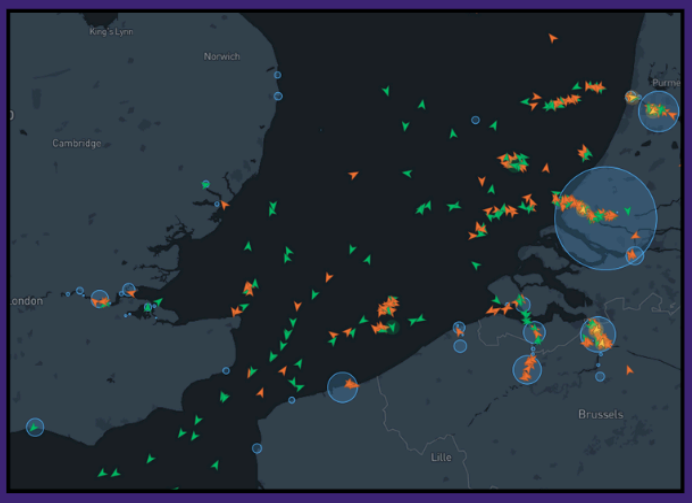
# ENSURING AN ECOLOGICAL DISASTER:

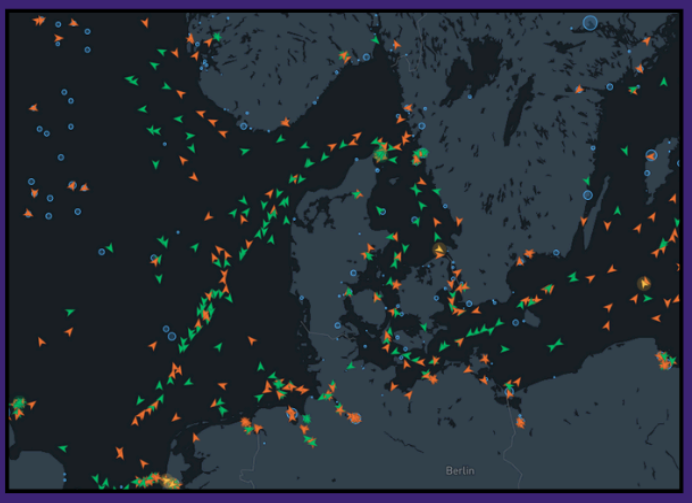
# ‘SHADOW’ TANKER SPILL

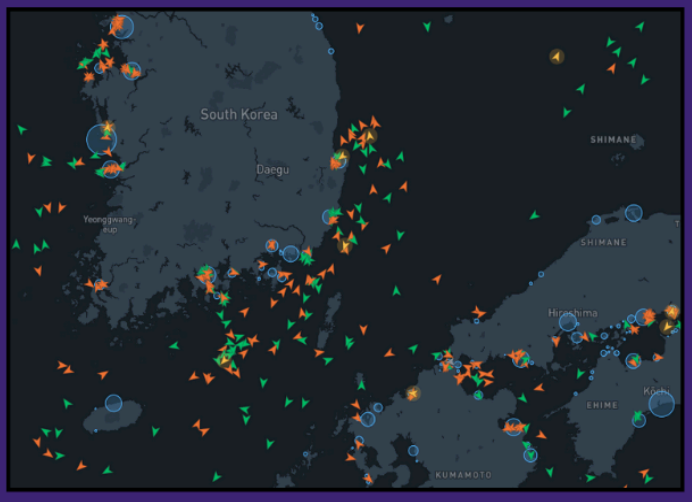
## COULD COST COASTAL STATES USD 1.6 BN

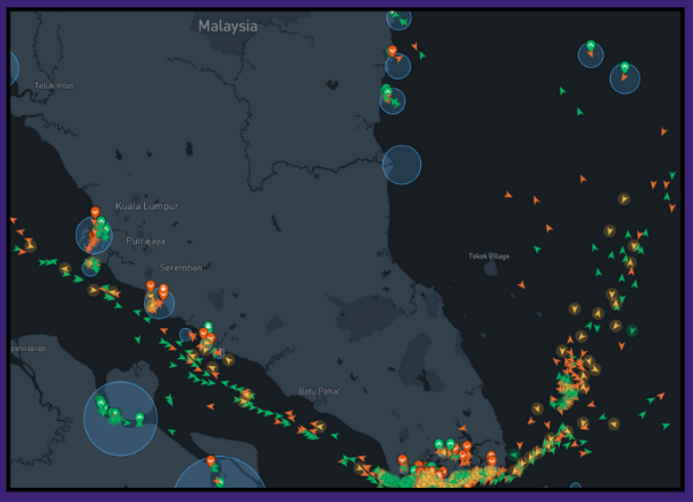
Petras Katinas
Luke Wickenden

October 2024




CREA

FINANCING PUTIN'S WAR

**Ensuring an ecological disaster: 'Shadow' tanker spill could cost coastal states USD 1.6 bn**

**October 2024**

**Authors**
Petras Katinas, Luke Wickenden

**Editor**
Hannah Ekberg, Vaibhav Raghunandan

**Data lead**
Panda Rushwood

# About CREA

The Centre for Research on Energy and Clean Air (CREA) is an independent research organisation focused on revealing the trends, causes, health impacts, and solutions to air pollution. CREA uses scientific data, research, and evidence to support the efforts of governments, companies, and campaigning organisations worldwide in their efforts to move towards clean energy and clean air, believing that effective research and communication are the keys to successful policies, investment decisions, and advocacy efforts. CREA was founded in Helsinki and has staff in several Asian and European countries.

# Ensuring an ecological disaster: ‘Shadow’ tanker crude spill could cost coastal states USD 1.6 bn

## Key findings

- Since the onset of Russia’s full-scale invasion of Ukraine, 294 ‘shadow’ tankers have transported Russian seaborne crude oil worldwide.
- During the first eight months of 2024, an average of three ‘shadow’ tankers carrying Russian crude oil departed daily from Russian ports.
- Between January and August 2024, 46 mn tonnes of Russian seaborne crude oil passed through the Danish Straits, 64% of which was transported by 'shadow' tankers, an increase of 277% compared to the same period in 2022.
- 37 mn tonnes of crude oil flowed through the Dover and Gibraltar Straits, with ‘shadow’ vessels making up 67% of that total, a 355% increase from January to August 2022.
- The Turkish Straits handled 18 mn tonnes of crude, 70% of which were transported by shadow vessels, reflecting an increase of 258%, respectively, compared to the same period in 2022.
- From January to August 2024, the Suez Canal facilitated the passage of 52 mn tonnes of Russian crude, with 'shadow' tankers accounting for 69%, an increase of 649% compared to the same period in 2022.
- The Korea Strait recorded 35 mn tonnes of cargo, with ‘shadow’ tankers responsible for 89% of this volume, marking an increase in volume of 351% compared to 2022.
