



Freight & Logistics

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Cost of Congestion & Key Freight Bottlenecks — November 2022 Recap

Delay and congestion cost commercial industry millions of dollars each year. This cost eventually becomes a burden on the sustainability of the freight transportation sector, and the cost of goods and services for the end-consumer. This can be as straightforward as friction between volume and capacity, but freight congestion can also represent the challenge of reconciling network functionality with economic behavior.

Performance Measure	Oct-22	% CHANGE	Nov-22	% CHANGE
NCPFN System Total Commercial Cost of Delay	\$ 134,762,400	2.1%	\$ 136,946,410	1.6%
NCPFN System Commercial Average Daily Cost per VMT	\$ 0.30	0.0%	\$ 0.31	3.3%
Commercial VMT on the NCPFN System	449,816,861	2.1%	436,387,806	-3.0%
NCPFN System Com. Vehicle-hours of Delay (#Hours)	1,341,053	2.1%	1,362,787	1.6%
<i>NPMRDS Network Analysis</i>				
Top 10 Bottlenecks Total Cost of Delay	\$ 6,290,176	9.7%	\$ 8,138,212	29.4%
Top 10 Bottlenecks % of Total Cost	4.67%	7.4%	5.94%	27.3%
Top 10 Bottlenecks Average Daily Total Cost of Delay	\$ 202,909	6.2%	\$ 271,274	33.7%
Commercial VMT on Top 10 Bottlenecks NCPFN System	16,475,764	5.7%	13,038,020	-20.9%
Top 10 Bottlenecks Cost per VMT	\$ 0.38	2.7%	\$ 0.62	63.2%

Rank	Previous Rank	November 2022 Bottleneck Locations	Average Daily Delay*	Events or Incidents	Division
1	16	I-77 South at Nations Ford Road, Exit 4 in south Charlotte	1 h 56 m	44	10
2	447	I-40 West at US-276, Exit 20 between Clyde & Waterville Lake	5 h 37 m	8	13
3	263	I-40 East at US-276, Exit 20 between Clyde & Waterville Lake	5 h 7 m	18	13
4	9	I-40 East at US-70, Exit 306 between Garner and Clayton	1 h 53 m	15	5
5	697	I-40 East at Newfound Road, Exit 33 west of Canton	1 h 30 m	13	13
6	7	I-40 East at US-70, Exit 309 near New Bethel Church Road	59 m	21	5
7	84	I-26 West at US-25, Exit 44 between Flat Rock & Fletcher	1 h 29 m	30	13
8	11	I-85 North at Graham Street, Exit 40 in Charlotte	1 h 38 m	19	10
9	14	I-85 South at NC-273, Exit 27 between Charlotte and Belmont	1 h 16 m	8	10
10	40	NC-150 East at I-77 west of Mooresville across Lake Norman	1 h 26 m	2	12

* hours per day in which congestion was present

November 2022 was the second month in a row of widespread increases in congestion costs on the Statewide Priority Highway Freight Network including a 1.6% increase in total cost of congestion of nearly \$137M. While overall VMT on the network did decline, the average daily cost of congestion per VMT increased by 3.3%. Comparing November 2022 to 2021, this year's congestion costs represent a nominal improvement YOY of 0.8% or \$1.2M. November's top 10 freight bottlenecks also made a more significant contribution (+27.3%) to overall statewide network congestion costs versus October 2022 with a nearly 30% jump to more than \$8.1M in total cost of delay. As on the broader freight network, the top 10 bottlenecks represented less overall VMT, however the cost per VMT increased significantly in November. By comparison to last November, this past month's top freight bottlenecks were nearly \$4.7M more costly than November 2021. This past month's freight bottlenecks were also relatively new to the top 10 list with 8 of the top 10 appearing on the list from lesser rankings in the previous month.

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NCDOT RAIL DIVISION FREIGHT & LOGISTICS PROGRAM

The key NCDOT resource for supply chain, freight, and logistics-related issues, analysis, subject-matter expertise, related projects, and relevant initiatives.

