Annual Report

2021-2022 Crop Year

Monitoring the Canadian Grain Handling and Transportation System

Government of Canada / Gouvernement du Canada

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This report is available on the Quorum Corporation website.
www.grainmonitor.ca

Cover Image: An aerial view of Richardson International Limited's Vancouver Terminal, located on the North Shore of Burrard Inlet. Richardson embarked on an expansion of the facility's rail yard in 2022, with the intension of adding 15 new tracks within a larger reconfiguration. Until this project is completed, arriving trains with more than 100 cars must be broken apart in the Canadian National Railway's nearby Lynn Creek Yard, and processed as separate blocks. The new tracks will allow Richardson to receive and unload arriving unit trains intact, thereby reducing its current switching needs. The resultant improvement in efficiency is expected to increase the terminal's overall handling capacity by 17%, to roughly seven million tonnes annually from six. (Image courtesy of Richardson International Limited)

Foreword

The following report details the performance of Canada's Grain Handling and Transportation System (GHTS) for the crop year that ended 31 July 2022, and focuses on the various events, issues and trends manifest in the movement of Western Canadian grain during the past year. This is the twenty-second annual report submitted by Quorum Corporation in its capacity as the Monitor appointed under the Government of Canada's Grain Monitoring Program (GMP).

As with the Monitor's previous annual reports, it is structured around various measurement indicators, grouped into six series, namely:

Series 1 – Production and Supply
Series 2 – Traffic and Movement
Series 3 – Infrastructure
Series 4 – Commercial Relations
Series 5 – System Efficiency and Performance
Series 6 – Producer Impact

As in the past, each series builds on data collected by the Monitor from the industry's various stakeholders and frames the discussion using year-over-year comparisons. To that end, activity in the 2021-22 crop year is largely gauged against that of the 2020-21 crop year. But the Grain Monitoring Program (GMP) was also intended to frame recent activity against the backdrop of a longer time series. Beginning with the 1999-2000 crop year – referred to as the GMP's "base" year – the Monitor has now assembled relatable data in a time series that extends through 23 crop years. This data constitutes the backbone of the GMP and is used widely to identify significant trends and changes in GHTS performance. Although the Data Tables presented in Appendix 4 of this report can only depict a portion of this data, the full time series can be obtained as MS Excel spreadsheets from the Monitor's website (www.grainmonitor.ca). Similarly, select data elements can also be downloaded through the website's newest online feature, Grain Monitor Open Data System (GMODS).

Analogous space constraints have also made it necessary to limit the graphical presentation of data in this report to the last ten crop years. This report, as well as all past reports, can also be downloaded from the Monitor's website (www.grainmonitor.ca).

QUORUM CORPORATION

Edmonton, Alberta
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Executive Summary

With an anticipated 40% decline in crop production, it was apparent from the outset of the 2021-22 crop year that the Grain Handling and Transportation System (GHTS) would not be required to handle the output of another banner year. Initial grain deliveries to the country elevator system proved to be about one-third less than what had been handled the previous August. This decline foreshadowed what would be a decidedly lighter-than-normal workload, with weekly grain deliveries falling substantially below 2020-21 crop year levels.

Western Canadian grain required an average of 61.6 days to move from the Prairies to destinations within Western Canada during the 2021-22 crop year. This proved to be 46.0% more than the 42.2-day average reported a year earlier. The average also ranked as the fifth highest recorded under the GMP, and only 9.5% below the 68.1-day average first benchmarked in the base year. The 19.4-day worsening was largely the product of increases in country-elevator and terminal-elevator storage times, which rose by 12.9 days and 6.7 days respectively. However, these increases were marginally offset by a 0.2-day reduction in the railways' loaded transit time. The net increase reflected what proved to be problematic performance for the GHTS throughout much of the crop year.

With a much smaller crop looming, the railways had already begun placing more of their hopper-car fleets into storage. At the outset of the 2021-22 crop year, just under half of their combined fleet was reported to be in active service. This, coupled with reduced crew and motive power availability, suggested that the railways' carrying capacity had already been sharply reduced. As the 2021 harvest progressed, grain shippers soon began reporting that their car-orders were not being filled in a timely manner. Much of the delay appeared to be rooted in the slower return of empty equipment to the prairies for reloading, which elongated the railways' first-quarter average car cycle by 1.2 days, to 15.9 days from 14.7 days a year earlier. As a result, elevator inventories began to climb along with storage times. The aging of stocks in country and terminal elevators added 8.6 days to the first quarter's overall in-system average, which rose to 48.0 days from 40.4 days the previous year.

But the real difficulties began in mid-November 2021 when a series of atmospheric rivers smashed rainfall records throughout the Lower British Columbia Mainland as well as the interior of the province. The deluge caused rivers and streams to overflow, washing away dikes, roads, bridges, and railway lines throughout the Fraser River Valley. The scope of the damage wrought was unprecedented and severed the essential road and rail arteries leading into, and out of, Vancouver. Although CN and CP were able to rebuild their heavily damaged routes within weeks of November's disastrous rainfalls, the attendant service outage backlogged the flow of grain and other traffic well into the opening months of 2022. Not surprisingly, the average amount of time taken by grain to move through the system rose dramatically in response, reaching a height of 75.9 days in January 2022. Much of the additional time was again tied to country-elevator storage times, which reached a never-before seen average of 54.6 days as the average car cycle lengthened to an unparalleled 25.6 days. The downstream effects were equally pronounced. With the flow of grain interrupted, Vancouver terminal stocks began to decline, ultimately leading to a more than doubling of the time vessels spent in port, which reached a height of 28.6 days in January.

With time-in-the-system hovering around the 75-day mark through March 2022, grain shippers began to point to the mounting shortfalls in railway-supplied equipment as symptomatic of larger service failings. This led the Western Grain Elevator Association to ask the Canadian Transportation Agency to initiate an own-motion inquiry into the matter. While the Agency declined this request, and service improved during the fourth quarter, shippers remained concerned over the railways' potential inability to move a more normalized volume in the approaching 2022-23 crop year.

The stresses imposed on the GHTS would have undoubtedly been even greater had the 2021 crop reached the previous year's 78.8-million-tonne level. As it stands, the strains experienced in the movement of grain were not unique, as they extended to other commodities as well. Moreover, the vulnerability of global supply chains was being exposed as the flow of all essential goods and supplies slowed, became more expensive, and less reliable.

HIGHLIGHTS FOR THE 2021-2022 CROP YEAR

(Comparisons are to the previous crop year)

Production and Supply

- Grain production decreased 37.8% to 49.0 million tonnes; the smallest crop recorded under the GMP since the 2007-08 crop year.
  - Cereals comprised 58.1% of the crop; oilseeds 30.7%; and other commodities 11.2%.
  - Severe drought conditions led to a much smaller crop of highly variable quality.
- Carry-forward stocks from the 2020-21 crop year decreased 10.0% to 7.5 million tonnes.
- Carry-out stocks decreased 49.3% to 3.8 million tonnes.
- Total grain supply (production and carry-forward) decreased 35.1% to 56.6 million tonnes.