- The Strait of Malacca saw 5.7 mn tonnes of Russian crude oil, with 'shadow' tankers accounting for 72%, marking an increase in volume of 151% compared to the same period in 2022.
- The cleanup costs for an oil spill involving a typical ‘shadow’ tanker could range from USD 859 mn to USD 1.6 bn, and be covered by coastal countries as these ageing vessels frequently operate with inadequate or no protection and indemnity (P&I) insurance.

# Contents

# Introduction: Growth of ‘shadow’ tankers also comes with rising risks

In response to Russia’s full-scale invasion of Ukraine, Western governments introduced a raft of sanctions aimed at undermining Moscow’s financial stability. The EU’s embargo on Russian oil alongside a USD 60 per barrel price cap has been central to these efforts. A critical component of this price cap imposed by G7 countries and the EU[1] is the prohibition on G7 protection and indemnity (P&I) insurance clubs covering Russian oil shipments sold above the agreed threshold. These measures bar Western companies from transporting Russian oil priced over the cap, with the dual objective of curbing Russian revenues while maintaining its oil flow into global markets to avoid destabilising price hikes.

However, Russia has sidestepped Western sanctions by deploying a fleet of ‘shadow’ tankers — vessels with ownership and insurance outside G7 and EU jurisdictions, as this analysis defines them — enabling them to evade Western oversight. These ageing ships, with an average age of 17 years, frequently operate with inadequate or no P&I insurance while transporting crude oil priced above the cap.

Although ‘shadow’ tankers ensure the continued flow of Russian oil, they carry significant environmental risks. With opaque ownership structures and questionable insurance coverage, these tankers evade international regulatory scrutiny, making it nearly impossible to enforce accountability in the event of an oil spill or other major incident. Several near-misses involving these ‘shadow’ tankers, which did not have adequate P&I coverage, have already been reported in 2023 and 2024, particularly near European and Southeast Asian shores. The cost of addressing the fallout from economic and ecological accidents will likely fall on national governments and, by extension, their taxpayers.

## ‘Shadow’ tankers surge from Russian Baltic and Pacific ports

Since the onset of Russia’s full-scale invasion of Ukraine, 294 ‘shadow’ tankers have transported Russian seaborne crude oil worldwide. The volume of oil transported by these vessels has surged and far outpaced the amount handled by G7+ vessels.

