Pavlo Artemenko
Dmytro Motornyi Tavria State
Agrotechnological University
Scientific supervisor and language adviser:
Senior Lecturer Iryna Kryvonos

THE BLACK SEA IS IN DANGER: ECHOES OF WAR

The Black Sea is a unique body of water that stands out from other seas and oceans. Many rivers flow into the Black Sea, carrying significant volumes of fresh water, so the salinity of the Black Sea is almost twice as low as that of ocean waters. However, its semi-enclosed nature and the presence of a large volume of oxygen-free water make the Black Sea vulnerable to human activity and climate change [Садогурська, 2023].

The war is causing serious environmental damage to the Black Sea: explosions, chemical pollution, oil spillsand and new fish species are changing the ecosystem.

At the same time, the occupiers' undermining of the Kakhovka hydroelectric power station caused large-scale desalination of seawater. This affected marine molluscs, for which the critical sea salinity level of 6,8% is critical. As a result, there was a massive die-off of shellfish. Also, after the explosion of the Kakhovka hydroelectric power station, the presence of chemical elements and oil products was observed, which also affects the ecology of the Black Sea. In particular, this led to plankton blooms [Демідова, Стрельцова, 2025].

On 15 December 2024, two Russian tankers, Volgoneft-212 and Volgoneft-239, sank in the Kerch Strait. As a result of the accident, more than 4,000 tonnes of fuel oil spilled into the Black Sea, causing a large-scale oil slick [Сурова, 2025].

So far, environmentalists have confirmed the deaths of at least 61 dolphins and 700 seabirds. Hundreds of tonnes of contaminated sand have already been found on the Black Sea coast. There is a negative impact of the spill on the marine ecosystem as a whole for all residents. At the moment, it is known that the fuel oil should have

thickened enough even if it is in the middle of the tanker to prevent it from spilling out further, but nevertheless the amount that has entered the sea is enormous [Сурова, 2025].

Scientists estimate that the oil slick has covered tens of thousands of square kilometres of Ukraine's marine protected areas. Covering the water with a thin film, oil prevents oxygen from penetrating, which causes enormous damage to underwater life and often leads to their mass deaths. Oil and fuels and lubricants are toxic to aquatic life, especially to the smallest organisms that form plankton and neuston (a collection of organisms living near the surface of the water). Oil residues can remain on the sea surface for a long time, carried by currents, washed ashore or settle to the bottom, causing problems for many years [Садогурська, 2023].

It is expected that the fuel oil slicks that have settled to the bottom will eventually begin to rise. In the summer, due to rising temperatures, they will become more buoyant, which may facilitate their spread to the coasts of Ukraine, Romania, Bulgaria and Turkey. Especially vulnerable are estuaries with active flows and high-water temperatures. Even if a large mass of fuel oil does not enter the estuaries, there is a threat of chronic pollution by surface oil films that can remain in the sea for years [Сурова, 2025].

This fuel oil is now in a solid state. When it gets warmer, it will dissolve in water, and through the water, through the food chain, it will affect all living things in the Black Sea. And, of course, the people who will use the coast for recreation. Fuel oil is a substance that gradually accumulates and slowly kills a living organism. The peculiarity of fuel oil complicates the situation: it quickly settles on the seabed, where it is almost impossible to eliminate it with technical means. In the absence of timely clean-up, fuel oil residues can be biodegraded over decades, gradually poisoning the marine ecosystem [Сурова, 2025].

The recommendations how to protect people and what to do. At first, avoid swimming in potentially contaminated waters and follow official reports on water conditions. If somebody notice oil products on the beach, immediately inform the local

environmental services. Avoid contact with sand contaminated with fuel oil and do not allow children or pets in such areas. Environmentalists warn of the possibility of long-term pollution. There is also a risk of a decrease in biodiversity in the region.

But the war also had an unexpectedly positive impact. The ban on tourism, fishing and shipping allowed part of the water area to 'rest'.

Artificial reefs will help clean the water, but this requires detailed research. Their incorrect location can even be harmful, as the scientists at the Institute of Marine Biology of the National Academy of Sciences of Ukraine explain their decision of the problems with the Black Sea. Another solution is to develop mariculture, in particular mussel farming. These organisms naturally filter water, removing contaminants from it [Баранцевич, 2024].

REFERENCES

1. Баранцевич О. (2024). Чорне море в небезпеці: відлуння війни долинає за межі кордонів. *Nicenter*. https://nikcenter.org/2024/02/the-black-sea-in-peril-the-echoes-of-war-ripple-beyond-borders/

2. Демідова Л., Стрельцова С. (2025). Як війна змінює Чорне море: забруднення, втрата морських видів та шляхи відновлення. *Суспільне. Одеса*. https://suspilne.media/odesa/928971-ak-vijna-zminue-corne-more-zabrudnenna-vtrata-morskih-vidiv-ta-slahi-vidnovlenna

3. Садогурська С. (2023). Як війна вплинула на Чорне море. *Ukrainer*. https://www.ukrainer.net/viyna-chorne-more/

4. Сурова М. (2025). Мазут в Чорному морі після аварій російських танкерів: ситуація, наслідки та перспективи. *LetsdoitUkraine*. https://letsdoitukraine.org/2025/02/ldu-mazut-v-chornomu-mori/