

Policy Brief

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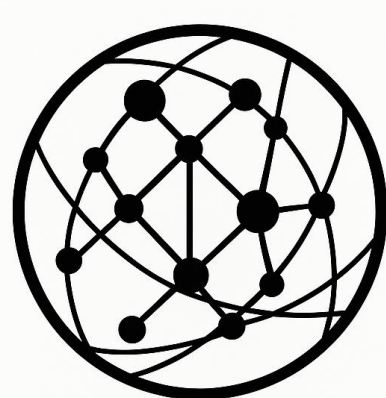
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Shock-Responsive Resilience in the Caspian Logistics System: Measuring Rebound Capacity after External Strikes

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Key Judgments

- **The Caspian system shows shock-responsive, not stable, resilience.** After external strikes, indicators often rebound sharply rather than collapse.
- **The preliminary CLRI score is 61/100, placing the Caspian corridor in the “shock-responsive resilience” category.** The system retains meaningful rebound capacity, but recovery remains volatile, uneven, and window-based.
- **Rebound does not equal normalization.** Post-strike surges likely reflect compressed logistics windows, backlog clearance, accelerated handling, and risk-managed movement rather than stable operating recovery.
- **Ukraine’s reported strikes have made the Caspian theater strategically visible.** Russian Caspian-linked vessels, energy infrastructure, and naval assets are now exposed to long-range pressure.
- **The corridor is adaptive but structurally stressed.** It cannot replace Gulf-scale logistics, but it can preserve selected flows under Hormuz pressure through compressed, volatile, and risk-managed movement.

Executive Summary

The Caspian Sea is no longer a passive rear logistics space. It has become a contested and shock-sensitive corridor within the Russia–Iran supply architecture.

This brief introduces and applies shock-responsive resilience to describe a recurring pattern in Caspian logistics data: after external attacks or threat events, the system often rebounds rather than collapses. Port output rises, vessel counts increase, departures and arrivals accelerate, and regional SHI improves.

To measure this pattern, the brief proposes a **Caspian Logistics Resilience Index (CLRI)** based on rebound amplitude, recovery speed, persistence duration, flow quality, and volatility cost. Using the May 7–12 rebound window as the primary observation period, the preliminary CLRI score is 61/100, placing the corridor in the shock-responsive resilience category.

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This score indicates meaningful rebound capacity, but not stable recovery. The evidence suggests a shift toward window-based logistics, in which cargo movement is compressed into short operational periods through accelerated clearance, rerouting, backlog processing, and risk-managed movement.

The key distinction is between healthy recovery and stress surge. The Caspian pattern appears closer to stress surge: sharp rebounds, short duration, uneven vessel recovery, tanker weakness, and post-surge contraction.

The corridor remains functional and strategically useful, but its resilience is increasingly expressed through compressed, volatile, and risk-managed movement rather than stable systemic normalization.

Why This Matters

Earlier EPINOVA analysis described the Russia–Iran northern logistics network as a constrained but durable system built around Caspian shipping, Central Asian rail, and overland trucking. Its purpose is not to replace Persian Gulf-scale throughput, but to preserve minimum viable flow and delay threshold collapse.

PB-42 identified the Caspian corridor as Iran’s clearest northern buffer under blockade pressure, while PB-44 showed that the Anzali strike pushed the corridor from routine movement toward higher-risk, window-based operations marked by flow inversion, surge, and contraction.

This brief extends that logic by asking whether post-shock rebounds can be measured as a distinct form of logistics resilience. The answer is yes: the Caspian corridor is not showing stable resilience, but shock-responsive resilience.

Methodological Note

This brief relies on open-source strike reporting, author-compiled Caspian port and vessel-monitoring indicators, and a preliminary CLRI rebound-assessment framework. The analysis evaluates system behavior rather than verified cargo content, ownership structure, operational intent, or final destination.

The CLRI score is a preliminary ordinal assessment based on observed SHI movement, port output, arrivals, departures, total vessel counts, and vessel-composition patterns during the May 7–12 rebound window. Strike reports are treated as open-source signals, not independently verified battlefield assessments.

1. Event Timeline: External Strikes and Caspian-Relevant Shock Points

The Caspian logistics system’s rebound pattern should be read against a sequence of reported external shocks and observed system responses. **Table 1** summarizes the main open-source strike reports and Caspian-relevant monitoring signals from December 2025 to May 2026.