[1] The briefing refers to the coalition of countries imposing sanctions on Russia as G7+ countries.

In the first eight months of 2024, ‘shadow’ tankers accounted for an astonishing 72% of Russia's total seaborne crude oil exports, a marked increase from just 22% in the first eight months of 2022. This growing trend has enabled Russia to sell its oil above the price cap, and reap significant profits amidst ongoing sanctions.

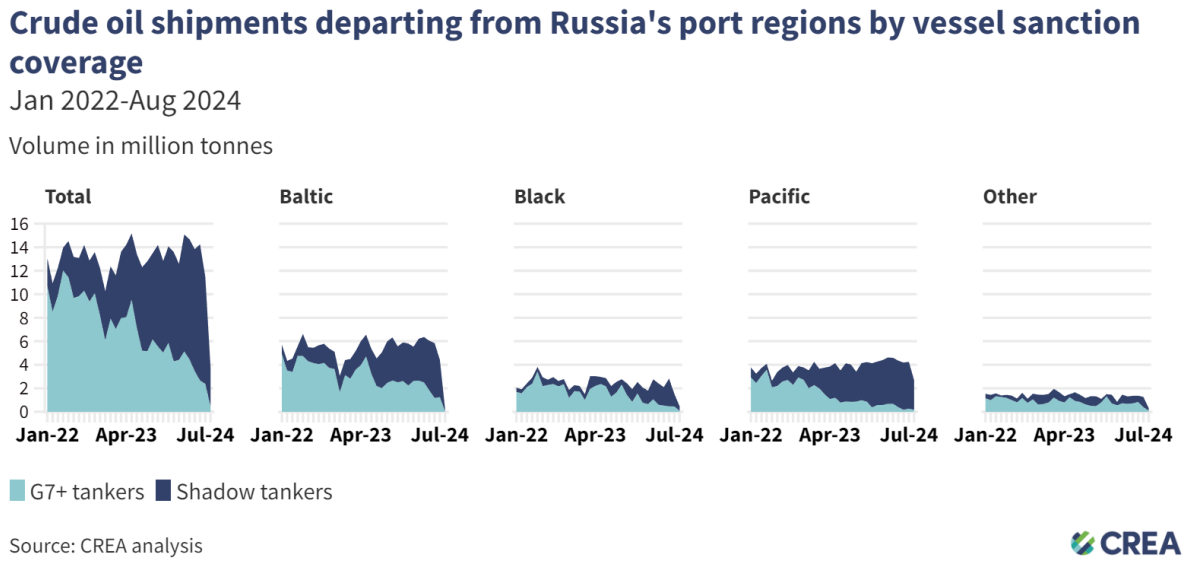



**Figure 1 – Crude oil shipments departing from Russia’s port regions by vessel sanction coverage**

From January to August 2024, Russia's crude oil exports remained heavily dependent on its Baltic Sea ports, which accounted for 41% of total seaborne shipments. The Pacific region was the second busiest, contributing 34%, while the Black Sea ports represented 16%. The remainder was exported from various other port areas, underscoring the strategic importance of these maritime routes in Russia's oil export landscape.

Between January and August 2024, 65% of all Russian seaborne crude oil exports from Baltic Sea ports were carried by ‘shadow’ tankers. This figure rises to 71% for shipments from the Black Sea and 89% from Pacific ports, with 49% of shipments coming from other locations.

## ‘Shadow’ tankers ship out Russian crude every day, endangering key straits across Europe, Africa, and Asia

The high seas are witnessing a dramatic rise in ‘shadow’ tanker operations, with 800 voyages transporting Russian crude oil recorded in the first eight months of 2024 — more than double the 374 trips completed by G7+ tankers. On average, three ‘shadow’ tankers leave Russian ports every day, significantly altering the global oil trade landscape. These vessels often ply dangerous routes, cutting through exclusive economic zones (EEZs), territorial waters, and vital maritime chokepoints such as the Danish Straits in Europe and the Korea Strait in Asia.

Navigating narrow straits poses a significant risk to oil tankers due to heavy maritime traffic, difficult water conditions, weather, and proximity to coastlines. These factors increase the likelihood of collisions, groundings, and oil spills, while the current geopolitical situation makes safe passage even more difficult.

