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LOGISTICS  
PROGRAM**

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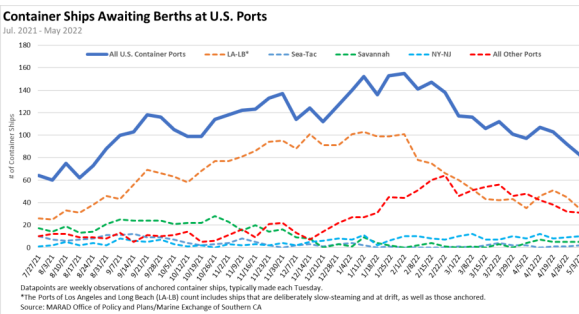
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**CONTACT US**

Dana Magliola  
[damagliola@ncdot.gov](mailto:damagliola@ncdot.gov)  
[supplychain@ncdot.gov](mailto:supplychain@ncdot.gov)  
919.707.0909

## Freight, Logistics & Supply Chain Year in Review: 2022

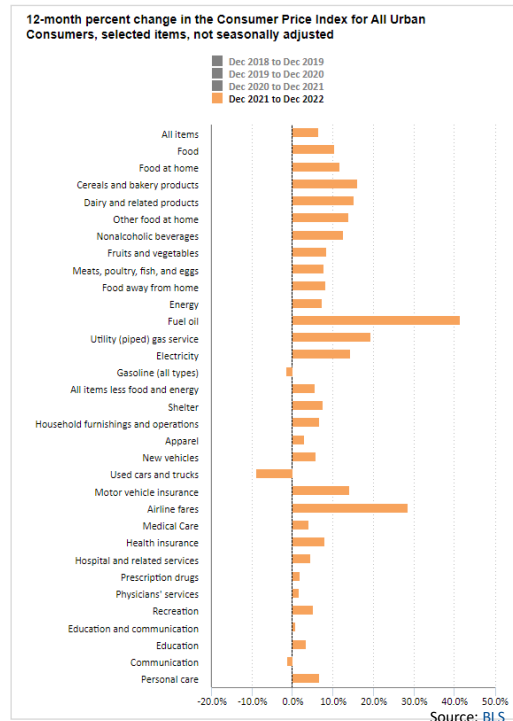
2022 was an interesting year for freight and the supply chain to say the least...It started with carry-over momentum of economic recovery from the end of 2021 and by the end of the first quarter, had reached new heights including a record \$7.7B growth in global trade. The post-COVID import surge which challenged many supply chains in 2021 continued leaving US west coast ports backlogged



with more than 100 ships awaiting service at the Port of Los Angeles/Long Beach. Port and supply chain congestion on the west coast peaked in February while both carrier and shipper diversions to the US east coast started to turn the tide. As a result, many US east coast ports began to post record volumes and a new bicoastal paradigm seemed to be emerging.

Then another shockwave hit the global economy with the outbreak of war in Europe following Russia's inva-

sion of the Ukraine. Oil, natural gas, and grain prices spiked turning bulls into bears across international markets and contributing to increasing global inflation. Consumer goods and food prices also grew at record pace. According to the USDA, all food categories exceeded their historical average growth rate with "food-at-home" prices growing by 11.4%, and "food-away-from-home" prices increasing by 7.7%. It wasn't just food and energy prices on the rise as nearly every sector saw increased prices. The producer price index for inputs to construction increased by 7.2% in 2022, outpacing the 6.5% increase in the US Consumer Price Index (CPI). Despite the challenge of 40-year peak inflation, corporate profits soared across many industrial sectors. According to economists at the Federal Reserve Bank of Kansas City, markup growth (increased prices for consumers) "likely contributed more than 50 percent to inflation in 2021, a substantially higher contribution than during the preceding decade," a trend which continued into 2022. In response to creeping inflation, in late March, the US Federal Reserve began to adjust monetary policy, increasing the benchmark interest rate seven times over the year reaching their highest level in 15 years.