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Table 1. Reported External Strikes and Caspian-Relevant Logistics Signals

Date	Signal	Logistics Relevance
Dec. 2025	Claimed strike on two Russian Caspian vessels	First signal of Caspian military-logistics exposure
Dec. 2025	Claimed strike on Caspian oil infrastructure	Target set expands from vessels to energy-support assets
Apr. 10, 2026	Reported offshore-platform strikes	Deep Caspian energy infrastructure becomes reachable
Apr. 18–28, 2026	Flow inversion, surge, and contraction	Port rhythm shifts toward window-based logistics
May 5, 2026	Intensified Ukrainian strikes on Russian logistics depth	Caspian activity fits wider logistics-depth campaign
May 7, 2026	Reported Kaspiysk missile-ship strike	Caspian naval assets enter long-range strike logic
May 7–12, 2026	SHI/output/vessel rebound	Post-shock mobilization and compressed recovery

Source: Author’s synthesis based on Reuters, Kyiv Independent, The Guardian, and EPINOVA Caspian monitoring indicators.

Note: Reported strikes should be treated as open-source claims or media-reported events rather than independently verified battlefield assessments. The logistics signals describe observed system behavior, not confirmed operational intent.

As shown in **Figure 1**, the Caspian logistics system did not exhibit linear collapse after reported strike activity. Instead, observed indicators suggest a recurring sequence of disruption, compression, and rebound consistent with shock-responsive resilience dynamics.

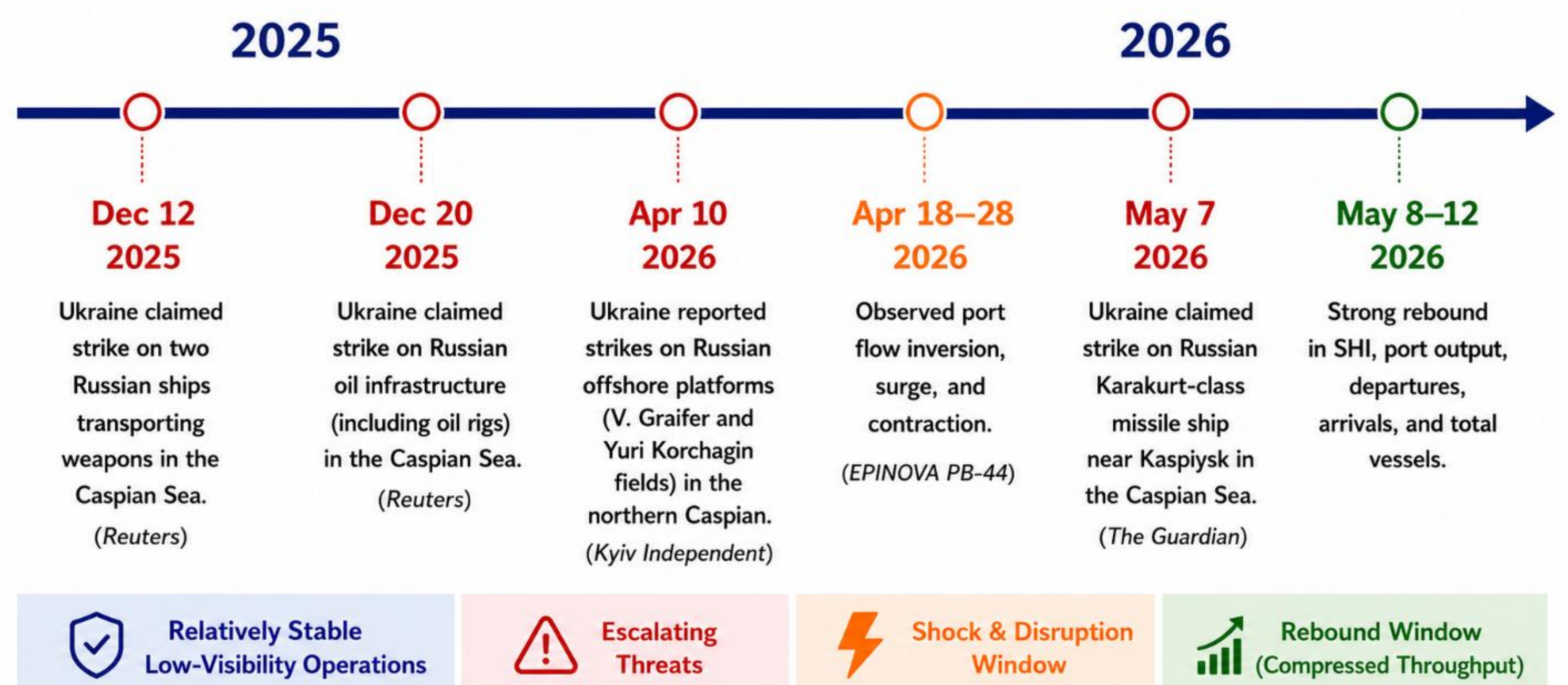


Figure 1. Evolution of the Caspian Logistics System under External Strike Pressure