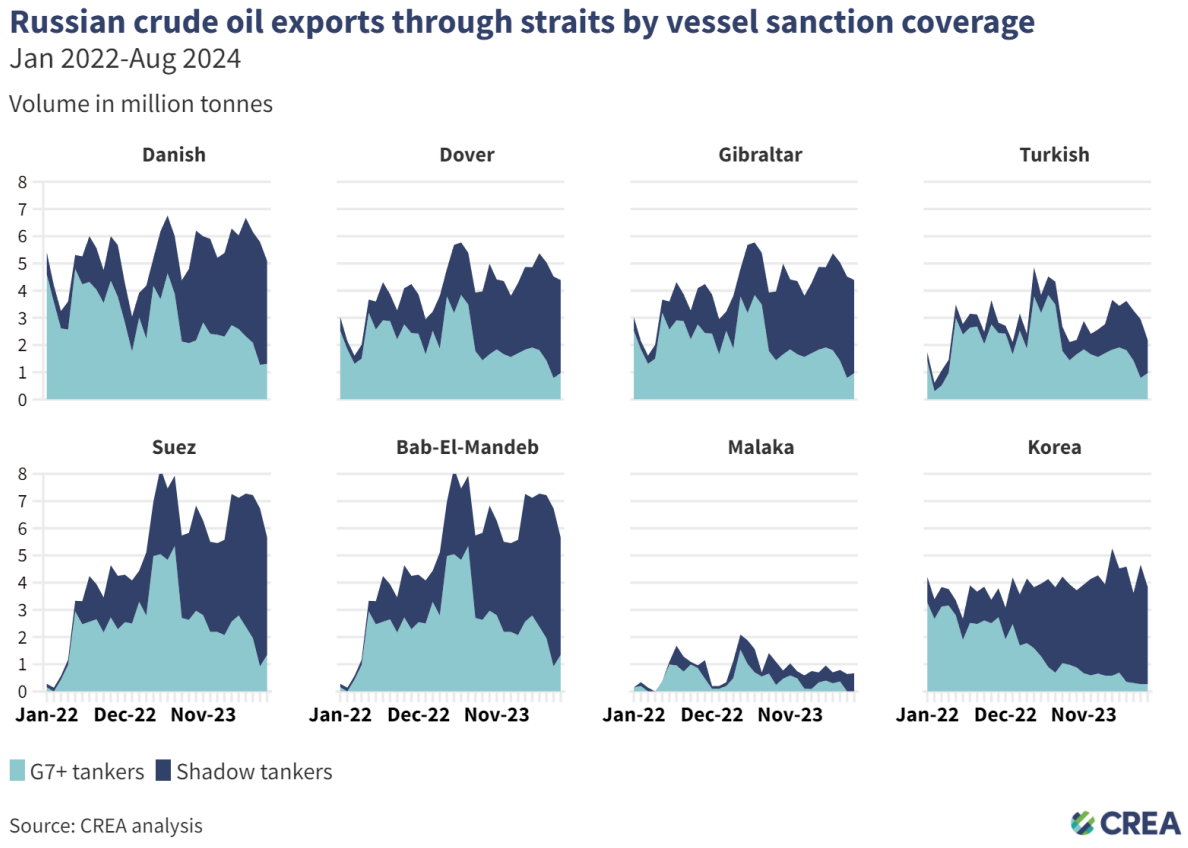



**Figure 2 – Russian crude oil exports through straits by vessel sanction coverage**

Between January and August 2024, 46 mn tonnes of Russian seaborne oil passed through the Danish Straits, with shadow tankers carrying 64% of Russia's crude exports. Russian 'shadow' tankers suspected of evading sanctions have increasingly refused expert navigation in the Danish Straits. Since January, at least 20 tankers have declined specialist pilots, heightening spill risks.

Over the same period, 37 mn tonnes of Russian crude were shipped via the Dover and Gibraltar Straits, with 'shadow' tankers responsible for 67% of this volume. The use of these vessels has surged dramatically, with volumes transported through the Danish Straits up 277% and those passing through Dover, which is considered to be one of the busiest shipping routes in the world and Gibraltar up 355% compared to the same period in 2022.

It is often assumed that 'shadow' vessels pose a threat solely to European territorial waters or exclusive economic zones. However, these ships also navigated strategic maritime straits off the coasts of Africa and Asia, extending their reach far beyond Europe.

In 2022, the Turkish Straits emerged as one of the world's busiest maritime chokepoints, with approximately 42,000 vessels transiting this critical waterway. At its narrowest point, the straits measure less than half a nautical mile wide (approximately 900 metres), presenting significant navigational challenges due to their winding geography. In the first eight months of 2024, the Turkish Straits handled 18 mn tonnes of cargo, with 'shadow' vessels accounting for 70% of that total. This marks a 258% increase compared to the same period in January-August 2022.

