

U W E C

Ukraine War Environmental Consequences Work Group

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Dear Friends!

We live in a difficult time, a time when it seems as if governments have lost their minds and refuse to see our changing climate. There is probably not a single country that is not rolling back some of its environmental and nature conservation policies. It is thus all the more critical to support each other and continue this important work.

We are pleased to share some exciting news with you. At the start of this year, we registered a branch of our organization in Ukraine. This development will enable us to participate officially in domestic efforts to overcome the war's environmental consequences as well as to advocate for the nation's green recovery. Read on to learn about a new way for you to participate in our work!

While Ukraine remains at the heart of UWEC Work Group, our initiative includes the analysis of the transboundary impacts of the war. Over the course of January and February, UWEC expert Eugene Simonov spoke with over 20 international news organizations about the role of the "shadow fleet" in the catastrophic mazut (a Russian blend of heavy fuel oil) spill in December 2024 that created an environmental disaster in the Black Sea. Read more about the shadow fleet and this spill:

• <u>Military oil spill: How the Kerch Strait tanker disaster is linked to Russia's</u> <u>'shadow fleet' oil exports</u>

The spill's consequences are a significant threat to Black Sea ecosystems. Numerous deaths of marine mammals (porpoises and dolphins) and birds have already been confirmed, while the long-term impacts to fish and other ichthyofauna is difficult to predict. The spill is already harming the region's protected areas, including Ramsar Convention sites. It is not expected that the Russian government will take correct actions to limit the effects of the disaster. Spill pollution has already reached the shores of other Black Sea states, and as seawater temperatures rise, mazut slicks will once again appear on the surface and pollute the entire Black Sea coastline. Read more about the environmental consequences of the oil spill:

• <u>Military oil spill (2): Scale and consequences of the catastrophe for flora and fauna and the region's ecosystems</u>

The Kerch mazut spill is not the first event to cause direct and indirect harm to the Black Sea. While the sabotage of the Kakhovka hydropower dam occurred in June 2023, analyses of its impacts are only now becoming available. In this UWEC Work Group issue, we examine the limited field research that is now underway behind the front lines in Ukraine, with the left bank of the Dnipro River inaccessible to researchers as a result of Russian occupation. We will only see the full picture after the war ends and lands are freed from occupation. UWEC expert Oleksiy Vasyliuk examines how the Kakhovka reservoir's silts spread during the June 2023 flood and discussed an initial analysis of soil pollution as a result of the dam's destruction:

• The toxic legacy of the Kakhovka Reservoir

Understanding the development and implementation of compensation mechanisms for war crimes, including environmental crimes, is one of today's most complicated challenges. Legal experts hope that this process will enable work to facilitate international recognition of ecocide. Read more about this and other research in our traditional monthly review:

• <u>Environmental consequences of the war in Ukraine: December 2024 – January</u> 2025 review

Understanding these environmental processes and even more so the implementation of "green recovery" programs will require significant financial investment. Ukraine's war-torn economy will certainly not be able to shoulder the entire burden, and it will require the help of allies and partners. International American programs had a large stake in the country's recovery initiatives. However, the Trump administration has ended a great many of them. UVVEC journalist Viktoria Hubareva examines how the end of financial aid from the United States has affected environmental initiatives in Ukraine:

• What did the Ukrainian environmental sector lose after US aid was cut off?

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Friends, today we welcome financial support in order to continue and expand our initiative. If you are able, we are excited to warmly invite you to <u>make a one-time or monthly</u> <u>gift via our website</u>. Our solidarity today determines whether Ukraine and the region will have a "green future" after the end of the war.

You can find more coverage of the environmental consequences of Russia's full-scale invasion of Ukraine on our <u>website</u>, as well as on <u>Twitter</u> (X), <u>Bluesky</u>, <u>Facebook</u>, <u>Telegram</u> and <u>BlueSky</u>.

We wish you strength and peace! Alexej Ovchinnikov, editor of UWEC Work Group



Military oil spill: How the Kerch Strait tanker disaster is linked to Russia's 'shadow fleet' oil exports

Eugene Simonov

Pollution of marine waters and coastlines with oil and oil products is one of the most serious threats to Black Sea ecosystems, threats which have been significantly exacerbated by the war. On December 15, 2024, two Russian tankers broke in half during a storm in the Kerch Strait, spilling between 2,400 and 8,500 metric tons of heavy fuel oil (a regional blend known as mazut) intended for export to India. This article analyzes the circumstances and causes of the accidental spill, including in the context

of a "shadow fleet" operation facilitating the export of oil products.

Although study of the oil spill and the spill response are aggravated by the military situation, the Russian government's chronic negligence is the root of the disaster with a power structure that is unable and unwilling to learn from its own mistakes. Nevertheless, if the international community were to implement strict environmental monitoring of the shadow fleet that is exporting Russian oil and oil products, the risks of similar spills



Mazut on the Anapa coastline in mid-December 2024. Source: <u>"Oil Spill in the Black Sea"</u> Telegram channel

in the near future could be significantly reduced.

History of chronic oil pollution in the Black Sea

This is not the first time oil pollution has occurred in the Kerch Strait and the adjacent waters of the Black and Azov seas. Quite the opposite, in fact: such oil product pollution has been a chronic occurrence since long before the start of Russia's full-scale invasion of Ukraine.

Conducted between 2017-2021 by ScanEx and Russian Academy of Sciences

institutions, a <u>five-year study</u> used 460 Sentinel-1A imagery to detect oil slicks on the sea surface in the Kerch Strait area. The study identified 2,599 film pollution spots covering a total area of 1,107 sq km. The spills were found mainly in (in order of decreasing size) road mooring transshipment areas in the strait, the port of Taman with its mooring complex, and road/anchorage areas at the entrance to the strait in the Azov and Black Seas. In addition, naturally-occurring oil seeps were discovered in the strait, adding a natural baseline that must also be considered.



2019 oil pollution sources in the Kerch Strait, showing the borders of ports, roads, and moorage sites, 2021. Source: P.P. Shirshov Institute of Oceanology (RAS) and <u>Skanex Group</u>

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The most important driver of increasing pollution is the expansion of transport routes, primarily due to increased shipping intensity. According to 2019 Rosmorrechflot data, over 20,000 ships pass through the Kerch Strait alone



Fire on the Moskva military cruiser before the ship's sinking, April 14, 2022. Source: <u>*Ukrainska Pravda</u>*</u>



A mazut leak (red slick west of the Crimean Peninsula) originating from the sunken Moskva military cruiser. Source: <u>Pravda_Gerashchenko</u> Telegram channel

each year, mostly cargo ships. Russia, Azerbaijan and Kazakhstan use the Black Sea to export oil and oil products. In the calendar year of 2024, cargo turnover at seaports controlled by the Russian Federation in the Azov-Black Sea basin <u>totaled</u> 254.2 million metric tons, including 133.1 million tons of ship-to-



Source: SourceMaterial and POLITICO research, based on SkyTruth images and Lloyd's List, Kpler data; Global Fishing Watch Hanne Collegane /POLITICO

Map of confirmed oil spills related to the shadow fleet in 2022-2024 and the routes of two vessels exporting Russian oil, October 17, 2024. Source: <u>Politico</u>

ship transfers of liquid cargo, largely oil and oil products.

Ship-to-ship transfer of oil products dangerous operation, often is а associated with significant oil spills. In general, pre-war oil pollution in the Black Sea exceeded standard indicators (maximum permissible concentration) by 20-80 percent, with the Kerch Strait experiencing the worst conditions. This is not surprising, given that the very narrow strait and its powerful water currents form a dangerous bottleneck between the two seas.

• Read more: <u>Crimean Bridge:</u> <u>Environmental impact of Russia's</u> <u>'project of the century'</u>

As severe as chronic marine oil pollution is, the problem can be exacerbated by major oil spills resulting from shipping or industrial accidents. Tankers carrying heavy oils or mazut occasionally wreck and sink, creating the potential for future leaks and spills from sunken ships. Although shipping accidents account for only about ten percent of all ocean oil pollution, each



The first tanker to sink, Volgoneft-212, on the Don River, November 17, 2024. Source: <u>*Fleetphoto.ru</u>*</u>

catastrophic spill poses a significant threat to marine and coastal ecosystems.

In a 2020 interview, Sergei Stanichny, head of the Department of Remote Methods the Sensing Marine at Hydrophysical Institute (Russian Academy of Sciences), explained that water is cold at great depths, causing oil products (such as mazut) to become viscous and heavy and settle on the bottom. But the water in the Black Sea has been gradually warming for many years, and while until recently water temperature stood at +7-8° C at a depth of 50 meters, the temperature today can reach +15° C.

According to pre-war data published by <u>Oktagon.Media</u>, approximately 800 military, passenger and industrial ships rest at the bottom of the Black Sea today. These vessels could become future sources of pollution due to the heavy oil products still on board. Hastened by corrosion and water currents, sooner or later mazut will leak out of ship hulls and pollute the seafloor, from there rising into the water column and fouling coastlines during bad weather or warming.

Impact of war on pollution of the Black Sea

With Russia's seizure of Crimea, its military and civilian activity in the area has <u>increased</u>, further <u>worsening</u> oil pollution in the Azov Sea and Black Sea.

Oil spills are clearly visible in satellite images made available in a <u>review</u> of the environmental consequences for marine ecosystems published by the Conflict and Environment Observatory (CEOBS) and Zoi Network. In one case, the spills resulted from missile attacks on ChernoMorNeftegaz drilling platforms in June 2022.

Risks posed by wrecked ships have also increased, with roughly 100 additional ships, military and civilian, sinking or damaged since the war began. For example, evidence of a limited oil spill was <u>visible</u> from space at the site where the Moskva military cruiser sank. Most of its <u>fuel reserves</u>, which may exceed 2,000 tons, are probably still stored in its fuel tanks at a depth of 50 meters – a huge risk for the future.

According to Sofya Sadogurska, a climate expert at the Ecoaction Environmental Initiatives Center in Ukraine, the oil slick resulting from ships sunk in 2022-23 has covered tens of thousands of square kilometers of Ukraine's marine protected areas, including the Snake Island National Zoological Reserve, Zernov Phyllophora Field National Botanical Reserve and the Black Sea Biosphere Reserve (National Academy of Sciences of Ukraine).

• Read more: <u>Impact of Russia's</u> <u>invasion of Ukraine on the Black</u> <u>Sea and the Sea of Azov</u>

Russia's shadow fleet – a potential environmental threat

Perhaps more than anything else, today's threat of marine oil pollution caused by the war in Ukraine lies with the "shadow fleet" – oil tankers that freely export Russian oil sold at prices above the ceiling set by the G7 sanctions and the Western governments that have joined them.

The radical reduction in pipeline oil purchases by European countries forced Russia to increase oil shipments by sea to reach other buyer-countries. Fearing that a direct block on Russian oil and oil product exports by sea could have adverse consequences for the global economy, Western governments created a complex sanctions regime for hydrocarbon fuels. The strategy involves the introduction of a \$60 per barrel price cap on the purchase of Russian oil, a policy designed to limit Russia's ability to finance the war without limiting the actual purchase of oil and its derivatives. Under this regime, oil tankers attempting to circumvent sanctions would become uninsurable and blocked from servicing in ports of call, practices seen as powerful leverage against the regime.

• Read more: <u>An environmental</u> <u>perspective: Are sanctions against</u> <u>Russia working, and if not, why</u> <u>not?</u>

In response, Russia has assembled a "shadow fleet" of more than 1,000 tankers sailing under a variety of flags, a fleet of worn-out vessels individually registered to tiny shell companies that typically operate the ships in violation of regulations and that are sometimes uninsured by Western insurers. When carrying Russian oil, these ships often conceal their destination ports and routes. In the event of an accident, a small company possessing only one vessel has absolutely nothing to seize; it goes bankrupt without a hitch, avoiding any liability.

