SHIPS SUNK IN THE BLACK SEA
DURING THE RUSSIAN-UKRAINIAN WAR (2022-2025)
– LESSONS FOR NAVAL STRATEGY AND TACTICS –

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Between February 2022 and mid-2025, the Black Sea became a testing ground for the naval warfare of the present and the future. This new reality, unimaginable in the recent past, forced the relocation of ships and naval military equipment, limited maritime control, while maritime freight transport faced new, high-impact risks because of naval mines and attacks by belligerents.

Cataloguing confirmed sinkings of military and commercial vessels (names, classes, locations, and dates) has allowed lessons to be learned about modern naval warfare, ships versus drones and ships versus missiles, in a semi-enclosed sea governed by the Montreux Convention.

Keywords: Russian Federation's naval forces; Black Sea; Ukrainian Navy; mine protection measures; Turkey-Romania-Bulgaria MCM Working Group;

INTRODUCTION

The Black Sea, a natural inland basin on the border between Europe and Asia, is important for Europe due to: its geographical position, which is now recognized as being of geostrategic importance; its surface area of over 420,000 km^2; its volume of over 547,000 km^3; its maximum depth of 2,212 m; a coastline of over 4,800 km; a coastal population of over 160 million, with 18 major ports and 10 major rivers in its hydrographical basin; a total freshwater flow of over 350 km^3/year and rich energy sources (current, wind, hydrogen sulphide).

The Black Sea has the appearance of a deep basin, oriented from west to east, stretching approximately six degrees of latitude between the parallels: 40^{0}55'N and 46^{0}37'N, and five degrees of longitude between the meridians: 27^{0}27'E and 41^{0}47'E *(figure 1)*.

The Black Sea is considered an intercontinental sea, with access to the Mediterranean Sea through the Bosporus Strait and to the Sea of Azov through the Kerch Strait. Due to its geography, it is thus positioned to represent a water link between East and West, a link between Europe and Asia, between coastal states and those in the immediate and distant proximity (Bosneagu, 2022).
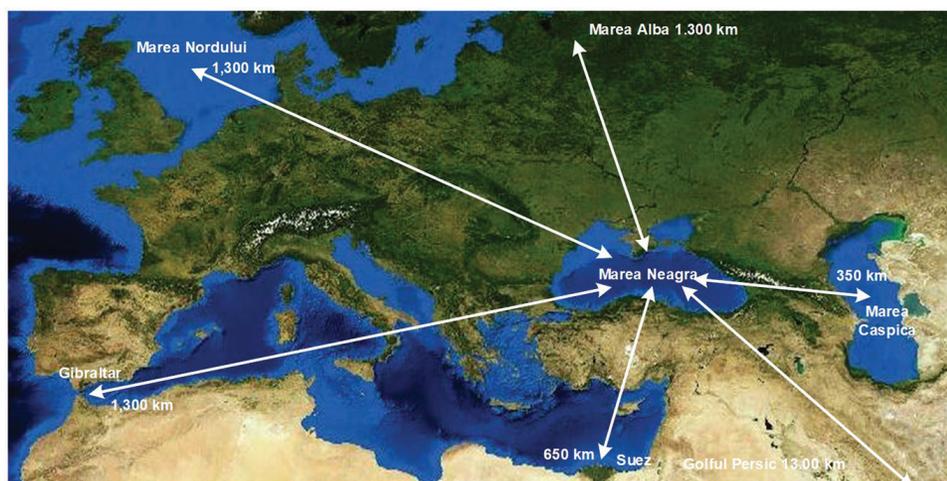

Figure 1: The Black Sea – geographical position (ro.wikipedia.org/wiki/Marea_Neagra)

Between February 2022 and mid-2025, the Black Sea became a testing ground for anti-ship missiles and unmanned surface vessels (USVs). Ukraine's coastal missile complex, together with MAGURA-V5 USVs, caused substantial losses to the Russian fleet in the Black Sea, forcing the relocation of Russian ships from Sevastopol and limiting maritime control. The Black Sea straits (Bosporus and Dardanelles) and Turkey's invocation of Article 19 of the Montreux Convention in 2022 restricted the transit of belligerent warships, limiting reinforcements and amplifying the effect of each loss (Reuters, 2023). In this context, Ukraine used long-range missiles and USVs to strike BSF warships at sea and in port, contributing to the relocation of the fleet to the east and a reduction in combat strength by about one-third by 2024-2025, according to widely cited sources (Royal United Services Institute, 2025).