The Suez Canal, the world's third-largest route for crude oil transport, is just 300 metres at its most narrow point. From January to August 2024, the canal facilitated the passage of 52 mn tonnes of Russian crude, with 'shadow' tankers responsible for 69% of this volume. The deployment of 'shadow' tankers along this route surged by an astounding 649% compared to the same period in 2022. Notably, southbound shipments through the canal have surged from 2021 to 2023, with Russian oil exports now comprising nearly 70% of the southbound traffic in 2023 — up from 23% in 2021.

Most crude oil transported through the Suez Canal also passes via the Bab el-Mandeb Strait, a critical maritime chokepoint historically known as the "Gate of Grief" due to its treacherous conditions. The strategic significance of these waterways has been underscored by recent geopolitical shifts, with heightened concerns over the impact of

Houthi attacks on vessels. These assaults increase the risk of a significant oil spill and pose a growing threat to the territorial waters of Red Sea nations, raising alarms over the security of one of the world's key energy corridors.

In Asia, the Korea Strait recorded 35 mn tonnes of cargo, with shadow tankers responsible for 89% of this volume in the first eight months of 2024. After the full-scale invasion of Ukraine, crude oil tankers started disabling or spoofing automatic identification system (AIS) signals near the Korea Strait, complicating the tracking of vessels carrying Russian oil and raising maritime security concerns.

For instance, a ship identified by CREA is currently active in the Sea of Japan, frequently traversing the Korea Strait and engaging in 'dark activities' along crucial routes between Iran and Russia's Pacific region. This vessel, lacking proper P&I insurance, presents a significant environmental risk. An oil spill could be catastrophic, with the potential to be five times larger than the Nakhodka tanker disaster that happened near Japan's shores in 1997, which cost USD 71 mn to clean up.

Yet, clean-up costs are just part of the equation. Potential oil spills could severely impact the region's fisheries, marine ecosystems, and biodiversity, driving the long-term economic and environmental toll.

Meanwhile, the Strait of Malacca—between Singapore and Indonesia on one side and Malaysia on the other—saw 5.7 mn tonnes of Russian seaborne crude oil shipped, with 'shadow' tankers accounting for 72% of that total. During the first eight months of 2024, the volume transported by 'shadow' tankers surged 351% in the Korea Strait and 151% in the Strait of Malacca compared to the same period in 2022.

Although the volume of Russian crude passing through the Strait of Malacca is lower than at other chokepoints, it remains the primary maritime choke point in Asia and the largest globally for oil transit. Crude oil makes up an estimated 70% of annual oil flows through the Strait of Malacca, with 823 mn tonnes of crude oil transiting the strait in 2023.

In the first eight months of this year, the Taiwan Strait also saw the transit of 2.2 million tonnes of Russian oil, transported on 21 vessels, 16 of which were ‘shadow’ tankers. 'Shadow' tankers shipped 1.7 mn tonnes of Russian crude oil through the Taiwan Strait.

Since the onset of sanctions on Russia in 2022, shifts in global trade patterns have seen increased volumes of Russian oil from the Baltic and Black Sea ports transit the Suez Canal and the Strait of Malacca to Asia. Notably, Russia's crude exports to India — including oil from its Far Eastern ports — have surged massively since 2022. With this huge uptick in

activity in the region, the potential for oil spills or accidents increases immeasurably and is a growing concern, particularly given that an incident involving a 'shadow' tanker without adequate P&I insurance has already occurred near the Strait of Malacca in Malaysian waters, a stone's throw from Singapore. Depending on the nature of the event, it could have significant and far reaching ecological impacts and disrupt vital maritime traffic for extended periods of time.

It cannot be overstated that shipping Russian crude oil to Southeast Asia via 'shadow' tankers raises significant environmental concerns as it involves crossing multiple countries' territorial waters and exclusive economic zones. Tankers from Baltic Sea ports navigate through eight to twelve territorial waters including the Danish Straits, the Mediterranean Sea, and the Suez Canal. Vessels from the Black Sea traverse the Turkish Straits and the Mediterranean Sea, passing through seven to ten territorial waters. Arctic exports may involve six to nine countries. Pacific shipments take a more direct route through the Sea of Japan and South China Sea, but still navigate through four to six territorial waters.

## Over 72% of 'shadow' tankers are over 15 years old, heightening risks of malfunctions, collisions, and oil spills

The rapid expansion of the 'shadow' tanker fleet to circumvent sanctions is only part of the growing concern in the maritime industry – the ageing profile of these vessels poses an even more pressing risk. Of the 294 vessels transporting crude oil, 51% are between 16 and 20 years old, with an additional 26% in the 11 to 15-year range. This ageing fleet heightens concerns within the industry, as tankers over 15 years old are more susceptible to malfunctions, collisions, and oil spills, increasing risks to both safety and environmental standards.