Greenpeace <u>counted</u> a 70 percent increase in tankers off the German Baltic coast in 2024 over pre-war numbers. Greenpeace and many other environmental organizations agree that the shadow fleet poses a serious environmental threat, given that the use of aged ships can lead to oil leaks. Moreover, their owners are not able to be held liable for damage. With a company registered to a post office box in Seychelles, no one bears responsibility for environmental damage.

At the same time, there is still insufficient direct evidence regarding the shadow fleet's negative consequences for marine ecosystems. A <u>review</u> of tanker leaks around the world, published in October 2024 by Politico, lists just nine examples of oil spills likely associated with the shadow fleet (shown in the map below).

By the end of 2024, the US and other Western countries had tallied a list of a scant 200 vessels believed to be violating the sanctions regime, just one-fifth of the potential violators in the shadow fleet. The challenge is that, in order to impose sanctions, convincing evidence must be assembled for each vessel believed to be in violation.

Ukrainian security services maintain a special <u>sanctions website</u> that already lists 570 shadow fleet vessels. In September 2024, Greenpeace <u>compiled a</u> <u>list</u> of 192 tankers that have not yet been sanctioned and that threaten the Baltic Sea ecosystem.

On the eve of the recent disaster in the Kerch Strait, the international community fearfully awaited a major oil spill. They were seriously concerned that the introduction of oil sanctions in the absence of sufficient mechanisms for their widespread application de facto increased the environmental risks of maritime oil transportation.

2024 catastrophe, déjà vu?

On December 15, 2024, two small river tankers located at the southern anchorage at the exit from the Kerch Strait awaited transshipment to a large sea tanker. Both were caught in stormy weather and broke in half. On the Volgoneft-212, which sank completely, one sailor died from hypothermia and exposure, but the remaining 12 crew members were rescued. The stern half of Volgoneft-239, which also broke apart during the storm, managed to approach the shore and run aground 80 meters offshore. The entire crew was rescued.

According to various estimates, between 2,400 and 8,000 metric tons of



Ship-to-ship transfer of oil products from two small tankers to a storage tanker. Source: Temryuk Municipal Administration

mazut originating from the Saratov Oil Refinery spilled out of the damaged tankers into the sea (in January 2025, the Marine Rescue Service described the mazut as the M-100 blend).

Mazut is a toxic, viscous black blend – the remaining residue after all useful light fractions (gasoline, kerosene, gas oil) have been distilled from crude oil.

The ships were also each carrying <u>25 tons</u> of diesel fuel, a substance even more toxic than mazut to aquatic life.

Another fuel oil tanker, the Volgoneft-109, developed a crack in its hull but managed to send a distress signal and was moved to a safe location.

This spill disaster literally duplicated (while exceeding the scale of) the

previous largest pollution of the Kerch Strait in the 21st century, an event which occurred on November 11, 2007, under approximately the same circumstances. While waiting to offload its cargo, a sudden storm caught tanker Volgoneft-139 by surprise and it sank, along with its mazut cargo. At the time, the authorities failed to delve into the systemic causes that led to the spill, <u>summarizing</u> the cause as "abnormal weather conditions."

What was the destination of the sunken tankers' mazut?

On December 19, 2024, the fourth day following the disaster, and during the traditional, annual "Direct Line"



Tanker travel from Murmansk to the port of Cochin, India, late 2022. Source: <u>Reuters</u>

broadcast, <u>President Putin</u> gave a clear indication of where to look for those responsible for the disaster in the Kerch Strait: *"First of all, this is, of course, an environmental disaster. This is completely obvious. Law enforcement agencies are assessing the actions of the ship captains."*

The president continued, "They report to me that, in their opinion, the ship captains violated relevant rules and did not seek shelter in a timely fashion. Some ships did reach shelter, and everything is fine with them. But those [two] did not leave, and they did not anchor where they were supposed to. Let the relevant services – both the Ministry of Transport and law enforcement agencies – deal with this." In saying this, he seemed to preemptively anticipate and limit the results of the investigation into why and how the déjà vu disaster happened.

Promptly after the sinking, progovernment Russian analysts immediately expressed concern that such accidents could be used to discredit the Russian fleet and oil exports.

As National Fund for Energy Security director Konstantin Simonov noted

on the pages of Rossiyskaya Gazeta: "If they wanted, of course, the US and the EU could latch onto this accident. But in reality, if we look at things objectively, this story has nothing to do with the tanker fleet. Firstly, these were Russian tankers. Secondly, they were transporting oil and oil products within Russia; the ships were not intended for international trade."

Digging deeper though, it is clear that the mazut being transported was intended for export. Most likely, it was destined for Indian oil refineries, which are <u>increasing</u> their purchases of mazut from Russia for the production of diesel fuel and other products.

Reputable websites analyzing the disaster cite credible evidence that both Volgoneft-212 and Volgoneft-109 were supposed to transfer cargo to crude oil tanker FIRN (known as SCF CAUCASUS until 2021, and then Bear <u>Alcor</u> until July 2023). Commissioned by Russia's Sovcomflot, the vessel was built in a South Korean shipyard in 2002 and sailed under a Liberian flag. In pre-war 2021 it was seen transporting sanctioned Venezuelan oil. In early 2023, the vessel garnered international attention as an example of delivering Arctic oil from Murmansk to India shortly after sanctions were imposed on Russian oil. In October 2023, an offshore Seychelles company purchased the vessel, sailing it under the flag of Panama. FIRN

appeared on the prestigious Lloyd's Register at the end of 2022.

In 2023-24, Equasis data <u>showed</u> that the tanker made several voyages from Baltic and Black Sea ports to Indian oil refineries. Ukraine's <u>Main Intelligence</u> <u>Directorate</u>, Greenpeace and the monitoring group <u>Black Sea Institute of</u> <u>Strategic Studies</u> have all included FIRN in lists of shadow fleet vessels.

Aside from being listed on Lloyd's Register, which is unusual for a shadow fleet vessel, the remainder of the ship's history is very similar to hundreds of other tankers exporting oil despite sanctions. The ship is operated by a tiny Indian management company that also has an identical crude oil tanker, the NEVE, at its disposal. Owned by another Seychelles firm and undertaking similar voyages, this ship also changed flags and names at exactly the same time as the FIRN. NEVE is currently en route from the Indian port of Vadinar to Novorossiysk.

On October 15, 2024, FIRN <u>served</u> as an "oil product storage tanker" during training exercises conducted prior to approval of STS TRANS LLC's oil spill prevention and response (OPR) program for offshore transshipment practices in the Kavkaz seaport. Rosprirodnadzor employees <u>participated</u> in the work of a commission evaluating the results of the exercises, which were considered satisfactory. Earlier, on March 7, 2024, Rosprirodnadzor <u>approved</u> a positive



Transshipment of petroleum products from small tankers to storage tanker FIRN during training exercises in the port of Kavkaz on October 15, 2024. Source: <u>Rosprirodnadzor</u>

conclusion of the state environmental review on the <u>"Justification of the</u> <u>economic activities</u> of STS TRANS LLC for the transshipment of oil, oil products and chemical products in bulk within the boundaries of Section 2 and within the boundaries of Section 3 on the territory of Kavkaz seaport." Thus, in 2024 the agency responsible for environmental oversight twice approved ship-to-ship transfers in the location where the catastrophe subsequently occurred.

In early January, the FIRN remained at a southern anchorage in the port of Kavkaz, not far from the main area for ship-to-ship transfer of oil products, the same area where similar tankers SANAR-7, SANAR-8, BORAY and other ships specializing in ship-to-ship transfer of oil for export were located. It is most likely that FIRN was specifically chartered as a storage tanker to support transshipment and export operations.

From the day of the accident until the end of 2024, at least seven to 14 additional <u>Volgoneft series</u> tankers (e.g. 150, 141, 109, 114, 267, 147 and 266) were in the Kerch Strait, Black Sea and Azov Sea and were likely headed to Kavkaz port carrying mazut for transshipment and export. The tanker Prikamye (formerly known as Volgoneft-55) managed to transfer its cargo to FIRN and make it to shelter before the storm. At the time of this article's writing, FIRN is still anchored, awaiting additional loads of mazut.

Thanks to the 2007 disaster, it was understood that Volgoneft tankers, "river-sea" class vessels, are poorly suited for navigation in rough seas and cannot be operated at wave heights exceeding 2.5 meters. At present, there are approximately 80-140 Volgoneftseries vessels at sea in Russia. Most of them are rusty, old ships built in the 1970s that have completely exhausted their service life and require immediate disposal. Records show that each of them was repeatedly repaired and usually has permission to sail in clear weather as far into the sea as the port of Kavkaz.

In the registry maintained by the <u>Russian Classification Society</u>, "vessel Volgoneft-239's status" is recorded as "08 - Documents suspended", i.e., it had no permission to go to sea at all. The Russian Ministry of Transport has already acknowledged that the two tankers that sank did not have permission to be at sea after November 30. Insurance policies for both vessels had also expired in November.

In other words, their characteristics as a whole indicate that the wrecked ships are equivalent to "shadow fleet" tankers, neglecting safety requirements in order to maximize export volumes of Russian petroleum products.

Similar past accidents

The recent disaster in the Kerch Strait is not unique. Similar large mazut fuel spills have happened a number of times in the last quarter-century. • PRESTIGE

In November 2002, the tanker Prestige broke in half and sank in the Atlantic Ocean off the coast of northern Spain during a severe storm. More than 80,000 tons of Russian mazut spilled into the ocean. At the time, the pollutant being shipped from Russia was identified precisely as <u>"Heavy Fuel Oil No. 6</u>; this is the same mazut that spilled in December 2024.

Pollution covered 3,000 km of coastline in Spain, Portugal and France. Ships from ten countries, including 1,000 fishing boats, participated in efforts to collect the mazut from the water before it reached the shoreline. They collected roughly 50,000 tons of oil products and oil-contaminated garbage. The shores were cleaned for many months by 300,000 volunteers from all over Europe, many of whom had health problems afterwards. In addition, 5,000 military personnel, municipal employees and hired workers took part in the cleanup in Spain. There, 141,000 tons of oilcontaminated soil were collected, mostly manually, and in France collection exceeded 18,000 tons. The most difficult part was cleaning bluffs and rocky shorelines.

By 2008, the main Spanish processing center had handled 170,000 tons of contaminated material. In total, material volume four times the amount of leaked mazut was collected and processed. Researchers estimate that 34,000 tons



Stern of the Erika sinking, December 12, 1999. Source: Guardian

of oil products remained in the marine environment.

The spill is thought to have killed between 150,000 and 250,000 guillemots, fulmars, puffins, and other waterfowl and seabirds. During and immediately after the spill, the deaths of 124 cetaceans (11 species), and 90 sea turtles (two species) were documented along the coastline. Local marine zoologists estimate that on average only 14% of all dead cetaceans wash ashore in those waters. Generally speaking, the Prestige is the largest well-documented mazut spill disaster.

• ERIKA

Another example of a fuel oil spill is a catastrophic oil spill from the tanker Erika on December 12, 1999. It sank off the French port of Brest, spilling 17,000 tons of HFO into the sea. Oil products washed up on sandy beaches, rocky shores, salt marshes and into river estuaries.

An independent expert analysis showed that the tanker's cargo was a "non-standardized mixture of petroleum products" containing significant and other substances carcinogens extremely dangerous to humans, while the export of toxic industrial waste is prohibited by EU regulations. However, the EU Environment Commissioner and other official bodies did not share this perspective, since the company responsible for the disaster mobilized many experts and the press to prove that the spill consisted of "Total's standard heavy fuel oil No. 2" (EU equivalent of



Wreckage of the tanker Volgoneft-139 aground in the Kerch Strait, November 2007. Source: UNEP

mazut). This not only freed the company from accusations of illegally exporting toxic substances, but also allowed the authorities to continue to recruit volunteers to clean up the toxic mess and even to open the "cleaned beaches" to vacationers. On the beaches, people cleaned up the mazut using shovels, collecting more than 250,000 tons of contaminated material, over an order of magnitude greater than the volume of the spill itself.

