

# 2022 GREAT LAKES – ST. LAWRENCE SEAWAY WATERWAY TONNAGE ACTIVITY



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## Introduction

The Great Lakes – St. Lawrence Seaway Waterway (GLSLW) is a strategically important commercial thoroughfare in North America. This waterway connects Canada to the United States (U.S.) and connects inland North America to other parts of the world through the Atlantic Ocean. Stretching east from Lake Superior to the end of the St. Lawrence River and beyond, this bi-national trade corridor serves the U.S. and Canada's most vital inland markets and facilitates billions of dollars of economic activity annually. According to estimates, the Great Lakes – St. Lawrence region states and provinces (Minnesota, Wisconsin, Illinois, Indiana, Michigan, Ohio, New York, Pennsylvania, Ontario, and Quebec) had a combined annual Gross Domestic Product (GDP) of roughly \$8 trillion in 2022.

The commodities moved on the GLSLW are transported by either Canadian-flag, U.S.-flag, or foreign-flag ships. These vessels move upbound (westward) and downbound (eastward) loading and/or unloading a wide range of commodities at North American ports within the system either for domestic use or destined to / originating from foreign ports. This report gives a description of the tonnage volume transported within the GLSLW for the 2022 calendar year, activity that supports hundreds of thousands of jobs on ships, in ports, and other business units.

## Executive Summary\*

The findings of this report estimate that **143.0 million metric tonnes<sup>1</sup>** of cargo were moved on the GLSLW during the period. This activity supported hundreds of thousands of jobs on ships, ports, and other sectors of the economy.

The findings of the report show:

Overall, cargo shipments on the binational navigation system (143 million metric tons in total) were down **-4%** compared to 2021. The results represent a slowdown in the system's post-pandemic recovery – with tonnage totaling about 92% of 3-year pre pandemic average.

- Despite a **-2.9%** drop in iron ore tonnage, it continues to be the most traded commodity on the system, accounting for roughly a third of total cargo tonnage on the GLSLW. Construction related commodities such as stone, cement, steel, and other dry bulk commodities account for another third of tonnage cargo.
- Canadian-flag ships carried **62.1 million metric tons** of cargo, a decrease of **-1.8%** compared to 2021. Total cargo tonnage was roughly 96% of the five-year average. While commodities like coal, stone, steel, and petroleum products posted increases – these were offset by decreases in shipments of cement, iron ore, grain, other dry bulk, and liquid bulk products. Upon the relaxation of travel restrictions, petroleum product shipments rose by 9.2% (after a -5.7% decline in 2021 due to restrictions in place through 2021).
- U.S.-flag ships experienced decreases in key cargo sectors, carrying a total of **69.3 million metric tons** (76.4 million net tons) – down **-6.6%** over 2021. Total tonnage fell to 93% of its five-year average, after recovering to about 98% in 2021. Iron ore and coal shipments were both down at **-10.2%** respectively, erasing the recovery gains from pandemic lows.
- Foreign-flag ships transported **11.7 million metric tons** of cargo through the St. Lawrence Seaway to and from overseas destinations – slightly surpassing 2021's performance (+0.3%). Ocean-going vessels played an important role in exporting Canadian and U.S. grain, potash for fertilizer, and other dry bulk products to overseas markets.

<sup>1</sup> This also includes upbound and downbound cargo carried by Canadian-flag vessels in the lower St. Lawrence River and beyond Anticosti Island and into the Atlantic and Arctic Regions. It also includes cargo carried by foreign-flag vessels that at some point passes through the Canadian portion of the St. Lawrence Seaway lock system.

\* Please note; all tonnage numbers in the text of this report are rounded to one decimal place.





## 2018-2022 Great Lakes – St. Lawrence Seaway Waterway Tonnage Summary (Million Metric Tonnes)

	Source	2018	2019	2020	2021	2022	2022/2021% CHANGE
CANADIAN FLAG	(1)	66.9 MT	65.3 MT	64.0 MT	63.2 MT	62.1 MT	-1.8%
U.S. FLAG	(2)	76.0 MT	81.7 MT	63.5 MT	74.2 MT	69.3 MT	-6.6%
FOREIGN FLAG (GL-SEAWAY)	(3)	13.6 MT	11.2 MT	11.6 MT	11.6 MT	11.7 MT	+0.03%
<b>TOTAL GL-SLW</b>		<b>156.5 MT</b>	<b>158.2 MT</b>	<b>139.2 MT</b>	<b>149.0 MT</b>	<b>143.0 MT</b>	<b>-4.0%</b>
<b>ST. LAWRENCE SEAWAY (Total)</b>	<b>(3)</b>	<b>41.0 MT</b>	<b>38.4 MT</b>	<b>37.8 MT</b>	<b>38.2 MT</b>	<b>36.3 MT</b>	<b>-4.86%</b>

(1) CMC Tonnage Survey

(2) Lake Carriers Association – Annual Reports, 2021, 2022

(3) St. Lawrence Seaway Management Corporation

## Organization

Following a brief overview, this report analyzes the tonnage activity trend of some of the system's core commodities and the composition of this tonnage, based on the three proprietary tonnage data sources. Canadian-flag vessel tonnage data was sourced from major Canadian domestic ship owners, while the foreign-flag vessel tonnage and U.S.-flag vessel tonnage data was provided by The St. Lawrence Seaway Management Corporation and the Lake Carriers' Association (LCA), respectively.