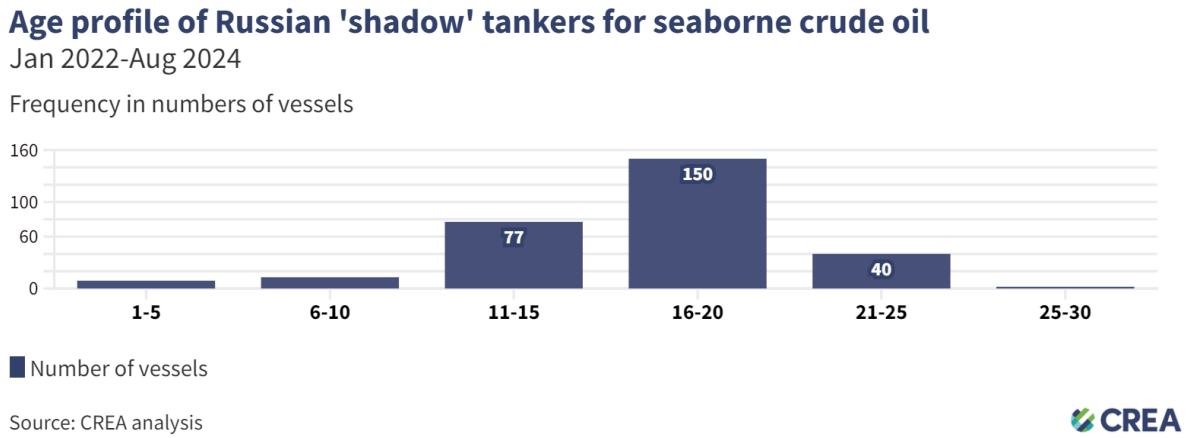



**Figure 3 – Age profile of Russian 'shadow' tankers for seaborne crude oil**

Another issue related to 'shadow' tankers is flags of convenience (FOC). FOCs allow shipowners to bypass stricter regulations by registering vessels in countries with more lenient shipping frameworks, such as Panama, Liberia, and Gabon. Panama leads the pack of countries providing these tankers with FOCs at 101 vessels, followed by Gabon (57) and Antigua and Barbuda (10). The numbers underscore the scale of this practice. Other notable registries include Vietnam (14) and Russia (31). This lack of oversight increases the risk of environmental disasters, as ageing ships flying FOCs from these countries often undergo fewer inspections and are more prone to harmful practices like illegal waste dumping that pose significant threats to marine ecosystems as 'shadow' tankers also regularly turn off their transponders, an accident leading to an ecological disaster of a grand scale is only a matter of time.

## The cleanup costs for an oil spill involving a typical 'shadow' tanker could range from USD 859 mn to USD 1.6 bn

One of the most notorious oil spills in recent times occurred off the coast of Alaska when the Exxon Valdez, a Very Large Crude Carrier (VLCC), leaked oil, resulting in cleanup costs of approximately USD 2 bn. Notably, there are no 'shadow' tankers of VLCC size. Instead, Russian crude is primarily carried on Aframax-class vessels, which dominate the fleet at 212 ships. Each of these vessels is capable of carrying around 100,000 tonnes of crude oil.

Suezmax tankers form the second-largest group at 69 vessels that can transport roughly 130,000 tonnes each. Smaller categories, including Handy/MR1 and Panamax/LR1 tankers, are less common, with just five and two vessels, respectively, while six short-sea tankers are dedicated to coastal and regional shipments.