Caption: The figure links reported Ukrainian strikes on Russian Caspian-linked military, maritime, and energy assets with subsequent disruption, compression, and rebound phases from December 2025 to May 2026. It shows the corridor’s shift from low-visibility sustainment toward shock-responsive, window-based logistics.

Source: Author’s reconstruction based on Reuters, Kyiv Independent, The Guardian, and the author’s Caspian monitoring dataset developed in EPINOVA-2026-PB-42 and EPINOVA-2026-PB-44.

Note: “Rebound” refers to observed post-shock increases in SHI, vessel activity, arrivals, departures, and port throughput. It does not imply full normalization, and may reflect backlog clearance, accelerated handling, or risk-managed movement under elevated threat conditions.

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2. Analytical Concept: Shock-Responsive Resilience

Shock-responsive resilience refers to a logistics system's ability to generate a measurable rebound after disruption without necessarily returning to stable normality.

It differs from ordinary resilience in three ways.

First, recovery is **event-driven** rather than smooth. The system reacts to shock by clearing backlogs, accelerating vessel movements, opening short cargo windows, or temporarily increasing port throughput.

Second, rebound may be **temporary**. High throughput after a strike may reflect urgency, risk avoidance, or compressed scheduling rather than restored commercial confidence.

Third, resilience is achieved through **coordination compression**. Ports, vessels, cargo managers, insurers, security actors, and customs systems are forced into tighter operating cycles.

This concept is useful because it avoids a binary interpretation of logistics disruption. The Caspian corridor can be disrupted and resilient at the same time. It can absorb pressure while becoming less stable. It can generate throughput while operating under rising friction.

3. Proposed Index: Caspian Logistics Resilience Index

This brief proposes and applies a Caspian Logistics Resilience Index, or CLRI, to measure the Caspian system's post-shock rebound capacity.

CLRI is designed to capture not only whether activity rebounds after a disruption, but also whether that rebound is fast, durable, compositionally balanced, and operationally stable.

Conceptually, CLRI is defined as a function of rebound amplitude, recovery speed, persistence duration, flow quality, and volatility cost:

$$CLRI = f(RA, RS, PD, FQ, VC) \quad (3.1)$$

where:

- **RA = Rebound Amplitude:** the scale of post-shock increase in SHI, port output, departures, arrivals, or vessel counts. Higher RA indicates stronger immediate adaptive capacity.
- **RS = Recovery Speed:** the time required to return to the historical baseline or operational reference average. Higher RS indicates faster operational responsiveness.
- **PD = Persistence Duration:** the length of time the rebound remains above baseline. Higher PD indicates more durable resilience.
- **FQ = Flow Quality:** the degree to which cargo vessels, tankers, and support craft recover together. Higher FQ indicates healthier system-wide recovery.
- **VC = Volatility Cost:** the degree of surge-collapse instability after rebound. Higher VC reduces true resilience.

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For this preliminary application, the operational formula is:

$$CLRI = 0.25 \cdot RA + 0.25 \cdot RS + 0.20 \cdot PD + 0.20 \cdot FQ - 0.10 \cdot VC \tag{3.2}$$

The negative volatility term prevents short, unstable surges from being scored as equivalent to durable recovery.

Table 2. CLRI Interpretation Benchmark

CLRI Score	Resilience Category	Interpretation
0–30	Low resilience / disruption-dominant	The system shows limited rebound capacity and remains highly vulnerable to disruption.
31–50	Fragile rebound	The system can recover partially, but rebound is weak, short-lived, or highly unstable.
51–70	Shock-responsive resilience	The system can rebound meaningfully after disruption, but recovery remains volatile, uneven, or window-based.
71–85	Stable adaptive resilience	The system rebounds quickly and sustains recovery with moderate volatility and balanced flow restoration.
86–100	High systemic resilience	The system absorbs disruption with limited degradation and returns to stable operating conditions.

