-%D0%BA%D1%80%D1%8B%D0%BC%D1%83-%D1%81%D1%82%D1%80%D0%BE%D1%8F%D1%82-%D0%BB%D0%B8%D0%BD%D0%B8%D1%8E-%D0%BE%D0%B1%D0%BE%D1%80%D0%BE%D0%BD%D1%8B/32317373.html>



Engineering fortifications in Chornomorske, 10.12.2022
<https://t.me/Crimeanwind/17666>



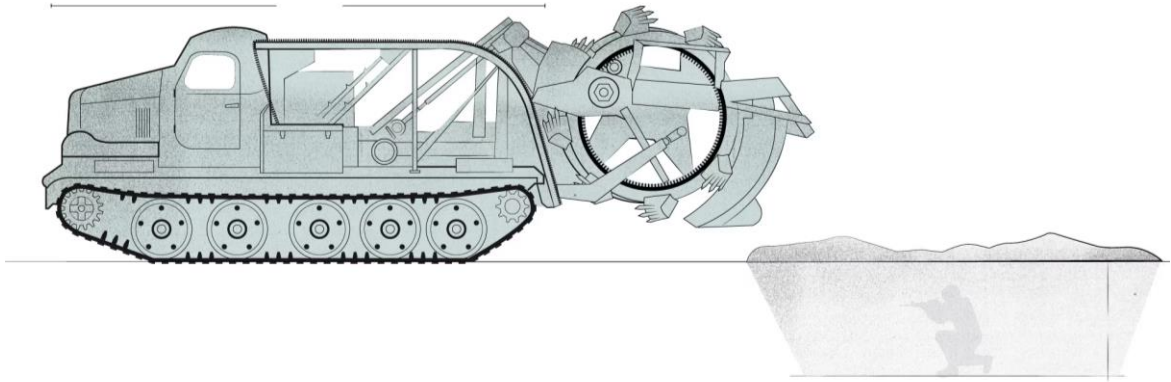
Engineering fortifications in Mizhvodne, 18.12.2022
<https://t.me/Crimeanwind/18323>

Such structures on beaches can be considered a significant factor in environmental destruction. The construction of these fortifications, particularly in sensitive environments like the coastal steppes of the Arabat Spit and the Chonhar Peninsula, poses a major environmental threat. In 2023, the creation of defensive positions in northern Crimea coincided with the withdrawal of military equipment and depots²⁵⁰, most likely due to Ukraine's acquisition of long-range precision weapons capable of striking key military sites near occupied Crimea, such as the village of Askania Nova²⁵¹.

Many of the fortifications consist of simple trenches dug into the ground or sand, with Russian forces using Soviet-era BTM-3 trenching machines, capable of digging trenches at a rate of half a mile per hour, even through frozen terrain.

²⁵⁰ <https://x.com/bradyafr/status/1651167988089847809>

²⁵¹ <https://mil.in.ua/uk/news/zsu-urazyly-vijskovu-bazu-rf-u-askaniyi-novij/>



The BTM-3 trenching machine is equipped with a rear-mounted rotor featuring buckets that scoop and unload soil next to the trench. This process forms front and rear parapets about 1.5 feet high, offering added protection for personnel. The BTM-3 is capable of digging straight, zigzag, or curved trenches. It can create basic trenches 3.5 feet deep or full-sized trenches up to 5 feet deep, with the trench bottom measuring approximately 2 feet in width.

The occupying authorities in Crimea have employed local laborers to dig trenches along the coast, offering payment for their work²⁵². These defensive structures are primarily positioned near natural water barriers like seashores and canals, designed to create additional obstacles in the event of an offensive by the Ukrainian Armed Forces.

Several key areas have become centers for fortifications on the territory of Crimea:

1. In the vicinity of Medvedivka (near the isthmus with mainland Ukraine): A complex system of trenches spans several kilometers, with passages cut at angles to give soldiers a wider firing range. Nearby, deep ditches have been dug to accommodate tanks and heavy equipment.



Section of Russian engineering fortifications near Medvedivka. Source: https://www.washingtonpost.com/world/interactive/2023/ukraine-russia-crimea-battle-trenches/?itid=hp-top-table-main_p001_f001

²⁵²<https://zn.ua/ukr/war/rosija-pobuduvala-v-krimu-tsilu-merezhu-transhej-ta-zahorodzen-the-washington-post.html>

2. In the vicinity of Vitine outskirts (Sakskyi Raion): Between February 27 and March 12, 2023, defensive structures were erected over a distance of about 20 km²⁵³.



Section of Russian engineering fortifications near the village of Vitine (12 March 2023). The photo shows trenches and even “dragon’s teeth” along the coastline. Source: https://www.washingtonpost.com/world/interactive/2023/ukraine-russia-crimea-battle-trenches/?itid=hp-top-table-main_p001_f001

3. In the vicinity of the North Crimean Canal area: The canal itself serves as a significant obstacle to the movement of military equipment, making it a strategic location for defense. The largest modern network of Russian fortifications in Crimea has been built here, featuring numerous “dragon’s teeth” barriers designed to block the passage of military equipment.

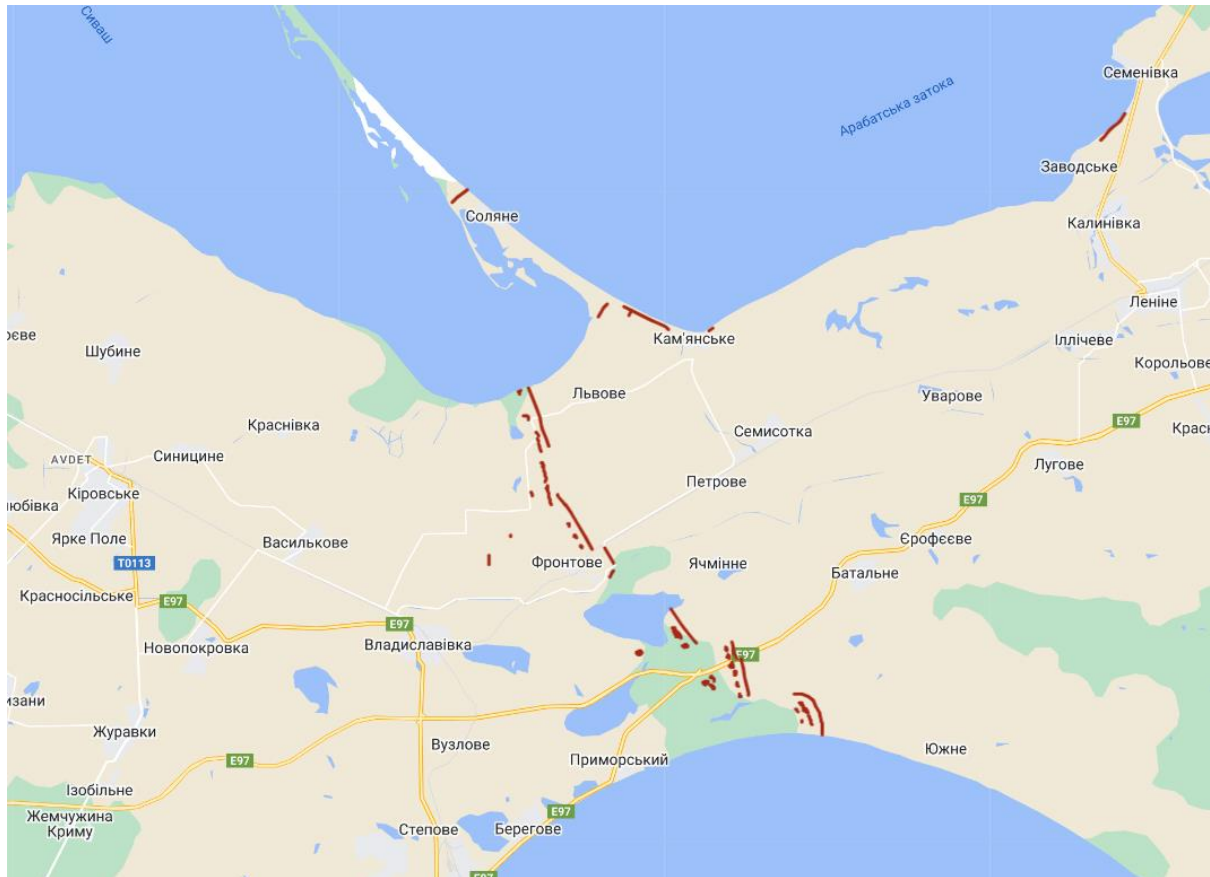


Trenches and “dragon’s teeth” along the banks of the North Crimea Canal. Source: https://www.washingtonpost.com/world/interactive/2023/ukraine-russia-crimea-battle-trenches/?itid=hp-top-table-main_p001_f001

²⁵³https://www.washingtonpost.com/world/interactive/2023/ukraine-russia-crimea-battle-trenches/?itid=hp-top-table-main_p001_f001

This highly concentrated fortification zone is located near Dzhankoi, a military and transportation hub.

4. Arabat Spit and Kerch Peninsula Isthmus: The Arabat Spit is considered a potential route for Ukrainian forces during the liberation of Crimea. Currently, it is divided by ten lanes of trenches, while the Kerch Peninsula isthmus is entirely blocked by fortifications.



Fortifications near the isthmus of the Kerch Peninsula, spring 2024²⁵⁴

5. Chornomorske Bay: This area, which once housed Soviet military facilities, has become another key concentration point for Russian fortifications and defenses. The scale of construction of fortifications can be shown on a map.

²⁵⁴<https://www.google.com/maps/d/u/0/viewer?mid=1IP0v8iC5XebcLjxq2f-qBJZxeOx0BZo&ll=45.23560489130885%2C35.52629734308364&z=11>

5. **Eastern Syvash (SiteCode: UA0000131)**²⁶⁴ encompasses the Arabat Spit and adjacent lakes of Eastern Syvash, as well as the outskirts of Dzhankoi. The total length of the trenches and other fortifications is over 19 km. Bern Convention Resolution 4 habitat types likely to be affected: A2.5, B1.1 (sandy beaches of the surf line)²⁶⁵, B1.3, B1.4, D6.1 (continental salt marshes)²⁶⁶, E1.2, X02 (saline coastal lagoons)²⁶⁷, X03 (brackish coastal lagoons)²⁶⁸. Another five types of marine habitats could be affected by marine pollution.