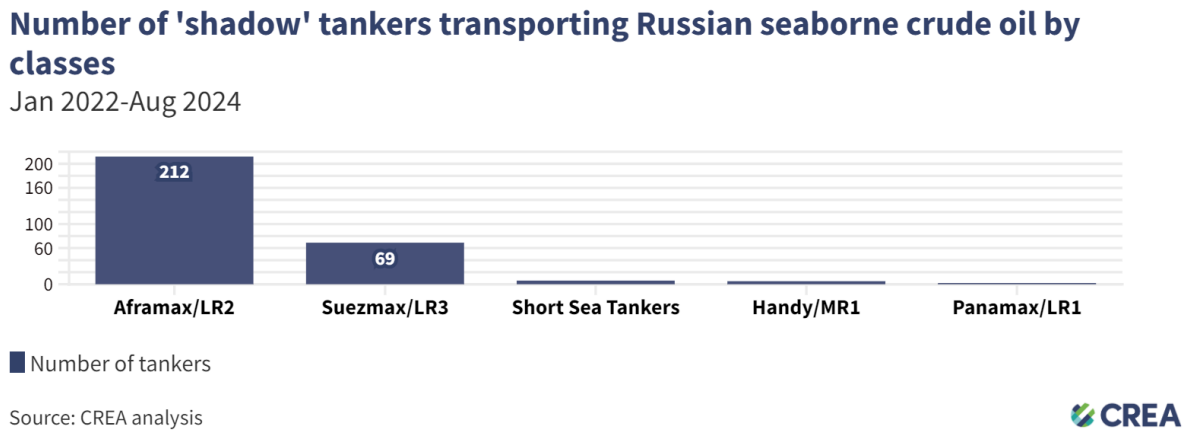



**Figure 4 – Number of 'shadow' tankers transporting Russian seaborne crude oil by classes**

Findings from the OSIR International Oil Spill Database underscore the escalating financial implications of oil spills. The average cleanup cost in Europe is estimated at USD 8,595.50 per tonne of oil spilled. In comparison, Southeast Asia incurs significantly higher expenses, with cleanup costs averaging approximately USD 16,006.22 per tonne, not accounting for inflation.

The financial burden of oil spills is particularly significant when considering the capacity of an Aframax-class vessel, which typically transports approximately 100,000 tonnes of crude oil. The cleanup from a spill involving such a vessel could amount to a staggering USD 859 mn in Europe and the potentially even higher number of USD 1.6 bn in Southeast Asia.

Since the start of Russia's full-scale invasion of Ukraine, 'shadow' tankers have been involved in 50 incidents across various geographies like the Danish Straits, the Turkish Straits, and even reaching the shores of Malaysia. While these accidents have been resolved without any major catastrophes, the continued operation of these ageing vessels

— which often lack proper insurance — poses a significant risk as they transport Russian crude oil, primarily from Europe and the Pacific to Asia, whilst navigating numerous global maritime chokepoints 'in the dark', with their location and movements concealed.

The geography of these incidents and the routes taken by 'shadow' tankers highlight a pressing issue that extends beyond the scope of Western sanctions. This is not merely a regional challenge– it is a global maritime concern that requires collective action from countries worldwide. Addressing the complexities of this situation is essential for ensuring safer maritime practices and protecting international trade routes.

## Russian maritime insurers raise concerns over financial stability

Before Russia's full-scale invasion of Ukraine, oil tanker insurance coverage was predominantly managed by a select group of mutual insurers within the International Group of P&I Clubs (IGP&I). CREA's analysis of publicly available information from S&P Global Ratings reveals that six of these insurers held financial and issuer credit ratings of A or A+, reflecting robust financial stability with moderate vulnerability to economic shifts. The remaining five members had ratings of BBB+ or BB+, indicating adequate financial protection but greater sensitivity to economic downturns. Members of this well-established IGP&I club provided a relatively stable environment for oil tanker operations globally.

In contrast, the largest Russian maritime insurers reviewed by CREA who provide P&I coverage and control the domestic P&I market held BBB- or BB ratings before the invasion, indicating a weaker financial standing within their risk category. Before the full-scale invasion, some of these firms did provide coverage for a limited number of tankers transporting crude oil internationally. However, this number has increased dramatically since the invasion, raising further concerns over these firms' financial capacity to provide coverage. In March 2024, less than 25% of Russian cargo was insured by IGP&I members, underscoring a significant shift in the insurance landscape.

Furthermore, shortly after the start of the invasion, ratings for Russian insurers were downgraded to CCC+ amid escalating fears of sovereign default. Subsequently, in March 2024, the EU imposed a ban on rating agencies providing financial ratings to Russian entities, including insurers, leading to the complete withdrawal of those firms' ratings. This

has created a substantial information blackhole regarding their current financial capacity to manage potential accidents, raising serious doubts about their ability to fulfil insurance claims. As Russia's 'shadow' vessels expand, the country increasingly relies on its National Reinsurance Company (RNRC) to support domestic insurers covering these vessels.

Even if these Russian insurers possess the financial resources to cover accidents, their insurance terms and willingness to pay out remain highly uncertain. Reports from the Financial Times and Denmark's Danwatch indicate that one prominent Russian insurer has covered vessels identified as part of the 'shadow' fleet. However, their insurance policy includes clauses stating coverage may be voided if shipments violate existing sanctions, rendering the coverage effectively meaningless. The questionable insurance coverage of 'shadow' tankers leaves coastal states vulnerable to substantial clean-up costs in the event of an oil spill, as they may find themselves without recourse to claim compensation from the insurers.