## Overview

The macroeconomic backdrop for trade in 2022 was marked with uncertainty, following the COVID pandemic. In January 2022, the Bank of Canada's key overnight rate stood at the effective lower bound of 0.25%, and the Bank was projecting inflation would peak at roughly 5% in the first half of 2022 before moderating through the second half of the year. In March, the Bank took its first step in what it described as "a rising path" for interest with a 0.25% increase in its overnight rate. However, by June, Russia had invaded Ukraine, global energy prices (using West Texas Intermediate crude as a benchmark) were 160% of what the

Bank's economic projections were based upon. Inflation in Canada was running at 8.1% (highest reading since 1983), primarily driven by increases in energy prices. The story in the U.S. was similar, as U.S. inflation for June 2022 was 9.1%.

Consequently, the U.S. Federal Reserve and the Bank of Canada took steps to combat inflation and restore price stability with 0.75% rate increases through the second half of the year. These factors negatively impacted business and consumer purchasing power in 2022 and partly contributed to the weaker tonnage activity for some of the commodities moved on the Great Lakes – St. Lawrence Waterway. Despite these challenges, the GLSLW remained resilient and served as a relief corridor for European markets looking to source grain, potash for fertilizer and other dry bulk commodities from outside the Black Sea trade corridor.



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## Great Lakes – St. Lawrence Waterway Tonnage:

Table 1 presents a summary of cargo tonnage transported on the GLSLW in 2022, while figure 1 provides a breakdown of the different commodities moved. Major commodity categories experienced softness in 2022. Total tonnage was approximately **143.0 million metric tonnes**, which represents a **-4.0%** decrease over 2021 tonnage (**149.0 million metric tonnes**). This decrease was due to a drop in Canadian-flag and U.S.-flag vessel tonnage. U.S.-flag tonnage was **-6.6%** less than in 2021,

while Canadian-flag vessel tonnage was **-1.8%** below the previous year. Conversely, foreign-flag vessel tonnage eked out 0.3% growth in 2022.

The share of GLSLW tonnage carried on Canadian-flag vessels increased in 2022 from 42.4% in 2021 to **43.4%**, while the share of U.S.-flag vessel tonnage decreased from about 49.8% in 2021 to **48.5%** in 2022. The share of foreign-flag vessels tonnage increased slightly to approximately **8.1%** in 2022 (up from 7.8% in 2021).

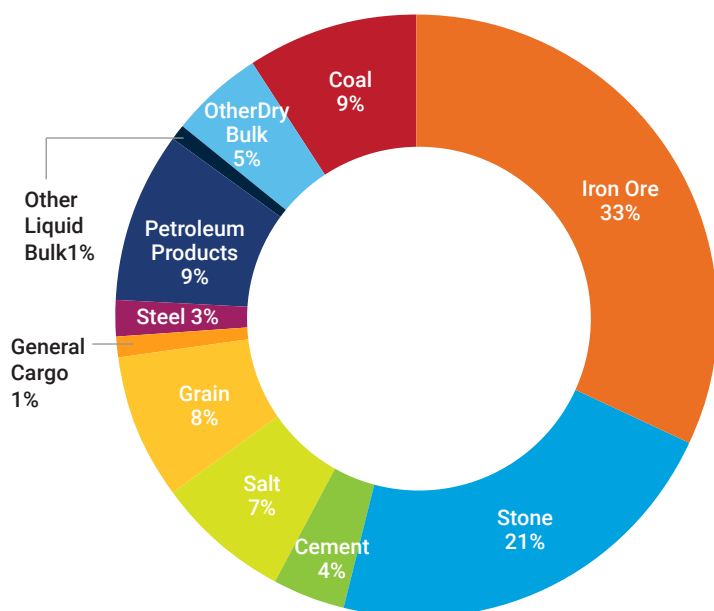
**Table1** 2022 Great Lakes – St. Lawrence Waterway Tonnage Cargo Breakdown

	Metric Tonnes
Cement	6,289,884
Coal	12,641,267
General Cargo	1,523,429
Grain	12,032,076
Iron Ore	45,304,088
Other Dry Bulk	7,717,342
Other Liquid Bulk	682,516
Petroleum Products	12,095,023
Salt	9,770,414
Steel	3,183,664
Stone	31,764,464
<b>Total</b>	<b>143,004,167</b>

\* Source: Chamber of Marine Commerce, Annual Tonnage Survey



**Figure 1 2022 Percentage Breakdown of Cargo Type on GLSLW**



## Canadian-flag Vessel Tonnage<sup>2</sup> :

Tonnage moved on Canadian-flag vessels in 2022 fell from **63.2 million metric tonnes** in the previous year to approximately **62.1 million metric tonnes**, making for a **-1.8%** decline. Major commodities transported on Canadian-flag vessels experienced softer demand in 2022, except for coal, stone, steel, cement, and petroleum (these commodities make up just roughly 30% of total Canadian-flag tonnage). Figure 2 shows that the drop in tonnage moved in 2022 was a deviation from the long-run average trend seen in recent years. The total cargo carried on Canadian-flag vessels in 2022 was roughly **-3.8%** less than 5-year average of **64.5 million metric tonnes** recorded over the previous five years.