Source: Author’s analytical framework.

Note: The benchmark is an ordinal interpretation scale for comparative logistics-resilience assessment. It should not be read as a universal engineering standard. Score ranges classify observed post-shock system behavior by rebound strength, recovery durability, flow balance, and volatility.

Using the May 7–12 rebound window as the primary observation period, the preliminary CLRI assessment is shown in **Table 3**.

Table 3. Preliminary CLRI Component Assessment for the May 7–12 Rebound Window

Component	Preliminary Score	Interpretation
RA	90	Strong rebound in SHI, port output, and vessel activity.
RS	85	Rapid recovery after the prior compression period.
PD	60	Rebound persists, but remains short-window rather than durable.
FQ	62	Cargo vessels recover more strongly than tankers; support craft remain stable.
VC	70	High volatility cost; surge-contraction behavior reduces net resilience.

Source: Author’s preliminary scoring based on the Caspian logistics monitoring dataset, SHI observations, port-output indicators, arrivals/departures data, total vessel counts, and vessel-composition patterns for the May 7–12 rebound window.

Note: Scores are preliminary ordinal estimates on a 0–100 scale. They operationalize observed rebound behavior rather than provide a definitive operational audit. The volatility-cost score is subtracted because higher volatility reduces true resilience.

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The preliminary CLRI calculation is:

$$CLRI = 0.25 \cdot (90) + 0.25 \cdot (85) + 0.20 \cdot (60) + 0.20 \cdot (62) - 0.10 \cdot (70) = 61.15$$

Rounded to the nearest whole number:

$$\textit{Preliminary CLRI} = 61 / 100$$

A preliminary CLRI score of 61/100 places the Caspian logistics system in the shock-responsive resilience category. The system retains meaningful rebound capacity after disruption, but that capacity is increasingly expressed through compressed, volatile, and compositionally uneven recovery windows rather than stable systemic normalization.

In practical terms, the Caspian system can rebound quickly, but it does not yet show stable adaptive resilience. Its score is lifted by strong rebound amplitude and recovery speed, but constrained by short persistence, uneven vessel-category recovery, and high volatility.

4. Reading the Current Indicators

The current indicators show a clear post-May rebound across multiple dimensions of the Caspian logistics system. As illustrated in **Figure 2**, the Caspian system exhibited rapid post-shock recovery behavior rather than sustained collapse.

The regional SHI rises sharply into the mid-80 range after earlier periods of sub-50 and sub-30 stress. This pattern suggests that the system regained a degree of operational functionality after prior compression. However, the recovery should not be read as full normalization. A rapid SHI rebound may also indicate accelerated port processing, backlog clearance, and short-window logistics mobilization under continued threat pressure.

Other indicators point in the same direction. Selected Caspian port output rises well above the historical baseline, with major spikes after May 8–10. Departures and arrivals also increase, suggesting renewed system circulation rather than passive vessel accumulation. Total vessel counts rise from lower April levels into one of the highest observed May peaks, indicating that vessels either re-entered or concentrated within the Caspian logistics space after disruption.

The vessel-composition pattern is especially important. Russian cargo vessels show a sharp rebound before easing, while tanker activity recovers only partially and special craft or tug activity remains relatively stable. This mixed recovery suggests that the rebound is real but uneven. Cargo flows appear more responsive than tanker flows, while support vessels provide continuity even when commercial or energy-linked movement remains constrained.

Taken together, these indicators suggest that the Caspian system is adapting rather than collapsing. The next analytical question is whether that adaptation represents durable resilience or stress surge.