## Policy recommendations: How can coastal states create better mechanisms to reduce risk?

**Mandatory P&I insurance for territorial waters and exclusive economic zones (EEZs):** All oil tankers entering territorial waters and exclusive economic zones must be required to provide proof of adequate protection and indemnity (P&I) insurance, ensuring compliance with EU/G7+ sanctions and safeguarding against potential environmental damage.

**Enforce environmental standards:** Minimum environmental standards for oil tankers operating in territorial waters and EEZs must be implemented to mitigate ecological risks and promote higher operational safety.

**P&I insurance and safety compliance for international straits:** Tankers navigating international straits should be required to demonstrate proof of P&I insurance and adherence to minimum safety standards. This will help regulate 'shadow' fleet operations and drive up costs for non-compliant vessels.

# Methodology

This briefing concentrated exclusively on vessels transporting crude oil from Russia to global markets. To ensure a comprehensive analysis, we cross-referenced CREA's data with information from official Russian sources and statements made by government officials. This comparison allowed us to identify discrepancies in the reported volumes of exported Russian crude oil, providing deeper insight into the complexities of the current market dynamic.

| | | mn tonnes | | |
|---|---|---|---|---|
| | | **2022** | **2023** | **Total** |
| **Crude oil** | Russia | 242 | 234 | 476 |
| | CREA | 246 | 235 | 481 |
| | Discrepancies | +1.7 % | +0.4% | +1.8% |

It should be noted that following Russia's full-scale invasion of Ukraine, the Federal Customs Service halted the publication of statistics as of 14 March 2022. Additionally, the Central Dispatch Department of the Fuel and Energy Complex ceased disclosing data on Russian oil production and exports in physical terms. As a result, CREA's analysis relies on 2021 data published by the Central Bank of the Russian Federation for crude oil. Data for 2022 and 2023 was sourced from public records, in which representatives of the Russian government specified export volumes.

CREA's data on Russian seaborne crude oil exports is derived from Kpler. We further applied our custom categorisation to define and analyse crude oil flows. This includes aggregating all liquid fuels covered by the price caps and import bans imposed by countries implementing the price cap policy. For pipeline exports, we referenced data from China's customs and EUROSTAT. To refine our figures, we deducted the amount of oil transshipped via ship-to-ship transfers en route to their final destinations. This adjustment accounts for the complexities of categorisation – in a ship-to-ship transshipment, the initial

vessel may be a ‘shadow’ tanker, while the cargo reaching its destination could be carried by a G7+ tanker.

This analysis categorises vessels based on their insurance and ownership status. The first category comprises tankers that are, at the time of the voyage, flagged, insured, or owned by countries implementing the oil price cap policy, including G7 countries, the EU, Australia, Norway, and Switzerland — collectively referred to as 'G7+ tankers'. The second category includes tankers, not G7+, that have explicitly shipped Russian oil in their last five voyages, and are categorised as ‘shadow’ tankers. By adopting a broad definition of suspicious tankers, we aim to address the complexities surrounding the classification of ‘shadow’ tankers used by Russia to circumvent the oil price cap policy.

To track insurance and ownership details, we employ Kpler and Equasis datasets, which enable us to analyse the provision of insurance and vessel ownership necessary for transporting Russian oil shipments. P&I insurance, flag, and ownership data are collected from Equasis regularly (daily to weekly). Since Equasis does not maintain historical records of ship insurers, we assume the first insurer identified for each vessel on Equasis was its insurer before the collection or indicated inception date.

We have identified vessels transporting Russian crude oil by scrutinising key shipping routes and strategic chokepoints. Tankers from the Baltic Sea to India or Southeast Asia typically traverse the Danish Straits, Dover Strait, Gibraltar, the Suez Canal, and Bab-el-Mandeb. Notably, we have excluded the recently and temporarily established Cape of Good Hope route, which emerged following attacks on vessels by Houthi forces. This exclusion reflects a more cautious approach to monitoring the territorial and exclusive economic zone (EEZ) waters frequented by these 'shadow' tankers.

Vessels from the Black Sea to India or Southeast Asia pass through the Suez and Bab-El-Mandeb straits. At the same time, ships from the Pacific, excluding those bound for Malaysia, Indonesia, or Singapore, traverse the Korea Strait and Malacca Strait. This route analysis is critical for understanding the complexities of Russian oil exports and the potential risks associated with the shipping industry in the current geopolitical climate.