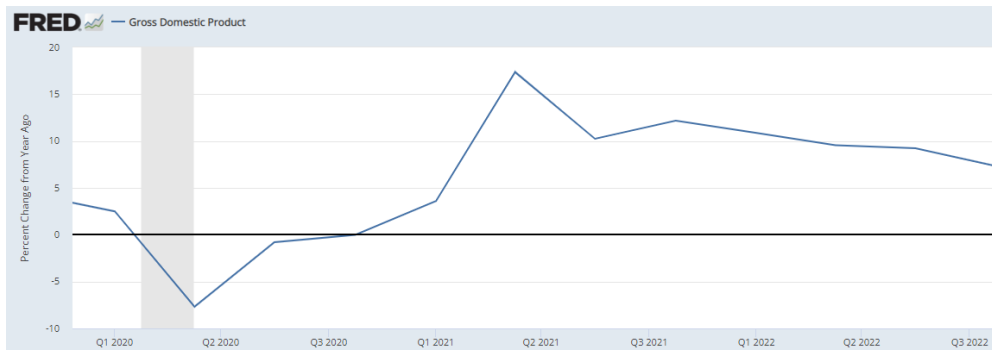
Macroeconomic dynamics aside, COVID-related complications continued to linger well into 2022. In China, the omicron variant of COVID-19 and China's No-COVID policy shut down factories across the world's largest manufacturing economy. In maritime, major Chinese ports including the world's largest, Shanghai, ground to a halt further complicating the global supply chain. With war, ongoing pandemic, and inflation, talk of recession took over the national economic dialogue in the early summer. The first two quarters of the year saw contraction in the US economy. Apropos, in July, Google searches for "recession" overtook similar searches for "inflation." However, by the end of 2022...

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## Freight, Logistics & Supply Chain Year in Review: 2022, *continued...*

the US national GDP had grown by 2.1% annually following real GDP growth in the second half of the year. Increased consumer spending, growth in exports and inventory levels, non-residential fixed investment, and a strong job market were key drivers for growth, and staving off recession (for now).



Labor, *organized* labor in particular, was an important part of the shifting economic landscape in 2022. According to a Gallup poll in August, 71% of the American public support unions, labor's highest approval rate since 1965. Unsurprisingly, union membership gained ground in nearly every sector in 2022. Durable goods manufacturing added 76,000 union-represented jobs, while transportation and warehousing added an additional 46,000 union-represented jobs. Labor's largest gains were in the leisure and hospitality sector, adding more than 102,000 new jobs. The public sector gained a net 87,000 jobs largely driven by growth in union state government jobs primarily at colleges and universities. (Overall, North Carolina ranks 49th in number of employees represented by unions with 3.9% of the labor force, up 0.5% from 2021.)

This past year also witnessed significant labor actions including the largest strike in US higher education history. Many of the most significant strikes or work stoppages occurred in the freight transportation and supply chain sectors. There were at least 38 protests, strikes, or labor actions impacting port operations in 2022 globally, four times the previous year's total. Global organized labor strikes at ports and rail facilities in South Korea, Germany, France, and the United Kingdom brought headwinds to the automotive, semiconductor, and petrochemical sectors,

### Strikes on the rise

The number of major U.S. labor strikes – defined as involving more than 1,000 workers – rose in 2022 but remains far below figures from the 1980s and even the 1990s.