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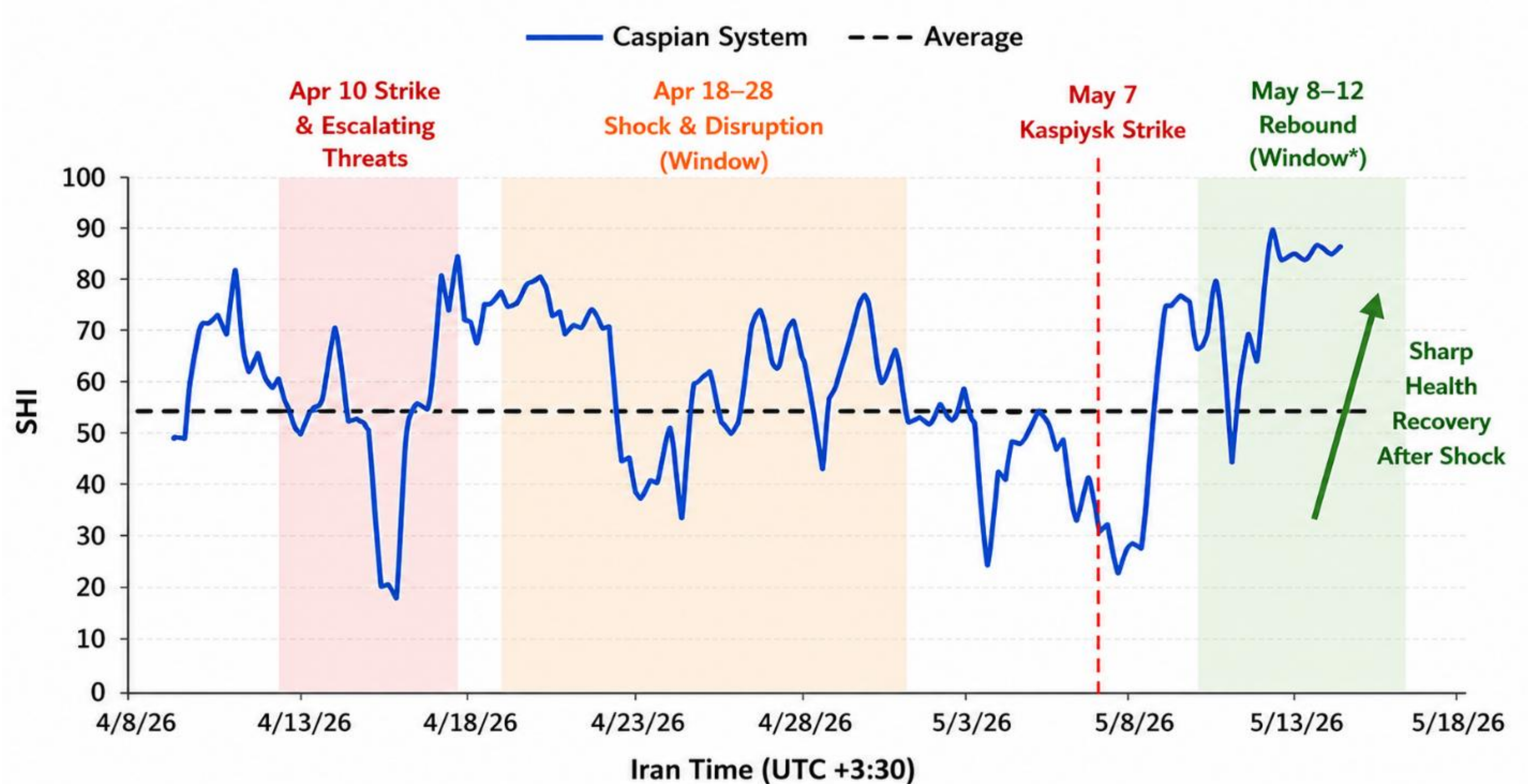


Figure 2. Regional System Health Index (SHI) by Time

Caption: The figure shows Caspian SHI trends between April and May 2026. The rebound into the mid-80 range after earlier compression suggests renewed operational rhythm following shock-induced degradation.

Source: Author's Caspian logistics monitoring dataset and SHI framework developed through EPINOVA logistics-system assessments, including EPINOVA-2026-PB-27 and EPINOVA-2026-PB-44.

Note: SHI is an analytical composite indicator based on vessel activity, arrivals, departures, throughput rhythm, and coordination signals. Temporary SHI increases should not be read as full normalization; they may reflect compressed recovery windows, accelerated port processing, or backlog-clearance surges.

5. Resilience or Stress Surge?

The central analytical challenge is distinguishing resilient recovery from stress surge.

A resilient recovery would show quick rebound, sustained output, balanced vessel recovery, and declining volatility. A stress surge would show a sharper but less durable pattern: rapid rebound, short duration, uneven vessel composition, and subsequent contraction.

The current Caspian pattern contains elements of both, but it leans toward stress surge. The system can generate rapid recovery, yet the rebound appears compressed and uneven. Cargo activity responds more visibly than tanker activity, and port output can spike far above baseline. These spikes may reflect emergency clearance, backlog release, or risk-window exploitation rather than stable operating capacity.