6. **Kerch Peninsula (SiteCode: UA0000377)**²⁶⁹ is an area on the isthmus of the Kerch Peninsula. The total length of trenches and other fortifications is over 10 km. Bern Convention Resolution 4 habitat types of likely to be affected: E1.2.

7. **Crimean coast of Syvash (SiteCode: UA0000411)**²⁷⁰ consists of salt lakes, steppe beams and Eastern Syvash lagoons. The affected area lies in the vicinity of Dzhankoi. The total length of the trenches is up to 12 km. Bern Convention Resolution 4 habitat types likely to be affected: A2.5, D6.1, E1.2, X02, X03.

8. **Western Syvash (SiteCode: UA0000425)**²⁷¹ is situated near the isthmus, close to Armiansk and Perekop. The total length of the trenches is up to 5 km. Bern Convention Resolution 4 habitat types likely to be affected: A2.5, D6.1, E1.2, X02, X03.

9. **Chonharskyi (SiteCode: UA0000213)**²⁷², central Syvash, in the vicinity of Chonhar Peninsula. The total length of fortifications is up to 7 km. Bern Convention Resolution 4 habitat types likely to be affected: A2.5, D6.1, E1.2, X02.

The potential impact on protected animal species due to the construction of fortifications in these areas has not yet been thoroughly examined. A detailed study is required to assess the risks. However, most of the species protected in these Emerald Network sites are birds, which are unlikely to be directly affected by the construction. A different concern will arise once Crimea is de-occupied, particularly the conservation of terrestrial animals. The meadow viper (*Vipera ursinii*)²⁷³, the European pond turtle (*Emys orbicularis*)²⁷⁴, and the southern birch mouse (*Sicista subtilis*)²⁷⁵ on the Kerch Peninsula are commonly found and protected in most of the Emerald Network sites mentioned.

The destruction of the habitat types in these areas is significant, as 100% of the space occupied by trenches, surrounding dumps, and trencher tracks falls within protected habitats. The estimated width of the impacted area along the fortifications is at least 20 meters. Given that the total length of the trenches identified is 71.5 km, the total affected habitat area within the Emerald Network is calculated to be 1.43 km², or 1,430 m². In most cases, they include the coast, the coastal steppes and salt marshes.

The coastal strip along the seas is one of the most critical regions for species and habitat protection. All coastal habitat types are protected and are considered among the most endangered ecosystems globally. Crimea, with its extensive coastal tourism development, has

²⁶⁴ <https://emerald.eea.europa.eu/?query=Adopted%20sites,SITECODE,UA0000131>

²⁶⁵ https://eunis.eea.europa.eu/habitats_codeEUNIS/B1.1

²⁶⁶ https://eunis.eea.europa.eu/habitats_codeEUNIS/D6.1

²⁶⁷ https://eunis.eea.europa.eu/habitats_codeEUNIS/X02

²⁶⁸ https://eunis.eea.europa.eu/habitats_codeEUNIS/X03

²⁶⁹ <https://emerald.eea.europa.eu/?query=Adopted%20sites,SITECODE,UA0000377>

²⁷⁰ <https://emerald.eea.europa.eu/?query=Proposed%20sites,SITECODE,UA0000411>

²⁷¹ <https://emerald.eea.europa.eu/?query=Proposed%20sites,SITECODE,UA0000425>

²⁷² <https://emerald.eea.europa.eu/?query=Adopted%20sites,SITECODE,UA0000213>

²⁷³ <https://eunis.eea.europa.eu/species/831>

²⁷⁴ <https://eunis.eea.europa.eu/species/678>

²⁷⁵ <https://eunis.eea.europa.eu/species/8354>

long been under anthropogenic pressure, especially construction. This makes the preservation of undisturbed coastal ecosystems, which have been included in international protected areas, even more urgent.

The construction of fortifications is one of the largest factors negatively affecting landscapes. In terms of soil impact, this military activity is second only to ammunition explosions. Given the lack of large-scale military operations in Crimea as of summer 2024, it may represent the greatest environmental threat on the peninsula. While fortification construction does not have the same chemical effects as ammunition explosions, it causes significant mechanical damage. Additionally, it results in other harmful environmental consequences, such as littering and disruption of sanitary conditions.

The construction of fortifications poses a significant threat to many species, often causing extensive environmental damage. This process combines several harmful effects: destruction of vegetation, disruption of soil structure and geochemical processes, alteration of groundwater hydrology, loss of natural moisture, and eventual desertification. While chemical pollution is absent in these cases, it's typically more relevant to economic impacts and future land use rather than wildlife preservation.

During the creation of defense structures — such as dugouts, trenches, bunkers, tunnels, and fuel storage facilities — soil layers are mixed and disturbed, leading to erosion and degradation. This destruction is exacerbated by weathering, including physical, chemical, and biological factors.

In many cases, the depth of groundwater is ignored during construction, disrupting hydrological balance. This can lead to surface water accumulation, causing waterlogging and soil salinization. Saline layers from deep underground may rise to the surface, spreading beyond the boundaries of the fortifications. Additionally, these defense structures are often the focus of heavy shelling, which further damages soil processes, resulting in landslides, subsidence, and waterlogging over larger areas. The impact zone of a single trench, ditch, or dugout can range from 20 to 100 m or more, meaning the total affected area is substantial.

Another alarming issue was observed during a 2022 expedition to Kamianska Sich National Nature Park in Kherson Oblast, following its liberation. Russian soldiers had used rare plant species, such as feather grass, to camouflage their positions. While this destruction of rare species was likely unintentional, it is reasonable to assume similar activities are occurring in Crimea.

Most permanent shelters are reinforced using large amounts of timber, particularly from Scots pine and other straight-trunked pine species. These logs are used to line the walls of dugouts and create a triple-layered roof capable of withstanding 152-155 mm caliber shells. Constructing a fortified dugout for 5 to 10 people requires parts of 20 to 50 trees, and living in these shelters demands a constant supply of firewood for heating and cooking, adding further strain on the ecosystem²⁷⁶.

Finally, the construction of barriers, often involving extensive use of barbed wire around military bases, air defense sites, and even highways, poses another threat²⁷⁷. Although these barriers may not be visible on satellite images and might seem insignificant, they form impassable obstacles for land animals and birds, often leading to injury or death.

²⁷⁶ <https://uwecworkgroup.info/uk/military-fortifications-in-ukraine-what-comes-next/>

²⁷⁷ <https://zn.ua/ukr/war/rosijani-u-krimu-budujut-zahorodzhennja-shchob-prikhovati-sistemi-ppo-atesh.html>

MILITARIZATION OF THE MARINE ENVIRONMENT

The militarization of the marine environment truly escalated following Russia's full-scale invasion of Ukraine, turning the seas into active zones of combat, air defense, missile launches and explosions, and drifting mines. The Black and Azov Seas have become nearly inaccessible, not only to fishermen and tourists but also to scientists who have long studied changes in the marine environment. With ports blockaded and waters mined, direct sampling is currently impossible, yet the effects of war on the marine environment can still be understood through existing data and observations.

The ongoing war, which started in 2014, has significantly harmed efforts to restore Ukraine's seas, leading to the deterioration of marine ecosystems, particularly in areas under occupation, such as Crimea and the Azov coast in Donetsk Oblast. In the Black Sea, the first signs of environmental damage from military activity surfaced in 2014. For example, shortly after Crimea's occupation, the Russian military sank²⁷⁸ four ships at the entrance to Lake Donuzlav, blocking Ukrainian naval access to the sea. Among them was the largest, the anti-submarine ship Ochakov, which remained submerged for six months before being salvaged. Ukraine's Ministry of Environment immediately raised concerns about the ecological damage caused by these rash actions²⁷⁹.

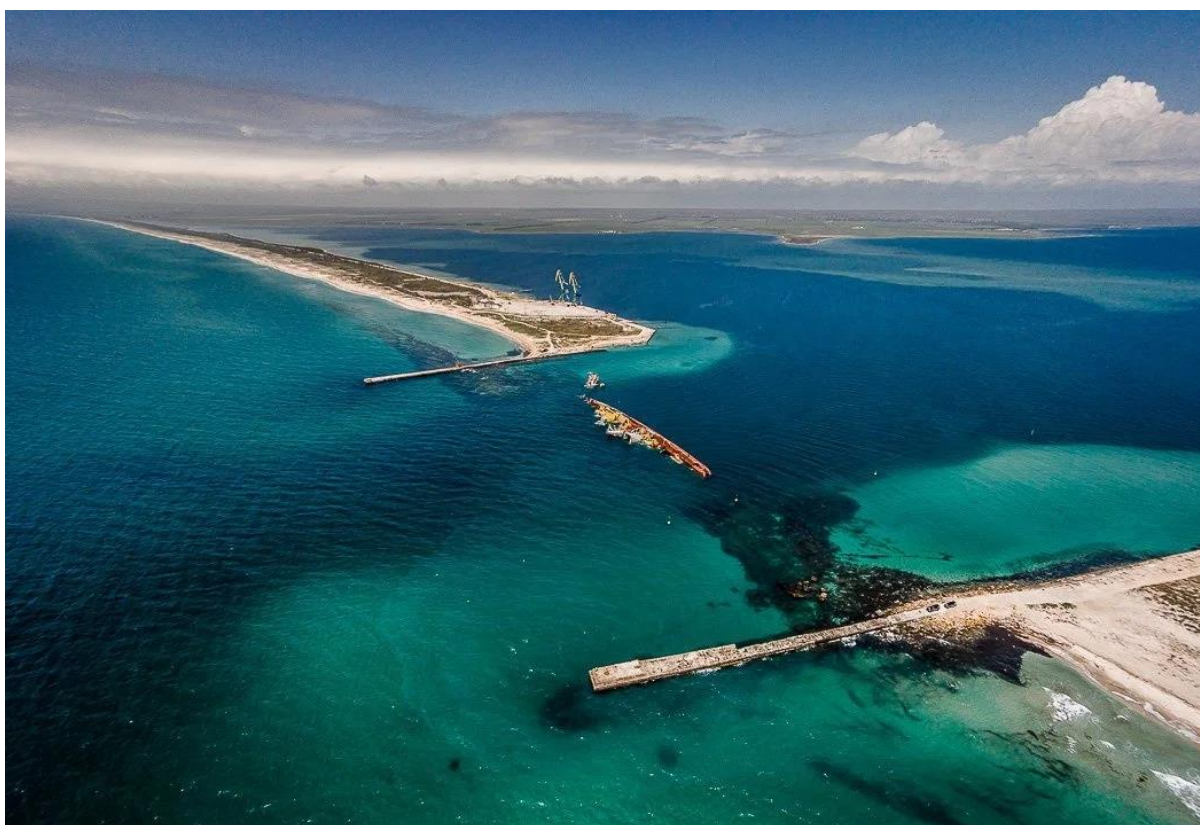


Photo. Sunken anti-submarine ship Ochakov near the entrance to Lake Donuzlav (source: topwar.ru)