Traffic and Movement

- Primary-elevator throughput decreased by 36.1%, to 34.4 million tonnes, the lowest volume in a decade.
  - Represented 80.9% of all producer deliveries (primary and process elevators, as well as producer cars).
- Railway shipments decreased 41.0% to 36.4 million tonnes.
  - Traffic to Western Canada totaled 27.5 million tonnes, down 45.7%.
  - Traffic to Eastern Canada totaled 2.3 million tonnes, down 44.1%.
  - Traffic to the United States and Mexico totaled 6.6 million tonnes, down 4.6%.
- Terminal-elevator throughput decreased 45.7% to 24.3 million tonnes.
  - Terminal unloads totaled 250,400 cars, down 45.3%.
  - CN/CP traffic shares were 51.7% and 48.3% respectively.
- Containerized traffic decreased 57.1% to 2.4 million tonnes.
  - Reduced equipment-supply compounded volume decline from smaller crop.
- Truck traffic to the United States decreased 2.2% to 2.2 million tonnes.
  - Limited decline reflects protection of transborder movements.

HIGHLIGHTS FOR THE 2021-2022 CROP YEAR (continued)

(Comparisons are to the previous crop year)

Infrastructure

- The number of country elevators increased 0.5% to 413.
  - Reflected the licensing of 19 facilities along with the closure of 17 others.
  - Three new or retrofitted loop-track elevators became operational, with 37 at crop year's end.
  - Storage capacity increased 1.5% to 9.4 million tonnes, a GMP record.
- The railway network remained unchanged at 17,265.7 route-miles.
  - CN and CP operated 84.5% of the network; Regional and shortline carriers operated 15.5% of the network.
- The railways' hopper-car fleet decreased by 17.3% to an annualized average of 21,226 cars.
  - Marks second consecutive decline from 26,381-car high three years earlier.
  - Proportion of cars in active service reached a height of 81.3% in October 2021.
- Terminal elevators decreased by 5.6% to 17.
  - Reflects official closure of Parrish & Heimbecker facility following the opening of Fraser Grain Terminal a year earlier.
  - Storage capacity decreased by 0.5%, remaining effectively unchanged at 2.8 million tonnes.

Commercial Relations

- Country elevator handling charges saw mixed changes.
  - Elevation rates decreased 0.4%; dockage rates increased 1.3%; and storage rates increased 2.2%.
- Railway freight rates showed continuing cyclicality, with net changes as at 31 July 2022:
  - CN rates to Vancouver and Prince Rupert increased 9.4%; and Thunder Bay rates increased 5.1%.
  - CP rates to Vancouver increased 5.8%; and Thunder Bay rates decreased 10.3%.
  - Multiple-car block discounts were unchanged.
    - CN and CP now only provide discounts on movements in blocks of 100 or more cars.
  - Maximum Revenue Entitlements:
    - CN exceeds its MRE by $3.1 million.
    - CP exceeds its MRE by $2.4 million.
- Terminal Country elevator handling charges moved higher.
  - Elevation rates increased 1.9%; and storage rates increased 0.4%.
- Commercial Developments:
  - Canola processing poised for expansion as demand for cleaner-energy alternative fuels increases.
  - Container supply problems deepen as global economy struggles to exit COVID-induced downturn.
  - Rail service in British Columbia halted by severe flooding.
  - Ukraine conflict impacts global grain markets.
  - Port of Vancouver launches Active Vessel Traffic Management program to optimize vessel movement.
  - Grain shipments through Churchill effectively halted for two years to permit extensive rehabilitation of the rail line.
  - CP-KCS merger advances pending US Surface Transportation Board approval.
  - CP train and yard workers mount work stoppage; ultimately conclude new two-year collective agreement.
  - CN weathers 17-day strike by signals and communications employees.
  - Federal government announces additional funding for Saskatchewan shortlines under National Trade Corridors Fund.

HIGHLIGHTS FOR THE 2021-2022 CROP YEAR (continued)

(Comparisons are to the previous crop year)

System Efficiency and Performance

- Country elevator operations reflect reduced activity.
  - Capacity turnover ratio decreased 35.4% to 4.2 turns; includes impact of 119,500-tonne increase in storage capacity.
  - Average weekly stocks decreased 7.8% to 3.5 million tonnes; reached high of 4.3 million tonnes in March 2022.
  - Average days-in-store increased 50.7% to 38.3 days; reached high of 54.6 days in January 2022.
  - Stock-to-shipment ratio increased 58.7% to 5.9; reflected buildup of grain stocks due to slower movement.
- Railway operations reflect slower movement along with service disruptions.
  - Average car-cycle to Western Canada increased 16.2% to 17.8 days; average loaded transit time decreased 2.3% to 6.8 days.
  - Average car-cycle to Eastern Canada increased 36.6% to 29.9 days; average loaded transit time increased 26.6% to 13.6 days.
  - Average car-cycle to United States increased 5.8% to 27.7 days; average loaded transit time increased 6.9% to 11.4 days.
  - Multiple-car block movement share in Western Canada decreased to 82.0% from 84.1%.
    - Annual freight savings decreased 46.5% to an estimated $174.2 million.
- Terminal Elevator operations reflect reduced activity.
  - Capacity turnover ratio decreased 48.3% to 9.1 turns; includes impact of 15,000-tonne reduction in storage capacity.
  - Average weekly stocks decreased 11.6% to 1.1 million tonnes.
  - Average days-in-store increased 68.4% to 16.5 days; reflected effects of reduced movement.
  - Out-of-car time increased to 15.3% from 15.1%, continued to show high variability owing to reduced grain deliveries.
- Port operations
  - Vessels calls decreased 42.8% to 635 ships.
  - Average vessel time in port decreased 14.3% to 9.1 days in the face of reduced grain deliveries.
  - Dispatch earnings exceed demurrage costs for the first time in twelve years.
    - Demurrage costs decreased 55.8% to $19.4 million; dispatch earnings increased 20.9% to $20.2 million.
- System performance
  - Average time spent in the system increased 46.0% to 61.6 days.
    - Reflected buildup and aging of country-elevator stocks in the face of slower railway service and disruptions.

Producer Impact

- Producer Netback
  - 1CWRS wheat: Average price increased 44.4%; export basis decreased 4.2%; netback increased 63.2% to $428.68 per tonne.
  - 1CWA durum: Average price increased 95.4%; export basis increased 52.8%; netback increased 110.7% to $620.71 per tonne.
  - 1 Canada canola: Average price increased 47.1%; export basis increased 25.0%; netback increased 48.9% to $1,006.07 per tonne.
  - Large yellow peas: Average price increased 113.2%; export basis increased 111.5%; netback increased 113.4% to $642.59 per tonne.
- Producer cars
  - Producer-car loading sites remained unchanged at 272.
  - Scheduled producer-car shipments decreased 59.3% to 1,113 carloads.
    - Lowest volume recorded under the GMP.

Section 1: Production and Supply

Indicator Description	Table	1999-00	2019-20	2020-21	2021-22 Q1	Q2	Q3	Q4	YTD	% VAR
Western Canada Production and Supply										
Crop Production (000 tonnes)	1A-1	55,141.7	75,395.3	78,829.6	49,016.9				49,016.9	-37.8%
Carry Forward Stock (000 tonnes)	1A-2	7,418.2	10,196.5	8,383.6	7,542.1				7,542.1	-10.0%
Grain Supply (000 tonnes)		62,559.9	85,591.8	87,213.2	56,559.0				56,559.0	-35.1%
Crop Production (000 tonnes) – Special Crops	1A-3	3,936.7	7,511.7	8,420.0	4,470.2				4,470.2	-46.9%

DISCUSSION AND ANALYSIS

PRODUCTION AND SUPPLY
[See TABLES 1A-1 through 1A-3]

Owing to a widespread prairie drought, Western Canadian grain production fell to 49.0 million tonnes in the 2021-22 crop year, a 37.8% decrease from the previous crop year's record-setting 78.8 million-tonne crop. The drought resulted in the smallest crop witnessed under the Grain Monitoring Program (GMP) since the 2007-08 crop year, and the steepest year-over-year decline in its history. The scope of this downturn had far-reaching implications for the Grain Handling and Transportation System (GHTS), which were reflected in sharply reduced volume and performance measures.