After an unfavorable crop yield in 2021, grain tonnage aboard Canadian-flag vessels was down again in 2022. Despite the general increase in Canadian crop production

over 2022, dry soil conditions persisted in many parts of the Canadian Prairies during the growing season, affecting crop yield in those regions. These conditions contributed to a **-4.5%** drop in tonnage of grain carried on Canadian-flag vessels. The market for grains continue to experience variability due to dependance on weather conditions. As shown in Table 2, over the past 5 years, grain shipments on Canadian-flag vessels have increased and decreased every other year. The volume of grain moved on Canadian-flag vessels in 2022 was about **94%** the 5-year average, down from 98% in 2021.

With Canadian steel production in 2022 down by -7.8% according to the World Steel Association, Canadian-flag vessels moved less (**-527k tonnes**) iron ore (key steelmaking components) in 2022. Between 2015 and 2018, iron ore accounted for roughly 23% of total Canadian-flag vessel tonnage. However, this number has been on a steady decline over the past 4 years. In 2022, iron ore volume on Canadian-flag vessels was down by **-4.5%**, while its share of total Canadian-flag tonnage was down to 18%.

Shipments of salt on Canadian-flag vessels were also down by **-0.3** in 2022. Like 2021, the warmer 2022 winter likely left regional authorities with sufficient reserves for the winter 2022 season. Despite the decrease, salt volumes moved on Canadian-flag vessels are still 2% above the 5-year average recorded in the preceding years. Figure 3 shows the breakdown of the commodities transported by Canadian-flag vessels in 2022. Notwithstanding the drop in iron ore, salt, and grain volumes moved, they account for approximately 45% of the tonnage aboard Canadian-flag vessels.

Government lockdowns and mobility restrictions in 2020 and 2021 forced people to reduce their demand for domestic and international travel, which led airlines to cancel travel routes and ground planes. Decreased transportation demand consequently led to decreased demand for petroleum products in those years. However, those restrictions were either relaxed or removed entirely in 2022. This led to an increase in demand for petroleum products. Tonnage of petroleum products (about 19% of total Canadian-flag tonnage in 2022) increased by **9.2%**. This was after a decline of **-6.6%** and **-5.7%** in 2020 and 2021 respectively.

<sup>2</sup> This includes tonnage moved on Canadian-flag vessel owned/operated by members of the Chamber of Marine Commerce, including members of CMC Domestic Shipowner Committee.