²⁷⁸ <https://www.ukrmilitary.com/2014/03/donuzlav.html>

²⁷⁹ <https://uwecworkgroup.info/uk/impact-of-russias-invasion-of-ukraine-on-the-black-and-azov-seas/>

During the years of occupation, particularly following the full-scale invasion, marine ecosystems have been systematically damaged by infrastructure development, resource extraction, military exercises, and alterations to the status of protected areas. A notable example is the construction of the bridge across the Kerch Strait, which destroyed the unique²⁸⁰ ecosystems and lakes of Tuzla Island and disrupted fish and cetacean migration routes in the strait.

The Bakal Spit in Karkinit Bay of the Black Sea has also suffered severe damage. Industrial sand mining during the occupation destroyed the spit's structure, harming the natural habitats in the nearby coastal salt lakes. Satellite images from 2019 revealed that the spit had become an island, raising concerns that it could disappear entirely.

In addition, the occupying authorities have transformed²⁸¹ the Oputskyi Nature Reserve, which protects marine and coastal ecosystems as well as virgin steppes, into a military training ground. Large-scale military exercises around the Chauda and Opuk Capes involved the use of air missiles, vacuum bombs, and other explosives, posing a severe threat to the marine environment through chemical pollution and the effects of blast waves.

With the onset of the full-scale invasion, the negative impact on the seas worsened significantly. From the very first days, it became clear that military operations, bombardments of coastal cities, port blockades, and pollution from oil and other substances would have far-reaching consequences for the marine environment. In the spring of 2022, Russian warships blockaded Black Sea ports and patrolled the northwestern waters of the Black Sea. Besides the direct military threat — these ships, for instance, fired on Ukrainian cities — they presented additional hidden dangers. Unmonitored discharges from these vessels could release pollutants and invasive species into the marine environment through ballast water from ships arriving from other sea regions²⁸².

Another catastrophe during this period was the mass death of cetaceans. For the first time, dolphins and porpoises were found washed up in large numbers along the Turkish coast near the Bosphorus Strait, coinciding with the entry of Russian warships into the Black Sea. The peak of these incidents occurred in May and June 2022, during intense fighting, particularly around Zmiinyi Island. Between January and October 2022, scientists from Ukraine, Romania, Bulgaria, Turkey, and Georgia recorded²⁸³ around a thousand cetacean deaths in the Black Sea — two to three times more than in the years 2019-2021. These figures only reflect confirmed cases, meaning the actual number of deaths could be much higher. There was also a significant rise in cases where animals were stranded alive, with most incidents occurring²⁸⁴ in Crimea, particularly around Sevastopol, where Russian military bases are located.

In response to the mass death of dolphins in the Black Sea, possibly linked to Russia's armed aggression, the Odesa Regional Prosecutor's Office launched²⁸⁵ a criminal investigation into ecocide. Scientists collected numerous samples to determine whether the animals exhibited signs of acoustic trauma²⁸⁶, a serious concern since warship and submarine radars operate at

²⁸⁰<https://uwecworkgroup.info/the-crimean-bridge-environmental-impact-of-russias-project-of-the-century/>

²⁸¹<https://uwecworkgroup.info/nine-years-after-crimeas-annexation-militarizations-environmental-consequences/>

²⁸² <https://uwecworkgroup.info/uk/impact-of-russias-invasion-of-ukraine-on-the-black-and-azov-seas/>

²⁸³<https://www.facebook.com/ABDolphins/posts/pfbid0daMHg4XF8KGroGbThTr1qccYVVCgcbiHcBkVBLvApgYyB54HcVbUoRPFiutBSTAal>

²⁸⁴ <https://kunsht.com.ua/slidstvo-vedut-naukovci-chomu-v-chornomu-mori-masovo-ginuli-delfini/>

²⁸⁵https://od.gp.gov.ua/ua/news.html?_m=publications&_c=view&_t=rec&id=319340&fbclid=IwAR1_ttK_Xzj_LKMIp5FQ_5XDL_ETsOYhazh9qnD5-CwhZ8iRO7dZjC6hXio

²⁸⁶ <https://kunsht.com.ua/slidstvo-vedut-naukovci-chomu-v-chornomu-mori-masovo-ginuli-delfini/>

frequencies that overlap with those used by cetaceans for echolocation. This can impair their hearing, affecting their ability to navigate, hunt, and communicate. Underwater explosions further exacerbate the threat by causing both acoustic and blast injuries. While the number of dolphin deaths declined in 2023 — possibly due to reduced hostilities in the northwestern Black Sea after the liberation of Zmiinyi Island — dolphins and porpoises continue to wash up on its shores. Moreover, reports of mass animal deaths have surfaced in the Mediterranean. In March 2023, scientists linked the deaths of a dozen dolphins off Cyprus to acoustic trauma²⁸⁷, potentially caused by Russian military exercises, indicating that the threat remains ongoing.

Russian warships pose significant environmental threats not only through missile launches and radar use but also due to oil spills, which form oxygen-blocking films on the sea's surface. Fuel and oil leaks from older Russian military vessels — many built in the Soviet era without environmental regulations — add to this problem. In addition to oil spills, fuel and oil from Russian military ships and aircraft are also a negative factor. Submarines further contaminate the waters by dumping spent rocket fuel during missile launches. These oil products spread across the surface, dissolve into the water, and heavier fractions settle on the seabed. However, the greatest damage to ecosystems comes from sunken ships. Ammunition in the water, containing heavy metals like nickel, tungsten, tin, and lead, as well as toxic plasticizers and stabilizers such as nitroglycerin and nitrocellulose, compounds the issue. Incendiary weapons, such as white phosphorus, also pose risks when introduced to seawater²⁸⁸.

These substances are particularly toxic to neustonic organisms — microscopic life forms that inhabit the sea's surface layer, an essential “incubator” for young aquatic life. Damage to this surface layer can disrupt food chains and destabilize entire ecosystems²⁸⁹.

Satellite images have captured²⁹⁰ oil spills resulting from shipwrecks, with films covering tens of thousands of square kilometers of marine protected areas in Ukraine. These include the Zmiinyi Island Zoological Reserve of national significance, the Zernove Filoforne Pole Botanical Reserve of national significance, the Sviatoslav Biloberezhzhia National Nature Park, and the Black Sea Biosphere Reserve of the National Academy of Sciences of Ukraine, among others.

²⁸⁷https://www.newsweek.com/cuiviers-beached-whales-russian-navy-killed-blast-cyprus-1784733?fbclid=IwAR3D2mJ_QoeGRU-Sy1c97p-sQ-Bj2djU6TyD_ymlr7YJ6n3DiGPQH8CfWD0

²⁸⁸<https://nv.ua/ukraine/events/kak-voyna-vliyaet-na-vo-duh-i-zemlyu-ukrainy-ekspert-novosti-ukrainy-50243604.html>

²⁸⁹ <https://uwecworkgroup.info/uk/impact-of-russias-invasion-of-ukraine-on-the-black-and-azov-seas/>

²⁹⁰ <https://www.nas.gov.ua/UA/Messages/News/Pages/View.aspx?MessageID=9679>

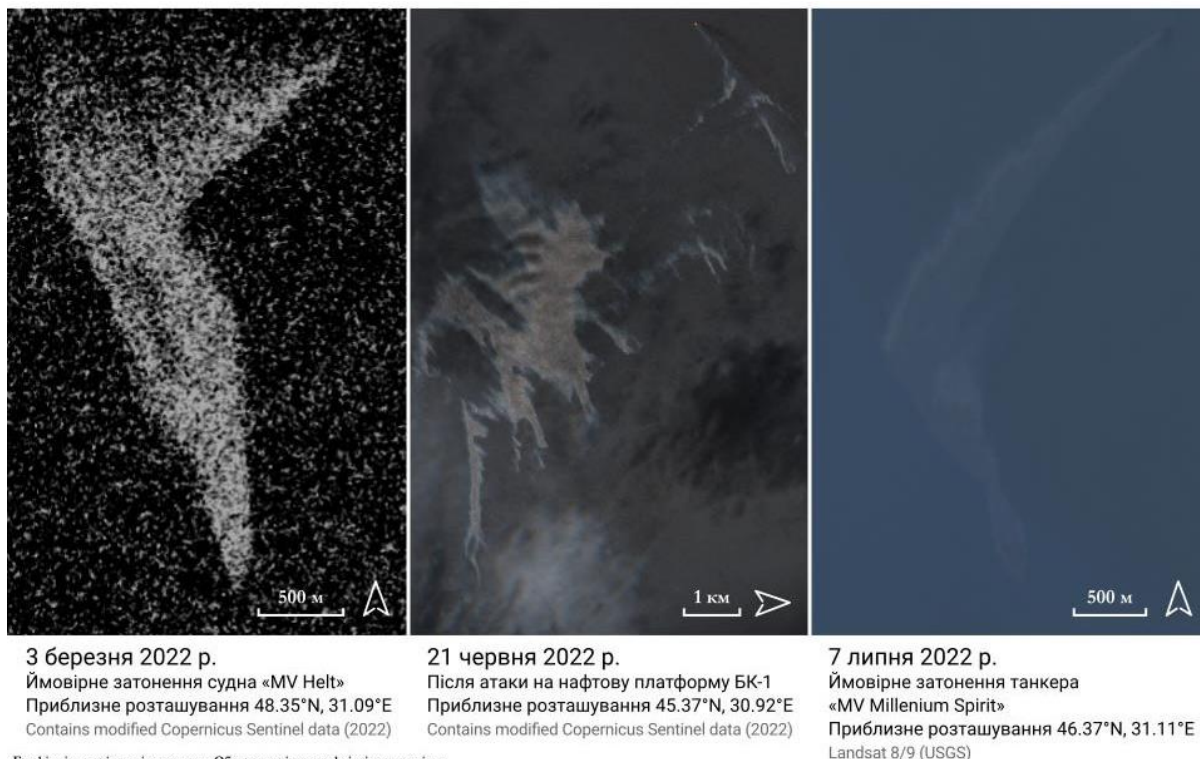


Photo. Oil spills recorded using radar and optical satellite images in a study by CEOBS (Conflict and Environment Observatory) and Zoï Environment Network (Source: [CEOBS](https://ceobs.org/))²⁹¹