MATERIALS AND METHODS

The main sources of information and analysis include: a. international media institutions: a. Reuters/AP, (https://www.reuters.com/company/associated-press/), USNI News (https://www. usni.org/ magazines/proceedings), Naval News (https://www.navalnews.com/category/naval-news/), RUSI assessments (https://www.rusi.org/news-and-comment), b. official sources of the combatants: TASS (https://tass.com/), The Moscow Times (https://www. themoscowtimes. com/), Ukraiform (https://www.ukrinform.net/), Kyiv Post (https://www. kyivpost.com/), Ministry of Defence of Ukraine (https://mod.gov.ua/en/news, https://mod.gov.ua/en/about-us/the-general-staff-of-the-armed-forces-of-ukraine), c. international encyclopaedic sources for data verification: Britannica (https://www.britannica.com/).

The classic rule of research data confirmation was applied: a ship appears on the list of sunken ships only when its sinking/destruction (not just *"damage"*) is confirmed by several reliable sources.

RESULTS AND DISCUSSIONS

An analysis of the strength of the Russian Federation's naval forces in the Black Sea versus that of Ukraine's naval forces prior to 2022 shows the clear superiority of the Russian forces *(table 1* and *figure 2).*

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Table 1: Russian Navy versus Ukrainian Navy before 2022 (Jane's Fighting Ships, 1999)

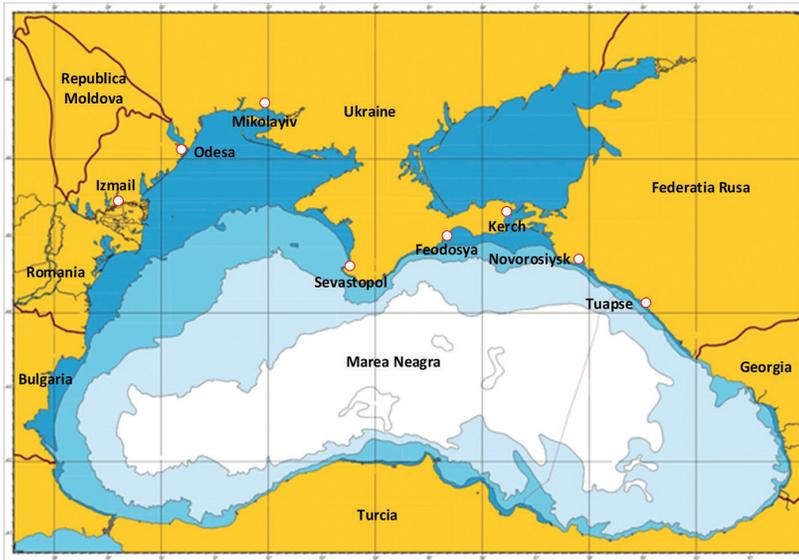| Ship	Russian Federation	Ukraine
Missile cruiser	1 Slava Class, displacement 11,674 t	
Missile destroyer	1 Kashin Class, displacement 4,826 t	
Frigate	3 FFG Krivak Class, displacement 3,709 t	1 FFGHM Class, displacement 2,500 t
SSK submarine, patrol submarine with ASW capability	3: 1 Kilo Class, 2 Varshavyanka Class	1 Foxtrot Class, displacement 2,475 t
Corvettes	15	
Anti-submarine corvettes	5	
Missile boats	6	4
Minesweepers Mine hunters	10	
Minelayers		1
Torpedo boats		
Landing craft vessels	7	
Patrol vessels		2
Reconnaissance ships		2
Training vessels		
Auxiliary vessels	13	21
Aircraft	20 helicopters, 10 transport aircraft 2 fighter squadrons	
Naval bases	Sevastopol, Tuapse, Novorossiysk, Feodosia	Odessa, Novozerne, Mikolaiv, Feodosiya, Izmail
Personnel	11,000 (including marines)	14,800