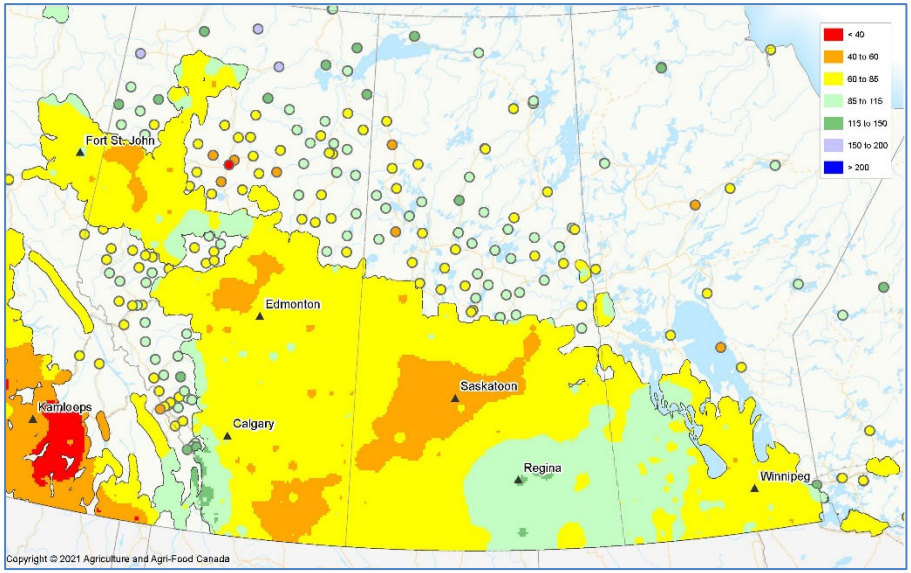
General Growing Conditions

The 2021 growing season was shaped by the severest drought experienced in some 40 years. Very few parts of the prairie region received normal or above-normal amounts of precipitation. Fully three-quarters of the region reported moisture levels that fell under 85% of the norm. Unlike other dry years, the drought touched virtually all areas of Western Canada, leading to much broader crop damage.

At the time of seeding, topsoil moisture conditions were already poor owing to the lack of rainfall the previous autumn. With little rain, moisture conditions only worsened as the season progressed. Limited thunder showers provided some localized but insufficient relief. Starting in late June 2021, extreme heat blanketed Western Canada, repeatedly setting record temperatures across the region. This heat dome extended well into July 2021.

An even worse crop failure was averted in late August when a massive, slow-moving rain system crossed Saskatchewan and Manitoba with accumulations of up to 5 inches. Some fields were too advanced to benefit from this, but the late rain literally saved many crops from total devastation. The prevailing warm, dry conditions ultimately permitted the harvest to progress quickly with an earlier-than-normal completion. Still, the quality of the crop was highly variable. While much of the wheat and canola fell into the top grades, the oil content in canola proved disappointingly low.

Percent of Average Precipitation (1 April to 31 August 2021)



Impact on Provincial Production

Saskatchewan saw the largest decrease in grain production, with a reduction of 43.9%. This was followed by declines of 35.0% in Alberta, and 25.7% in Manitoba. British Columbia was the only province to post an increase, with production climbing by 11.9%. However, these variances did little to change the traditional ranking of the provinces themselves. Saskatchewan remained the largest grain producer with 22.5 million tonnes harvested, or a 45.9% share. This was followed in turn by Alberta with 16.3 million tonnes, or 33.2%; Manitoba with 9.9 million tonnes, or 20.2%; and British Columbia with 311,100 tonnes, or 0.6%.

Changing Face of the Harvest

While growing conditions have always resulted in significant swings in the size of the overall crop, there has been a significant longer-term shift in both the quantity and mix of grains that are now harvested. Until 2013 prairie grain production seldom reached beyond an average of 55 million tonnes annually. At that point, grain production surged dramatically, reaching a record 77.0 million tonnes. In the wake of that historic harvest, the amount of grain drawn from prairie fields rose steadily, regularly surpassing 70 million tonnes. These enlarged harvests reflected the better yields achieved through advancements in plant genetics and agronomic practices, although favourable weather and moisture conditions remained key determinants.

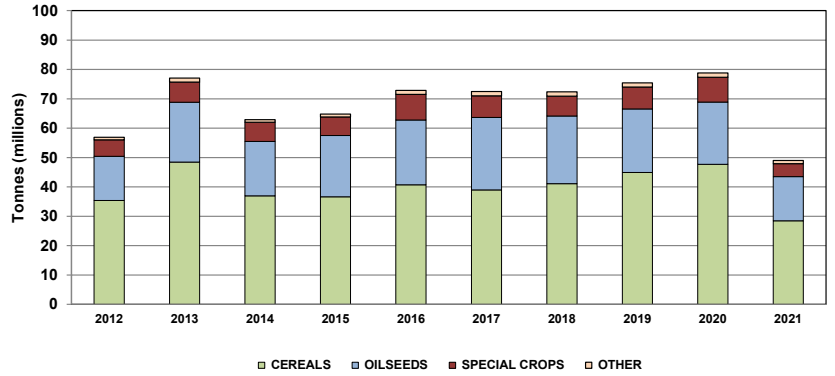
At the outset of the GMP, cereals constituted about three-quarters of all grains grown in Western Canada. However, since the 2014-15 crop year, these same commodities have generally accounted for under 60% of the total tonnes harvested. This was again the case in the 2021-22 crop year when 28.5 million tonnes of cereal production garnered a 58.1% share. Cereal's decline reflects the growing significance of oilseeds and other commodities in today's marketplace, which reached a combined 20.6 million tonnes of production representing 41.9% of all grains harvested.

By far, the most significant contributor to the overall displacement of cereals has been oilseeds, with combined canola, soybean and flaxseed harvests totalling 15.0 million tonnes in the 2021-22 crop year; well above the base year's 9.7 million tonnes. This was bolstered by an analogous increase in the output of special crops, especially dry peas and lentils, which rose to 4.5 million tonnes from 3.9 million tonnes during the same period.

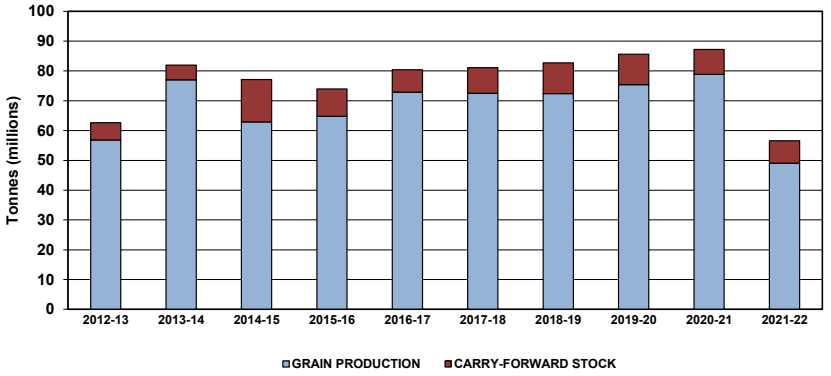
Increasing Grain Supply and GHTS Workload

The amount of grain that the GHTS handles in any given crop year is not defined by production alone; it is also affected by the amount of grain held over in inventory from the previous crop year. These carry-forward stocks

Grain Production - Principal Commodities
(Western Canada)



Grain Supply
(Western Canada)



have augmented current-year production values by as much as 20%.[1] Until the 2021-22 crop year's sharp downturn in production, carry-forward stocks had regularly lifted the total grain supply to over 80.0 million tonnes annually. Even with carry-forward stocks of 7.5 million tonnes, the grain supply only reached 56.6 million tonnes in the 2021-22 crop year, 35.1% below the previous crop year's 87.2-million-tonne record. Moreover, given the 3.8 million tonnes that remained as carry-out stocks at the close of the crop year, this meant that the GHTS faced a much-reduced handle of 52.8 million tonnes.