The cleanup ended in December 2003. More than 300,000 birds <u>died</u> as a result of the disaster. In some habitats, such as salt marshes, mazut <u>persisted</u> for a decade after the accident.

The Prestige and Erika oil spill disasters are covered in detail in Tim Deere-Jones' 2016 <u>report</u> on the risks of heavy oil fuel spills.

• Volgoneft-248

On December 29, 1999, the Volgoneft-248 broke in half and sank with 4,300 tons of mazut on board during a storm in the Sea of Marmara, near Istanbul. The ship was built in 1975.



Dead Azov-Black Sea harbor porpoise (known locally as "Azovka"). Coast near Anapa, December 2024. Source: <u>Oil Spill in the Black Sea</u> Telegram channel

According to various sources, between 1,500 and 3,000 tons of the mazut spilled into the sea. Five kilometers of Istanbul's coastline, including popular beaches, were heavily polluted. Some of the oil product settled on the seafloor, and the government was forced to <u>hire divers</u> to collect it, since using a dredger would have harmed seafloor ecosystems.

• Volgoneft-139

The closest example is the sinking of the Volgoneft-139 tanker in the Kerch Strait during a severe storm on November 11, 2007. The vessel broke in half at anchor, the bow sank on the spot, and the stern was thrown aground on the island of Tuzla. According to official data, 1,600 tons of mazut leaked into the sea, the exact blend of which is still unknown. By all indications, it was mazut M-100. The bi-coastal cleanup took Russia and Ukraine more than a year to complete. As many as 30,000 birds <u>died</u>.

Following the 2007 tragedy, marine biologist **Alexander Korshenko** and his co-authors, commissioned by the International Black Sea Commission, an intergovernmental body implementing the Convention on the Protection of the Black Sea from Pollution, wrote a book entitled "Oil Spill Accident in the Kerch Strait in November 2007." Intending to obtain compensation for losses, Ukraine requested assistance from UNEP and the European Union, which resulted in the publication of the <u>"Oil Spill in</u> <u>the Kerch Strait: Ukraine Post-Disaster</u> <u>Needs Assessment"</u> report.

The above cases are important lessons that could be very useful to the

Russian authorities to more accurately assess risks, prevent disasters and better organize spill cleanup, if they so desired.

Unwillingness to learn from past mistakes

The desire and capacity of the Russian Federation to ensure the safety of oil and gas shipping has diminished substantially during this war, hostilities which are fundamentally nourished by oil exports. However, even prior to this catastrophe, environmental safety in the oil and gas shipping sector has not been a priority.

The main reason for these accidents, according to an independent environmental expert who wishes to remain anonymous, is the careless disregard of the state and all its structures, as well as big business, for environmental safety. These tragedies occur because of irresponsible individuals and organizations, as well as gaps in legislation and deliberate weakening of environmental law in recent years (especially since 2021, when the requirement for constituent regions to maintain oil spill response plans (OSRs) was abolished), corporate lowering environmental lobbying standards and procedures, and stifling professional environmental of the conservation community and the country's news media.

Despite the harsh lesson of the 2007 spill, the Russian authorities

have learned nothing and prepared for nothing. Everything that "went wrong" in 2024, was a repeat of events in 2007, as <u>made evident</u> by the local independent press. Furthermore, at the time of the spill in 2007 leading experts <u>analyzed</u> earlier accidents in detail and accused the authorities of being unable (or unwilling) to learn.

Procedures, technical capacity, and standards for the export of heavy petroleum products, if they have changed, have only increased the risk of accidents. At the same time, the fleet transporting them has aged by 17 years. Government agencies do not ensure strict compliance with existing environmental safety standards, let alone work to improve legal norms using analysis of past accidents.

Offshore transshipment - ship-toship transfer of oil at sea-especially fraught with oil leaks and spills, is still encouraged in every possible way. Thus, the "justification" for this activity fails to even consider the possibility of an accident with a "tanker-carrier" breaking in half during a strong storm, although this is exactly what happened in this same area in 2007. The training exercises conducted by STS TRANS LLC just two months before the 2024 disaster (noted earlier in this article) did not in any way ensure the company's oil spill response readiness. All of this was approved by the highest oversight authority, Rosprirodnadzor.



Tanker FIRN, flagship of Russia's shadow fleet, in Sea of Marmara, Türkiye, 2022. Source: <u>Fleetphoto.ru</u>

Outdated oil refining technologies at Volga region refineries apparently also contribute to the creation of large quantities of mazut, a substance that is essentially a toxic mixture of residues from refinery processing for which there is no consumer or processing capacity within Russia. But there is demand for it at more advanced refineries in other countries. This, coupled with the lack of proper government oversight, creates irresistible incentives to continue using old river tankers that are unsuitable for sea navigation as a means of delivering mazut to export vessels waiting at sea.

This situation in Russia is an obvious anomaly in the context of global trends. <u>According</u> to Russian researchers, the number and volume of large oil and oil product spills during their transportation by ships decreased dramatically worldwide between 1970 and 2021. This downward trend

in oil spills has persisted despite the overall increase in oil trade during the same period. Thus, in the 2010s, the total number of oil spills amounted to 164,000 tons, an amount 95% smaller than in the 1970s. The general trend of decreasing numbers and volume of oil and oil product spills is explained by the adoption of the international MARPOL convention. This convention established requirements for the double-hull design of oil tankers, development of navigation systems for ship navigation, introduction of strict national legislation, and development and implementation of multi-level OSR systems. Russia, as a leading oil power, should be at the forefront of this process, instead, it is an outsider.

The "Russian threat" of oil spills has seriously alarmed international NGOs and networks involved in the protection of ecosystems and shipping safety in the Arctic and Atlantic oceans. In particular, they have made <u>statements</u> and <u>appeals</u> aimed at drawing attention to the threats arising from Russia's irresponsible behavior in the transportation of oil products around the world.

Dr Sian Prior, lead advisor to the Clean Arctic Alliance told UWEC, "The Clean Arctic Alliance believes that other regions would benefit from following the example of the <u>International Maritime</u> <u>Organization</u>, through which a new ban (with notable caveats) on the carriage and use of HFO as fuel in polar regions came into force in July 2024."

She said, "The accidents in the Kerch Strait demonstrate the inability of authorities to respond to heavy fuel oil accidents even in a region where there are considerable shipping, port facilities and resources – a spill would have far worse implications in the Arctic."

Preventive measures to avoid future disasters

It is relatively clear what Russia must do in order to prevent future catastrophes:

- Ensure nationwide implementation of all international environmental safety requirements in marine environments, requirements with demonstrated effectiveness on a global scale;
- Establish strict state oversight enforcing compliance with legal

requirements by the oil and transport sectors;

- Ban aging river vessels from entering waters that pose a danger to them, and take old oil tankers out of service due to excessive risk and replace them with new, safe vessels;
- Offshore transshipment of petroleum products must be limited and equipped with technologies and control systems to guarantee safety;
- Equip the country's Marine Rescue Service with equipment for cleaning and protecting shallow water areas during spills as well as with the technology required to detect and neutralize oil products in the water column and on the seafloor;
- Ensure coastal municipalities and regions possess realistic OSRs, necessary equipment and personnel, and sufficient capacity to dispose of oil products and rescue injured animals; and
- Create an open database on spills Russia, oil in analyze accumulated experience and introduce systemic improvements to the regulatory framework and mechanisms management to prevent future accidents.

For Russian leadership, however, these recommendations fall on deaf ears.

As long as the war rages on and the trade in oil products fuels it, no reasonable or sufficient restrictions will be made for this industry.

Thus, as pro-government oil analyst Konstantin Simonov feared, the most promising path now is to use all available international mechanisms to effectively halt the export of oil by the shadow fleet, a process that violates environmental safety standards. Ports around the world must limit the access of old tankers and their questionable owners and suspect documents and subject them to detailed inspection for compliance with environmental safety regulations. Port administrations that fail to carry out such inspections should be subject to fines and sanctions.

The December 2024 disaster is the clearest proof of the seriousness of the environmental risks of transporting oil in old vessels with murky ownership. If dangerous exports are not limited, what happened in the Kerch Strait could be repeated in any waters around the world through which the Russian "shadow fleet" passes.

The second article in the series "Military Oil Spill" will focus on the scale of the environmental catastrophe now unfolding in the Black Sea.

Note: On January 10, 2025, while this article was being finalized, the United

States announced a new sanctions package that included strict restrictions on 183 shipping vessels, 150 of which are involved in the transportation of Russian oil. This move can be assessed as a significant new threat to the trade in Russian oil, one that is capable of reducing the resources available to the Russian Federation to finance its war in Ukraine. The reasoning for their inclusion in the sanctions list has no environmental component, and thus the environmental effect is not yet apparent. The "hero" of our investigation into the oil spill, the tanker FIRN, was not subjected to sanctions, but the list includes the tankers NEVE and APUS, as well as the storage tankers SANAR-7, SANAR-8, and BORAY, all of which are involved in transshipment operations at the port of Kavkaz. It falls to the marine ecology community to assess whether or not these new sanctions have reduced the environmental risks of oil spills and, if so, to what extent. Furthermore, it will only be possible to assess these effects if the incoming US president's administration establishes strict control to force compliance *with these sanctions.* •

> Translated by Jennifer Castner Main image: Preparation for transfer of oil products at a Kavkaz seaport anchorage Source: Temryuk Municipal Administration January 18, 2025



Military oil spill (2): Scale and consequences of the catastrophe for flora and fauna and the region's ecosystems

Eugene Simonov

Oil and its derivatives occur naturally in the sea, as do microorganisms that can absorb and process these substances. But human activity releases petroleum products into seawater in such quantities that nature cannot cope, and the pollution causes chronic suppression or catastrophic upheavals in local marine and coastal ecosystems. Oil spills are also very dangerous for humans, affecting both health and local economies.

UWEC's earlier article in this series covered oil pollution in the Azov-Black Sea basin, oil spills from tanker accidents, and the connection between the December 2024 disaster and Russia's "shadow fleet" of ships exporting oil and oil products in defiance of sanctions. This second article covers the



impact of the heavy fuel oil spill on animals and ecosystems in the region, as well as the disaster's rapid spread to new coastal areas.

Mazut is hazardous to health

The December spill is largely mazut (a heavy fuel oil (HFO) produced in Russia), a thick and viscous blend of many substances that form as a residual product of oil refining (cracking) and which poses a serious threat to the health of both humans and animals.

<u>According</u> to Russia's Federal Service for Consumer Rights Protection and Human Welfare ("Rospotrebnadzor"), mazut is considered a persistent pollutant that mixes paraffinic, olefinic and aromatic hydrocarbons. This includes polycyclic aromatic hydrocarbons, benzopyrene, petroleum resins, asphaltenes, carbenes, carboids and other organic compounds which may contain iron, manganese, nickel, vanadium and other metals. The composition of a particular mazut product varies widely depending on the original grade of oil and the refining process.

Despite claims by Russian rescuers that the tankers were carrying M-100 HFO, the exact composition of the products that spilled during the tanker sinkings in December is unknown and continues to be a source of controversy over two months after the accident.

According to numerous testimonies, the spilled oil products contained an unusually large amount of polycyclic aromatic substances, emitting an atypical odor as mazut goes. In particular, participants in clean-up efforts <u>reported</u> that during work in many areas along the coast, the air was so saturated with oil vapors that people experienced dizziness and weakness. Medical experts <u>commented</u> that mazut contains many known <u>carcinogens</u> and increases the risk of cardiovascular diseases.

Inhalation of mazut vapors can cause irritation of the respiratory tract, coughing and shortness of breath and can lead to bronchitis, pneumonia and other respiratory diseases. Direct contact with this petroleum product can lead to dermatitis, eczema and other skin problems. Some mazut components have neurotoxic properties that can manifest as headaches, dizziness and general weakness. Mazut absorption by humans and animals through skin, water or food can cause poisoning, digestive disorders, impaired coordination, weakness and even death.