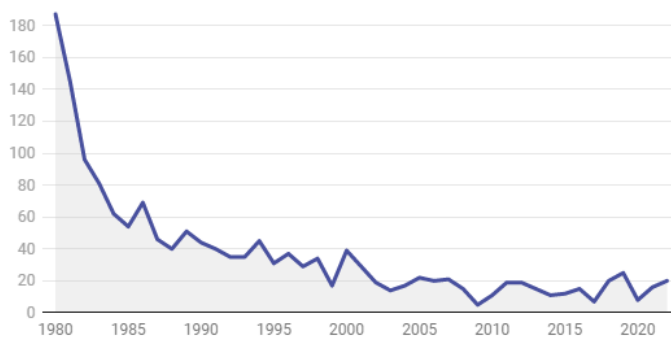


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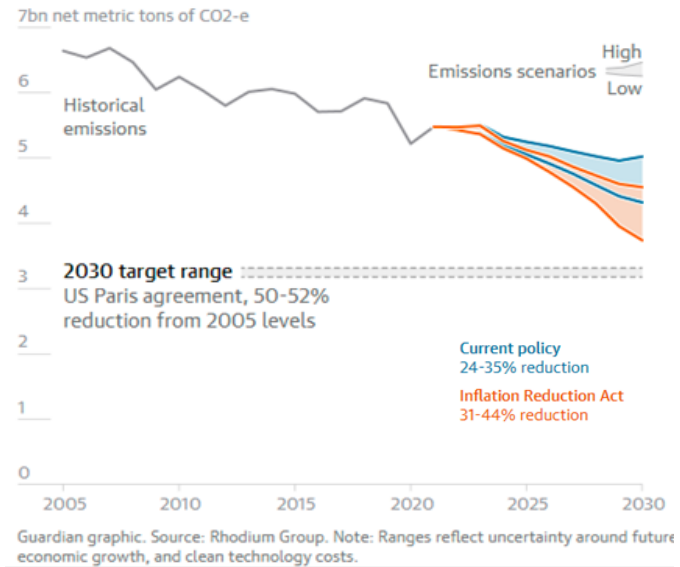
as well as snarled general container traffic with pain points in Busan (KR), Bremerhaven, Bremen (DE), Liverpool and Felixstowe (UK). In the US, much of the attention on labor also centered on maritime and freight rail. In May, as US west coast ports were finally whittling down historic levels of congestion, negotiations stalled between the International Longshore and Warehouse Union (ILWU) and the Pacific Maritime Association, representing carriers and ports on the US west coast. Uncertainty about the west coast labor situation added additional incentive for shippers to divert more cargo to US east coast ports, further strengthening this paradigm shift east. A March strike by Canadian freight rail workers delayed lumber and raw material flows into the US, challenging the entire US freight rail network. By the end of 3Q2022, domestic freight rail labor relations were front and center in national economic and policy discussions. Operating for nearly 3 years without a contract and following several negotiation stalemates, it took the involvement of a Presidential Emergency Board to bring US freight rail companies and labor together on a tentative labor agreement. Further uncertainty loomed well into 4Q2022 following the failed agreement ratification by several rail unions. In December, leveraging the authority of the Railway Labor Act of 1926, Congress passed legislation approving a final contract between the freight railroads and labor unions representing more than 115,000 rail workers across the US, thereby averting any potential strike or lockout which would have had further significant negative impact on the US supply chain.

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## Freight, Logistics & Supply Chain Year in Review: 2022, *continued...*

In a year where geopolitical uncertainty and spiking fossil fuel prices drove attention and investment into alternative fuels, sustainability and resiliency (both environmental and economic) may be key factors in growing importance of the clean energy sector and bringing about climate-smart policy changes. Supporting this trend is the landmark federal investment being made in pursuit of resiliency through legislation such as the Inflation Reduction Act (IRA), the Infrastructure Investment and Jobs Act (IIJA), as well as further commitments by the US to addressing global climate challenges through the United Nations' efforts. The \$700B IRA offers the potential for a 40% reduction in US greenhouse gas emissions by 2030, while the \$1.2T IIJA creates and funds several new programs aimed at mitigating the impact of climate change and improving the resiliency of the United States' surface transportation system including \$15B for low-carbon mobility, \$2.5B for charging infrastructure, a \$5B Clean School Bus program and even \$1.25B for low-carbon ferries. At the international level, through the UN's Convention on Climate Change (COP27), the US will support an international *loss and damage fund* which will provide financial support to nations most vulnerable to the impacts of climate change. Adding further incentive to develop supply chain resiliency, according to the National Oceanic and Atmospheric Administration (NOAA), a total of 18 extreme weather and climate disasters across the country cost the US more than \$165B in damage in 2022, ranking it as the third costliest year ever.