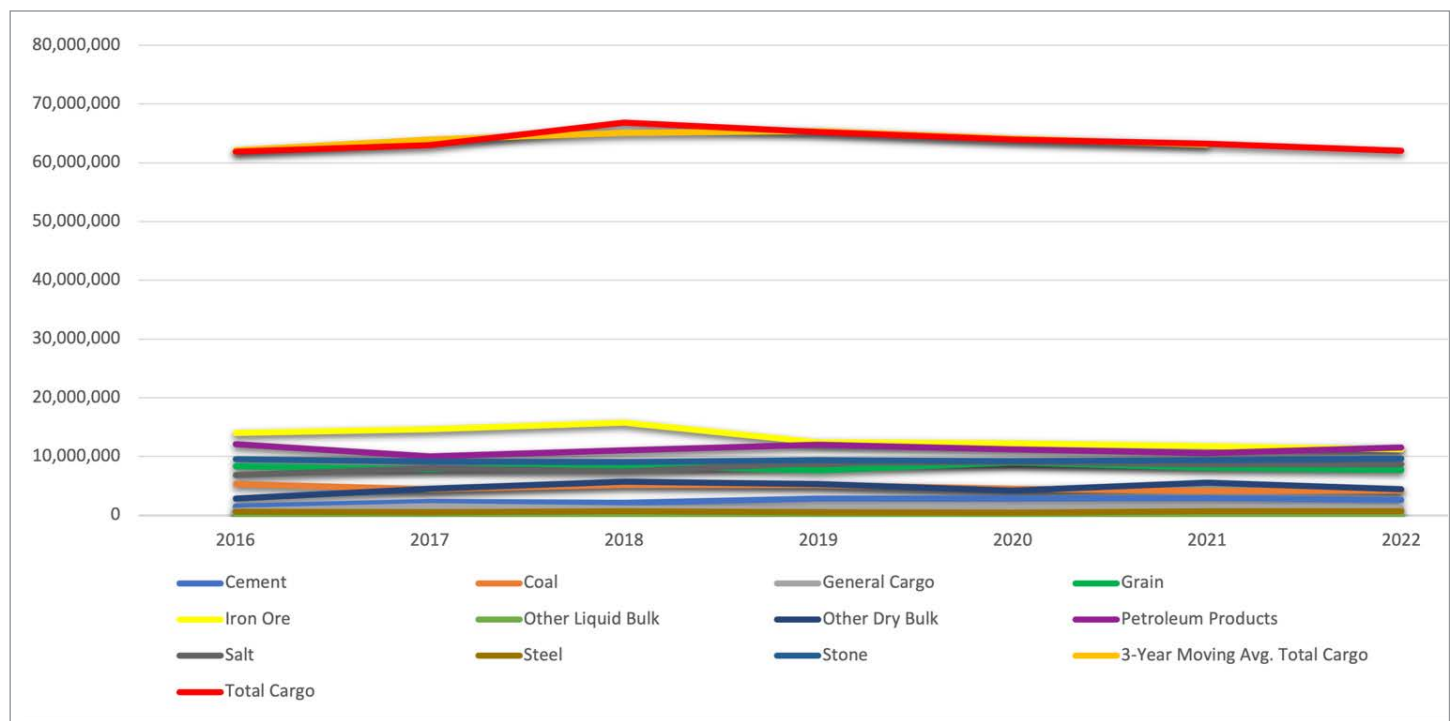


**Table 2 Canadian Flag Vessels Great Lakes-St. Lawrence River Waterway Tonnage (2017-2022)\***

	2017	2018	2019	2020	2021	2022	5-Y-AVG
<b>Cement</b>	2,276,086	2,143,260	2,807,172	2,813,603	2,902,947	2,619,057	2,588,614
<b>Coal</b>	4,392,788	5,116,514	5,121,578	4,543,945	4,128,158	4,203,547	4,660,597
<b>General Cargo</b>	1,534,238	1,181,770	1,099,365	1,163,840	1,374,982	1,254,010	1,270,839
<b>Grain</b>	7,830,841	8,508,281	7,601,268	9,005,759	8,078,112	7,712,573	8,204,852
<b>Iron Ore</b>	14,642,354	15,789,024	12,400,944	12,272,244	11,778,383	11,251,364	13,376,590
<b>Other Dry Bulk</b>	4,528,186	5,698,674	5,322,286	4,164,025	5,573,548	4,458,040	5,057,344
<b>Other Liquid Bulk</b>	90,439	109,453	114,682	94,899	91,806	72,819	100,256
<b>Petroleum Products</b>	10,007,189	11,062,544	11,982,491	11,198,236	10,560,148	11,530,135	10,962,122
<b>Salt</b>	8,045,543	7,501,736	8,885,257	9,093,977	8,656,634	8,631,955	8,436,629
<b>Steel</b>	532,553	654,592	556,591	411,400	717,041	718,124	627,410
<b>Stone</b>	9,132,784	9,084,943	9,373,055	9,202,187	9,346,796	9,605,660	9,227,953
<b>Total</b>	<b>63,013,001</b>	<b>66,850,791</b>	<b>65,264,689</b>	<b>63,964,115</b>	<b>63,208,555</b>	<b>62,057,284</b>	<b>64,513,204</b>

\* Source: Chamber of Marine Commerce, Annual Member Tonnage Survey

**Figure 2 Canadian-Flag Vessels Tonnage 2016-2022 (Metric Tonnes)**



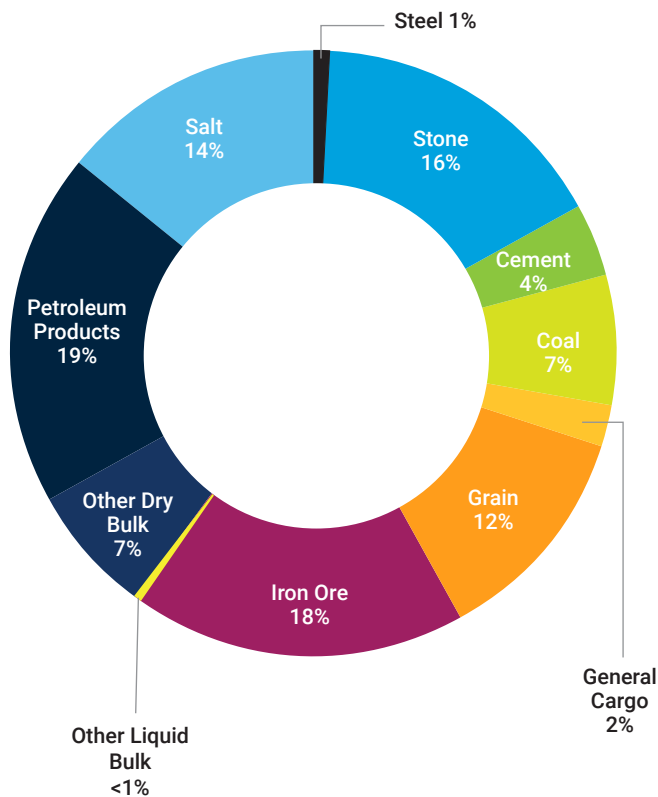
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Notwithstanding the overall softness of Canadian-flag vessel tonnage moved, a few commodities fared well in 2022. Notably, tonnage volumes of stone used for construction increased (+2.8%) in 2022. Infrastructure projects like the \$4.9 billion electric vehicle (EV) battery plant being constructed in Windsor, ON and the Gordie Howe International Bridge supported the expansion of the stone

trade on the GLSLW in 2022. As more investments are made in establishing the market for EVs in Canada, there is potential for Canadian-flag vessels to continue moving these construction materials and also some of the bulk minerals (e.g. lithium and copper) that will be required in the production processes at these plants.