Notwithstanding the 2021-22 crop year's decline in volume, growth in the grain supply has spurred the GHTS into adding new capacity. The most visible manifestation of this has been in the establishment of extra storage, be it on individual farms or at country elevators. Moreover, it has also spurred investment in still more efficient high-throughput elevators, with many featuring loop tracks that allow for the continuous loading of unit trains reaching up to 150 railcars in length. At the close of the 2021-22 crop year, 37 such facilities had already been commissioned, with several more still under construction.

Significant investments in additional port handling capacity have also been made, with much of this being centred in Vancouver, British Columbia. The first of these came in 2016 when Richardson International completed a three-year expansion program that virtually doubled the capacity of its Vancouver Terminal. This was paralleled by major upgrades to the ship-loading galleries at Viterra's Pacific Terminal and the Alliance Grain Terminal, which substantially increased their handling capacities. Analogous modernization initiatives were also initiated at other terminals, including those of Fibreco Export Inc. and Columbia Containers Ltd. More noteworthy still was the completion of the first all-new terminal facility in several decades, the 183,000-tonne G3 Terminal Vancouver, which officially opened in July 2020. Similarly, the 72,000-tonne Fraser Grain Terminal, whose development was spearheaded by Parrish and Heimbecker Limited and GrainsConnect Canada, became operational in November 2020.

Likewise, there has been substantial new investment at the port of Prince Rupert, British Columbia. Not only did this include an upgrade to the grain-handling equipment at Prince Rupert Grain, but it also encompassed the creation of a new, state-of-the-art container transloading operation by Ray-Mont Logistics to support growth through the port's still expanding Fairview Container Terminal.

These same market forces have also been exerting pressure on the railways to invest in additional grain-handling capacity, the most visible facet being their purchases of new, higher-capacity covered-hopper cars. Grain companies have contributed to this expansion as well, with larger handlers purchasing or leasing their own equipment. In addition, the Canadian National Railway (CN) and the Canadian Pacific Railway (CP) have also moved on a variety of initiatives aimed at adding capacity, including double-tracking and siding extensions, locomotive purchases, and the hiring of new employees. Much the same can be said of marine carriers, which have been commissioning larger ships in a parallel effort to improve the efficiency of their own operations.

All these elements have played a role in enabling the GHTS to deal with ever-increasing grain volumes. However, mounting non-grain volumes have placed still more pressure on the country's ports, which have had to contend with an ever-increasing amount of oceanic traffic. As Canada's largest port, the Port of Vancouver has been especially susceptible to the vessel congestion that has come from this growth. Recognizing the need to improve port efficiency, the Government of Canada approved 15 investment projects worth some $314 million for the Vancouver Fraser Port Authority through its National Trade Corridors Fund (NTCF). These NTCF projects are varied in their scope and focus on marine, rail, and road infrastructure improvements. More recently, the port authority launched its Active Vessel Traffic Management program as a means of enhancing capacity by optimizing vessel movements through the port while increasing collaboration between various industry and community stakeholders.

1 Carry-forward stocks are defined as inventories on hand at farms or primary elevators at the close of a crop year (i.e., 31 July) and the beginning of a new crop year (i.e., 1 August).

Section 2: Traffic and Movement

Indicator Description	Table	1999-00	2019-20	2020-21	2021-22 Q1	Q2	Q3	Q4	YTD	% VAR
Country Elevator Throughput										
Grain Throughput (000 tonnes) – Primary Elevators	2A-1	32,493.9	51,993.6	53,876.8	10,797.6	8,178.8	8,124.9	7,340.8	34,442.1	-36.1%
Railway Traffic										
Traffic to Western Canada										
Railway Shipments (000 tonnes) – Ports Only	2B-1	26,439.2	46,501.8	49,774.3	9,267.6	6,422.6	5,616.0	5,227.1	26,533.3	-46.7%
Railway Shipments (000 tonnes) – Western Domestic	2B-1	n/a	986.7	857.2	260.7	236.2	239.9	225.0	961.8	12.2%
Traffic to Western Canada (Ports Only)										
Railway Shipments (000 tonnes) – All Grains	2B-1	26,439.2	46,501.8	49,774.3	9,267.6	6,422.6	5,616.0	5,227.1	26,533.3	-46.7%
Railway Shipments (000 tonnes) – Hopper Cars	2B-1	25,664.6	44,345.3	47,669.7	9,028.3	6,250.7	5,394.5	5,036.0	25,709.5	-46.1%
Railway Shipments (000 tonnes) – Non-Hopper Cars	2B-1	774.7	2,156.6	2,104.6	239.3	171.8	221.6	191.1	823.8	-60.9%
Special Crop Shipments (000 tonnes) – All Grains	2B-2	2,102.9	5,779.4	5,519.6	1,147.9	202.6	648.5	516.5	2,515.4	-54.4%
Special Crop Shipments (000 tonnes) – Hopper Cars	2B-2	1,844.1	5,381.7	5,122.5	1,117.3	193.3	622.3	492.1	2,425.0	-52.7%
Special Crop Shipments (000 tonnes) – Non-Hopper Cars	2B-2	258.7	397.7	397.1	30.6	9.3	26.2	24.4	90.4	-77.2%
Hopper Car Shipments (000 tonnes) – Origin Province	2B-3									
Hopper Car Shipments (000 tonnes) – Primary Commodities	2B-4	25,664.6	44,345.3	47,669.7	9,028.3	6,250.7	5,394.5	5,036.0	25,709.5	-46.1%
Hopper Car Shipments (000 tonnes) – Detailed Breakdown	2B-5									
Hopper Car Shipments (000 tonnes) – Grain-Dependent Network	2B-6	8,685.9	12,925.9	13,302.0	2,782.1	1,723.2	1,466.8	1,226.4	7,198.5	-45.9%
Hopper Car Shipments (000 tonnes) – Non-Grain-Dependent Network	2B-6	16,978.7	31,419.4	34,367.7	6,246.2	4,527.5	3,927.7	3,809.6	18,511.0	-46.1%
Hopper Car Shipments (000 tonnes) – Class 1 Carriers	2B-7	23,573.5	42,908.1	46,024.2	8,748.3	6,082.8	5,291.2	4,925.0	25,047.3	-45.6%
Hopper Car Shipments (000 tonnes) – Non-Class-1 Carriers	2B-7	2,091.0	1,437.2	1,645.5	280.0	167.9	103.3	111.0	662.1	-59.8%
Traffic to Eastern Canada										
Railway Shipments (000 tonnes) – All Grains	2B-8	n/a	3,841.8	4,059.3	624.0	463.1	672.6	511.2	2,270.8	-44.1%
Railway Shipments (000 tonnes) – Hopper Cars	2B-8	n/a	2,905.4	3,224.8	454.7	322.5	534.4	362.0	1,673.6	-48.1%
Railway Shipments (000 tonnes) – Non-Hopper Cars	2B-8	n/a	936.5	834.5	169.2	140.6	138.2	149.2	597.2	-28.4%
Special Crop Shipments (000 tonnes) – All Grains	2B-9	n/a	629.5	509.0	137.4	85.5	137.6	139.3	499.9	-1.8%
Western Canadian Originated Traffic										
Railway Shipments (000 tonnes) – All Grains	2B-15	n/a	58,590.7	61,637.7	11,917.2	8,702.7	8,161.2	7,612.5	36,393.6	-41.0%
Railway Shipments (000 tonnes) - Canada	2B-15	n/a	51,330.4	54,690.8	10,152.2	7,121.9	6,528.5	5,963.3	29,765.9	-45.6%
Railway Shipments (000 tonnes) – United States	2B-15	n/a	7,001.1	6,592.2	1,688.0	1,503.6	1,529.5	1,525.1	6,246.2	-5.2%
Railway Shipments (000 tonnes) – Mexico	2B-15	n/a	259.2	354.7	76.9	77.2	103.2	124.1	381.5	7.5%
Terminal Elevator Throughput										
Grain Throughput (000 tonnes) – All Commodities	2C-1	23,555.5	39,981.9	44,686.8	8,024.5	6,531.8	4,395.6	5,310.3	24,262.2	-45.7%
Hopper Cars Unloaded (number) – All Carriers	2C-2	278,255	418,245	457,559	89,143	64,206	51,073	45,978	250,400	-45.3%
Hopper Cars Unloaded (number) – CN	2C-2	144,800	200,017	215,145	45,386	32,166	27,843	24,129	129,524	-39.8%
Hopper Cars Unloaded (number) – CP	2C-2	133,455	218,228	242,414	43,757	32,040	23,230	21,849	120,876	-50.1%
Truck Volumes to US Destinations										
Truck Shipments to US (000 tonnes) – Destination Region / Origin Province	2D-1									
Truck Shipments to US (000 tonnes) – Origin Province / Commodity	2D-2	n/a	2,087.0	2,281.3	637.2	506.4	525.7	560.8	2,230.0	-2.2%
Truck Shipments to US (000 tonnes) – Destination Region / Commodity	2D-3									