Warships not only pollute the environment but pose a significant threat if they sink. Scientists have raised concerns²⁹², about the Russian cruiser Moskva, which sank in the northwestern Black Sea and may have contained up to 1,740 tons of fuel oil!²⁹³ After its sinking, the cruiser was towed by Russian forces to an area rich in nature reserves and rare habitats. Notably, it was moved near the Zernove Filoforne Pole Botanical Reserve, a critical site for protecting the unique red algae called “phyllophora.” This ecosystem, sometimes compared to the Sargasso Sea for its dense clusters of microscopic, unattached algae, is unique as it is located on the seabed of our Black Sea and is home to numerous rare species, some of which are listed in Ukraine’s Red Data Book.

The potential damage to these fragile ecosystems from the sunken Moskva remains unclear. Scientists stress the need for thorough investigation of the sinking site to analyze the composition of the ship’s ammunition, determine whether radioactive elements were present, estimate the fuel onboard, and assess the impact on the seabed’s biocenoses²⁹⁴.

Another pressing issue is the use of drifting mines by Russian forces, which are now moving uncontrollably through the Black Sea. Explosions from these mines can kill marine life within a wide radius, and for cetaceans, the lethal range can be much greater.

²⁹¹<https://ceobs.org/%d0%b5%d0%ba%d0%be%d0%bb%d0%be%d0%b3%d1%96%d1%87%d0%bd%d0%b8%d0%b9-%d0%b1%d1%8e%d0%bb%d0%b5%d1%82%d0%b5%d0%bd%d1%8c-%d1%89%d0%be%d0%b4%d0%be-%d0%b2%d1%96%d0%b9%d0%bd%d0%b8-%d0%b2-%d1%83%d0%ba%d1%80/#4>

²⁹² <https://www.nas.gov.ua/UA/Messages/News/Pages/View.aspx?MessageID=9679>

²⁹³ <https://ciaec.ru/our-blog/utoplennoe-toplivo/>

²⁹⁴ <https://investigator.org.ua/ua/publication/245067/>, <https://uwecworkgroup.info/uk/impact-of-russias-invasion-of-ukraine-on-the-black-and-azov-seas/>

CONCLUSIONS AND RECOMMENDATIONS

A) The environmental pollution and depletion of natural resources described above pose serious risks to public health and living conditions in Crimea, leading to a decline in living standards and violations of environmental human rights. Some actions appear to be the deliberate destruction of nature, while others result from the short-sightedness and negligence of the occupying authorities.

The future de-occupation of Crimea will bring a major overhaul of the governance system, with a large-scale rotation of state bodies and a review of many decisions made under the “Russian reality.” It is crucial to prepare now for the environmental protection measures that will be needed post-occupation — not only to address the damage caused by the Russian occupation but also to halt ongoing destructive processes.

B) Ukraine has already made considerable progress toward ensuring accountability for Russia’s environmental crimes. The Prosecutor General of Ukraine has established a special unit to investigate and prosecute these offenses, while also pursuing international avenues to hold the perpetrators accountable.

Although environmental crimes are not specifically under the jurisdiction of the International Criminal Court (ICC), Ukraine cooperates closely with the ICC Office of the Prosecutor. Some environmental offenses may fall under international crimes, particularly crimes against property in occupied territories. As a result, the ICC is authorized to investigate international crimes committed on Ukrainian territory since 21 November 2013.

C) Russia and its affiliated entities must be held accountable for the environmental damage inflicted on Ukraine due to armed aggression, including the destruction on the Crimean Peninsula. The precise and reliable collection and preservation of evidence is essential to support criminal prosecutions for environmental crimes and to substantiate claims for damages.

In addition to criminal liability for individuals responsible for environmental destruction — whether as a war crime or as ecocide — accountability must also include securing reparations from the state responsible for the harm. Several mechanisms for obtaining reparations are possible, including the use of frozen Russian state assets and their proceeds, which could be directed toward Ukraine’s recovery and reconstruction.<sup>[P]
[SEP]</sup>

Ending uncontrolled recreation in existing protected areas and establishing new protected areas

A) Any decisions made by the occupation authorities to declare protected areas are undoubtedly illegitimate and hold no legal standing for Ukraine. However, the natural value of the areas they have attempted to protect remains significant and should be preserved.

B) Following de-occupation, it would be prudent to consider declaring these “protected areas” through legitimate decisions made by Ukrainian authorities. Additionally, the creation of new protected areas in Crimea should be explored to meet the country’s obligations under international agreements aimed at expanding the network of protected areas.

Protecting endangered species

A) The occupation of Crimea has undermined the enforcement of environmental legislation, meaning species once protected under Ukrainian law have lost their safeguards. The prospects for continued protection during the occupation exist only for species listed in both Ukraine's Red Data Book and Russia's equivalent. However, there are two major barriers to effective conservation. First, many unique species found exclusively in Crimea are absent from Russia's Red Data Book, stripping them of any legal protection. Second, species that are recognized in both countries' lists face insufficient protection under Russian law, leading to their ongoing destruction.

B) To ensure the survival of species listed in Ukraine's Red Data Book, it is crucial to immediately halt several environmentally destructive practices carried out by the occupying authorities. These include the plowing of steppes for reforestation, construction projects, and river diversions for water supply. Additionally, it is vital to reduce the recreational impact on protected areas and enforce stricter regulations on the protection of rare and endangered species. This should involve efforts to prevent the production of juniper souvenirs and crack down on poaching activities.

Preserving the steppes

A) The occupying authorities in Crimea have shown little regard for the preservation of the peninsula's steppes. This is evident from the reforestation efforts in steppe areas and the increase in agricultural land following the annexation, which has been achieved through the plowing of steppe regions.

B) Crimea is not suited for large-scale forestry, as such activities disrupt its unique natural ecosystems, particularly the steppes. It is essential to preserve the existing ecosystems by preventing further deforestation, plowing, reforestation of steppes, and river regulation. The environmental damage inflicted during the occupation must be halted, and efforts should be made to restore the ecosystems to their pre-2014 state.

Forest and steppe fires

A) In addition to forest fires in the mountainous regions, caused by both natural and human factors, there have been incidents of steppe fires triggered by military activities, specifically from the use of air defense systems.

B) To reduce the number of fires, military operations in Crimea must cease – a goal that can only be achieved when the peninsula returns to Ukrainian control. Restoration plans should be created to rehabilitate the ecosystems damaged by these fires and other military actions.

Reevaluating agriculture for regional sustainability

A) After the de-occupation of Crimea, it is unlikely that the North Crimean Canal will continue to serve its irrigation function in its current state. While Dnipro water could be supplied to the canal without restoring the Kakhovka reservoir, the extensive water use and soil salinization associated with this approach render it unsustainable and environmentally harmful.

B) A more viable solution would be to shift towards efficient, climate-adapted dry steppe agriculture, relying on methods like drip irrigation, which aligns with sustainable development and balanced land-use planning. Rather than focusing on irrigation-based crop production, Crimea should return to traditional livestock farming, which was prevalent before Soviet-era environmental modifications. This approach will ensure a sustainable future for the peninsula. While local water resources are sufficient for the population's needs, water pipelines, rather than canals, should be considered to supply industrial water from the Dnipro River.

Preventing new housing construction in natural areas and mitigating urban impact

A) The development of natural areas leads to biodiversity loss, reducing populations of wild animals and plants, and destroying rare habitats. Often, such construction is carried out in protected areas, in violation of Ukrainian legislation. After Crimea's de-occupation, it will be essential to halt ongoing construction in these protected areas, where it has already begun under occupation authorities, and prevent new construction in other natural zones.

B) As for the millions of square meters of housing already built by the occupation authorities, it will be necessary to assess the urban impact on surrounding natural areas. This includes addressing underdeveloped infrastructure, such as sewage, water, and waste treatment systems, which are often overlooked in new residential developments. Although a population outflow is expected after de-occupation, ensuring the functionality of basic infrastructure should not be forgotten.

Waste management and air pollution under occupation authorities

A) Crimea continues to struggle with waste recycling, outdated landfills, and the rise of unauthorized dumpsites. The occupation authorities have attempted to address this by constructing new incinerators, but these facilities present a significant risk of air pollution.

B) One example is a proposed waste processing plant that was ultimately blocked due to local activism and public outcry. To further protect Crimea's environment, it is recommended that civic activists and environmental organizations:

- Identify and document instances of environmental degradation in occupied Crimea;
- Publicize information about environmental issues while considering security risks;
- Advocate for environmental protection in Crimea through Ukrainian state institutions and international organizations.

Environmental consequences of militarization on land and water

A) The construction of engineering fortifications and the conduct of military exercises on both land and sea have caused significant environmental damage in Crimea, particularly in protected areas. The occupying authorities have shown little regard for limiting these activities, which has led to the creation of belligerent landscapes (due to the formation of military infrastructure), more frequent fires, and specific forms of pollution — physical, chemical, and acoustic — that harm water areas and marine life, including cetaceans and mollusks.