Figure 2: Russian Federation, Ukraine – naval bases in the Black Sea
(ro.wikipedia.org/wiki/Marea_Neagra)

At the beginning of the war, the Russian Federation Navy, although numerically and technically superior to the Ukrainian Navy, was moved from Crimea (Sevastopol) by 2024, with approximately 25-33% of its combat capacity destroyed or neutralised, according to international estimates (Royal United Services Institute, 2025).

With limited traditional naval resources, Ukraine resorted to unconventional means of combat (modernised anti-ship missiles, surface and submarines drones) to block the asymmetric access of Russian naval forces at sea (Reuters, 2025).

Due to its inferiority in terms of conventional naval warfare capabilities (medium and large ships equipped with missiles and heavy naval weapons), Ukraine has employed a novel approach to maritime warfare using unconventional means that are technically and tactically superior to Russian ones, fast, inexpensive, and relatively simple to use in combat, remotely controlled, difficult to detect and counter, relatively simple to use in combat without human loss *(table 2)*.

Table 2: Unconventional means used by Ukraine in naval warfare in the Black Sea, 2022–2025

Means of combat	Technical and tactical characteristics
Magura V5	5.5 m long, 1.5 m wide, 0.5 m above the waterline, 22 (minimum) 42 (maximum) knots speed, 450 nautical miles range, 320 kg payload, radio and satellite communications

Means of combat	Technical and tactical characteristics
Bayractar TB 2	Medium-altitude, long-endurance (MALE) unmanned tactical aerial vehicle capable of performing intelligence, surveillance and reconnaissance (ISR) missions and armed attack missions, operational altitude 16,000 feet, payload capacity 150 kg, wingspan 12 m, length 6.5 m, height 2.2 m
Sea Baby	length: 6 m, width: 2 m, height above waterline: 0.6 m, maximum speed: 49 knots, range: 540 nautical miles with additional fuel tanks, payload: 850 kg, propulsion: two 200 hp internal engines, satellite communications, can carry RPV-16 thermobaric missiles, unguided, with a range of approximately 1,000 m
R-360 Neptune, anti-ship missile	development of the Soviet Zvezda Kh-35 (SS-N-25 SWITCHBLADE) anti-ship missile, weighing 870 kg, length 5.05 m, maximum range of 400 km (combat weight of 150 kg for the anti-ship version), guided by satellite and, in the final part of the flight, by an infrared guidance system

Analysis of naval actions in the Black Sea between 2022 and 2025 led to ship losses for both belligerent forces, after verification of the information, as follows *(tables 3* and *4, figure 3).*

Table 3: Losses of military ships in the naval war in the Black Sea, 2022-2025

Ship	Date and position	Russian version	Ukrainian version	Details
Russian ships				
Moskva, missile cruiser	13/14 April 2022; approx. 80 miles south-west of Odessa	A fire caused an ammunition explosion, and the ship sank in stormy seas while being towed to port	Hit by 2 *R-360 Neptune* anti-ship missiles	Of the 485 crew members, casualties vary depending on the source (Russian sources initially reported 1 and then 27 missing, while other sources claim that only 58 sailors were rescued). According to unverified open sources, there were two 350-kiloton nuclear warheads on board the ship – information that has been unconfirmed or denied