Official reports <u>noted</u> that by February 7 almost 300 participants in beach cleanup had sought medical help, at least nine of whom were hospitalized. One minor student died after helping cleanup a beach, possibly from exacerbation of bronchial asthma, but also possibly from overfatigue. Another risk group is residents living near areas where the sand or soil mazut mixture collected along the coast is being stored and processed. For example, residents of the Voskresensky farm near Anapa, where sand from the pollution zone is kept at a "temporary accumulation site," complained of headaches, coughing and high blood pressure.

Silent victims and the spill's environmental consequences

As dangerous as it is for humans, for animals it is even worse. Zoologist Pavel Goldin noted that waterfowl and semi-aquatic birds have suffered en masse from the December mazut spill. They become covered in the sticky substance, their feathers stick together, preventing them from flying and disrupted thermoregulation causes birds to freeze. In addition, in using their beaks to try to clean their plumage, birds ingest mazut, leading to acute poisoning and mass mortality among birds. Svetlana Smirnova, Chairperson of the Krasnodar Branch of the Russian Ornithological Society, explained, "Substances in mazut ingested by birds negatively affect liver, kidney and pulmonary function."

85% of bird victims of the spill to date are great-crested grebes (Podiceps cristatus), but other species of grebes, gulls, European shags (Phalacrocorax aristotelis), European cormorants (Phalacrocorax carbo), loons, swans, several species of ducks and other waterfowl and fish-eating birds also suffered. Among Red Book of Russia species affected by the spill, Arctic loons (Gavia arctica) have suffered the most; the International Union for the Conservation of Nature (IUCN) states that the largest threat to this species is the issue of oil spills contaminating their overwintering habitats.



Excerpt of a bird identification guide created for volunteer rescuers in December 2024. Source: <u>*Oil Spill in the Black Sea*</u> *Telegram channel*

It is not possible to accurately calculate the number of birds that have died as a result of the spill, since only a small percentage of affected sea animals are recovered by rescuers, dead or alive. It is thought that after the similar but much smaller spill in 2007, 30,000 birds died. <u>According</u> to the Ministry of Emergency Services's operational headquarters, at the end of January, 336 birds contaminated with mazut had been collected in Krasnodar province. 3,166 were captured alive and sent for rehabilitation, but less than 500 birds ultimately survived. Official statistics for Crimea have not been made public. The number of affected birds may increase significantly when the spring bird migration north gets underway. In general, fewer than 10% of birds affected by oil products survive rescue attempts in oil spill cleanups around the world.

Even less is known at this time about how fish are affected. AzNIIRKH (Azov Research Institute of Fisheries), a regional center for fisheries science, previously reported that fish eggs begin to be killed at concentrations of oil products of approximately 0.000006 mg/l of water. Fish fry are approximately one order of magnitude more resistant than eggs, and adult fish can withstand even higher concentrations. The toxic impacts of oil on adult fish is evident at concentrations of oil products of 0.01-0.1 mg/l of water, affecting their physiology, nutrition, reproduction, and other biological processes. Depending on the duration and scale of the pollution, a wide range of damaging effects can be observed: behavioral anomalies and the death of organisms in the water column at the initial stages of a spill to structural and functional reorganizations in populations



Authorities quickly conducted tests and announced that the dead European anchovy found in Sevastopol were unrelated to the oil spills, photo dated January 14. Source: <u>Yuliya Krymova/</u><u>Rossiyskaya Gazeta</u>

and communities with chronic exposure in coastal benthic ecosystems.

Before the Federal Fisheries Agency had time to express cautious optimism and announce that commercial fisheries were unharmed and catch was fit for consumption, a large school of dead European anchovy <u>washed ashore</u> in Sevastopol on January 14, coinciding with the timing of the oil spill and when fishing was underway. In January 2025, commercial fish <u>harvests decreased</u> relative to January 2024, which may also be due to the disaster's consequences.

Marine biologist and NGO Ekodiya climate expert, Sofya Sadugorska <u>told</u> UWEC that spills of any oil products result in an oxygen-impermeable film at the sea's surface, preventing oxygen

affecting exchange and respiration in aquatic organisms. In addition, oil products are toxic to sea inhabitants, especially to neuston, microscopic organisms that inhabit the water's thin surface layer. This water acts as an "incubator" for many pre-adult aquatic organisms. Pollution and blockage of gas exchange on the surface and for neuston can lead to significant changes in food chains and disruption of the delicate balance of marine ecosystems.

When mazut settles on the seabed, it kills seafloor fauna and flora, <u>explains</u> Goldin. For example, there are many endemic species of goby, a food source for dolphins, in the Black and Azov seas. Mazut components can also accumulate in shellfish and other bottom-dwelling



Delfa-Center employees with a dead dolphin, December 2024, Krasnodar Krai coast. Source: <u>*Delfa-Center*</u> *Telegram channel*

organisms lucky enough not to die immediately after the spill. Consequently, mazut toxicity can affect entire food chains, at the top of which are cetaceans and humans.

Goldin also notes that contact with a large oil spill may cause acute intoxication and skin and mucous membrane burns in dolphins. The worst consequences occur much later as a result of accumulated toxins causing significant weakening of cetacean immune systems, development of various diseases, and infectious

disease outbreaks. From December 15 to February 7, more than 80 dead dolphins and Azov-Black Sea porpoises (Azovkas) have been recorded on the coast of Krasnodar province and the Crimean possible connection peninsula. А between their deaths and the mazut spill was officially recognized by the Federal Fisheries Agency. However, as of the end of February, not a single report on autopsies and examinations of the causes of death of cetaceans has been made public, limiting public understanding of the specific causes of death for porpoises, mortality which is occurring more frequently than on average in previous winters.

Overall, the history of other spills in Europe <u>shows</u> that a December mazut spill is less damaging to marine biota. Most species do not actively reproduce or migrate along the coast in December, and the storm season facilitates rapid cleanup of marine habitats (but increases coastal pollution and complicates cleanup there). A similar spill in spring or summer could have much greater immediate consequences for marine life.

Scale of the catastrophe grows steadily

An important characteristic of mazut, which, according to official data, constituted the main cargo of the damaged tankers, is that on average its density is similar to that of water, density which changes with temperature. At the same time, mazut is a rather arbitrary mixture of many chemical substances that can exhibit different characteristics in sea water. Prior to the spill, the mazut was probably heated to facilitate transshipment to another vessel. Once it entered the water, it first floated on the surface and then quickly cooled, light fractions evaporated, and some components dissolved in water, while others oxidized, etc. As a result, a portion of this mass formed films and accumulations on the surface, some clots entered the water column and others

settled to the bottom. Thus, the spread of such a contaminant is quite difficult to predict, given how temperature, winds and currents influence mazut dispersal.

By early February 2025, mazut had reached coasts far from the site where the tankers broke apart. It traveled west to the Danube Delta in the Odesa region (600 km) to occupied Berdyansk in the north, to Zaporizhzhya region in Ukraine (170 km), and southeast to the Gelendzhik resort town in Russia's Krasnodar province (160 km). Birds coated with mazut were also observed in more distant locations, including Adler, Imereti Lowlands, and even Batumi (Georgia).

Water areas and coastlines affected or threatened by the mazut pollution include extremely valuable ecosystems, protected areas, and major tourist and recreational centers. The Kerch Strait itself is critical habitat for all three Black Sea cetacean species: common bottlenose dolphin (Tursiops truncatus), "Azovka" harbor (Phocoena porpoise phocoena) and common dolphin (Delphinus delphis). According to Dmitry Glazov, executive director of the Marine Mammal Council, their migration routes pass through the strait, and breeding season feeding grounds are in the area as well. The Kerch Strait and Taman Bay are included in IUCN's list of Important Marine Mammal Areas (IMMA). In sum, the mazut spill has affected at least five IMMAs in the Azov-Black Sea basin.



Zaporizhzhya-Tamansky Nature Reserve is also located in Taman Bay, through which up to two million waterfowl migrate and many hundreds of thousands of birds overwinter. In 2007, a significant proportion of the 30,000 birds that perished in that earlier mazut spill died in or near this protected area. In mid-January 2025, mazut pollution covered the southwestern shore of Taman Bay, and it is possible that it will spread further into the protected area. Environmentalists have repeatedly asked the authorities to block the entrance to the bay using oilspill booms and mazut-trapping nets, or to at least stop oil from reaching the main coastal reed beds sheltering birds.

Consequences of the catastrophe for ecosystems in Ukraine

The greatest pollution of the Ukrainian coastline occurred on the occupied Crimean Peninsula, Ukraine's most valuable landscapes in species diversity terms. It is noteworthy that almost the entire coastline of the Kerch Peninsula and a significant part of Ukraine's southern coastline of Crimea <u>include</u> sites in the <u>Emerald Network</u>, a register of the most valuable habitats in Europe in need of protection. The <u>Ukrainian side of the</u> <u>Kerch</u> Strait was nominated for inclusion in the Emerald Network in 2019, in other words, after the peninsula was annexed by Russia.

Learn more: <u>Emerald network in</u> <u>Ukraine</u>

The entire Crimean shoreline along the Kerch Strait suffers from ongoing and intensive emissions of mazut at present. Also <u>threatened</u> is the area around Kazantipsky Nature Reserve on the Azov coast of the Kerch Peninsula. There the occupying authorities have given permission to store and process mazutcontaminated materials on a completely unsuitable site, one that was previously intended for construction of the planned Crimean Nuclear Power Plant.

The December 2024 shipwrecks occurred opposite Cape Takil, at the peninsula's southeastern tip, where a landscape-recreational refuge of the same name is located. Satellite images showed a large area of spilled oil and fouled shorelines here as early as late December. Further west on the Crimean coast, Opuksky Nature Reserve and the sea surrounding it have been protected since 1972 and is known as the Coastal Aquatic Complex at Cape Opuk and the Elken-Kaya Islands. This protected area was created to protect marine and migratory fish, <u>including</u> sturgeons. It is also recognized as a Wetland of International Importance and is included in the Ramsar Convention list. On January 4, 18 kilometers of the reserve's shoreline were coated with mazut for the first time, and after that cleanup, mazut has washed ashore several more times. Another IMMA, Karadag and Opuk IMMA stretches along the coast from Cape Opuk to Karadag Nature Reserve and is critical habitat for bottlenose dolphins.

Further west, there are many protected areas on Crimea's southern polluted coastline between Cape Opuk and Cape Tarkhankut: 23 regional protected areas, nine national refuges of national significance and two nature reserves. Many of these protected areas have been affected. Cleaning up clots of mazut along these jagged rocky shorelines is an almost hopeless task. Shallow waters with uneven rocky bottoms and covered with dense thickets of large algae—typical habitat along the Crimean coast—can trap settled mazut in the long-term, poisoning local biota and serving as a source of repeated oil slicks and fouling shorelines in the future.

Also heavily polluted are waters along the coast of southwestern Crimea, including the Balaklava and Southern Crimea IMMA, important habitat for all three Black Sea cetacean species.

Information about specific mazut pollution in Crimea is quite scarce, given that occupation authorities are trying to put a positive spin on the situation and regularly talk about the pristine purity of one or another popular shoreline. The fact is that they are justifiably afraid of disrupting the summer resort season and/or fear reprimands from their higher ups.

Six weeks after the spill, occupying leader of the Republic of Crimea, Sergei Aksyonov's office released a <u>decree</u> on January 30 informing residents that an additional six districts were included in the emergency zone and that the zone currently includes the Kerch, Feodosia, Sudak, Saki, Yevpatoriya metropolitan areas, as well as Leninsky, Saksky, and Chernomorsky districts. Sevastopol is also now included. In other words, only two communities—Alushta and Yalta—



Collecting mazut in Limanskaya community, January 31. Source: <u>Ivan Rusev</u> Facebook account

have not yet been declared part of the emergency area. There are probably two reasons for such a belated expansion of the emergency zone: extensive new contamination with oil products along the entire coast at the end of January and the opportunity to use emergency declarations in order to obtain federal money with weak oversight.