B) After the war, dismantling military fortifications will be one of the most challenging tasks in the green restoration of Crimea. The actual area of damage from trench construction and active soil erosion is much larger than the fortified zones themselves. Restoration efforts must be comprehensive. Firstly, this involves leveling the altered landscape by filling in trenches and developing detailed plans for ecosystem recovery. Addressing the spread of invasive species will also be essential. However, simply restoring the landscape may not halt soil erosion, so specific land reclamation strategies must be developed after examining each individual case of military infrastructure construction.

To ease the strain on marine ecosystems, demining operations will be needed, along with salvaging sunken ships for proper disposal.

To control the problems that have emerged during the occupation, a comprehensive Environmental Restoration Program for Crimea should be established, aligning with European standards, particularly the principles outlined in the EU Nature Restoration Law adopted in February 2024.

Addendum No.1

Comparison of the Condition of Nature Reserve Fund Territories²⁹⁵

[link to addendum](#)

Addendum No.2

Approximate List of Military Incidents on the Territory of Occupied Crimea

Data	Data concerning the military incident	Type of weapon
31.07.2022	Announcement of a UAV attack on the headquarters of the Black Sea Fleet of the Russian Navy in Sevastopol ²⁹⁶	UAV
09.08.2022	Novofedorivka, airfield, warehouses ²⁹⁷	?
16.08.2022	Dzhankoi, Maiske, ammunition depot ²⁹⁸	?
16.08.2022	Hvardiiske, military infrastructure ²⁹⁹	?
20.08.2022	Announcement of a UAV attack on the headquarters of the Black Sea Fleet of the Russian Navy in Sevastopol ³⁰⁰	UAV
20.08.2022	Yevpatoriiskiy Raion ³⁰¹	UAV
21.08.2022	Belbek airfield ³⁰²	UAV
23.08.2022	Sevastopol ³⁰³	UAV
28.08.2022	Sevastopol, military infrastructure ³⁰⁴	?
28.08.2022	Cape Fiolent ³⁰⁵	UAV
22.09.2022	Dzhankoi ³⁰⁶	UAV

²⁹⁵ The table does not include new sites created by the self-proclaimed occupying power

²⁹⁶<https://mil.in.ua/uk/news/shtab-rosijskogo-chornomorskogo-flotu-v-sevastopoli-atakuvaly-bezpilotnykom/>

²⁹⁷<https://www.reuters.com/world/europe/loud-explosions-heard-near-russian-military-airbase-crimea-witnesses-2022-08-09/>

²⁹⁸<https://www.bbc.com/ukrainian/features-62559855>

²⁹⁹<https://www.slovoidilo.ua/2022/08/16/novyna/suspilstvo/vijskovomu-aerodromi-rf-simferopolem-stalysya-vybuhy-zmi>

³⁰⁰<https://mil.in.ua/uk/news/dron-kamikadze-atakuvav-shtab-rosijskogo-flotu-u-sevastopoli/>

³⁰¹<https://www.pravda.com.ua/news/2022/08/20/7364090/>

³⁰²<https://mil.in.ua/uk/news/u-krymu-spratsyuvalo-ppo-rf-na-pidhodah-do-aeroportu-belbek/>

³⁰³<https://mil.in.ua/uk/news/okupatsijna-vlada-krymu-povidomyla-pro-zbytj-bezpilotnyk-nepodalik-sevastopolya/>

³⁰⁴<https://web.archive.org/web/20221013175759/https://fakty.com.ua/ua/proisshestvija/20220829-u-rajoni-mysu-fiolent-v-krymu-progrymily-potuzhni-vybuhy/>

³⁰⁵<https://mil.in.ua/uk/news/u-krymu-bilya-mysu-fiolent-ta-kozachoyi-buhty-prolunaly-vybuhy/>

³⁰⁶<https://mil.in.ua/uk/news/krym-atakuvaly-nevidomi-bezpilotnyky-z-chervonyomy-zirkamy/>

22.09.2022	Nyzhnohirskiy Raion ³⁰⁷	UAV
08.10.2022	Kerch Strait, truck explosion on the bridge ³⁰⁸	?
27.10.2022	Sevastopol, Balaklavsk TPP ³⁰⁹	UAV
29.10.2022	Sevastopol; attack by unmanned surface vehicles; data on damage to the Ivan Golubets minesweeper and the containment booms in Pivdenna Bay ³¹⁰	UAV
22.11.2022	Sevastopol ³¹¹	UAV
29.12.2022	Dzankoi, explosions ³¹²	?
16.02.2023	Armiansk ³¹³	?
23.02.2023	Bakhchysaraiskyi Raion; data on the destruction of a section of the metal railway track ³¹⁴	?
04.03.2023	Hvardiiske airbase ³¹⁵	UAV
20.03.2023	Dzhankoi, weapons depot ³¹⁶	UAV
20.03.2023	Explosions recorded in Dzhankoi; announcement of the destruction of Russian Kalibr cruise missiles during their railway transport ³¹⁷	?
22.03.2023	Sevastopol ³¹⁸	USV
07.04.2023	Feodosia ³¹⁹	?
24.04.2023	Sevastopol ³²⁰	USV
29.04.2023	Sevastopol, explosion and fire at an oil depot ³²¹	USV

³⁰⁷ <https://mil.in.ua/uk/news/krym-atakuvaly-nevidomi-bezpilotnyky-z-chervonymy-zirkamy/>

³⁰⁸ [https://uk.wikipedia.org/wiki/%D0%92%D0%B8%D0%B1%D1%83%D1%85_%D0%BD%D0%B0_%D0%9A%D1%80%D0%B8%D0%BC%D1%81%D1%8C%D0%BA%D0%BE%D0%BC%D1%83_%D0%BC%D0%BE%D1%81%D1%82%D1%83_\(2022\)](https://uk.wikipedia.org/wiki/%D0%92%D0%B8%D0%B1%D1%83%D1%85_%D0%BD%D0%B0_%D0%9A%D1%80%D0%B8%D0%BC%D1%81%D1%8C%D0%BA%D0%BE%D0%BC%D1%83_%D0%BC%D0%BE%D1%81%D1%82%D1%83_(2022))

³⁰⁹ <https://mil.in.ua/uk/news/rosiyan-yayavyly-pro-ataku-drona-na-balaklavsku-tes-v-okupovanomu-krymu/>

³¹⁰ <https://mil.in.ua/uk/news/rosiyan-vyznala-urazhennya-korabliv-chf-u-gavani-sevastopolya/>

³¹¹ <https://mil.in.ua/uk/news/v-sevastopoli-ta-na-okolytsyah-prolunala-seriya-vybuchiv/>

³¹² <https://hvylyya.net/uk/news/270543-vzryvy-v-krymu-v-feodosii-unichtozhena-rossiyskaya-sistema-pvo-s-300-smi>

³¹³ <https://www.stopcor.org/ukr/section-uaneews/news-pivnichnokrimskya-bavovna-povidomlyayut-pro-masshtabnu-pozhezhu-v-armyansku-znimki-16-02-2023.html>

³¹⁴ <https://mil.in.ua/uk/news/u-krymu-pidirvaly-chastynu-zaliznytsi/>

³¹⁵ <https://mil.in.ua/uk/news/poblyzu-aviabazy-gvardijske-v-krymu-stavsya-potuzhnyy-vybuch/>

³¹⁶ <https://gur.gov.ua/content/vybuch-u-misti-dzhankoi-znyshchyv-rosiyski-krylati-rakety-kalybr-nk.html>

³¹⁷ <https://www.radiosvoboda.org/a/news-ukrainska-rozvidka-vybuch-dzhankoi-rakety/32326859.html>

³¹⁸ <https://mil.in.ua/uk/news/z-yavlyosya-video-atomy-sevastopolskoyi-buhty-nadvodnyy-bezpilotnykamy/>

³¹⁹ <https://hvylyya.net/uk/news/270543-vzryvy-v-krymu-v-feodosii-unichtozhena-rossiyskaya-sistema-pvo-s-300-smi>

³²⁰ <https://mil.in.ua/uk/news/rosiyan-yayavyly-shho-nadvodni-drony-atakuvaly-okupovanyj-sevastopol/>

³²¹ https://uk.wikipedia.org/wiki/%D0%9F%D0%B5%D1%80%D0%B5%D0%BB%D1%96%D0%BA_%D0%B0%D1%82%D0%B0%D0%BA_%D0%BD%D0%B0_%D1%82%D0%B5%D1%80%D0%B8%D1%82%D0%BE%D1%80%D1%96%D1%97_%D0%9A%D1%80%D0%B8%D0%BC%D1%83_%D0%B2_%D1%85%D0%BE%D0%B4%D1%96_%D1%80%D0%BE%D1%81%D1%96%D0%B9%D1%81%D1%8C%D0%BA%D0%BE-%D1%83%D0%BA%D1%80%D0%B0%D1%97%D0%BD%D1%81%D1%8C%D0%BA%D0%BE%D1%97_%D0%B2%D1%96%D0%B9%D0%BD%D0%B8#cite_note-21

07.05.2023	Sevastopol ³²²	UAV
22.06.2023	Attack on the road bridge between the Kherson Oblast and the Autonomous Republic of Crimea ³²³	Storm Shadow
09.07.2023	Kerch Strait, explosion on the bridge across the Kerch Strait, as a result of which traffic is partially restricted ³²⁴	5B28
17.07.2023	Kerch Strait ³²⁵	USV
19.07.2023	explosions and detonation at the Starokrymskyi training ground; people were evacuated from four nearby settlements ³²⁶	?
22.07.2023	Crimea, military infrastructure ³²⁷	Storm Shadow
22.07.2023	Oktiabske, explosions and detonation at the Oktiabske airbase, fire in the vicinity of the Elevatorna railway station ³²⁸	UAV
22.07.2023	Krasnohvardiyskyi Raion, explosions and fire at an oil depot, evacuation of the population within a radius of 5 km ³²⁹	?
24.07.2023	Vesele, weapons depot ³³⁰	Storm Shadow
28.07.2023	Kozacha Bukhta, weapons depot ³³¹	?
29.07.2023	Railway Bridge between Crimea and Kherson Oblast	Storm Shadow
01.08.2023	Sevastopol ³³²	?
02.08.2023	Missiles destroyed ³³³	Storm Shadow
04.08.2023	Feodosia, oil storage ³³⁴	?
05.08.2023	The Black Sea, near Kerch Strait, data on attack on the project	?