**Figure 3 2022 Percentage Breakdown of Cargo Type Moved By Canadian-Flag Vessels**



## U.S.-Flag Vessel Tonnage<sup>3</sup>

Total cargo moved on U.S.-flag vessels decreased from 74.2 million metric tonnes in 2021 to **69.3 million metric tonnes**. This makes for a decrease of approximately **-6.6%**. Major commodities moved by U.S.-flag vessels on the Great Lakes experienced softness in 2022. Most noticeably, iron ore shipments fell by more than **-10.2%**. As seen in Table 3, iron ore tonnage was about **-15%** less than the 5-year average. The drop in U.S. steel production likely contributed to the decrease in iron float for 2022. According to the World Steel Association, steel plants in the U.S. produced about **-5.9%** less steel in 2022 than in 2021. This reduced level of steel production in the United States pos

sibly contributed to the fall in demand and shipments of iron ore. Likewise, shipments of coal, another key component in the steel-making process, were also lower in 2022 (**-10.2%**). U.S.-flag vessels moved nearly **1 million MT** less coal during the season.

Due to lower yields in 2021, shipments of grain products carried aboard U.S.-flag vessels on the Great Lakes were still suppressed in 2022, decreasing by roughly **-2.6%**. Cement shipments grew by roughly **4.0%** (+124k tons). Likewise, salt tonnage increased by about **6.0%** (+62k tons).

**Table 3<sup>4</sup> U.S.-Flag Dry Bulk Cargo Movement on the Great Lakes 2017-2022 and Long-Term Average (Net Tons)**

Commodity	2017	2018	2019	2020	2021	2022	Average 2017-2021
<b>Iron Ore</b>							
Direct Shipments	41,924,553	41,711,804	46,004,805	33,422,404	41,025,561	35,370,648	40,204,760
Transshipments	4,064,262	4,092,629	3,678,669	3,637,614	625,628	2,017,176	3,832,826
<b>Total - Iron Ore</b>	<b>45,988,815</b>	<b>45,804,433</b>	<b>49,683,474</b>	<b>37,060,018</b>	<b>41,651,189</b>	<b>37,387,824</b>	<b>44,037,586</b>
<b>Coal</b>							
Lake Superior	10,254,462	8,697,702	7,952,133	4,930,728	7,268,985	6,160,250	7,820,802
Lake Michigan	369,327	390,438	723,841	560,057	827,962	878,467	574,325
Lake Erie	2,708,708	2,728,192	2,642,972	1,764,650	2,255,738	2,262,121	2,420,052
<b>Total - Coal</b>	<b>13,332,497</b>	<b>11,816,332</b>	<b>11,318,946</b>	<b>7,255,435</b>	<b>10,352,685</b>	<b>9,300,838</b>	<b>10,815,179</b>
Limestone	21,553,131	21,961,050	24,086,722	20,694,823	24,141,410	23,704,683	22,487,427
Cement	3,182,636	2,933,346	3,288,509	3,441,467	3,612,012	3,748,705	3,291,594
Salt	1,067,836	460,577	923,476	866,354	1,162,396	1,230,538	896,128
Sand	375,638	493,128	413,040	411,165	500,055	653,695	438,605
Grain	237,331	259,745	289,728	314,849	366,154	356,50	293,561
<b>Totals</b>	<b>85,737,884</b>	<b>83,728,611</b>	<b>90,003,895</b>	<b>70,044,110</b>	<b>81,785,901</b>	<b>76,382,786</b>	<b>82,260,080</b>

Source: Lake Carriers Association – Annual Report, February 2023

<sup>3</sup> This includes cargo tonnage moved by the LCA's 11 vessel owner/operator members servicing the Great Lakes

<sup>4</sup> 1 U.S. net ton is equal to 0.90718474 metric tonnes.





Figure 4 U.S.-Flag Vessel Tonnage 2017-2022 (Net Tons)