Plenty of freight and supply chain questions remain for the year ahead in 2023. Will the recession economists mistakenly predicted for 2022 find us in 2023? Will the crypto collapse of 2022 bring on new oversights or slow adoption of supply chain-relevant technologies like blockchain. Will the investment in resiliency support continued shift towards renewable or green technologies? Will war in Europe continue and how will the global economy adapt? Will the momentum and leverage of labor continue into the new year? If 2022 is any indication, any answer we might have for these questions in this January will be rendered irrelevant by an unpredictable year ahead.

## Cost of Congestion & Key Freight Bottlenecks — December 2022 Recap

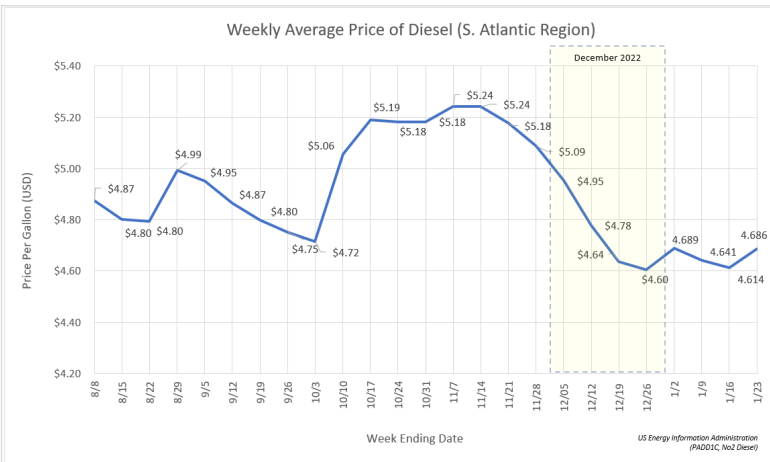
*Delay and congestion cost commercial industry millions of dollars each year. This cost eventually becomes a burden on the sustainability of the freight transportation sector, and the cost of goods and services for the end-consumer. This can be as straightforward as friction between volume and capacity,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

Performance Measure	Oct-22	% CHANGE	Nov-22	% CHANGE	Dec-22	% CHANGE	Quarterly Summary (Q4) *	Quarterly % CHANGE (Q4)
NCPFN System Total Commercial Cost of Delay	\$ 134,762,400	2.1%	\$ 136,946,410	1.6%	\$ 143,619,425	4.9%	\$ 138,442,745	5.81%
NCPFN System Commercial Average Daily Cost per VMT	\$ 0.30	0.0%	\$ 0.31	3.3%	\$ 0.30	-3.2%	\$ 0.30	4.6%
Commercial VMT on the NCPFN System	449,816,861	2.1%	436,387,806	-3.0%	474,527,959	8.7%	<b>1,360,732,626</b>	0.79%
NCPFN System Com. Vehicle-hours of Delay (#Hours)	1,341,053	2.1%	1,362,787	1.6%	1,429,192	4.9%	1,377,677	5.97%
NPMRDS Network Analysis							* BOLD = Total    Italics = Average	



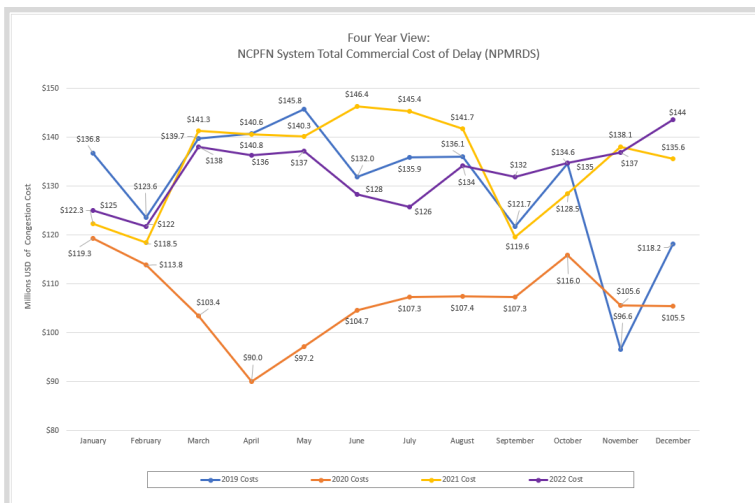
## Cost of Congestion & Key Freight Bottlenecks, *continued*