As shown in **Figure 3**, the Caspian corridor repeatedly generated short-duration output surges following disruption periods. This pattern is consistent with stress-responsive logistics adaptation: the system remains capable of moving cargo, but increasingly does so through compressed, high-pressure operating windows.

This distinction matters. An attacker's failure to permanently stop movement does not mean the system is healthy. Under pressure, a logistics system may move more, not less, in the short run. Operators may accelerate cargo handling precisely because they anticipate future closure, interdiction, insurance withdrawal, or port restriction.

In this sense, post-strike rebound is not always evidence of normality. It may be evidence of stress.

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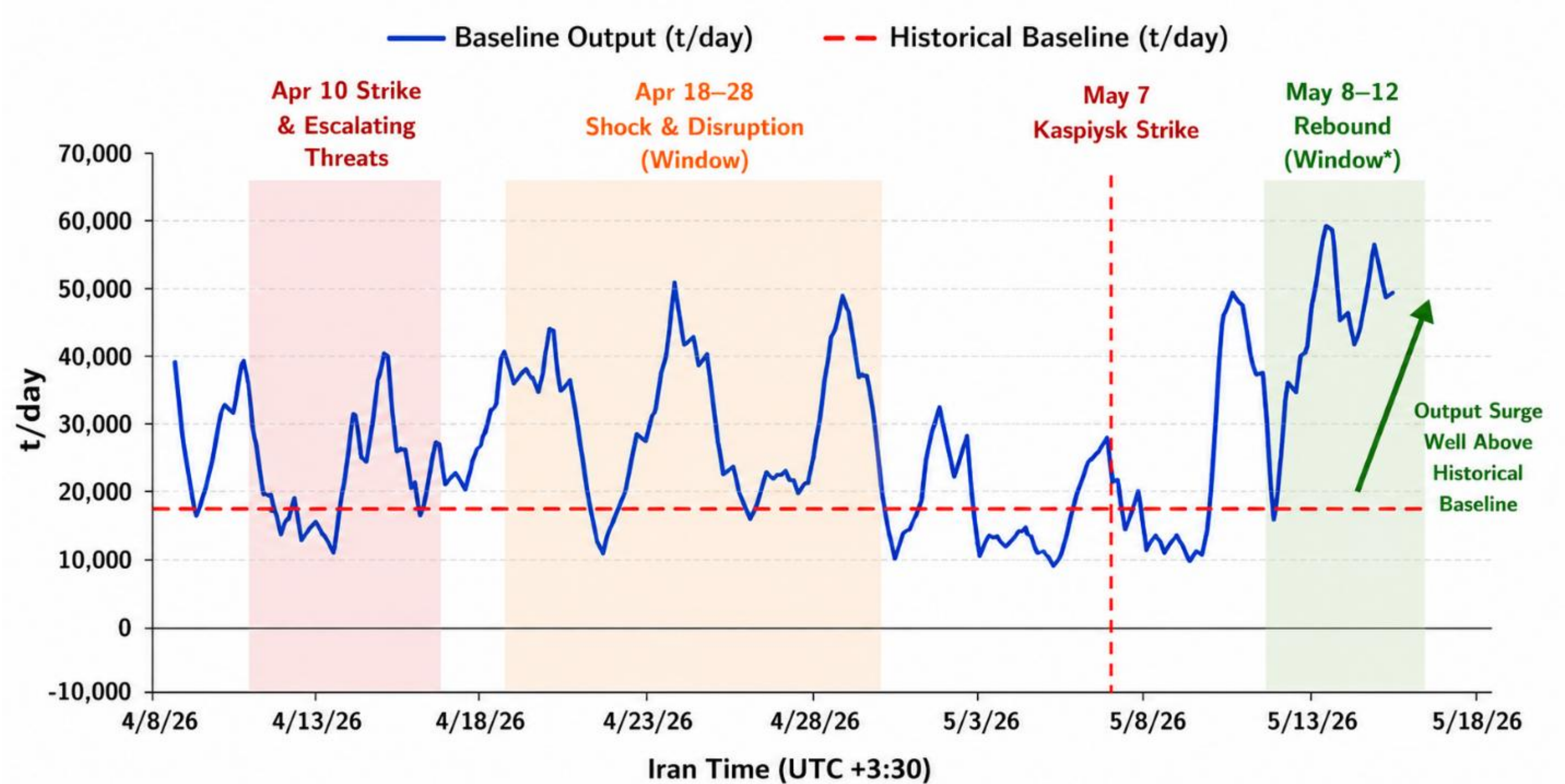


Figure 3. Caspian Port Output versus Historical Baseline

Caption: The figure compares observed Caspian port output with a historical baseline between April and May 2026. Repeated surge–contraction cycles and post-shock spikes suggest compressed logistics operations under elevated pressure.