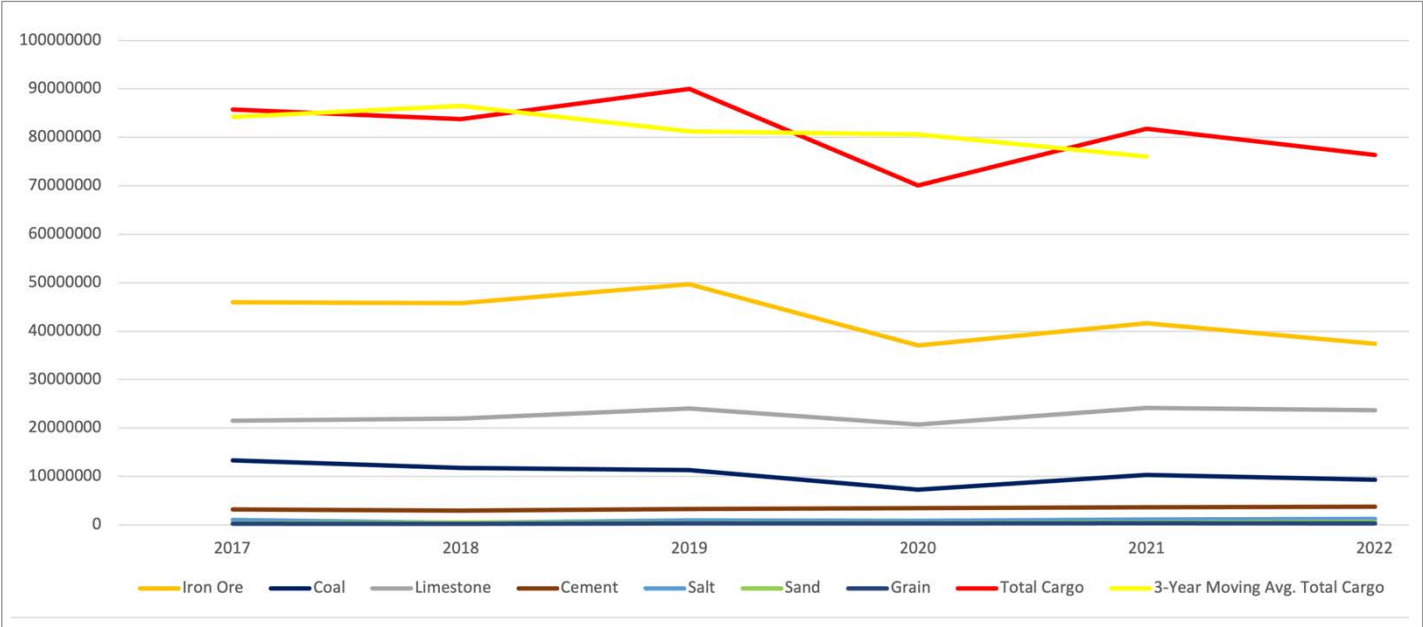
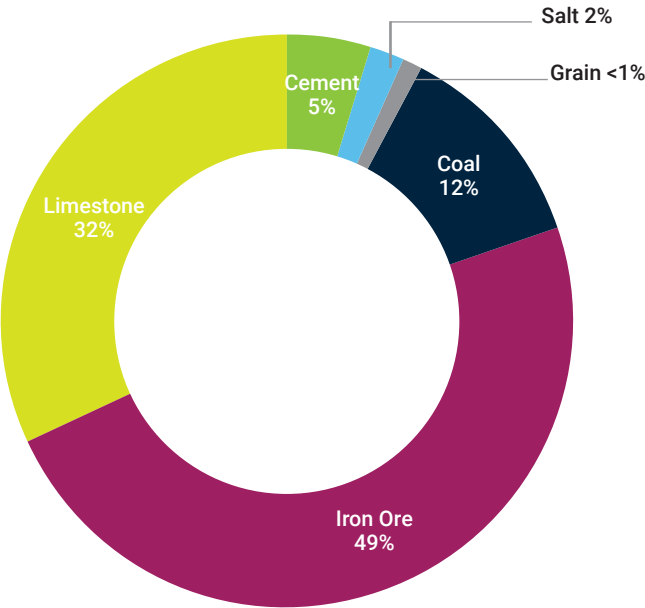


Figure 5 2022 Percentage Breakdown of Cargo Type Moved by U.S.-Flagged Vessels



## St. Lawrence Seaway Tonnage

Opened in 1959, the St. Lawrence Seaway (SLS) is a bi-national system of locks, which connects the Great Lakes to the lower St. Lawrence River and beyond. Vessel traffic on the Seaway excludes trades occurring exclusively in the upper four Great Lakes (Superior, Erie, Huron and Michigan) and exclusively in the lower St. Lawrence River and beyond. Total tonnage haulage through the St. Lawrence Seaway locks decreased by about **-4.9%** from 38.2 million metric tonnes to approximately **36.3 million metric tonnes**. Tonnage volume on Foreign-flag vessels, which accounted for roughly 30% (11.7 million metric tonnes) eked out a 0.3% increase in 2022, as increased liquid bulk, dry bulk compensated for the reduced grain, iron ore, coal, and general cargo tonnage.

As shown in Table 4, tonnage volumes of some commodities moved through the Seaway locks fell in 2022, with general cargo (**-21.8**), coal (**-16.3%**) & iron ore (**-10.0%**) experiencing the largest percentage declines. Tonnage of grain

through the SLS locks fell by **-5.8%**, as tonnage was negatively impacted by adverse weather conditions in the Canadian prairies. General cargo volumes were softer partially due to reduced steel imports. Foreign-flag vessels carried roughly **-30%** less steel in 2022 year-over-year, as Canadian steelmakers imported less steel.

For a second consecutive year, grain shipments on the SLS were down due to adverse weather conditions in Western Canada and U.S. Midwest in 2021. Grain shipments decreased by about **-5.8%** (**-613k** metric tonnes). This is a **-13.7%** below the 5-year average of grain shipment volumes. Grains remain the second most moved commodities through the SLS. Figure 6 shows grain shipments represented roughly 28% of the total tonnage through the St. Lawrence Seaway locks in 2022, which is in line with the average share seen in recent years.

**Table 4<sup>5</sup> St. Lawrence Seaway Total Tonnage Handled 2017 - 2022 (in Metric Tonnes)**

	2017	2018	2019	2020	2021	2022	5-Year Average
Grain	10,174,000	12,297,000	10,463,000	13,302,000	10,609,000	9,996,000	11,369,000
Iron Ore	8,227,000	7,487,000	6,910,000	6,080,000	6,872,000	6,201,000	7,115,000
Coal	2,250,000	2,516,000	2,391,000	2,439,000	2,116,000	1,771,000	2,342,000
Dry bulk	10,409,000	10,740,000	11,631,000	10,534,000	11,378,000	11,686,000	10,938,000
Liquid Bulk	3,779,000	4,585,000	4,693,000	3,077,000	3,233,000	3,516,000	3,873,000
General Cargo	3,382,000	3,322,000	2,193,000	2,257,000	3,909,000	3,058,000	3,013,000
<b>Total Cargo</b>	<b>38,280,000</b>	<b>41,011,000</b>	<b>38,375,00</b>	<b>37,762,000</b>	<b>38,193,000</b>	<b>36,336,000</b>	<b>38,724,000</b>
% Change Year/Year	+9.34%	+7.13%	<b>-6.43%</b>	-1.60%	+1.14%	<b>-4.86%</b>	
Total Vessel Transits	4,127	4,389	4,136	3,855	3,918	4,008	4,033