The intensity of spill pollution was also quite significant at the western end of the peninsula near Cape Tarkhankut and Donuzlav Bay, an area that is key habitat for wintering and migratory birds. The entire Sevastopol shoreline was also heavily fouled with mazut.

In addition to Crimea, Ukraine's Ministry of Environmental Protection and Natural Resources <u>reported</u> mazut pollution around December 20 along the Sea of Azov coastline at Priazovsky National Park in the Zaporizhzhya region in the coastal zone between Stepanovskaya Spit landscape refuge and the border with Kherson region, including parts of the Fedotova Spit and Peresyp Spit landscape refuges. From January 11 to 14, the occupation administration of the Zaporizhzhya region organized a mazut cleanup on the shores of both the national park and Berdyansk Spit, but a new batch of mazut <u>washed ashore</u> near Berdyansk on February 1.

Head of Tuzlovsky Liman Nature Park's science department Ivan Rusev <u>reported</u> that as of February 1, the farthest extent of mazut pollution from the disaster site occurred in the Odesa region on a sand spit near the Katranka



Morning of December 22, 2024 in Anapa. Source: Ecologist Zhora Kavanosyan Telegram channel/Photo by KD Production

recreation area, not far from the Danube Biosphere Reserve and nature park. According to him, oil-contaminated birds first appeared in the park in early January, but they could not be saved. The oil spill itself was small and consisted of fairly solid small clots of oil, pollution which has to be collected by hand.

The border between Romania and Ukraine travels through the Danube Delta, so it is possible that oil products will reach the Romanian part of Danube Delta Nature Reserve in the near future. The spill has most likely already affected waters in another IMMA "Kaliakra to the Danube Delta", which stretches from the northern edge of the Danube Delta to Cape Kaliakra in Bulgaria and is habitat for common dolphins and Azov porpoises in the summer.

In accordance with the Convention on Biological Diversity (CBD), the following "ecologically or biologically significant marine areas" (EBSAs) have been identified in areas of the Azov-Black Sea basin that are affected by oil pollution: EBSAs Danube Delta, Zernov's Phyllophora Field and Balaklava in Ukraine, with Taman Bay and the Kerch Strait EBSA on the Ukraine-Russia border, as well as the Kuban Delta and Northern Caucasus Black Sea Coast in Krasnodar province (see the CBD's <u>official map</u>). The latter EBSA, along the shores of Anapa, suffered the most from pollution.

Russia's spill epicenter and delayed efforts to shield the coastline

In Russia's Krasnodar province, Anapa Persyp protected area was hit the hardest,



Reinforcement construction at Solyonoye Lake, January 30. Source: <u>Krasnodar province</u> <u>operational headquarters</u> Telegram channel

along with beaches and spits of resort town Anapa and the adjacent Temryuk district. Most of the photos and videos showing apocalyptic pictures of the shores covered with a continuous carpet of mazut were taken here.

In addition to multiple instances of oil pollution, beaches and protected areas in Anapa have also suffered the removal of huge masses of oil-contaminated sand as a result of generous state payments for their removal and storage at temporary storage sites, regardless of the proportion of mazut in the removed material. By the end of January, only 30-50 cm of sand remained atop the bedrock on some beaches. Experts <u>believe</u> that this practice will cause rapid coastal erosion and destruction of the existing near-water infrastructure.

At the end of January, the authorities began to <u>create</u> a ditch and rampart

along the water's edge stretching 42 km from Anapa's central beach to the village of Veselovka in Temryuk district. A polypropylene net is being laid along the rampart, which should protect the structure from being washed away by storms and is a sort of filter, capturing even small particles of mazut.

Director of Anapa Resorts Nikolai Zalivin <u>stated</u> that the main purpose of the two-meter rampart is to prevent new oil product pollution on the remaining 10-12 m of beach width.

Three lines of protective barrier were also created on the spit between the reservoir and the sea in order to protect Solyonoye Lake Nature Monument: a drainage channel, sand rampart reinforced with a net and an additional line of sandbags where sea waves could reach the lake. It is understood that all these engineering structures constitute additional violations of the territory's natural character and that their construction is a major disturbance factor, for example, for wintering birds.

Pollution is gradually spreading to other resort areas in Krasnodar province on the Black Sea coast. <u>According</u> to the official map, there are up to 20 protected areas along the coast here.

Among federal protected areas, east of Anapa the spill <u>reached</u> Utrish Nature Reserve, the staff of which has repeatedly reported that they "cleaned everything up quickly" and "there have been no further mazut impacts." The grounds of the reserve are closed to visitors, but the surrounding area that is open to the public is heavily fouled, and birds covered in mazut are regularly found on the shoreline.

The last Russian protected area found to have been contaminated with mazut is <u>Priazovsky</u> Nature Refuge in the Kuban Delta on the Sea of Azov. There more than 1,350 kg of seaweed, sand and stones contaminated with mazut were collected near the villages of <u>Kuchugury and Achuevo</u> January 20-24. Situated along a flyway, over 200 species of birds stopover in Priazovsky Nature Refuge during migration. Sea currents and storm surges, especially frequent in winter, could mean that the rest of the delta may also end up in the "risk zone".

The Sea of Azov is designated as an IMMA in recognition of its role as the most important breeding ground for Azov porpoise. At the same time, judging by the breadth of coastal locations where the mazut is turning up, the mazut spill has probably affected the entire southern part of the Sea of Azov.

Beach holidays with a dash of mazut

Government authorities, business, the press and the Russian public are very concerned about the safety of beach holidays this year. Russians are not as eagerly awaited at foreign resorts as they once were, and, given the weak ruble, vacations abroad have become more costly. Moreover, since the war's beginning, employees in government, law enforcement and defense have been prohibited from leaving the Russian Despite Federation. Russia being washed by three oceans and a dozen seas, beach resorts are found mainly in the Azov-Black Sea basin, because other seas are very cold. In the last three years, Russians have even vacationed in areas of the Black Sea coast that are adjacent to military facilities regularly subjected to shelling by the Armed Forces of Ukraine.

The Russian official press quotes regional officials who remain optimistic about the prospects for vacationing at Black Sea resorts this year. Until mid-January officials unanimously <u>promised</u> that they would "prepare Anapa for the resort season," but by February most



President Vladimir Putin listens to Natural Resources Minister Alexander Kozlov report on the accident and cleanup measures on January 9. Source: <u>Administration of the President of Russia</u>

forecasters were saying that the resort season in Anapa and Kerch is ruined, although other places are mostly safe for holiday-goers. The Travel Industry Association even <u>published</u> a combination map showing both military shelling risk and mazut pollution on the coast in order to attract vacationers to Black Sea resorts.

The ostentatious optimism strongly facts contradicts experience, and scientific forecasts. Even if the mazut that washed ashore in December could be removed to produce safe and clean beach conditions, a significant quantity of mazut and other oil products have settled on the seafloor along the coast and will reappear in the future one way or another. When water temperatures warm in April, Minister of Natural Resources Alexander Kozlov and his experts expect a significant amount of mazut to resurface, creating a new wave of pollution both in Anapa and on other coasts in Kuban and Crimea.

Other experts believe that it is not rising temperature that raises mazut to the surface but storms. Mazut will continue to be regularly washed ashore with each storm, although the amount will gradually decrease. Spilled oil derivatives are found mainly in relatively shallow areas. In the northern Black Sea, wave action can be felt up to 100 meters deep, so almost all of the spilled mazut remains in the reach of waves. This means that it will emerge again and again, regardless of water temperature. The exception is probably along the southern coast of Crimea, where the shelf drops off greatly right at the shoreline and sunken mazut has no chance of re-emerging. But springtime water currents may deliver



Beach in Anapa, December 2024. Source: Sergei Malgavko/TASS

huge amounts of mazut that first rose to the surface elsewhere.

The expanding geographical creep of mazut to new shores is also inevitable. Some experts, including Viktor Danilov-Danilyan, scientific director of Moscow's Institute of Water Problems, <u>concede the</u> <u>likelihood</u> of oil products turning up on the shores of other Black Sea nations, such as Georgia, Bulgaria and Turkey, which seems more and more likely as events unfold.

Those who consider the oil spill as already in the past are hopeless optimists. Experts predict that it will take between two and 20 years to overcome the consequences of this disaster.

All eyes are on microbes... Recovery is likely to require decades

Volunteers from all over the country arrived at their own risk to clean up

the mazut and save birds from the first days of the spill. They drew media attention to government inaction, but still did not receive timely assistance or support by government agencies. Rospotrebnadzor's guidelines for safe oil volunteer cleanup were <u>released</u> 45 days after the accident and do not contain a single reference to specific studies on the health consequences of mazut toxicity.

the Anyone commenting on disaster never ceases to be amazed at the incompetence, indifference and impotence of the Russian government that is being demonstrated during the "spill cleanup". The entire state machine has seemingly fallen into a stupor, as if it had never seen a mazut spill. Ten days passed before the government declared a national state of emergency - the very time window when something could still have been done to reduce the scale of the spill's consequences.



Ministry of Emergency Services on December 31: «This tool is dragged across the sea floor. The degree of pollution is assessed by the amount of mazut clinging to the weight and the rope.» Source: Ministry of Emergency Services Telegram channel

Additionally, the possible impacts and measures required for addressing them have been well studied thanks to the Volgoneft-139 tanker accident in 2007 in the same Kerch Strait. At the same time, federal Marine Rescue Service experts brazenly claim that the December accident is <u>"the world's first mazut accident"</u> in an attempt to justify the lack of equipment on hand, established procedures for spill cleanup, or capacity for safe disposal of mazut and contaminated sand along the coast. In reality, marine mazut pollution has been a common occurrence since the Soviet era, and a number of specific cleanup solutions and technologies exist.

Russia's federal Emergency Services Minister candidly <u>admitted</u> on December 28 that "as far as the water aspect is concerned, it's a complete unknown." Neither that agency nor the Government Commission for Oil Spill Cleanup know what to do with the sunken mazut, and neither entity has the necessary specialists or equipment to monitor and cleanup such spills. 50 days after the accident, three halves of the sunken tankers containing mazut remain on the seabed, and these government organizations lack the skills and technology to pump it out or raise the vessels, as well as being unwilling to request assistance from countries that do have such capabilities.

On the eve of the new year, the Ministry of Emergency Services released to the press a video <u>demonstrating</u> the government's technological capacity for monitoring the situation: a rope tied to a workout weight, which they then dragged along the seafloor on the shoreline in order to judge the location and amount of mazut that has settled there.

Considering all the experience and technological capabilities the <u>"great</u> <u>energy superpower</u>" has already demonstrated in the process of responding to the mazut spill, there is no doubt that the leading hope for disaster cleanup is microorganisms that, though slowly and reluctantly, both break down and harden clots of mazut, turning thicker fractions into inert solid clumps similar to stones. In that case, 10-20 years is a realistic timeframe to fully address the disaster's consequences.

As the flooding of pollutants into the Black Sea following the sabotage of Kakhovka dam has shown, most components and processes in marine ecosystems are generally capable of rapid recovery in a year or two following catastrophic events. Vulnerable species, coastal ecosystems and the tourism and recreational industries will take much longer to overcome the consequences.•

Translated by Jennifer Castner Main image: Net fence to capture mazut in Opuksky Nature Reserve, January 2025. Source: Ecologist Zhora Kavanosyan Telegram channel February 28, 2025



The toxic legacy of the Kakhovka Reservoir

Oleksiy Vasyliuk

The destruction of the dam at the . Kakhovka hydropower plant on Ukraine's Dnipro River in June 2023 caused not only a huge humanitarian crisis, but also an environmental catastrophe. Sediment samples collected from the former Kakhovka Reservoir show that over the decades, toxic deposits had accumulated on the bed of the reservoir as a result of the discharge of untreated wastewater from heavy industry upstream. Following the destruction of the dam, these deposits – including toxic elements such as lead, arsenic and zinc were carried downstream threatening the ecosystems of the Dnipro and surrounding areas. Oleksiy Vasyliuk looks at how the

pollution of soils and bottom deposits in the Kakhovka Reservoir is impacting the environment and local ecosystems, and asks what conservation measures need to be taken to prevent their further spread.