Source: Author’s Caspian port monitoring dataset, throughput estimates, and analytical reconstruction based on vessel activity, arrivals, departures, and selected port observations.

Note: The historical baseline is an analytical reference, not official port statistics. Output spikes may reflect backlog release, emergency cargo prioritization, risk-window exploitation, or accelerated clearance rather than stable growth.

6. Strategic Interpretation

The Caspian system has entered a new operating mode. Once a low-visibility rear sustainment route, it is now a contested corridor exposed to direct strikes, indirect pressure, confidence degradation, and operational monitoring.

In the current phase, it operates as a shock-responsive, window-based logistics network. As shown in **Figure 4**, recovery is compositionally uneven: cargo vessels rebound more visibly, tanker activity remains constrained, and support craft provide continuity. This suggests an adaptive but structurally stressed corridor.

External strikes may not close the corridor outright. Instead, they may force Russia and Iran to accelerate cargo movement, concentrate vessel activity, prioritize selected cargo, and exploit short operational windows. This creates a paradox: strikes can degrade stability while temporarily increasing observed movement.

The corridor’s current value lies not in stable throughput, but in its ability to preserve movement under pressure. Its vulnerability lies in the fact that this movement increasingly depends on compressed, uneven, and risk-managed operating windows.

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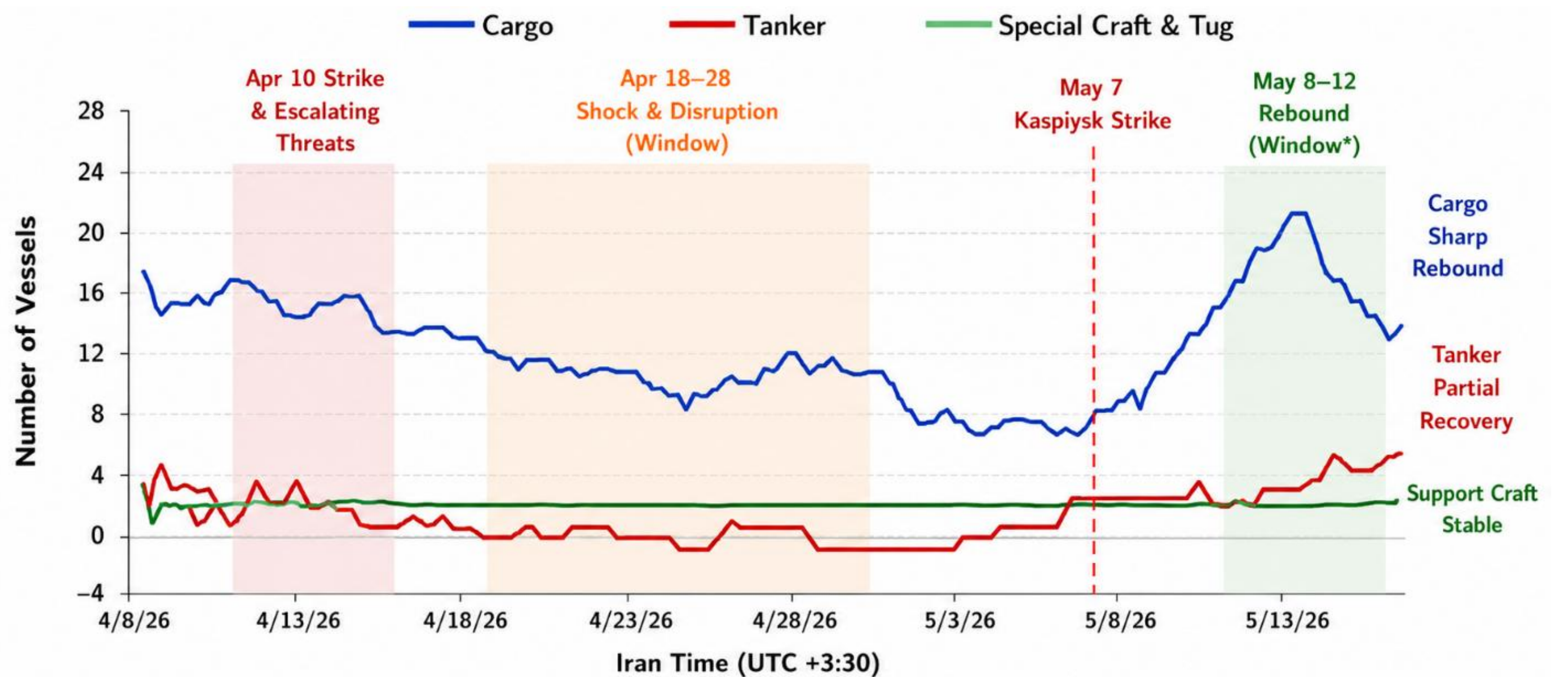