MULTIMODAL FOCUS

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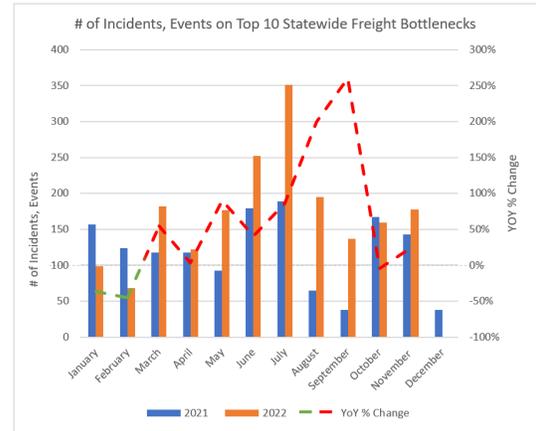
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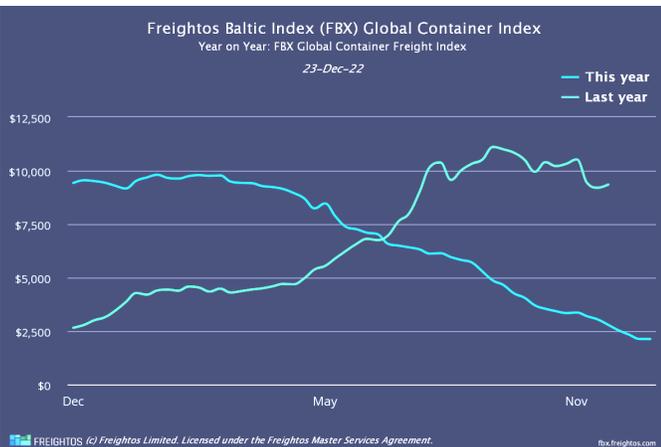
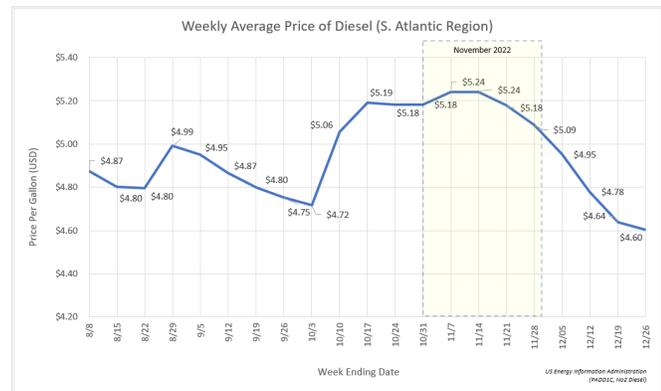
Cost of Congestion & Key Freight Bottlenecks, *continued*

This is especially relevant for three of the top 10 bottlenecks on I-40 between Canton and the Tennessee state line, a rare high ranking for a more rural stretch of the network. This stretch made a significant jump in the overall rankings due to extended delays of more than 5 hours per day and multiple incidents and events on the route. Other top bottlenecks were centered in urban or suburban areas, a more regular occurrence. November witnessed a 12% increase in incidents and events from the previous month, representing a 24% increase over November 2021 with this year continuing to outpace 2021 in overall incidents and events by more than 46% in YOY monthly average. As congestion costs continue to rise across the network, an overall decline in diesel fuel prices across the region proved to be a bright spot. After a six-month peak in prices by mid-November, diesel prices began a decline that continued into December with the last full week of 2022's \$4.60 per gallon representing the lowest price since the end of February 2022 (\$4.07).



Key Supply Chain Issues Facing North Carolina

Maritime freight rates declining as retailers and manufacturers shift to a new inventory management paradigm: After record prices on container freight rates in 2021 and early 2022, the cost of shipping intermodal freight from Asia to the US has declined significantly in 4Q2022. China to the US west coast freight rates are down 93% with a December 2022 price point of \$1,378 per forty-foot equivalent (FEU) from the all-time high rates in September 2021 according to the *Freightos Baltic Daily Index*, a widely-accepted bellwether index for global container freight rates. For Asia to the US east coast trade lanes rates are also declining albeit slower than the west coast. This lag reflects the last vestiges of congestion at some US east coast ports as well as a shift of volumes by shippers to the east coast as a measure to avoid potential maritime labor issues on the west coast. For trans-Atlantic trade lanes, rates remain at pre-COVID levels especially for Europe to the US east coast where rates were \$5,643 per FEU or nearly 3X rates in December 2019. Despite this, rates for the trans-Atlantic are declining and analysts expect it to fall further as carriers are signaling increased capacity on these routes in early 2023.



Inventory management practices are changing and this is another factor in the decline of maritime freight rates. As retailers and manufacturers have shifted to carry more inventory than in the past due to the impact of stockouts, component unavailability or delays, and perceived improving consumer confidence, trade volumes are softer than in years past when retailers relied on razor thin margins of inventory or producers more aggressively pursued just-in-time inventory for manufacturing. Major retailers such as Walmart have reported increased inventory in 3Q2022 of nearly 12.4% versus the same period last year. TJX, the parent company of T.J. Maxx, Marshalls, and Home Goods has reported a 26% increase in inventory while apparel and



footwear manufacturer Nike Inc. has reported a whopping 44% increase in inventory. From a broader view the entire retail sector is carrying higher levels of inventory. The sharply higher *monthly inventory-to-sales ratio* (chart on right) as tracked by the Federal Reserve Bank of St. Louis highlights this inefficiency of matching inventory to sales, but retailers are opting for this path versus the risk of running out of stock and losing potential sales. This ratio was especially high during the early pandemic with short supplies on items like toilet paper and disinfectants but has recovered slowly. Analysts claim this shifting view of inventory is a sign of major changes in consumer behavior and some retailers carrying higher inventory levels are poised to take advantage of resilient demand, especially in the apparel, appliances, and sports equipment sectors.