³²²https://uk.wikipedia.org/wiki/%D0%9F%D0%B5%D1%80%D0%B5%D0%BB%D1%96%D0%BA_%D0%B0%D1%82%D0%B0%D0%BA_%D0%BD%D0%B0_%D1%82%D0%B5%D1%80%D0%B8%D1%82%D0%BE%D1%80%D1%96%D1%97_%D0%9A%D1%80%D0%B8%D0%BC%D1%83_%D0%B2_%D1%85%D0%BE%D0%B4%D1%96_%D1%80%D0%BE%D1%81%D1%96%D0%B9%D1%81%D1%8C%D0%BA%D0%BE-%D1%83%D0%BA%D1%80%D0%B0%D1%97%D0%BD%D1%81%D1%8C%D0%BA%D0%BE%D1%97_%D0%B2%D1%96%D0%B9%D0%BD%D0%B8#cite_note-22

³²³<https://www.unian.ua/war/udar-po-chongarskomu-mostu-u-krimu-dovgi-zatori-vantazhivok-video-12304956.html>

³²⁴<https://www.unian.ua/russianworld/rosiya-zvinuvatila-zsu-u-sprobi-atakuvati-krimskiy-mist-raketami-s-200-video-12322947.html>

³²⁵[https://uk.wikipedia.org/wiki/%D0%92%D0%B8%D0%B1%D1%83%D1%85_%D0%BD%D0%B0_%D0%9A%D1%80%D0%B8%D0%BC%D1%81%D1%8C%D0%BA%D0%BE%D0%BC%D1%83_%D0%BC%D0%BE%D1%81%D1%82%D1%83_\(2023\)](https://uk.wikipedia.org/wiki/%D0%92%D0%B8%D0%B1%D1%83%D1%85_%D0%BD%D0%B0_%D0%9A%D1%80%D0%B8%D0%BC%D1%81%D1%8C%D0%BA%D0%BE%D0%BC%D1%83_%D0%BC%D0%BE%D1%81%D1%82%D1%83_(2023))

³²⁶ <https://theins.ru/news/263536>

³²⁷ https://twitter.com/666_mancer/status/1683127753921495041

³²⁸https://zaxid.net/v_okupovanomu_krimu_pislya_potuzhnih_vibuhiv_zagorilasya_zaliznichna_stantsiya_n1567845

³²⁹ <https://mil.in.ua/uk/news/u-krymu-goryt-naftobaza-ta-detonuyut-boyeprypasy/>

³³⁰ <https://twitter.com/Archer83Able/status/1684151900223025158>

³³¹<https://gur.gov.ua/content/v-kazachii-bukhti-okupovanoho-krymu-vybukhnuv-sklad-boieprypasiv-okupantiv.html>

³³²https://uk.wikipedia.org/wiki/%D0%9F%D0%B5%D1%80%D0%B5%D0%BB%D1%96%D0%BA_%D0%B0%D1%82%D0%B0%D0%BA_%D0%BD%D0%B0_%D1%82%D0%B5%D1%80%D0%B8%D1%82%D0%BE%D1%80%D1%96%D1%97_%D0%9A%D1%80%D0%B8%D0%BC%D1%83_%D0%B2_%D1%85%D0%BE%D0%B4%D1%96_%D1%80%D0%BE%D1%81%D1%96%D0%B9%D1%81%D1%8C%D0%BA%D0%BE-%D1%83%D0%BA%D1%80%D0%B0%D1%97%D0%BD%D1%81%D1%8C%D0%BA%D0%BE%D1%97_%D0%B2%D1%96%D0%B9%D0%BD%D0%B8#cite_note-36

³³³ https://twitter.com/666_mancer/status/1686606661941686272

³³⁴<https://focus.ua/uk/voennyje-novosti/583571-tam-velike-naftove-shovishe-u-zsu-pidtvordili-nichnij-udar-po-krimu-video>

	52 Sig chemical tanker ³³⁵	
06.08.2023	missile strikes on the bridges in Chonhar and Henichesk ³³⁶	Storm Shadow
10.08.2023	Sevastopol ³³⁷	UAV
12.08.2023	Kerch Strait, downed ³³⁸	5B28
12.08.2023	Novoozerne ³³⁹	UAV
23.08.2023	destruction of two 5 П85CM2-01 launchers of the Russian S-400 Triumph complex in ³⁴⁰	?
24.08.2023	On the morning of August 24, HUR special forces of the Ministry of Defense of Ukraine landed on Cape Tarkhankut in occupied Crimea ³⁴¹	?
30.08.2023	Feodosiia ³⁴²	UAV
13.09.2023	Sevastopol, project 775 landing ship ³⁴³	Storm Shadow
13.09.2023	Sevastopol, Project 877/636 submarine ³⁴⁴	Storm Shadow
14.09.2023	Yevpatoriia, S-400 Triumph (military unit A-0879) ³⁴⁵	P-360 Neptune
14.09.2023	destruction of S-400 Triumph system on Russian air defense base (before occupation - military unit A-0879 of the 40 th Radio Engineering Brigade) ³⁴⁶	P-360 Neptune / UAV
17.09.2023	Sevastopol ³⁴⁷	UAV
20.09.2023	Sevastopol, military infrastructure ³⁴⁸	Storm Shadow
21.09.2023	Saki ³⁴⁹	UAV
21.09.2023	Crimea ³⁵⁰	UAV

³³⁵ <https://www.rbc.ua/rus/news/rosiyi-zayavili-nibito-urazhennya-tankera-1691189386.html>

³³⁶ <https://www.bbc.com/ukrainian/news-66420820>

³³⁷ <https://novynarnia.com/2023/08/10/sevastopol-namagalysya-atakuvaly-11-bpla-minoborony-rf/>

³³⁸ <https://www.unian.ua/russianworld/krimskiy-mist-zadimivsyia-u-minoborony-rf-zayavili-pro-ataku-raketami-s-200-12358206.html>

³³⁹ <https://www.unian.ua/war/krimskiy-mist-perekritiy-miscevi-povidomlyayut-pro-vibuhi-socmerezhi-12357888.html>

³⁴⁰ <https://mil.in.ua/uk/news/u-gur-daly-otsinku-znyshhennyyu-zrk-s-400-u-krymu/>

³⁴¹ <https://www.pravda.com.ua/news/2023/08/24/7416880/>

³⁴² <https://nv.ua/ukr/ukraine/events/vibuhi-v-krimu-u-feodosiji-progrimilo-kilka-vibuhiv-novini-ukrajini-50350174.html>

³⁴³ <https://mil.in.ua/uk/news/rosiya-vtratyla-dva-korablya-v-sevastopoli/>

³⁴⁴ <https://mil.in.ua/uk/news/rosiya-vtratyla-dva-korablya-v-sevastopoli/>

³⁴⁵ <https://www.pravda.com.ua/news/2023/09/14/7419745/>

³⁴⁶ <https://www.pravda.com.ua/news/2023/09/14/7419745/>

³⁴⁷ https://uk.wikipedia.org/wiki/%D0%9F%D0%B5%D1%80%D0%B5%D0%BB%D1%96%D0%BA_%D0%B0%D1%82%D0%B0%D0%BA_%D0%BD%D0%B0_%D1%82%D0%B5%D1%80%D0%B8%D1%82%D0%BE%D1%80%D1%96%D1%97_%D0%9A%D1%80%D0%B8%D0%BC%D1%83_%D0%B2_%D1%85%D0%BE%D0%B4%D1%96_%D1%80%D0%BE%D1%81%D1%96%D0%B9%D1%81%D1%8C%D0%BA%D0%BE-%D1%83%D0%BA%D1%80%D0%B0%D1%97%D0%BD%D1%81%D1%8C%D0%BA%D0%BE%D1%97_%D0%B2%D1%96%D0%B9%D0%BD%D0%B8#cite_note-56

³⁴⁸ <https://focus.ua/uk/voennyie-novosti/593886-ataka-na-bazu-rf-v-krimu-storm-shadow-mogli-vdariti-po-bunkeru-kaddafi-eksperti>

³⁴⁹ <https://www.pravda.com.ua/news/2023/09/21/7420771/>

³⁵⁰ <https://suspilne.media/577085-nicna-ataka-na-okupovanij-krim-minoborony-rf-zaavilo-pro-zbitta-19-bpla/>

21.09.2023	Sevastopol ³⁵¹	?
22.09.2023	Sevastopol, Headquarters of the Black Sea Fleet of the Russian Federation ³⁵²	Storm Shadow
01.10.2023	Dzhankoi ³⁵³	?
07.10.2023	Dzhankoi ³⁵⁴	?
14.10.2023	Sevastopol, damage to the patrol ship Pavel Derzhavin ³⁵⁵	UAV
14.10.2023	Sevastopol. damage to the tugboat Nikolay Muru ³⁵⁶	UAV
18.10.2023	Sevastopol, military infrastructure ³⁵⁷	?
30.10.2023	Olenivka, military infrastructure, air defense systems ³⁵⁸	MGM-140A
30.10.2023	Sevastopol, military infrastructure ³⁵⁹	Rockets+ UAV
01.11.2023	Sevastopol ³⁶⁰	?
02.11.2023	Dzhankoi ³⁶¹	?
02.11.2023	Crimea ³⁶²	UAV
04.11.2023	Kerch, Zaliv shipyard ³⁶³	EG Scalp
04.11.2023	Kerch, Askold missile ship, Project 22800 ³⁶⁴	EG Scalp
05.11.2023	Dzhankoy Raion, detonation on the railroad ³⁶⁵	?
07.11.2023	Crimea ³⁶⁶	UAV
10.11.2023	Chornomorske, military infrastructure ³⁶⁷	Rockets+БНА