DISCUSSION AND ANALYSIS

COUNTRY ELEVATOR THROUGHPUT
[See TABLE 2A-1]

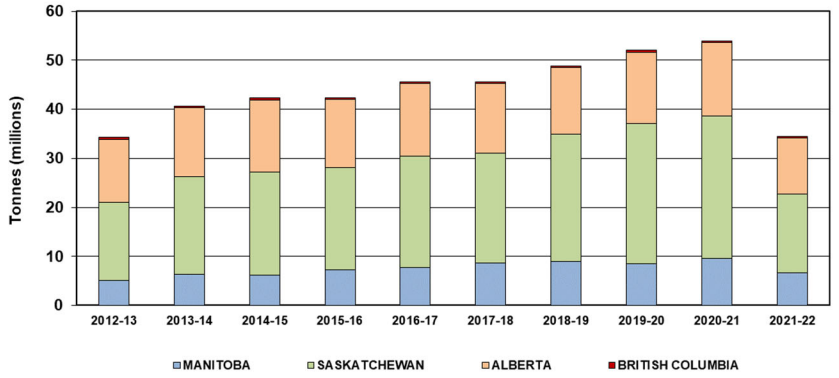
Country elevator throughput, as gauged by all road and rail shipments from the primary elevators situated across Western Canada, decreased by 36.1% in the 2021-22 crop year, to 34.4 million tonnes from 53.9 million tonnes a year earlier. This denoted the lowest amount of grain accepted into the system under the GMP since the 2012-13 crop year.

Primary-elevator shipments from Saskatchewan plunged by almost 13.0 million tonnes, or 44.7%, to 16.1 million tonnes. This was accompanied by decreases in the throughput for Alberta, which dropped by almost 3.7 million tonnes, or 24.3%, to 11.4 million tonnes; and Manitoba, which dropped 2.8 million tonnes, or 29.6%, to 6.7 million tonnes. Marginally offsetting these losses was a 30,900-tonne, or 13.6%, increase in volume for British Columbia, which reported shipments of 257,500 tonnes. Even with such tonnage swings, the proportion accorded to shipments from each province has remained generally consistent with those benchmarked in the GMP's base year. Saskatchewan claimed a 46.6% share; Alberta, 33.2%; Manitoba, 19.5% share; and British Columbia, 0.7%.

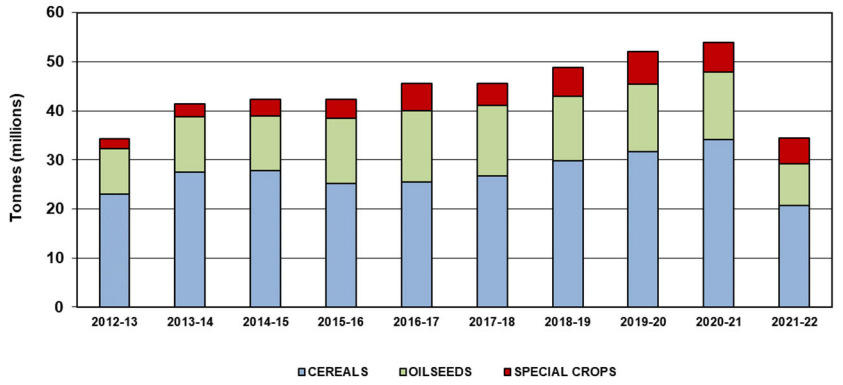
In reflection of production, cereals accounted for most of the grain shipped through the primary elevator network, although total shipments decreased by 39.6%, to 20.6 million tonnes from 34.1 million tonnes a year earlier. Their share of the total handle also declined, to 59.9% from 63.4%. Oilseed shipments also fell, albeit by a slightly lesser 37.9%, to 8.5 million tonnes from 13.7 million tonnes, with its share falling to 24.7% from 25.4%. Much of this slippage was attributable to a comparatively better showing by special crops, which posted a lesser 12.2% decline, with throughput falling to 5.3 million tonnes from 6.0 million tonnes the previous year. This resulted in its securement of a greater 15.4% share against 11.2% a year earlier.

Primary-elevator throughput provides the all-important signal to industry stakeholders of the attendant workload to be borne by the GHTS's railways and terminal elevators. With throughput falling to just 34.4 million tonnes

Primary Elevator Throughput - Originating Province



Primary Elevator Throughput - Principal Commodities



from the previous crop year's record handle of 53.9 million tonnes, significantly less pressure was brought to bear on the GHTS.