Source: St. Lawrence Seaway Management Corporation

<sup>5</sup> Note: 'Dry Bulk' includes commodities such as salt, cement, stone/Aggregate, etc. General cargo includes containerized cargo, oversized project cargo, aluminum and steel

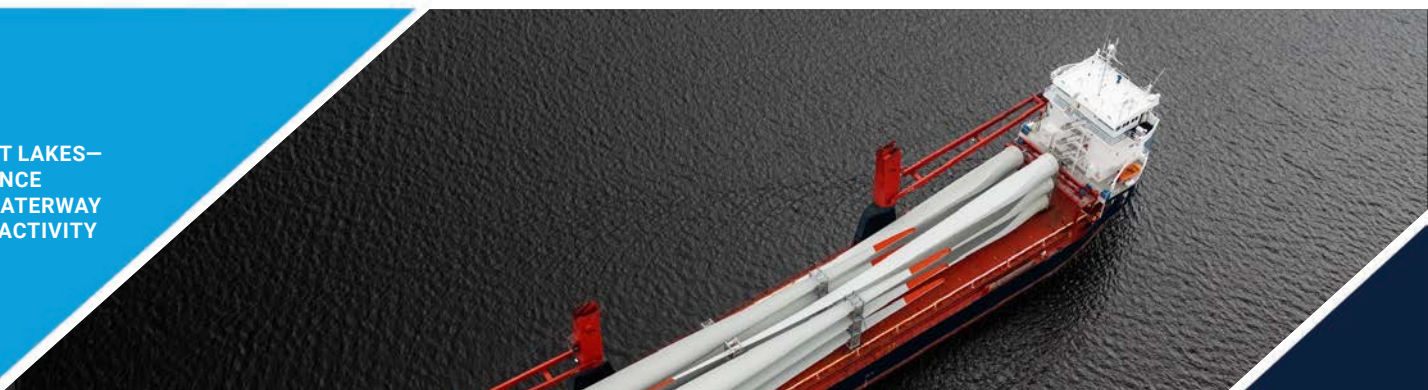


Figure 6 2022 The Breakdown of Cargo Type Moved Through St. Lawrence Seaway Locks