³⁵¹ <https://www.rbc.ua/rus/news/sevastopoli-prolunali-vibuhi-merezhi-pishut-1695311321.html>

³⁵² <https://www.pravda.com.ua/news/2023/09/22/7420967/>

³⁵³ <https://www.unian.ua/war/dzhankoy-vibuhi-1-zhovtnya-u-rf-zayavili-pro-raketnu-ataku-foto-12411225.html>

³⁵⁴ <https://www.unian.ua/war/dzhankoy-novini-7-zhovtnya-u-krimu-prolunali-vibuhi-foto-12418089.html>

³⁵⁵ <https://www.slovoidilo.ua/2023/10/14/novyna/suspilstvo/udary-po-vijskovyx-korablyax-rf-sevastopoli-vms-utochnyly-detali>

³⁵⁶ <https://www.slovoidilo.ua/2023/10/19/novyna/suspilstvo/raketnyj-udar-po-sevastopolyu-vchora-vvecheri-prypav-sklad-ozbroyennya-chf-rosiyi-zmi>

³⁵⁷ <https://www.slovoidilo.ua/2023/10/19/novyna/suspilstvo/raketnyj-udar-po-sevastopolyu-vchora-vvecheri-prypav-sklad-ozbroyennya-chf-rosiyi-zmi>

³⁵⁸ <https://suspilne.media/605357-zsu-pidverdili-znisenna-sistemi-ppo-okupantiv-u-krimu/>

³⁵⁹ <https://mil.in.ua/uk/news/rosiyany-zayavlyayut-pro-ataku-na-polk-ppo-u-krymu-ye-poraneni/>

³⁶⁰ <https://focus.ua/uk/voennye-novosti/603239-v-krimu-lunali-vibuhi-v-minoboroni-rf-zayavili-pro-ataku-bpla-foto>

³⁶¹ <https://www.rbc.ua/rus/news/okupovanomu-krimu-povidomlyayut-guchnij-vibuh-1698919478.html>

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³⁶³ <https://mil.in.ua/uk/news/oprylyudneno-sputnykovi-znimky-sudnobudivnogo-zavodu-zalyv-pislya-raketnoyi-ataky/>

³⁶⁴ <https://mil.in.ua/uk/news/oprylyudneno-sputnykovi-znimky-sudnobudivnogo-zavodu-zalyv-pislya-raketnoyi-ataky/>

³⁶⁵ https://antikor.com.ua/articles/664072-vsu_pytalisyj_distantsionno_podorvatj_heleznuju_dorogu_smi

³⁶⁶ <https://www.slovoidilo.ua/2023/11/07/novyna/bezpeka/krymu-lunayut-vybuhy-okupanty-zayavly-pro-robotu-ppo>

³⁶⁷ <https://www.unian.ua/war/u-krimu-dva-razi-priletilo-v-kazarmu-rosiyan-krymskiy-veter-12451677.html>

22.11.2023	Sevastopol ³⁶⁸	UAV
22.11.2023	Novoozerne ³⁶⁹	UAV
24.11.2023	Dzankoi ³⁷⁰	UAV
05.12.2023	Northern Crimea ³⁷¹	UAV
05.12.2023	Baherove ³⁷²	UAV
05.12.2023	Feodosiia, oil storage depot ³⁷³	UAV
15.12.2023	Crimea ³⁷⁴	UAV
20.12.2023	Soniachnohirske, military infrastructure ³⁷⁵	SCALP EG
20.12.2023	Vityne, military infrastructure ³⁷⁶	SCALP EG
26.12.2023 ³⁷⁷	Feodosiia, dock landing ship, Project 775	SCALP EG
03.01.2024	Sevastopol ³⁷⁸	?
04.01.2024	Hryshyne, ammunition depot ³⁷⁹	SCALP EG
04.01.2024	Saki, 222th communications hub (military unit 03121) ³⁸⁰	SCALP EG
04.01.2024	Saki, Oborona-14 radar station 5N84A ³⁸¹	SCALP EG
04.01.2024	Sevastopol, attack on the territory of a military unit (military unit 03121) of the 31 st Air Defense Division, strike on the command post ³⁸²	Rocket attack / UAV
04.01.2024	Yevpatoriyskiy Raion ³⁸³	Rocket attack / UAV
04.01.2024	Uiutne ³⁸⁴	Rocket attack / UAV

³⁶⁸<https://focus.ua/uk/voennyye-novosti/607705-vzryvy-v-krymu-v-sevastopole-zakryli-reyd-cherez-buhtu-posle-ataki-bpla-foto-video>

³⁶⁹<https://focus.ua/uk/voennyye-novosti/607705-vzryvy-v-krymu-v-sevastopole-zakryli-reyd-cherez-buhtu-posle-ataki-bpla-foto-video>

³⁷⁰<https://focus.ua/uk/voennyye-novosti/608261-krim-zaznav-masovanyoi-ataki-bpla-u-dzhankoyi-progrimilo-kilka-vibuhiv-detali>

³⁷¹<https://www.pravda.com.ua/news/2023/12/5/7431751/>

³⁷²<https://www.pravda.com.ua/news/2023/12/5/7431751/>

³⁷³<https://www.slovoidilo.ua/2023/12/05/novyna/suspilstvo/bezpilotnyky-atakuvaly-naftobazu-krymu-zmi>

³⁷⁴<https://www.pravda.com.ua/news/2023/12/15/7433289/>

³⁷⁵<https://www.unian.ua/war/vibuhi-v-krimu-priletilo-po-vazhlivomu-ob-yektu-zv-yazku-rf-12489171.html>

³⁷⁶<https://www.unian.ua/war/vibuhi-v-krimu-priletilo-po-vazhlivomu-ob-yektu-zv-yazku-rf-12489171.html>

³⁷⁷<https://www.slovoidilo.ua/2023/12/26/novyna/suspilstvo/minoborony-rf-pidtvverdly-udar-zsu-po-korablyu-novocherkask-krymu>

³⁷⁸<https://www.bbc.com/ukrainian/articles/cmlj11yw9kro>

³⁷⁹<https://mil.in.ua/uk/news/u-gur-rozpovily-pro-rezultaty-udariv-zsu-po-krymu/>

³⁸⁰<https://mil.in.ua/uk/news/u-krymu-likvidovano-komandyra-3-go-radiotekhnichnogo-polku/>

³⁸¹<https://mil.in.ua/uk/news/na-aerodromi-saky-urazyly-punkt-upravlinnya-rosiyan/>

³⁸²<https://mil.in.ua/uk/news/na-terytoriyi-vijskovoyi-chastyny-ppo-v-krymu-prolunav-vybuch/>

³⁸³<https://www.rbc.ua/rus/news/saki-novofedorivka-evpatoriya-okupovanomu-1704397031.html>

³⁸⁴<https://www.rbc.ua/rus/news/saki-novofedorivka-evpatoriya-okupovanomu-1704397031.html>

4.01.2024	Pervomaiske, ammunition depot ³⁸⁵	?
05.01.2024	Novofedorivka, command post ³⁸⁶	SCALP EG
06.01.2024	Crimea ³⁸⁷	Rocket attack
06.01.2024	Hryshyne, ammunition depot ³⁸⁸	Storm Shadow
14.01.2024	Azov Sea, destruction of Russian aircraft A-50U ³⁸⁹	?
17.01.2024	Saki ³⁹⁰	?
17.01.2024	Sevastopol ³⁹¹	?
21.01.2024	Sevastopol ³⁹²	?
30.01.2024	Ukrainian Armed Forces claim to have destroyed a Russian air defense radar near Razdolne village ³⁹³	Rocket attack
30.01.2024	Crimea ³⁹⁴	UAV
31.01.2024	Belbek, command post ³⁹⁵	SCALP EG
31.01.2024	Dzhankoi ³⁹⁶	?
31.01.2024	Sevastopol ³⁹⁷	?
01.02.2024	Donuzlav, Ivanovets missile boat destroyed, Project 12411 ³⁹⁸	UGV
14.02.2024	The Black Sea, near Alupka, destruction of the Russian Tsezar Kunikov amphibious assault ship, Project 775 ³⁹⁹	?
01.03.2024	Hvardiiske airfield ⁴⁰⁰	?
01.03.2024	Sevastopol ⁴⁰¹	?
03.03.2024	Feodosiia, the attack damaged the main pipeline at the oil depot,	Rocket attack /

³⁸⁵ https://lb.ua/society/2024/01/05/592393_zsu_urazili_skladi_boiepripraviv.html

³⁸⁶ <https://mil.in.ua/uk/news/u-krymu-buv-likvidovanyj-zastupnyk-komandira-43-go-aviatsijnogo-polku/>

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³⁹⁰ <https://twitter.com/Archer83Able/status/1747621193065103391>

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³⁹² <https://www.pravda.com.ua/news/2024/01/21/7438227/>

³⁹³ <https://daily.lviv.com/news/sytuatsiyi-i-pryhody/zsu-znyshchily-radiolokatsiynu-stantsiyu-rosiiskoyi-systemy-ppo-v-krymu-120563>

³⁹⁴ <https://espreso.tv/viyna-z-rosiyeyu-u-rosii-zayavili-pro-ataku-21-bezpilotnika-na-4-regioni-rf-ta-krim>