Ship	Date and position	Russian version	Ukrainian version	Details
Five Raptor-class patrol boats	22 March 2022		hit and damaged by an anti-tank guided missile	
Two Raptor-class patrol boats	2 May 2022; near Serpent Island		sunk by a Bayraktar TB2 drone	
Saratov, Russian Navy Alligator-class landing ship	24 March 2022; in Berdiansk	was sunk in March by its own crew, then recovered and was to be towed to Kerch	it was hit, caught fire and destroyed	
BK-16 High Speed Assault Boat	May 2022; near Serpent Island		sunk by a Ukrainian Bayraktar TB2 drone	
Serna-class landing craft	7 May 2022; near Serpent Island		sunk by a Ukrainian Bayraktar TB2 drone	
Vasily Bekh rescue tug	17 June 2022		sunk by 2 Harpoon missiles	
D106 Ondatra-class landing craft	July 2022		sunk by a sea mine	
Ivan Golubets Natya-class minesweeper	29 October 2022	slightly damaged by Ukrainian UAVs	sunk by a Ukrainian UAV	
Admiral Makarov frigate	29 October 2022	15 August 2023, entered service	hit by Ukrainian drones	
Ivan Khurs intelligence ship	24 May 2023		possibly hit by 1 to 3 drones	23 March 2024, hit by a missile in Sevastopol
Olenegorsky Gornyak landing ship	4 August 2023		heavily damaged by a marine drone	
Rostov-on-Don landing ship	13 September 2023; Sevastopol	repaired, operational	hit by air-to-surface missiles	

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Ship	Date and position	Russian version	Ukrainian version	Details
Minsk submarine	13 September 2023; Sevastopol	repaired, operational	hit by air missiles	
Tuna-class patrol boat	13 September 2023; in the north-western part of the Black Sea		sunk by a Ukrainian Bayraktar TB2 drone	3 September 2023 Ukrainian forces claimed to have sunk another Tuna-class patrol boat with Ukrainian Bayraktar TB2 drones
Sergey Kotov patrol ship	14 September 2023		damaged in an air strike	5 March 2024, it was sunk by a Ukrainian unmanned surface vehicle near the Kerch Strait
Askold corvette	4 November 2023; Zalyv		destroyed in an air strike	
Novocherkassk landing ship	26 December 2023; Feodosia harbour		destroyed in an air raid	massive and multiple explosions and fires; 74 crew members reported dead and 27 wounded; wreckage apparently removed in late January/early February 2024
Ivanovets corvette	1 February 2024; Donuzlav, in the western part of the Crimean Peninsula		sunk by an AUV	
Tsezar Kunikov large landing ship	14 February 2024; on the coast of the Crimean Peninsula	confirmed sinking	sunk by an AUV	

Ship	Date and position	Russian version	Ukrainian version	Details
Mangust-class patrol boat	6 May 2024		a drone exploded near a small boat that appears to resemble a Mangust-class vessel	
Saturn tugboat	6 June 2024		sunk by a Ukrainian sea drone	
Ukrainian ships				
A206 *Vinnytsia* auxuliary ship	24 February 2022	sunk at anchor		
Eight unidentified vessels	26 February 2022	reported as destroyed		
F130 Hetman Sahaidachny frigatte	3 March 2022		sunk in Mykolaiv to prevent its capture by the Russian Navy	
P190 Sloviansk patrol boat	3 March 2022	sunk by an air-to-surface missile		
Henichesk (M360) minesweeper	August 2022		lost in the early stages of the Russian invasion	
about a dozen Ukrainian ships captured by Russian Navy	14 March 2022; Berdiansk and Mariupol			captured: artillery ships, missile ships, a corvette, a patrol ship, a minesweeper, a landing ship, a sea tug
A512 Pereyaslav reconnaissance ship	30 March 2022; Dniester	destroyed by artillery fire		
Dmitry Chubar hydrographic boat	20 May 2022	captured in the port of Mariupol		
L450 Stanislav fast assault craft	29 November 2022		losses during the Ukrainian counteroffensive on 7 May on Serpent Island	