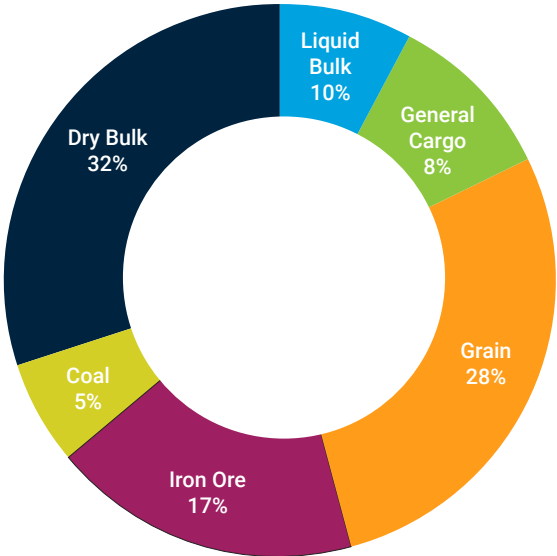
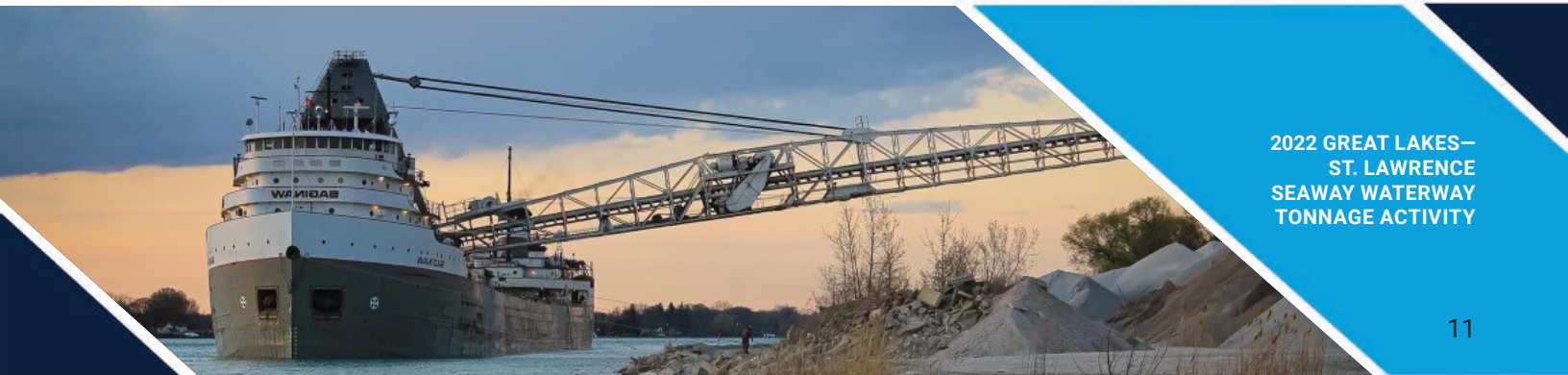
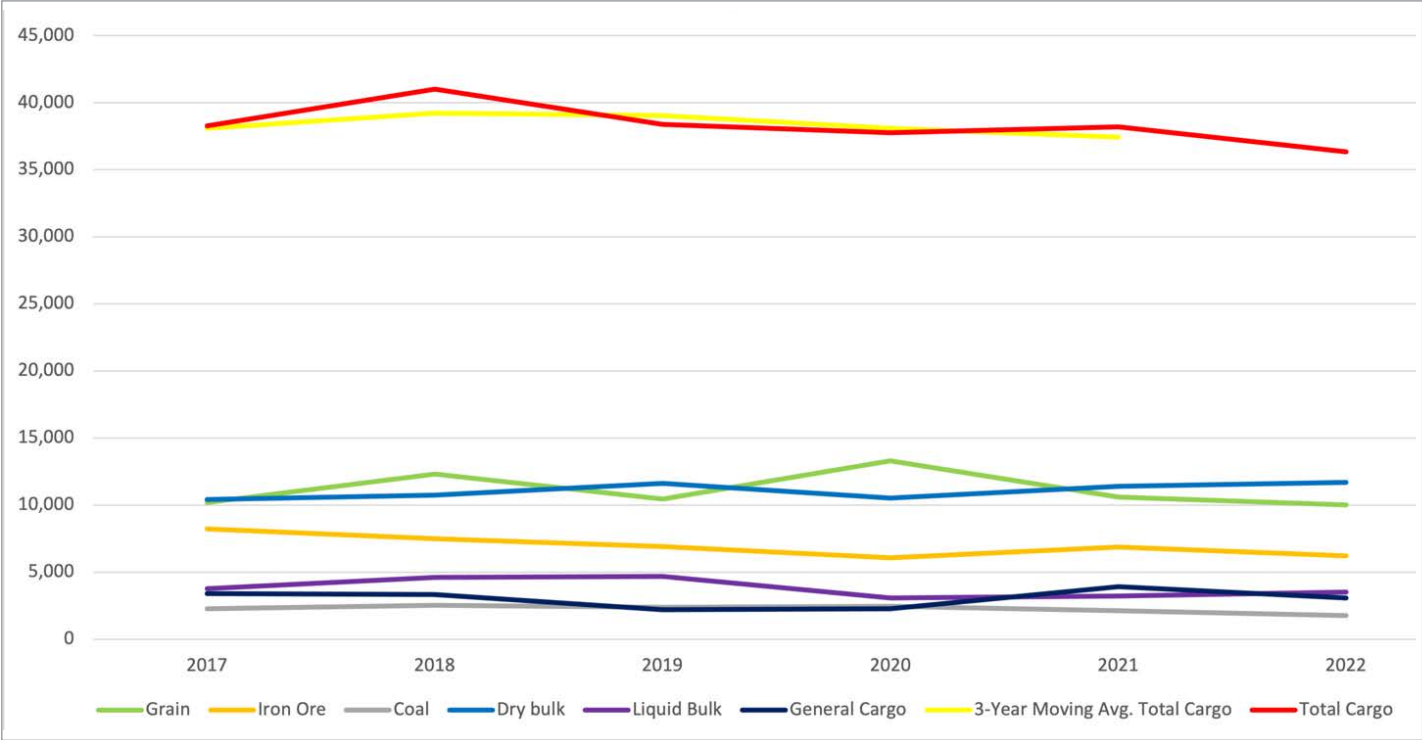


Figure 7 St. Lawrence Seaway Tonnage 2017-2022 (Metric Tonnes)





## Conclusion

Trade in 2022 was affected by macroeconomic conditions in the North American economy following the pandemic. Through the year, central banks and governments rolled back many of the policies which stimulated the post-pandemic recovery. The focus shifted to combatting inflation (which reach a 5-decade high in the summer of 2022) and restoring price stability to markets. Interest rates in North America continued to rise through the year, which eroded consumers' purchasing power and likely put downward pressure on the demand for construction-related commodities and consumer goods.

Unfortunately, the global economy also had to navigate the impacts of Russia's invasion of Ukraine in early 2022. The GLSLW provided much-needed relief to European markets looking to source grain products, potash for fertilizer, and other critical dry bulk commodities in the wake of the disruption in the Black Sea trade route.

The marketplace for grain products continues to show significant variability due to its dependence on weather and growing conditions. After a banner year in 2020, the 2021 and 2022 grain tonnage on the GLSLW were slightly below the 5-year average. Adverse weather conditions in the Canadian prairies and U.S. Midwest led to decreased yields in 2021 and consequently less grain tonnage moved in 2022. However, according to recent Statistics Canada reporting, the 2022 crop was a good crop. Particularly, wheat production reached the third highest level on record. This suggests there will be more grain movement in 2023.

Ultimately, the near term and medium-term outlook for most commodities is dependent on the path of inflation and interest rates. It appears the sharpest increases in interest rates to combat inflation are past. However, central banks are still constructing policies to help bring inflation back in line with targets. As inflation reduction policies are pursued in the coming months, demand for certain commodities may be impacted.

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