³⁹⁵ [https://uk.wikipedia.org/wiki/%D0%9F%D0%B5%D1%80%D0%B5%D0%BB%D1%96%D0%BA_%D1%80%D0%B0%D0%BA%D0%B5%D1%82%D0%BD%D0%B8%D1%85_%D1%83%D0%B4%D0%B0%D1%80%D1%96%D0%B2_%D0%BF%D1%96%D0%B4_%D1%87%D0%B0%D1%81_%D1%80%D0%BE%D1%81%D1%96%D0%B9%D1%81%D1%8C%D0%BE%D0%B3%D0%BE_%D0%B2%D1%82%D0%BE%D1%80%D0%B3%D0%BD%D0%B5%D0%BD%D0%BD%D1%8F_\(%D0%B7%D0%B8%D0%BC%D0%B2_2023/2024\)#cite_note-199](https://uk.wikipedia.org/wiki/%D0%9F%D0%B5%D1%80%D0%B5%D0%BB%D1%96%D0%BA_%D1%80%D0%B0%D0%BA%D0%B5%D1%82%D0%BD%D0%B8%D1%85_%D1%83%D0%B4%D0%B0%D1%80%D1%96%D0%B2_%D0%BF%D1%96%D0%B4_%D1%87%D0%B0%D1%81_%D1%80%D0%BE%D1%81%D1%96%D0%B9%D1%81%D1%8C%D0%BE%D0%B3%D0%BE_%D0%B2%D1%82%D0%BE%D1%80%D0%B3%D0%BD%D0%B5%D0%BD%D0%BD%D1%8F_(%D0%B7%D0%B8%D0%BC%D0%B2_2023/2024)#cite_note-199)

³⁹⁶ https://24tv.ua/krimu-prolunali-vibuhi-guchno-bulo-sevastopoli-bilya-sak_n2484837

³⁹⁷ <https://espreso.tv/viyna-z-rosiyeyu-u-rosii-zayavili-pro-ataku-21-bezpilotnika-na-4-regioni-rf-ta-krim>

³⁹⁸ <https://mil.in.ua/uk/news/ukrayinski-drony-vtopily-rosijskyj-raketnyj-katerr/>

³⁹⁹ <https://www.pravda.com.ua/news/2024/02/14/7441777/>

⁴⁰⁰ <https://mil.in.ua/uk/news/na-vijskovomu-aerodromi-u-krymu-prolunav-potuzhnyj-vybuch/>

⁴⁰¹ <https://www.radiosvoboda.org/a/news-sevastopol-vybuchy-krym/32844052.html>

	surface of the Tavrida highway, houses and cars ⁴⁰²	UAV
05.03.2024	Black Sea, the Russian ship Sergey Kotov was destroyed near the Kerch Strait ⁴⁰³	?
24.03.2024	Hvardiiske, oil storage depot ⁴⁰⁴	SCALP EG
24.03.2024	Sevastopol, infrastructure of the Black Sea Fleet of the Russian Federation ⁴⁰⁵	SCALP EG
24.03.2024	Sevastopol, communications hub of the Black Sea Fleet of the Russian Federation ⁴⁰⁶	SCALP EG
02.04.2024	Defence Intelligence of Ukraine (HUR) specialists blew up a power substation in occupied Sevastopol ⁴⁰⁷	Raid
09.04.2024	Crimea ⁴⁰⁸	Rocket attack
10.04.2024	Crimea, Russian authorities officially reported the loss of a Mi-24 in occupied Crimea ⁴⁰⁹	?
17.04.2024	Dzhankoi, air defense systems and radio station ⁴¹⁰	MGM-140A
21.04.2024	Sevastopol Bay, attack on Kommuna naval auxiliary vessel ⁴¹¹	Rocket attack / UAV
24.04.2024	Simferopol, railway tanks on fire ⁴¹²	?
28.04.2024	Dzhankoi ⁴¹³	Rocket attack / UAV
30.04.2024	Dzhankoi, air defense systems and radio station ⁴¹⁴	MGM-140A
30.04.2024	Sakskyyi Raion, air defense systems and radio station ⁴¹⁵	MGM-140A
30.04.2024	Donske, air defense systems and radio station ⁴¹⁶	MGM-140A

⁴⁰² <https://www.radiosvoboda.org/a/news-krym-feodosiya-vybukh-naslidky/32847119.html>

⁴⁰³ <https://mil.in.ua/uk/news/ukrayinski-drony-urazyly-rosijskij-patrulnyj-korabel-sergej-kotov/>

⁴⁰⁴ <https://mil.in.ua/uk/news/udarni-drony-atakuvaly-naftobazu-pid-simferopolem/>

⁴⁰⁵ [https://uk.wikipedia.org/wiki/%D0%9F%D0%B5%D1%80%D0%B5%D0%BB%D1%96%D0%BA_%D1%80%D0%B0%D0%BA%D0%B5%D1%82%D0%BD%D0%B8%D1%85_%D1%83%D0%B4%D0%B0%D1%80%D1%96%D0%B2_%D0%BF%D1%96%D0%B4_%D1%87%D0%B0%D1%81_%D1%80%D0%BE%D1%81%D1%96%D0%B9%D1%81%D1%8C%D0%BA%D0%BE%D0%B3%D0%BE_%D0%B2%D1%82%D0%BE%D1%80%D0%B3%D0%BD%D0%B5%D0%BD%D0%BD%D1%8F_\(%D0%B2%D0%B5%D1%81%D0%BD%D0%B0_2024\)#cite_note-105](https://uk.wikipedia.org/wiki/%D0%9F%D0%B5%D1%80%D0%B5%D0%BB%D1%96%D0%BA_%D1%80%D0%B0%D0%BA%D0%B5%D1%82%D0%BD%D0%B8%D1%85_%D1%83%D0%B4%D0%B0%D1%80%D1%96%D0%B2_%D0%BF%D1%96%D0%B4_%D1%87%D0%B0%D1%81_%D1%80%D0%BE%D1%81%D1%96%D0%B9%D1%81%D1%8C%D0%BA%D0%BE%D0%B3%D0%BE_%D0%B2%D1%82%D0%BE%D1%80%D0%B3%D0%BD%D0%B5%D0%BD%D0%BD%D1%8F_(%D0%B2%D0%B5%D1%81%D0%BD%D0%B0_2024)#cite_note-105)

⁴⁰⁶ <https://glavcom.ua/country/incidents/zjavilisja-sputnikovi-znimki-naslidkiv-udaru-po-992577.html>

⁴⁰⁷ https://lb.ua/society/2024/04/02/606447_up_vnochi_gur_pidirvalo.html

⁴⁰⁸ <https://espreso.tv/viyna-z-rosiyeyu-u-rf-zayavili-pro-nibito-zbittya-raketi-neptun-nad-okupovanim-krimom>

⁴⁰⁹ https://24tv.ua/rosiya-viznala-vtrata-gelikoptera-tse-nachebto-mi-24_n2532615

⁴¹⁰ <https://mil.in.ua/uk/news/u-dzhankoyi-bilya-vijskovogo-aerodromu-urazyly-ob-yekty-rf/>

⁴¹¹ <https://mil.in.ua/uk/news/u-buhti-sevastopolya-prolunav-vybuh/>

⁴¹² https://twitter.com/666_mancer/status/1783101325225464146

⁴¹³ <https://news.bigmir.net/ua/ukraine/7519911-v-dzankoe-i-brianske-progremeli-vzryvy>

⁴¹⁴ <https://ua.korrespondent.net/ukraine/4682952-u-krymu-atakovano-try-pidrozdily-ppo-sotsmerezhi>

⁴¹⁵ <https://ua.korrespondent.net/ukraine/4682952-u-krymu-atakovano-try-pidrozdily-ppo-sotsmerezhi>

⁴¹⁶ <https://ua.korrespondent.net/ukraine/4682952-u-krymu-atakovano-try-pidrozdily-ppo-sotsmerezhi>

30.04.2024	Chornomorske, air defense systems and radio station ⁴¹⁷	MGM-140A
04.05.2024	Susanske, attack on Iskander positions (operational and tactical missiles) ⁴¹⁸	MGM-140A
06.05.2024	Vuzka Bukhta, Ukrainian Magura V5 maritime drone destroys Russian speedboat in temporarily occupied Crimea ⁴¹⁹	MAGURA V5
13.05.2024	Ai-Petri, military base ⁴²⁰	?
15.05.2024	Hvardiiske ⁴²¹	?
15.05.2024	Sevastopol, aircraft and air defense systems ⁴²²	MGM-140A
15.05.2024	Sevastopol, warehouses on Belbek airfield ⁴²³	MGM-140A
17.05.2024	Sevastopol is left partially without power after a night drone attack, a power substation was damaged in the city ⁴²⁴	UAV
19.05.2024	Sevastopol, small missile ship, Project 22800 ⁴²⁵	MGM-140A
19.05.2024	Yevpatoriia ⁴²⁶	Rocket attack / UAV
19.05.2024	Perevalne ⁴²⁷	Rocket attack / UAV
19.05.2024	Saki ⁴²⁸	Rocket attack / UAV
23.05.2024	Soniachnohirske, military infrastructure ⁴²⁹	MGM-140A

⁴¹⁷<https://ua.korrespondent.net/ukraine/4682952-u-krymu-atakovano-try-pidrozdily-ppo-sotsmerezhi>

⁴¹⁸<https://nv.ua/ukr/ukraine/events/u-krimu-stalasya-pozhezha-na-misci-dislokaciji-iskanderiv-50416115.html>

⁴¹⁹ <https://mil.in.ua/uk/news/dron-magura-znyshhyv-shvydkisnyj-kater-rosijan-u-krymu/>

⁴²⁰<https://mil.in.ua/uk/news/v-rezultati-udaru-po-sekretnij-bazi-ppo-rf-u-krymu-zagynuv-yiyi-komandyr/>

⁴²¹ https://lb.ua/society/2024/05/16/613519_krimu_prolunali_vibuhi.html

⁴²² <https://www.radiosvoboda.org/a/news-krym-ataka-belbek-pozhezha/32947905.html>

⁴²³<https://babel.ua/news/107143-atesh-u-krimu-poshkodzheno-golovnij-sklad-aerodromu-belbek>

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⁴²⁵<https://focus.ua/uk/voennye-novosti/647253-raketi-atacms-mogli-znishchiti-mrk-ciklon-u-sevastopoli-rozsmi>

⁴²⁶ <https://www.radiosvoboda.org/a/news-rosia-krym-ataka-drony/32953499.html>

⁴²⁷ <https://www.radiosvoboda.org/a/news-rosia-krym-ataka-drony/32953499.html>

⁴²⁸ <https://www.radiosvoboda.org/a/news-rosia-krym-ataka-drony/32953499.html>

⁴²⁹ <https://mil.in.ua/uk/news/vnochi-buv-zdijsnenyj-raketnyj-udar-po-okupovanomu-krymu/>