Occupying an area of over 2,000 square kilometers, the Kakhovka Reservoir was the final link in a <u>hydroelectric cascade</u> on the Dnipro River built during the Soviet era. The reservoir, which could hold up to 18.6 cubic kilometers of water, collected water from the entire cascade, creating a kind of reserve for irrigating the region in the summer period.

In the last 68 years agricultural activity in the south of Ukraine has

depended significantly on the supply of water from the Kakhovka Reservoir. A year after the reservoir vanished when a hole was blown in the dam, allegedly by Russian troops, the region has adapted to the new conditions relatively well, using alternative sources of water supply and power generation. Three water pipelines were built to meet the needs of the population and industry, while the industrial enterprises of the Dnipro region and the Zaporizhzhia Nuclear Power Plant receive water from underground sources.

Over the course of decades, pollutants from all the reservoirs located upstream, as well as from agricultural lands along its shoreline, entered the "Kakhovka Sea," where they settled to the bottom, remaining in the reservoir rather than being carried downstream into the Black Sea. Heavy metals and other toxic substances accumulate in bottom deposits and can migrate into the food chain, creating a long-term threat of serious diseases and they are generally indicators of a dangerous, polluted environment. The main sources of the pollution are sewer networks and industrial treatment facilities that are in unsatisfactory technical condition and do not ensure complete water purification.

More than 400 industrial and agricultural sites were located on the shores of the Kakhovka Reservoir, discharging 6.1 million cubic meters of

wastewater daily. Every year, enterprises in the city of Zaporizhzhia would dump 282 million cubic meters of untreated or insufficiently treated wastewater into the upper part of the Kakhovka Reservoir (for example, Dniprospetsstal, and other coke, chemical, aluminum and hardware plants discharge 20.9 million cubic meters of wastewater annually). In the Dnipro region, the main polluters of the Kakhovka Reservoir were industrial enterprises in the city of Nikopol, which discharged more than 50 million cubic meters of wastewater annually, including 47 million cubic meters of contaminated water.

As early as 1952, scientists were predicting that an accumulation of industrial and domestic wastewater from surrounding settlements would cause excessive water pollution in the Kakhovka Reservoir. But sufficient measures to limit pollution were not taken, and treatment facilities in the Dnipro River basin have proven ineffective in cleaning wastewater to safe levels.

The alkaline environment that typically forms in bottom sediments facilitates the binding and sedimentation of toxic substances. This means they tended to accumulate at the bottom of the reservoir, preventing them from being carried further downstream. Pollutants accumulated in bottom sediments on the reservoir bed in large quantities, as well as in the bodies of Dreissena polymorpha mollusks (Zebra mussels), which are unable to filter large volumes of water.

An act of sabotage

The dam sabotaged at the Kakhovka hydropower plant on June 6, 2023 caused the most destructive shortterm impact on the environment in Ukrainian history, leading to significant economic losses and the destruction of important ecosystems that are critical for biodiversity. The explosive sabotage of the dam is regarded by many international organizations and governments and civil society as an act of <u>ecocide</u>.

The reclamation infrastructure of the Kakhovka hydroelectric complex has been destroyed, and most of the surrounding irrigated land is now mined or contaminated with toxic substances (including heavy metals), which means it will be impossible to use even after the end of the war.

The destruction of the dam was a large-scale environmental disaster that radically transformed the regional ecosystems that had formed during the reservoir's existence. Three key zones have been affected by the changes: the bed of the former reservoir, areas downstream that suffered from flooding, and the northwestern part of the Black Sea.

However, of all the environmental consequences of the catastrophe, it is

the pollutants (heavy metals and other toxic compounds) that had accumulated at the bottom of the reservoir in the past that pose the greatest long-term threat.

 Read more: <u>Sabotage of the</u> <u>Kakhovka Hydropower Plant:</u> <u>What are the environmental</u> <u>consequences?</u>

Sediment spreads after the disaster

In the 70 years following the filling of the Kakhovka Reservoir, a significant volume of silt (bottom sediments) was deposited on its bed, forming a deep layer of sludge. Although it <u>was</u> 17.6 cm thick on average, the depth of this layer varied, depending on the relief of the reservoir bed and water circulation, reaching up to one meter in depth in some spots.

We do not know how much of this silt was washed out as the reservoir emptied and then deposited in flooded areas. As water flowed out of the reservoir, water drained rapidly from shallower parts of the bed into deeper areas. This caused silts to wash horizontally into deeper areas (branches and channels) and then into the main channel and beyond into the lower reaches of the river, and ultimately the Black Sea. Silt accumulated in a more concentrated form in a swampy area in the eastern section of the former reservoir, where, as the water level fell, a large isolated



Silt from the Kakhovka Reservoir is carried downstream (18.06.2023). Source: Sentinel

water body formed. More silt entered this "lake" as the draining waters moved through the area. The pollution of the former Kakhovka Reservoir with toxic deposits is now having a negative effect not only on the land occupied by the reservoir, but also on those zones where large amounts of silt accumulated since the destruction of the dam. Within just 24 hours of the explosion, a band of water full of suspended matter was <u>visible</u> in the main channel of the Dnipro, extending along the fairway. Soon the whole stream of water escaping from the dam was filled with suspended sediment that had built up on the reservoir bed over many years and had now been disturbed.

Representatives of the <u>Ukrainian</u> <u>Nature Conservation Group (UNCG)</u> observed that as the water flow and flood levels began to subside, the concentration of suspended solids and pollutants continued to grow. By now, waste from the destruction of man-made structures and dumps was adding to the mix. Now the most polluted sediments – those that were deposited last – were now the topmost, secondary layer.

When the flow rate decreased where the delta widened and discharge slowed, <u>alluvial deposits</u> built up, emerging as water levels fell. These deposits were up to 70 cm deep in some places, even in the city of Kherson. Significantly larger volumes are likely to have settled in vegetation in the part of the Dnipro delta adjoining the left bank.

New soils form

After the reservoir's destruction and the disappearance of a large amount of silt from its former bed, soils characteristic of river floodplains began to form on



Alluvial deposits on the streets of Kherson after the destruction of the Kakhovka Reservoir, June 2023. Source: <u>Suspylne Kherson</u>

the exposed bottom. Formed from a mixture of different types of sandy and silty bottom sediments, their character depends on the structure of the bed, as well as the speed of the water flow.

The best base for the formation of soil and terrestrial biotopes is the layers of clay deposits found on the bed of the former reservoir, which contain up to 16% organic matter. In the future, vegetation growth in the area will increase the organic matter content of the soil.

 Read more: <u>One year after the</u> <u>terrorist attack at Kakhovka</u> <u>Hydropower Plant: 1b trees instead</u> <u>of desert and willow forests unique</u> <u>to the continent</u>

Analyzing polluted soils

In the summer of 2023, UNCG organized the collection of 119 samples of sediment from different parts of the reservoir bed. Some of the samples illustrate the situation in the lower reaches of the former reservoir in the Kherson region, while others were taken from around the city of Zaporizhzhia, in its northern part.

The sampling itself turned out to be an extremely challenging task, since much of the perimeter of the former reservoir remains an active combat zone and is also mined. Even visiting the former western shoreline means coming under threat of mortar shelling or sniper fire from the oppositebank, which is currently occupied



Samples being collected from the dry bed of the reservoir in 2023. Source: Ivan Moisienko

by the Russian army. The processing and analysis of samples was organized by Anastasia Sploditel, a geographical sciences PhD and staff member of the soil science department at the Technical University of Braunschweig's Institute of Geoecology. Laboratory testing was done at Canterbury Christ Church University (United Kingdom) as part of the Global Food and Water Security (GFWS) project.

In 94% of the soil samples analyzed, researchers found a significant excess of maximum permissible concentrations (MPC) and natural background values of toxic substance concentrations. Several trends were also observed in the soil samples studied:

1. All sediment types analyzed have a pH value defined as "alkaline" (range 7.0-8.6), which means the toxic elements they contain have a low migration capacity, leading to the formation of poorly soluble compounds. Because of the alkaline environment, toxic compounds mainly accumulated in the bottom sediments of the reservoir, instead of being washed downstream. As a result, the reservoir turned into a huge repository of heavy metals and other toxic substances, the quantity of which constantly increased.

2. Arsenic (As), lead (Pb), strontium and zinc (Zn) (Sr) are the pollutants most frequently found in the highest concentrations in samples. The toxic impacts these elements have on human health and ecosystems mean that this kind of soil contamination is a critical issue. Heavy metals, which accumulate in the body via water, food or dust, damage the nervous system and internal organs, and can even cause cancer. In addition, they have a negative impact on the growth and development of plants, reducing biodiversity and causing ecosystems to degrade, which agricultural affects production and environmental protection. Concentrations of copper (Cu),

carbon (C), molybdenum (Mo), manganese (Mn), nickel (Ni), phosphorus (P), vanadium (V) and barium (Ba) found in the bottom sediments were somewhat lower. Nevertheless, all the metals studied were found to be present in volumes significantly higher than the maximum permissible concentration (MPC) and background values (by 7-17 times). The sole exception is cadmium (Cd), the concentrations of which correspond geochemical to background values in all the areas studied.

- 3. Among the samples analyzed, zinc, vanadium and nickel demonstrated the greatest transport properties in the soil. Their high average concentrations are recorded at a depth of 25-35 cm. This means that the geographical coverage of subsequent studies will need to be significantly expanded, and samples will also need to be taken at different depths.
- 4. The high similarity between metal concentrations found in the bottom sediments of the flood zone and in soils from the bed of the former reservoir confirm that the pollutants have a common source – industrial facilities in the vicinity of the Kakhovka Reservoir (mostly located in the nearby cities of Zaporizhzhia

and Pokrov). This is a wake-up call: an increase in the presence of transferable hazardous chemical compounds heightens risk of toxic substances the entering food chains. For the inhabitants of nearby areas that were temporarily flooded in 2023 following the destruction of the dam, this is a serious concern. Their gardens are now covered in a layer of toxic sludge and it is possible that it will not be safe to grow food there in the future.

 Read about more analyses in this article about a study by the Czech environmental NGO Arnika: Pollution from the bed of the Kakhovka Reservoir could affect water quality in local settlements

Possible scenarios for land use

Despite the overwhelmingly negative impact of the disaster, it also created conditions for the spontaneous restoration of natural ecosystems, including the restoration of the natural flow along a 250-km section of the 2,201km Dnipro. Native plants such as willow and poplar have begun to grow in the drained areas, while floodplain areas, with their characteristic biodiversity, are also being restored. Contaminated silt poses less of a threat to surrounding areas when it is overgrown with forest: in such conditions it will not be carried downstream by water or borne by the wind. The soil formation processes that have already begun here will soon preserve the pollution under a layer of plant remains and soil, contributing to the conservation of this technogenically hazardous area.

The inaccessibility of much of the area formerly covered by the reservoir - part of which remains a frontline combat zone limits the scope of any assessments of the environmental impact caused by the destruction of the Kakhovka dam. The lack of precise quantitative data from the site is also a factor. Large-scale studies have been postponed due to the need for demining, which may ultimately mean that some information is lost as a result of natural ecosystem restoration processes. It seems likely that in the future researchers will be able to observe the restoration processes of ecosystems at work, rather than focus solely on the consequences of the Kakhovka disaster.

Nonetheless, the expectation is that once the soil samples have been analyzed and assessments of the pollution damage caused have been refined, the results will significantly expand the range of damage indicators and will serve as additional evidence of ecocide. This kind of information can be extremely useful for assessing the damage caused to Ukraine and for calculating subsequent reparations.