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Ship	Date and position	Russian version	Ukrainian version	Details
16 to 24 attack/ reconnaissance USVs	September 2022	captured and subsequently destroyed		
Several USVs	November 2020 - June 2023	destroyed during Ukrainian attacks		
PO-2 small patrol gunboat	17 April 2023	destroyed		
Centaur LK assault craft	26 June 2023	damaged in port		
Ship	28 August 2025; in the Danube Delta	sunk by a marine drone		

Table 4: Losses of military ships in the Black Sea war, type and number, 2022-2025

Type	Russia	Ukraine
Cruiser	1	-
Frigate	-	1
Corvette	-	2
Patrol vessel	3	6
Artillery-carrying boat	-	6
Assault ships	1	1
Command ship	-	1
Landing craft, medium	1	1
Small landing craft	1	-
Mine layer	-	1
Tugboat	2	-
Hydrographic vessel	-	1
Number	9	20
Tonnage	Approx. 10,000 t	Approx. 10,000 t

Figure 3: Russian Cruiser Moskva, before and after being hit by Ukrainian missiles
(http:www.navylookout.com/russian-cruiser-moskva-sunk-in-the-black-sea-assessing-the-implication/?)

During the naval war in the Black Sea, 2022-2025, a significant number of commercial ships were sunk *(table 5).*

Table 5: Commercial ships lost during the war in the Black Sea, 2022-2025

Ship	Type of ship, location and date
Yasa Jupiter	Bulk carrier hit by a Russian forces' missile, off the coast of Odessa, Ukraine, on 24 February 2022, damaged
Millennial Spirit	Chemical tanker bombed off the coast of Ukraine, on 25 February 2022, caught fire and sank
Helt	Cargo ship sunk off the coast of Ukraine on 2 March 2022, probably after hitting a mine or being sunk by a Russian missile
Azburg	Cargo ship bombed and sunk on 4 April 2022 during the battle of Mariupol, after being damaged the day before by two Russian missiles
Vyssos	Cargo ship hit a naval mine on 27 December 2023 off Bystre, at the entrance to the Danube Delta; the ship was beached to prevent it from sinking
Simferopol	Ship sunk after a naval drone attack in the Danube Delta on 28 August 2025

In addition to these commercial ships, there were many others that were hit by enemy fire, damaged in various ways, and suffered human losses on board.

The war is not over, Ukraine has continued research and testing for new means of combat (new types, with increasingly advanced technical and tactical characteristics/*table 6).* They are currently undergoing approval and will probably be used in future naval operations. They can be a source of inspiration for analysing the need to develop new naval weapons.

Some of these new weapon models are capable of travelling over 1,500 km and can carry up to 2,000 km of explosives. They can also carry a multiple rocket launch system.