December 2022 was the third month in a row of increased congestion costs on the Statewide Priority Highway Freight Network totaling more than \$143.6M including a monthly 4.9% increase of nearly \$6.7M. This was a YOY increase of 5.9%, or more than \$8M over December 2021. Total network VMT increased in December by 8.7% reaching more than 474.5M miles, the highest monthly VMT for 2022. Fuel prices continued to decline with December's south Atlantic region diesel prices dropping below \$5/gallon from peak prices in November helping to ease the sting of congestion inefficiencies for carriers. Looking at the final quarter of 2022, each metric category experienced an increase in cost and congestion over the previous quarter with commercial vehicles traveling more than 1.36B miles on the network from October through the end of the year. By comparison to 4Q2021, the final quarter of 2022 averaged nearly \$4.4M more in congestion costs per month. Fuel prices in 4Q2022 nearly peaked for the year in November while December prices were some of the lowest experienced in the region in 2022. The roller coaster continued as prices fluctuated further in January 2023.



## Cost of Congestion & Key Freight Bottlenecks — Annual 2022 Recap

Performance Measure	2022 Annual				
	2022 Averages	YOY Change 2021-2022 Averages	2022 Totals	YOY Change 2021-2022 Totals	YOY % Change 2021-2022 Totals
NCPFN System Total Commercial Cost of Delay	\$ 137,767,490	1.1%	\$ 1,653,209,875	\$ 17,790,310	1.1%
NCPFN System Commercial Average Daily Cost per VMT	\$ 0.29	3.4%			
Commercial VMT on the NCPFN System	472,610,748		5,671,328,974	(118,006,972)	-2.1%
NCPFN System Com. Vehicle-hours of Delay (#Hours)	1,370,957	2.1%	16,451,487	347,100	2.1%
NPMRDS Network Analysis					



In 2022, the Statewide Priority Highway Freight Network experienced a monthly average of more than \$137.7M in congestion costs totaling more than \$1.65B annually for commercial carriers, a nominal increase of 1.1% or nearly \$1.78M over 2021. Vehicle hours of delay increased on average by 2.1% monthly with a YOY increase of more than 347 thousand hours over 2021 figures. However, despite the increase in congestion costs, and hours of delay, total VMT on the network decreased by 2.1% or more than 118M miles versus last year. To the left is a four-year comparison of commercial congestion costs on the network.

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## Cost of Congestion & Key Freight Bottlenecks, *continued*