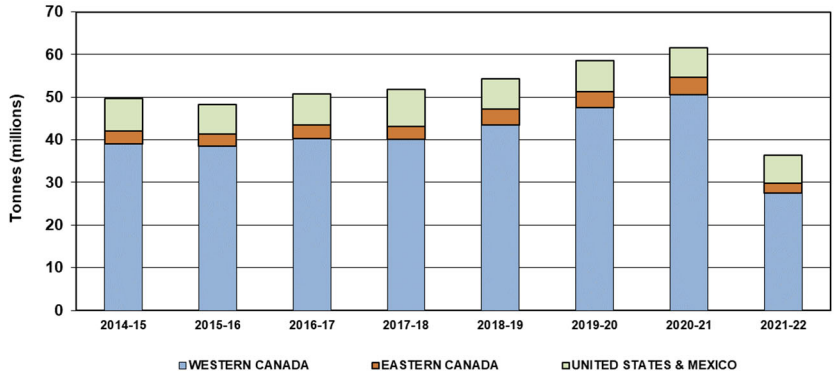
RAILWAY TRAFFIC
[See TABLES 2B-1 through 2B-21]

Although primary elevators serve as the principal gateway in moving grain through the GHTS, grain also enters the system by way of process elevators and producer-car loading sites. Producer deliveries to all of these facilities totaled 42.6 million tonnes in the 2021-22 crop year, 33.9% less than the record 64.5 million tonnes tendered a year earlier.[2] Ultimately, all of this grain is loaded into railcars or trucks for movement to destinations located throughout the system, with rail being the dominant mode.[3]

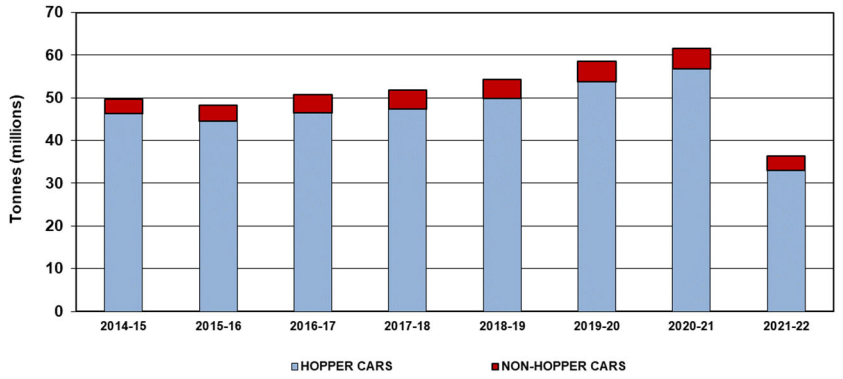
Railway grain shipments from Western Canada totaled almost 36.4 million tonnes in the 2021-22 crop year, down 41.0% from the previous crop year's record 61.6 million tonnes. Almost 29.8 million tonnes of this traffic, or 81.7%, was directed to destinations within Canada itself, be it for export or domestic use. The vast majority of this volume, almost 27.5 million tonnes, was destined to points within Western Canada, chiefly the ports of Vancouver, Prince Rupert, and Thunder Bay. These latter shipments easily overshadowed the 2.3 million tonnes directed into Eastern Canada as well as another 6.6 million tonnes destined to the United States and Mexico.

Almost 33.1 million tonnes of the traffic originated in Western Canada, or 90.9%, moved to its destination in covered hopper cars. The remaining 3.3 million tonnes moved in alternate forms of railway equipment, including boxcars and containers for bulk and bagged grain products, and tank cars for liquids such as canola oil. It is worth noting that while these latter movements represented only 9.1% of total railway shipments in the 2021-22 crop year, its share has inched steadily upwards from the 6.9% benchmarked just seven years earlier. Much of this gain has been tied to increased tank-car shipments, and the heightened trade in canola oil.

Railway Grain Shipments - Principal Destinations



Railway Grain Shipments - Hopper and Non-Hopper Cars



2 Statistics drawn from Canadian Grain Commission, *Grain Deliveries at Prairie Points.*

3 Until passage of Bill C-49, which revised the list of grains specified in Schedule II of the *Canada Transportation Act*, not all railway grain traffic – but especially soybeans – was captured in the traffic statistics provided to the Monitor. With this structural deficiency in the reporting of railway grain volumes having been addressed, greater confidence can now be ascribed to the completeness of the traffic statistics presented throughout this report.

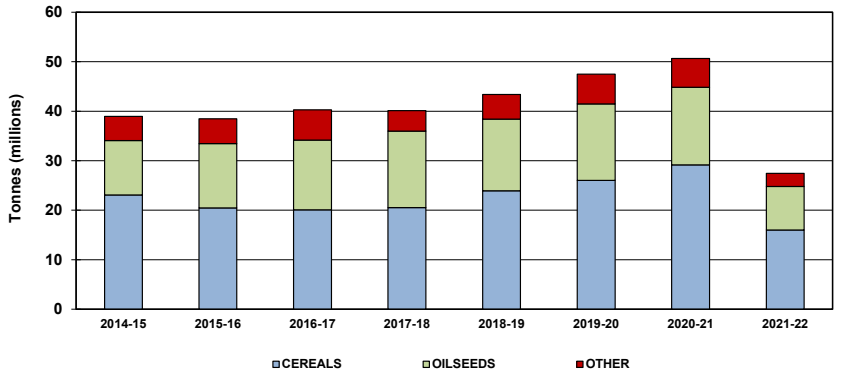
Traffic to Western Canada
[See Tables 2B-1 through 2B-7]

Much of the 27.5 million tonnes of grain moved by rail to points in Western Canada during the 2021-22 crop year were directed to one of three ports: Vancouver, Prince Rupert, and Thunder Bay.[4] These shipments amounted to just over 26.5 million tonnes, a reduction of 46.7% from the 49.8 million tonnes handled a year earlier. Another 961,800 tonnes were directed to points outside of the ports themselves, denoted as Western Domestic destinations, and which rose by 12.2% from the 857,200 tonnes handled the previous year.

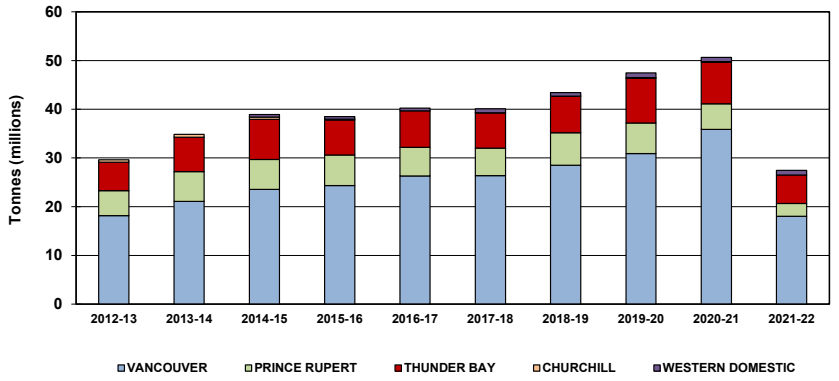
As the largest element in the movement of grain to points in Western Canada, cereals accounted for 58.2% of all railway traffic in the 2021-22 crop year, just over 16.0 million tonnes. This was followed by oilseeds with a 32.0% share, at 8.8 million tonnes, and a 9.8% share for other commodities, at 2.7 million tonnes. Segmental declines proved generally consistent, with decreases of 45.1% for cereals, 43.9% for oilseeds, and 53.5% for other commodities.

Of all the ports in Western Canada, Vancouver continues to be the preferred destination for railway grain shipments. This is due not only to the ready access it provides to Asia-Pacific markets, but to the concentration of export terminal facilities. During the 2021-22 crop year, Vancouver received almost 18.1 million tonnes of inbound grain, a decrease of 49.6% from the previous year's 35.9-million-tonne handle. This denoted 68.1% of all railway grain shipments originated in Western Canada. Prince Rupert, which represents an additional west-coast outlet for this traffic, received 2.6 million tonnes of grain, falling 50.3% from the 5.3 million tonnes handled a year earlier. This resulted in the port's share declining to 9.9% from 10.6%. Together, these two ports accounted for 78.0% of all the grain originated in Western Canada, down from the 82.7% share garnered a year earlier.