Data on pollution levels in different areas of the former reservoir bed will be of particular interest when it comes to planning future land use scenarios. It is possible that land use will be determined by zoning according to pollution levels.

- Read more: <u>After the deluge:</u> <u>One year on, can the ecosystems</u> <u>disrupted by the destruction of the</u> <u>Kakhovka Dam recover?</u>
- Is it time to restore Velykyi Luh?

addition option In the to of restoring the natural ecosystems of the historic Velykyi Luh meadow, power engineers are, of course, considering the conservative scenario of building a new dam - and accordingly, a new scenario reservoir. This envisages the complete <u>restoration of the entire</u> infrastructure of the hydropower plant, which will also mean a repeat of all the environmental mistakes made in 1952, when the decision to build the Kakhovka Reservoir was originally taken. This will lead to the renewed accumulation of hazardous substances on the bed of the new reservoir. There is also another concern: heavy metals have migrated from deep layers of soil into the biomass of trees now growing on the site of the former reservoir. If the area is flooded again, regardless of whether the trees are cut down or not, these hazardous substances that have accumulated in them will be transferred beyond the contaminated area. That is, the creation of a new reservoir will increase the spread of heavy metals.

• **Read more:** <u>Rebuilding the</u> <u>Kakhovka dam is a mistake, but</u> <u>what should be done instead?</u>

Apart from the two main scenarios – creating a new reservoir and turning the area into a nature reserve – there are also several other options, including building solar and wind farms or planting tree plantations on the former bed of the reservoir, with the aim of obtaining biofuel. The latter option is of particular interest for analysis, since the area has already been naturally overgrown with willows following the disaster, so it is clearly suitable for growing "energy willows."

Plantations like this could perform both simultaneously а reclamation and phytoremediation role, since willows are very effective at removing heavy metals from soils. However, the migration of pollutants into willow wood (and whether it can be then used safely) is an issue that has yet to be studied.

The risks of a phytoremediation project like this include the possible spread of invasive species and the release of heavy metals accumulated in plant biomass. Most fast-growing energy crops are invasive and can spread beyond controlled areas, harming local flora and fauna. In addition, if wood is used for energy purposes, heavy metals and other toxic substances and combustion products may be released into the air when it is burned, posing a threat to human health and ecosystems.

Comparing the possible scenarios in the context of pollution, we can safely say that only the natural restoration of ecosystems and conservation of the area will ensure that pollutants are isolated, preventing them from subsequent secondary transfer. Any active use of natural vegetation (for energy or even simply as firewood) will hinder soil formation processes and the conservation of pollutants in the soil, which means they may continue to spread.

As for the possible scenario of creating a new reservoir, this would not only fail to solve already existing problems, but would also result in pollutants beginning to accumulate again with renewed vigor.

Conclusions and recommendations

The pollution of soils and sediments in the vicinity of the former reservoir carries high environmental risks. The concentration of toxic substances indicates that the entire former Kakhovka Reservoir and areas affected by flooding (including downstream) are an environmental disaster zone.

Unfortunately, currently available data is insufficient to precisely identify the degree of geographic spread of pollution in the area. Preliminary analysis makes it clear that this territory is highly likely to be unsuitable for many types of human use. First of all, any site intended for cultivating agricultural products needs to undergo special examination for the presence of toxic substances. Given this danger, the production of industrial crops still seems possible, but growing food is extremely risky (including in the gardens of local residents whose territories were temporarily flooded).

Any decision on the future use of the land that was formerly part of the Kakhovka Reservoir should include an assessment of the toxic pollution in each sector earmarked for certain types of commercial use. For example, the development of recreational tourism on the banks of Velykyi Luh may be accompanied by certain risks. Before allocating and preparing sites for this it will be necessary to study how polluted bottom deposits will affect the safety of beachgoers.

The natural restoration of woodland vegetation calls into question the wisdom

of creating a new reservoir, since this would require the destruction of the largest area of forest in Ukraine's steppe zone, the young willow forest that now covers Velykyi Luh. Unfortunately, most of the previously existing forest in southeast Ukraine <u>has</u> <u>been destroyed</u> in nearly three years of war and the modern climate makes restoring it an almost impossible task.

Taking all of this into account, the best option in terms of nature management is the creation of a nature conservation area and the implementation of geochemical soil monitoring. More detailed studies are required to identify the processes by which mobile forms of metals migrate from the soil into plants. The results of these studies will allow us to draw conclusions about prospects for the use of phytoremediation to reduce contamination in these areas.•

> Translated by Alastair Gill Main image source: <u>1news.zp.ua</u> February 27, 2025



Environmental consequences of the war in Ukraine: December 2024 – January 2025 review

Alexej Ovchinnikov

Each month, the UWEC editorial team shares highlights of recent media coverage and analysis of the Ukraine war's environmental consequences with our readers. As always, we welcome reader feedback, which you can leave by commenting on texts, writing to us (editor@ uwecworkgroup.info) or contacting us via social networks.

Consequences of the oil spill in the Black Sea for Ukraine and other Black Sea nations

Two Russian tankers ran into trouble on December 15, 2024 in the Kerch Strait during stormy weather, resulting in a large spill of M-100 heavy fuel oil, known in Russia as mazut. Each tanker was transporting more than 4,000 tons of oil. Both of the vessels split in two, but while one sank, the crew of the second managed to run the stern aground. It is not yet clear how much mazut has escaped into the sea, but reports continue to come in of fresh deposits along the coastline of Russia's Krasnodar Territory. Data shows that Black Sea currents have also carried oil pollution into the waters around Crimea. The danger of M-100 is that it settles to the bottom in cold temperatures but may rise in the summer when the Black Sea warms up. The pollution is therefore likely to be long-term in nature.

 Read more: <u>Military oil spill: How</u> <u>the Kerch Strait tanker disaster is</u> <u>linked to Russia's 'shadow fleet'</u> <u>oil exports</u>

The December catastrophe is being compared with the sinking of the Volgoneft-139, a tanker of the same type which broke in two in 2007, also in the Kerch Strait. That accident resulted in the spilling of 2,000 tons of mazut, four times smaller than the spill in December 2024. In 2007, a staggering 11 vessels sank, some of which were carrying a large cargo of sulfur (the Volnogorsk transporting 2,436 was tons, the Nakhichevan around 2,000 tons). At that time the head of the National Ecological Center of Ukraine <u>called</u> the Black Sea "a slow-ticking time bomb", referring to the long-term consequences of the oil spill and sulfur pollution. After the

accident in 2007 Ukraine filed a <u>lawsuit</u> against Russia for \$1.5 billion. However, we have been unable to find out whether this claim was successful.

In wartime it is very difficult to obtain information about the real consequences of pollution. This is especially true when it comes to occupied territories such as Crimea. There is little openly accessible information about the scale of pollution on and around the peninsula, and volunteer clean-up activity along the Crimean coast is restricted. However, satellite monitoring does record pollution. For example, on January 4 the Sentinel-1 satellite <u>recorded</u> pollution of two square kilometers near Feodosia and 0.25 square kilometers in the vicinity of Cape Takil. Ukrainian specialists continue to <u>collect</u> data with the help of the Sentinel-1, TerraSar-X and PAZ satellites.

A trilateral online meeting was <u>held</u> between representatives of Ukraine, Romania and Bulgaria in mid-January with the aim of discussing joint action to monitor the consequences of the catastrophe in the Black Sea. Ukraine also made an appeal to the secretariats of relevant UN Convention fora, the United Nations Environment Program (UNEP), UNESCO, the European Union and the International Marine Organization (IMO). On January 27, the consequences of the oil spill in the Black Sea were considered at a meeting of the IMO Subcommittee on Pollution Prevention and Response.

"We are continuing our observations, preparing an appeal to the European Commission and awaiting a tough reaction from the international community," <u>said</u> Svitlana Hrynchuk, Ukraine's minister of the environment. "This is not the first situation of this kind with Russian tankers. Russia is ignoring international marine law. However, to ignore this accident now is to allow it to happen again in the future."

By the end of January, deposits of mazut had already been recorded in the Odesa region. This was reported by Ivan Rusev, an employee of the Tuzlovskiye Limany National Park, located southwest of Odesa. Patches of mazut were discovered in the Katranka recreational zone located near the Danube Biosphere Reserve and the Tuzlovskiye Limany National Park. A representative of Tuzlovskiye Limany National Park reported having already collected four kg of light fractions of mazut found on the shoreline on about January 26.

Natalia Gozak, director of the Ukrainian office of Greenpeace, says that the Odesa region is not expected to be significantly affected due to its distance from the site of the disaster. However, certain impacts are possible, including changes to the migration patterns of birds, fish, and marine mammals. It may take 10-12 years to fully eliminate the consequences of the disaster in the Black Sea. A bird was found covered in oil in Tuzlovskiye Limany National Park on January 9. Unfortunately, it was not possible to save it. Similar cases of birds covered in mazut have been documented in other countries – in Georgia, for <u>example</u>. Many of them die.

It is impossible to calculate the number of birds suffering from oil pollution as a result of the spill. Unfortunately, despite the active and productive work being done in the immediate area by volunteers, many birds die even after being rescued, cleaned and released into the wild. For example, after 160 great grebes were released in Anapa (a city on Russia's Black Sea coast bordering Georgia) 60 were found dead the next day. According to ornithologists, birds are often released back into the wild too early before their plumage is again fully waterproof. Ukrainian animal rights organization UAnimals reports that 61 dolphins have died as a result of the oil spill. In the period from December 15 to 22 alone, Russian environmentalists found the bodies of 10 dead dolphins in the Krasnodar region. And the damage done to the Black Sea's unique ichthyofauna is yet to be calculated.

Dealing with the consequences of December 15 will be very challenging, and will ideally involve the collaboration of all countries in the Black Sea basin. Ukraine is already establishing contact with Romania, Bulgaria and <u>Turkey</u> for joint monitoring. Unfortunately, Georgia has issued no statement on its involvement, and whether Russia is ready to join this process is something of a rhetorical question. Expressing willingness to compensate for the damage caused by the oil spill would be a step in the right direction, as well as abandoning its shadow fleet and acting in accordance with international standards for cargo transportation. According to Svitlana Hrynchuk, one month after the disaster the cost of the damage is preliminarily assessed at \$14 billion. These funds should be directed primarily to cleaning up the damage and creating effective mechanisms to prevent such tragedies from recurring.

Developing compensation mechanisms for the war's environmental damage

Whether the damage caused by the mazut spills in the Kerch Strait will be considered for Russia's future reparations to Ukraine is a question that has not yet been discussed. However, compensation mechanisms are still being developed.

The <u>Register of Damage for Ukraine</u> (RD4U) was founded in 2023. It is intended to become the main institution for determining and receiving compensation from Russia for damage caused during the war. This includes environmental damage, as well as damage related to the violation of citizens' rights to a healthy and clean environment. In 2024, as the Ukrainian organization Environment People Law <u>reports</u>, rules and regulations for the compensation register were established, along with a coordination platform for interaction with civil society.

Around 80 organizations took part in the first online meeting of the Coordination Platform, which was <u>held</u> on December 16. As RD4U's executive director Markiyan Kliuchkovskyi explained, approved submission procedures currently exist for all 45 categories. However, applications are currently being accepted for just one category, "Damage or destruction of residential real estate". As of the day of the meeting, 832 applications submitted for this category had been deemed acceptable and in accordance with the registry procedure.

The register contains two categories that are directly related to environmental damage: "Environmental damage" and "Depletion of or damage to natural resources". When the NGO Environment People Law inquired about when applications for this category would RD4U representatives be accepted, responded that at present there are no clear dates; it depends on technical and regulatory issues and that all information will be provided on the register's website in due course.

It is extremely important that projects funded by compensation take into account and are aimed at protecting the environment and Ukraine's green recovery. The UWEC Work Group has <u>said</u> on numerous occasions that the recovery period may be more difficult for nature than the "hot phase" of the war. Among other things, the challenge is linked to the extraction and use of resources for the construction of new infrastructure, cities and housing.