Table 6: New naval weapons developed by the Ukrainian Navy

Type	Characteristics
Magura W6	USV equipped with an improvised air defence system using the Sea Dragon system, whaler hull, consisting of two AA-11 ARCHER (R-73) missiles
Magura V6	USV similar to V7 and can carry the Sea Dragon air defence system with Sidewinder or AA-11 ARCHER missiles
Magura V7	Slightly larger, with a length of 7.5 m, can carry two AIM-9L Sidewinder air-to-air missiles. Similar to the V5, but redesigned with improved stability at sea, useful for winter operations, with multiple communications antennas and sensors
Toloka TLK-150	USV equipped with explosives, designed to function as a torpedo, with a typical tubular body, but with a large keel and horizontal stabilizers, with thrusters at the end of these stabilizers for propulsion and manoeuvring. With a mast above the water, it can be defined as a semi-submersible. There may be several versions, including one with a length of 4 m, a predictable range from 400 km to 1,200 km
Toloka TLK-1000	Much larger than the TLK-150, 12 metres long, 2,000 km range, and a maximum payload of 5,000 kg
Sea Baby-2, 'Avdiivka'	An explosive payload of 400 kg., 500 nautical miles range and a 48 knots speed. A reinforced hull for 1.5 metres high waves draught approximately 1 metre, and a height of 1 m above water. Communications by satellites
Sea Wolf	Larger than the Sea Baby, is offered with a wide range of weapon configurations
Stalker 5.0	Characteristics: 5 m long, 1.2 m wide, a payload of 150 kg. 60 Hp outboard motor, 40 knots maximum speed, 350-600 km range
Marichka Underwater Drone (AUV)	Large autonomous underwater vehicle (AUV), probably the first created directly from the needs of war. The base vehicle is 6 metres long and 1 metre in diameter, 1,000 km range, with all or most of the body being a pressure vessel. A keel appears to run along the bottom, and tow loops are located at the rear. For combating ships, bridges, gathering information and transport
Weaponized AM-800 RHIB	An unidentified USV was discovered, overturned, in Romanian waters on 3 April 2024. The vessel is based on an American-made Silver Ships AM-800 rigid-hulled inflatable boat (RHIB). The warhead came from a STYX anti-ship missile.

Type	Characteristics
Riverine Resupply USV	The logistics USV prototype was observed with two ammunition containers (American type, 120 mm or 155 mm cartridges). The vessel is very small, with a length of approximately 1.5 metres and a payload of 30 kg.
Katran X1	length: 8 metres, width: 2.3 metres, height above the waterline: 1.2 metres, speed: 56 knots max, 32 knots cruising, range: 650 nautical miles at cruising speed, payload: 4 10" FPV drones, "Osa" attack drones, propulsion: 1 outboard motor, satellite communications
Katran X3	length: 6.5 metres, width: 2.2 metres, height above waterline: 1.1 metres, speed: 40 knots max, 30 knots cruising, range: 890 nautical miles (1,650 km) at cruising speed, payload: 4 FPV drones, internal strike payload, propulsion: 1 outboard motor, satellite communications
Alligator	small naval drone, approximately the size of a jet ski, with a faceted shape
Barracuda	for river and coastal operations in support of sailors, equipped with 4 or more shoulder-launched RPG-26 missiles
Unnamed type with missile tubes	has two launch tubes, one on each side of the body. These look similar to torpedo tubes, but are more likely intended for missiles. Possibly a Katran Venom

Table 7: Russian drones (2022–2025) – characteristics and operational status

Name	Type/role	Technical characteristics	Operational status	Comments
Murena-300/300S	Medium USV, multi-role	5.5 m long; speed 40-45 kn; range ~500 km; payload up to 500 kg	Confirmed use (Pivdenne attack, 2024)	The only USV with documented actual combat use
Orkan	Lightweight, multi-role USV	~5.3 m; speed 40 kn; range 500 km; modular payload	Unconfirmed in combat	Presented at the exhibition, appears to be oriented towards reconnaissance/ anti-USV
Vizir (RK-700)	Heavy, multi-role USV	~7 m; range 500–800 km; can integrate missiles	Demonstration only	Robust platform but not validated in real conditions

Name	Type/role	Technical characteristics	Operational status	Comments
BEK-1000	Logistics/attack USV	Capacity 1000 kg	Prototype/ exhibitions	Pilot project for heavy loads

LESSONS IN NAVAL STRATEGY AND TACTICS

Ships versus Missiles

Analysis of the confrontation between missiles and ships shows the following:

❖ The density of salvos and the diversity of modern anti-ship missile guidance and strike systems (modernised Neptune missiles) have overwhelmed the classic anti-aircraft defence systems on Russian ships (e.g. the cruiser Moskva). The requirements for combating this new type of air-naval threat should now include: flexible, computerised, complex, very fast-reacting anti-aircraft weapon systems capable of combating fast, small targets that attack multidirectionally and in waves; reflective means of *"blinding"* drones, devices for physical camouflage and for reducing the thermal and radio-technical footprint of ships, plus integration with land-based and air defence systems (Reuters, 2025).