Railway Grain Shipments - Main Commodities
(Western Canada)



Railway Grain Shipments - Main Destinations
(Western Canada)



4 The Port of Churchill, normally a destination for Western Canadian export grain, was closed to traffic during the 2021-22 crop year.

The loss in share for West Coast ports was reflected in comparatively stronger rail deliveries to Thunder Bay, which fell by a lesser 31.6% to 5.8 million tonnes from 8.5 million tonnes a year earlier. This helped bolster the port's share to 22.0% from 17.2%. Closure of the port of Churchill also helped, as its handle fell to zero from the previous crop year's 96,900 tonnes. Railway grain shipments to non-port destinations – designated as Western Domestic – accounted for just 3.6% of all traffic. However, this too proved noticeably more than the 1.7% share reported a year earlier.

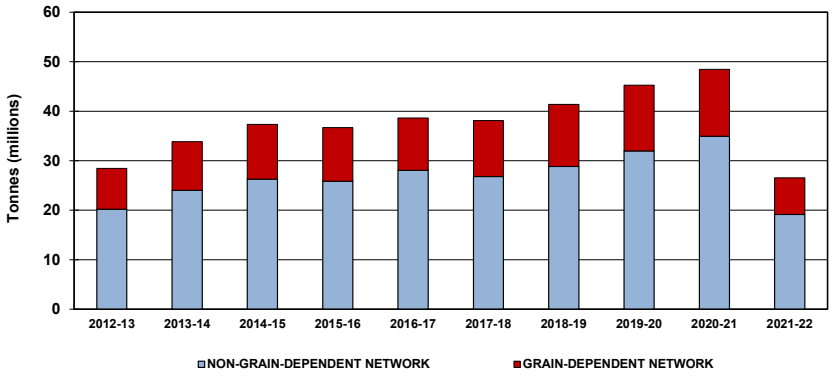
Covered Hopper Car Shipments

Covered hopper cars remain the primary means by which grain is conveyed to destinations within Western Canada. Of the 27.5 million tonnes shipped during the 2021-22 crop year, 26.6 million tonnes, or 96.7%, moved in covered hopper cars. Just 915,700 tonnes, or 3.3%, of grain and grain-related products moved in other forms of railway equipment, including boxcars, tank cars and containers.

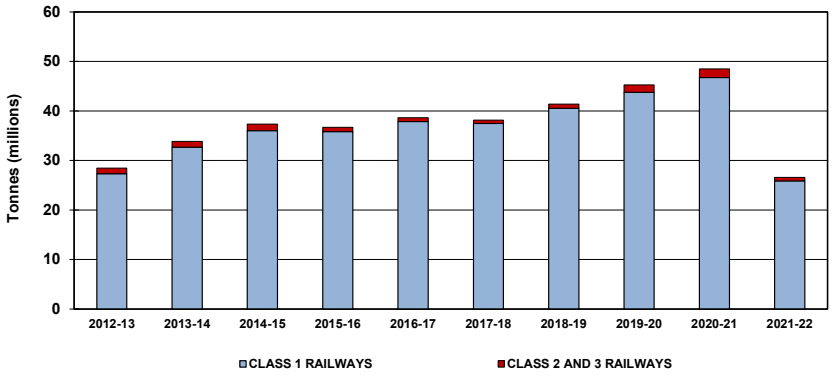
From the outset of the GMP, roughly two-thirds of covered-hopper-car shipments have originated at points on the railways' non-grain-dependent branchline network. Of the 26.6 million tonnes that were directed to destinations in Western Canada in the 2021-22 crop year, 19.1 million tonnes, or 72.0%, were sourced from points on such lines. This proportion stands moderately above the 66.2% share recorded at the beginning of the GMP. Conversely, just 7.4 million tonnes, or 28.0%, originated at points on the grain-dependent network.

More significantly, almost 25.9 million tonnes, or 97.3% of the covered-hopper-car traffic, originated on the railway lines directly operated by the major Class I carriers, CN and CP. This dominance is even greater than the 91.9% share observed in the base year. Likewise, the share garnered by the smaller Class 2 and 3 carriers (commonly referred to as regional and shortline railways) has contracted to about one-third of what it represented twenty-two years earlier. Just 705,300 tonnes, or 2.7%, originated with these smaller carriers in the 2021-22 crop year.

Hopper-Car Shipments - Branchline Originations
(Western Canada)



Hopper-Car Shipments - Carrier Originations
(Western Canada)



Traffic to Eastern Canada
[See Tables 2B-8 through 2B-14]

Grain shipments into Eastern Canada equate to less than one-twelfth of the tonnage directed into Western Canada. During the 2021-22 crop year, these railway shipments amounted to slightly under 2.3 million tonnes, a decline of 44.1% from the nearly 4.1 million tonnes shipped a year earlier. About two-thirds of this volume, 1.5 million tonnes, were shipped to the ports that extend from the Lower Great Lakes through the Gulf of St. Lawrence, and on to Halifax. Another 770,700 tonnes were directed to inland points, designated as Eastern Domestic destinations.

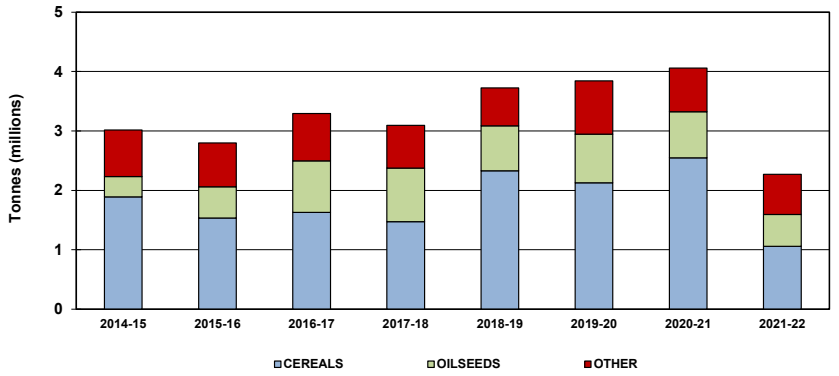
As with traffic routed to destinations in Western Canada, much of the traffic headed to points in Eastern Canada, slightly under 1.7 million tonnes, or 73.7%, moved in covered hopper cars. The remaining 597,200 tonnes moved in other types of railway equipment. These latter movements represented a more substantive 26.3% of the regional total than the 3.3% they constituted in Western Canada.

Similarly, cereals also embodied the largest traffic segment in eastbound movements, with total shipments of almost 1.1 million tonnes, down 58.5% from 2.5 million tonnes a year earlier. Oilseeds accounted for 536,300 tonnes, a decrease of 30.9% from the previous crop year's 776,300 tonnes. A further 677,800 tonnes were tied to special crops and other commodities, which declined by a much lesser 8.0% from the preceding crop year's 736,400 tonnes. Unlike those headed to Western Canadian destinations, these latter shipments accounted for a larger share of the overall traffic volume, 29.8% versus 9.8%.