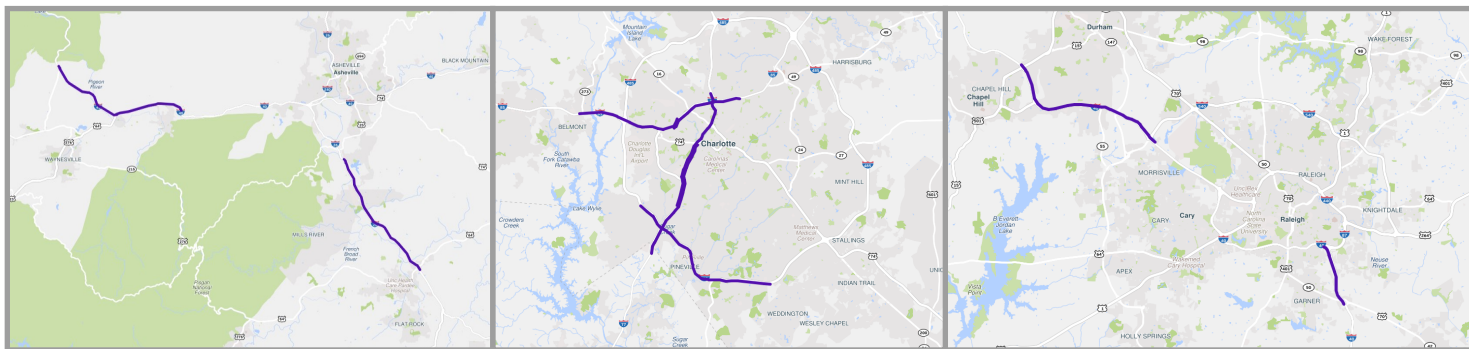
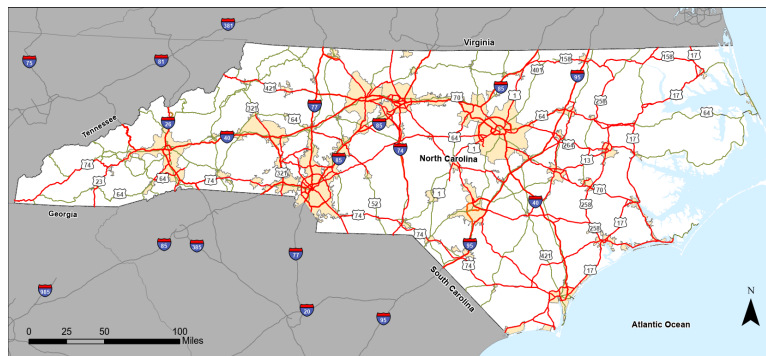
Rank	Top Freight Bottleneck Locations - August 1, 2022 - January 31, 2023	Average Daily Delay*	Division
1	I-40 East at US-70, Exit 306 between Garner and Clayton	2 h 15 m	5
2	I-77 South at Nations Ford Road, Exit 4 in south Charlotte	1 h 27 m	10
3	I-26 West at NC-146 Exit 37 south of Asheville	2 h 31 m	13
4	I-40 West at US-276, Exit 20 between Clyde & Waterville Lake	2 h 14 m	13
5	I-85 South at NC-273, Exit 27 between Charlotte and Belmont	1 h 8 m	10
6	I-77 North at US-74, Exit 9 near Bryant Park	42 m	10
7	I-485 East at NC-16, Providence Road, Exit 57 in Charlotte	1 h 38 m	10
8	US-74 East at US-601 Pageland Hwy. east of Charlotte	1 h 22 m	10
9	I-77 North at Woodlawn Road, Exit 6 in Charlotte	51 m	10
10	I-40 West at US-15/US-501 between Durham and Chapel Hill	1 h 55 m	5

\* hours per day in which congestion was present

After reviewing our process for freight bottleneck analysis, which has been a staple in the Freight & Logistics Bulletin, we have determined approaching the analysis on a monthly basis was not an effective lens by which to view statewide freight bottlenecks. Each month would

provide unique, or mostly unique sites captured in the top 10, however a monthly comparison of relevant congestion costs and delay figures to illustrate or identify trends proved to be too much like comparing apples and oranges. In August 2022, we also switched to a new data provider and similar to the monthly approach, comparing data before and after this change proved problematic. In order to provide a more meaningful overview of freight bottlenecks, we will now be using a six-month rolling capture of the top 10 statewide freight bottlenecks on the Statewide Priority Highway Freight Network, as well as trending their rank on this basis. We also identified issues, inaccuracies and regional disparities in the reporting of incidents and events and have henceforth discontinued tracking and comparing these metrics. We will continue to work on improving our analysis to ensure it provides meaningful perspectives and coherent analysis on freight fluidity within the state of North Carolina. Many of you have contacted us in the past about our process and if you would like more information on this revised approach, please do not hesitate to reach out. These rankings represent the first capture of freight bottlenecks using this revised process and identifies the top 10 bottlenecks from August 1, 2022 through January 31, 2023.

### NC Statewide Priority Highway Freight Network



Top 10 Freight Bottlenecks on the Statewide Priority Highway Freight Network  
August 1, 2022 through January 31, 2023