❖ The vulnerability of port and naval infrastructure to air and drone attacks and the destruction of ships in port show that berthing and repair areas require reinforced shelters, means of camouflage, deception of the enemy and rapid deployment. The following are also crucial for successful defence: the ability to rapidly disperse forces; means of increasing the mobility of personnel, ammunition and fuel (Ib.).

Ships versus Drones

An analysis of the confrontation between missiles and ships versus drones shows the following:

❖ In terms of detection, classification and success in naval combat, it can be seen how marine drone attacks exploited the weather, time and space: windows of opportunity during the day and night, sea conditions, low-altitude flight, and attacks from multiple directions. Effective countering of marine drones requires layered defence (with guided speedboats, physical barriers around anchored ships, anti-speedboat weapons with a longer range, and areas blocking satellite positioning information). The loss of Russian ships shows the failure of tactics regarding the thinking and organisation of close surveillance and defence (Naval News, 2025).

❖ The cost-benefit analysis favours the attacker: marine drones worth approximately $0.25-0.5 million endanger ships worth hundreds of millions of dollars; the tactics for implementing effective defence must focus on escort forces, night-fighting sensors, illumination from naval helicopters, and carefully planned denial and defence fire.

Maritime Denial and Trade at Sea

Despite sustained attacks, Ukraine requested and obtained the opening and reopening of corridors for grain exports and restored export volumes to pre-war levels in 2023-2024, showing how a maritime blockade and factors facilitating the continuation of maritime trade during a state of war can coexist (Reuters, 2024).

Sea Mine Warfare and Mine Protection Measures

Floating sea mines have increased the risk of accidents and ship sinkings throughout the entire Black Sea theatre of operations. The Turkey-Romania-Bulgaria MCM Working Group (2024) demonstrates the usefulness of coalitions of coastal states with common rules of action, the exchange of common information on incidents and frequent exercises – an essential model for the post-war normalisation of the naval situation in the Black Sea (Reuters, 2024).

Operational and Tactical Consequences

The Russian Black Sea Fleet has sometimes shown moments of operational inactivity, with reduced reaction, repositioning and freedom of action, proving that land-based missile and drone attacks can neutralise larger fleets in semi-enclosed seas for a time. This is a lesson to be learned for the future here and in other similar theatres of operations.

Implications for the Environment and Navigation Safety

Damaged or sunken warships, as well as attacks on port infrastructure, pose a risk of marine pollution from fuel spills and ammunition losses; Furthermore, drifting sea mines continue to wash ashore or are neutralised at sea, requiring long-term assessment of wrecks and monitoring of the coastline alongside mine countermeasures forces (Ib.).

CONCLUSIONS

The study on Russian and Ukrainian warship losses during the Black Sea war, 2022-2025, is not exhaustive; the data presented and analysed in this article are based solely on information from public sources.

No exhaustive research has yet been conducted on the human and material losses suffered by commercial vessels during the Russian-Ukrainian naval war in the Black Sea, 2022-2025.

The catalogued shipwrecks confirm Ukraine's sustained ability to strike the Russian Black Sea Fleet using missiles and marine drones, while the losses of commercial vessels, although fewer, had a disproportionate impact on insurance and trade.

Ukraine's new naval strategy of compensating for its lack of conventional forces and means with unconventional means has paid off. Surface and underwater marine drones, layered air defence, long-range anti-ship coastal missiles and sea mines provide a powerful deterrent to enemy action and are now basic requirements for coastal defence.

Given their superior technical and tactical characteristics: long range, high precision, high speed, difficult to detect and combat, large combat load in relation to their size, new approaches to naval tactics for the use of these dual-purpose means, both for defence and attack, have been tested.

Trilateral cooperation on mine defence in the Black Sea and transparent management of maritime transport corridors remain essential for the recovery of maritime trade.

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