Sanctioning the 'shadow fleet' and the oil trade to prevent environmental disasters

One way of putting economic pressure on Russia is to tighten sanctions on trading in oil and oil products. In principle, this could help avoid new environmental disasters. Moscow's shadow fleet is not made up of invisible ships, after all. It merely exploits loopholes in the regulatory system that allow Russia to use other vessels to circumvent sanctions and continue to increase its trade in oil products. If these loopholes are closed, the risks will also be reduced. Coordinated action by all countries is necessary and a task which has yet to be achieved.

Razom We Stand has published a <u>new</u> <u>appeal</u> to mayors of European cities to deprive the aggressor of oil revenues. The authors of the appeal, which has already been signed by 37 environmental organizations from around the world, point out that oil remains the main source of income for the Russian government. In 2024, it even grew by 42% in volume, outstripping gas to become one of the key components of Russia's wartime economy. At the same time, Moscow is making active use of a loophole for selling refined oil products through third countries. According to a recently published <u>investigation</u> into Georgia's participation in this mechanism, 99,000 tons of so-called "Georgian oil" were sold in Spain in 2023-2024. This data is not only not reflected in Georgia's national statistics database – the country simply does not produce oil in such volumes. This is just one example of Russia's circumvention of sanctions. Another is the infamous shadow fleet.

Since economies around the world overwhelming have shown their dependence on Russian oil. environmental organizations see the solution in reducing the demand for oil in cities through the development of energy-efficient mobility programs and citizen awareness. If there is no demand for oil, it will be unprofitable to buy or sell it. Russia will therefore lose its main source of income, income that it is using to finance its war in Ukraine. It will be an added bonus that energyefficient projects will make cities more comfortable for residents.

New study published on environmental degradation in southern Ukraine caused by explosive weapons

A recent <u>report</u> by Norwegian People's Aid and CEOBS describes the impact of the fighting on the environment, agriculture and infrastructure of the Kherson and Mykolaiv regions. After analyzing soil, water and biodiversity, the researchers concluded that work on restoring and rehabilitating these areas needs to begin as a matter of priority. Pollution levels are extremely high, which has a negative impact on both the environment and human health.

As part of that study, researchers collected samples and conducted satellite analysis of areas affected by the use of explosive weapons. For example, in the town of Snihurivka in the Mykolaiv region, critical infrastructure was destroyed during the war, including treatment facilities, industrial and agricultural enterprises and a railway station. Samples showed high levels of heavy metals and hydrocarbons in the soil and water. The situation has also been aggravated by the destruction of the Kakhovka dam, which caused additional pollution in parts of southern Ukraine which had already suffered damage from military action.

The study also touched upon the issue of mined areas, which may remain contaminated even after the end of the war. Explosive weapons such as shells, mines, and missiles have already caused serious damage to the region, including its nature reserves – as the study data confirms. The question of how to eliminate this contamination, which may remain a hidden threat for years, remains a serious problem.

Scientists are currently focused primarily on the analysis and collection of data. From this point of view the study has been an opportunity to pilot new technologies. "The study not only revealed the range of pollutants linked to the use of explosive weapons, but also, for example, showed the role that mine clearance personnel can play in supporting the collection of data in dangerous conditions such as those in the south of Ukraine," said Anna McKean, who led the CEOBS study. "These methods can supplement remote environmental analysis and thereby help to better understand the risks of pollution in conflict conditions."

The study can be downloaded <u>on the</u> <u>CEOBS website</u> (in English)

While the collection of data on the environmental consequences of Russia's war on Ukraine goes on, solutions need to be found today. One of these solutions is the creation of nature conservation territories in the most polluted areas. This experience has been successfully used in Ukraine in the Chornobyl region, as well as other countries that have had to deal with high levels of both military and industrial pollution. Read more about what the future may hold for areas contaminated with mines and damaged by explosive weapons in this article by UWEC Work Group expert Oleksiy Vasyliuk:

• Read more: <u>Caution, mines! The</u> <u>future of mined landscapes</u> •

Translated by Alastair Gill Main image source: ua.korrespondent.net February 7, 2025



What did the Ukrainian environmental sector lose after US aid was cut off?

Viktoria Hubareva

A t first glance, it may seem that the United States has provided almost no support to Ukraine's environmental sector. The consequences of Trump's decision may, however, be delayed, given the colossal volumes of US aid to other international funds of which Ukraine is a member. What are the consequences of the 47th US president's decision to end programs supporting environmental conservation in Ukraine?

immediately after his Almost US President Donald inauguration, issued an executive Trump order suspending US agencies and departments from providing aid to other countries for up to 90 days, a move with devastating consequences around the globe. The justification for this decision was that these payments were "inconsistent" with American interests. The order states that, "[the payments] serve to destabilize



Actual US government spending in Ukraine, 2024 spending, partial. Source: <u>ForeignAssistance.gov</u>

world peace by promoting ideas in foreign countries that are directly inverse of harmonious and stable relations internal to and among countries."

Within 90 days of the order being issued, the "appropriateness" of all foreign development assistance must be assessed. This applies to payments to foreign states and non-governmental implementing organizations, international organizations and contractors. This does not mean that the projects have been closed permanently, although for most of them all activities have been suspended, even in cases where money has already been transferred to the accounts of the organizations that received funding. This has led to disruptions in their work, in particular in Ukraine.

Direct US support for Ukraine's environment sector appeared in doubt before the cut off

According to the US government website <u>ForeignAssistance.gov</u>, aid to Ukraine consists of nine main sectors,

🏛 Managing Agency 🚺 \$5.413B - U.S. Agency for International Development \$255M - Department of the Treasury \$98.41M - Department of State \$3.164M - Department of Health and Human Services \$962.7k - Trade and Development Agency \$365.6k - Peace Corps \$314.4k - Department of Energy \$71.56k - Department of Agriculture \$0 - African Development Foundation \$0 - Department of Defense \$0 - Others \$0.0 \$1.4B \$2.7B \$4.1B \$5.4B

Agencies that actually paid US foreign assistance directly or through an implementing partner. Source: <u>ForeignAssistance.gov</u>

the largest of which were spending on economic development, humanitarian aid, and "Democracy, human rights protection and governance". Expenditures in the environmental sector amounted to \$303,600 in 2024 (partial) and occupied the last place.

The main organization from which funds flowed to Ukraine was USAID, which found itself in the spotlight starting the first minutes after the American president's public statements.

However, as for "Environment" sector spending, the majority – \$286,100 – came from the US State Department, with an implementing partner in Ukraine of the <u>Agency for Cultural Resilience</u>* – a public organization that coordinates its activities with the Ministry of Culture and Information Policy of Ukraine in the form of a working group working to preserve cultural heritage under martial law.

*UWEC sent an inquiry to the Agency for Cultural Sustainability of Ukraine seeking information about the organization's environmental initiatives. We will update this material as soon as we receive a response.

Smaller amounts (\$4,820 and \$2,640) were allocated in the "Clean Productive Environment" sector and \$10,000 in the "Natural Resources and Biodiversity" sector were directed to Ukraine's Ministry



USAID spending in Ukraine, partial 2024, by sector. Source: ForeignAssistance.gov

of Agrarian Policy. In the latter case, project implementers were unidentified public organizations.

On the face of it, it could be said that the United States has invested virtually no funds directly in environmental protection in Ukraine. Most of the above spending is linked to USAID, which provided funds for programs to protect health, humanitarian assistance, economic development, democracy and human rights, education and social services, and the "peace and security" sector. Other US government agencies provide funding and resources in support of Ukraine's environmental sector, but they are not the focus of this article due to the absence of publicly available financial data.

The full list of organizations that received assistance from USAID in five key areas was <u>published</u> by Ukraine's Ekonomicheskaya Pravda. Looking at this list, it seems that environmental conservation is only a possible "side effect" of such financing (for example, digital transformation in combination with other Ministry of Natural Resources structures), but not a direct target for expenditure. Consequently, the impacts of terminating financial support for environmental conservation are likely to be minimal.

However, this does not mean that the lost support, even temporarily, is painless. The funds transferred to Ukraine by USAID were used for essential lifesaving medicines, medical services, food, housing and living assistance, as well as the consumables and administrative costs necessary to provide such assistance. In addition, USAID funding supported humanitarian demining, electricity needs during blackouts, and much more. That lost support will certainly affect the work of conservation and environmental organizations.

Less obvious influences that may be felt, but not immediately

All of the above applies only to direct aid sent to the Ukrainian government and community organizations. When the US suspended all international spending, global funds responsible for nature conservation, biodiversity, water resources, ecosystem services, and climate crisis adaptation were also impacted.

This list includes the Clean Technology Fund, a fund that in the 2010s invested \$350 million in the Ukrainian government in a program running to 2050 to reduce the risks and overall cost of investments in renewable energy, energy efficiency in residential and public buildings, district heating and industry, introduction of Smart Grid components in the transportation system and the zero-emission natural gas-powered electricity generation.

Another example is the **Global Environment Facility** (GEF), which includes several multilateral funds working together to comprehensively address the planet's problems. The GEF has financed, among other things, the United Nations Development Program (UNDP), an entity that is implementing a variety of initiatives in Ukraine, in particular supporting "Green Recovery" in Ukraine, "Mitigation and adaptation to climate change" and others.

Much of this funding is now in question. On February 20, Republican Senator Mike Lee of Utah <u>introduced</u> a bill to completely withdraw the US from the UN and all related agencies in 2025, as well as to end US funding of their activities.

And although the suspension of those initiatives and agencies may not be directly related to projects implemented in Ukraine, it creates risks of reduced future funding as funds are redistributed between projects.

Is aid forever gone?

According to Trump's executive order, the contracts were originally to be reviewed within 90 days, and their extension or termination was to be negotiated with US Secretary of State Marco Rubio. The order notes that the grants can be restored, permanently terminated or modified.

Later, a lawsuit and a court ordered stay were <u>filed</u> in response to a motion requiring the State Department and USAID to pay all invoices and funding requests submitted through February 13, and for the U.S. government to release all other foreign aid disbursements by February 27. However, the order was ignored until on March 10, when Secretary of State Marco Rubio <u>announced</u> that the Trump administration had axed US foreign aid, eliminating 83% of programs (5200 of 6200 the USAID's global programs).

But even that decision is still too early to call final. The plaintiffs later backed away from the claim that Rubio personally reviewed all the terminations, arguing that "it would be impossible for one person or even a group of people to meaningfully review all of these contracts and awards in such a short period of time."

The trial could last for years, and given the presidential administration's disregard for interim court decisions, it is not a given that the outcome of these events will be in favor of the recipients of US grants during Trump's tenure.

Is it time to give up?

Politico <u>reports</u> that Senior US State Department officials are drawing up a list of exceptions to the freeze on foreign aid for Ukraine, citing an anonymous and a referring to corresponding document.

The exceptions being discussed relate to economic support for Ukraine and mine clearance, drug control and health programs, as well as financial support for democratic institutions and civil society. If we compare total US spending in Ukraine in the first half of 2024 with spending on the three areas mentioned above, in 2024 they amounted to \$990 million out of a total of \$5.8 billion. This gives some hope for humanitarian programs; a sixfold reduction in funding is better than a tenfold reduction.

It is also impossible to not to that Ukrainian acknowledge environmental organizations were previously largely supported by Western European institutions and agencies, with Japan also contributing significant Consequently, funding. catastrophe is unlikely, since this funding remains unchanged for the time being. Reallocation of funds remains possible and will most likely occur, as noted above.

Despite the suspension of US funding, the Ukrainian environmental sector has not been left without support. Many environmental initiatives continue their activities thanks to the assistance of European countries, international funds and private donors. At the same time, uncertainty related to US grant programs may affect long-term projects, in particular those aimed at preserving biodiversity and restoring ecosystems. It is important to monitor further developments, because decisions on international assistance may change as the political situation develops.

> Translated by Jennifer Castner Main image source: telegrafi.com March 21, 2025