Figure 4. Russian Vessels in the Caspian Sea by Type

Caption: The figure tracks Russian-linked cargo vessels, tankers, and special craft or tugs in the Caspian Sea between April and May 2026. Uneven recovery across categories suggests selective logistics adaptation rather than full system-wide normalization.

Source: Author's vessel-monitoring dataset and analytical classification of Caspian maritime traffic patterns compiled through AIS-based observation and EPINOVA Caspian logistics monitoring.

Note: Vessel categories are analytical classifications and should not be read as definitive cargo, ownership, mission, or destination verification. Uneven recovery suggests that rebound capacity remains structurally constrained rather than fully normalized.

7. Policy Implications

Monitoring should shift from single-event damage assessment to post-shock recovery measurement. The key question is no longer simply whether a target was destroyed, but whether the strike forced the Caspian corridor into a more expensive, less predictable, and more compressed operating mode.

- **Monitor rebound quality, not only strike damage.** Analysts should assess how fast the system rebounds, how long the rebound lasts, and whether throughput remains stable after the initial surge. A rapid rebound followed by contraction may indicate stress surge rather than durable recovery.
- **Distinguish corridor survival from corridor reliability.** Continued movement does not mean the corridor is healthy. A route can remain open while becoming slower, costlier, riskier, and more dependent on short operational windows.
- **Track vessel composition as a resilience indicator.** Balanced recovery across cargo vessels, tankers, and support craft would suggest broader system restoration. A rebound concentrated mainly in cargo traffic, with tanker activity still constrained, indicates selective and uneven recovery.
- **Treat volatility as evidence of degradation, not normal recovery.** In a threshold-delaying logistics system, degradation may appear not as immediate collapse, but as higher volatility, shorter movement windows, unstable port rhythm, and declining confidence among operators.

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This assessment relies on open-source reporting and author-compiled monitoring indicators. It does not independently verify strike claims, cargo content, ownership structures, military classification, or final destinations.

Wartime reporting should be treated as contested. Ukrainian claims, Russian denials or silence, and third-party media reports are analytical signals, not complete evidence.

The CLRI framework is a measurement tool for comparing post-shock system behavior over time, not a definitive operational audit or proof of intent.

High-frequency port and vessel indicators capture system rhythm, but cannot fully reveal cargo priority, insurance decisions, sanctions exposure, command decisions, or AIS-dark movement.

Conclusion

The Caspian logistics system is becoming a laboratory for measuring wartime logistics resilience. Ukrainian long-range strike activity has shown that Russia's Caspian rear is no longer insulated from external pressure. Yet the system's repeated rebounds show that disruption does not automatically produce collapse.

This brief finds that the Caspian corridor exhibits shock-responsive resilience. Using the May 7–12 rebound window, the preliminary Caspian Logistics Resilience Index (CLRI) score is 61/100, placing the system in the shock-responsive resilience category. This indicates meaningful rebound capacity, but not stable systemic recovery.

The Caspian corridor can absorb shocks and generate rapid rebounds, especially through port-output surges, vessel re-entry, and accelerated arrivals and departures. However, its recovery remains constrained by short persistence, uneven vessel-category performance, tanker weakness, and high volatility.

The corridor is therefore strategically valuable but structurally stressed. Its resilience lies not in stable normality, but in its ability to keep moving under pressure through compressed, volatile, and risk-managed operating windows.

For analysts, the next step is not only to ask whether the Caspian corridor survives disruption, but to measure how it survives: through durable recovery, or through repeated stress surges that preserve flow while degrading systemic stability.