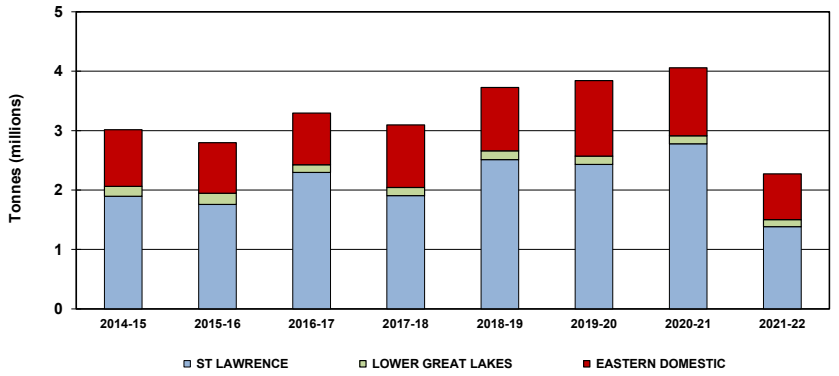
Covered Hopper Car Shipments

Most of the grain moving to Eastern Canada in covered hopper cars was sourced from points on the non-grain-dependent railway network in Western Canada. During the 2021-22 crop year this amounted to somewhat under 1.2 million tonnes, down 52.5% from the 2.5 million tonnes originated a year earlier. Traffic originating at points on the grain-dependent network fell by a lesser 34.2%, to 508,000 tonnes from 772,300 tonnes. With 69.7% of the tonnage attributable to non-grain-dependent

Railway Grain Shipments - Main Commodities
(Eastern Canada)



Railway Grain Shipments - Main Destinations
(Eastern Canada)



originations, this division is only marginally less than the 72.1% share tied to traffic destined to points in Western Canada.

Similarly, some 1.5 million tonnes, or 90.8% of the grain shipped to Eastern Canada in covered hopper cars, originated on the lines of the major Class-1 railways. The tonnage originated by non-Class-1 carriers, which amounted to 154,000 tonnes, accounted for just 9.2%. These proportions were moderately less skewed than the shares garnered by traffic destined to points within Western Canada, which were reported as 97.3% and 2.7% respectively.

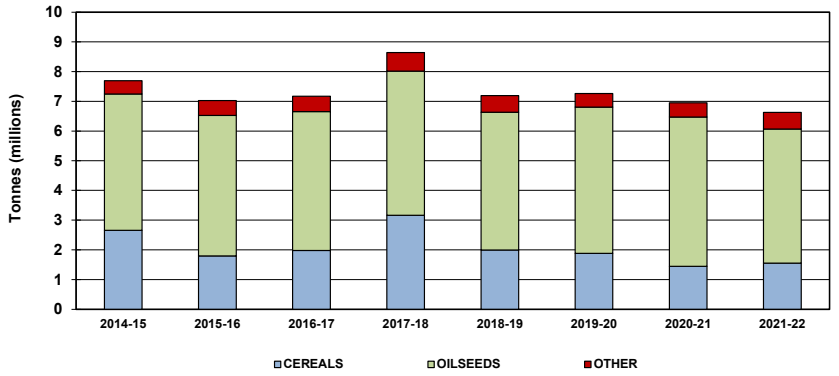
Traffic to the United States and Mexico
[See Tables 2B-15 through 2B-18]

The amount of grain moved by rail to the United States and Mexico during the 2021-22 crop year totaled over 6.6 million tonnes. This marked a 4.6% decrease from the 6.9 million tonnes directed into these markets a year earlier. The more modest decline stands in contrast to the steeper reductions noted on domestic movements, owing in large measure to the preference given to transborder shipments. Over 6.2 million tonnes were destined to the United States, down 5.2% from the 6.6 million tonnes handled the previous year. Although just 381,500 tonnes were earmarked for Mexico, shipments to that country grew by 7.5%. Much of the overall tonnage decline was attributable to a 10.2% reduction in oilseed volumes, which were partially offset by a 7.4% increase for cereals and a 17.4% gain for other commodities.

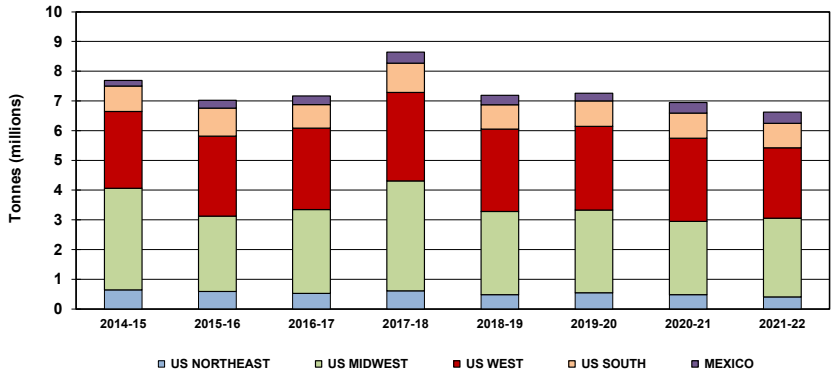
Over 4.6 million tonnes of US-bound traffic moved in covered hopper cars in the 2021-22 crop year. This represented a 7.4% decrease from the 5.0 million tonnes handled a year earlier. Another 1.6 million tonnes moved in other types of railway equipment, which encompassed a modest gain of 1.5% from what had been shipped the previous year.

Canola and canola-related products (be it in the form of seed, meal or oil) accounted for a little more than 4.3 million tonnes, or about 69.0%, of all US-bound shipments. Approximately half of this volume, almost 2.2 million tonnes, was directed to states in the US West, chiefly California. This was followed by another 1.3 million tonnes that moved into the

Railway Grain Shipments - Main Commodities
(United States and Mexico)



Railway Grain Shipments - Main Destinations
(United States and Mexico)



Midwest, 620,200 tonnes into the South, and 277,000 tonnes into the Northeast. Cereals and other commodities accounted for a lesser 31.0% of all US-bound shipments.

On a broader basis, the US Midwest proved to be the chief destination for US-bound grain shipments, drawing in slightly under 2.7 million tonnes. This was closely followed by destinations in the US West, with just under 2.4 million tonnes; the US South, with 826,800 tonnes; and the US Northeast, with 401,700 tonnes.

Traffic from the United States
[See Table 2B-19]

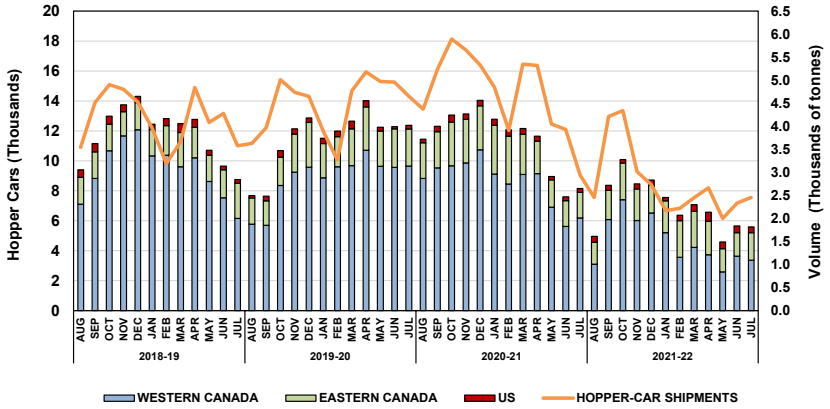
Grain imported into Canada by rail from the United States during the 2021-22 crop year jumped a staggering 2,149.4%, to almost 5.2 million tonnes from a mere 229,300 tonnes a year earlier. The largest portion, amounting to over 4.9 million tonnes, was destined to points in Western Canada, with Eastern Canadian destinations drawing in just 246,300 tonnes. This extraordinary influx was fuelled by the drought that left Western Canadian livestock producers in desperate want of feed. Over 4.1 million tonnes of this northbound movement were directly tied to the importing of American feed corn.

Loads on Wheels
[See Table 2B-20]

The pace at which bulk grain moves through the GHTS can be gauged by tabulating the number of loaded hopper cars in transit at regular moments in time; normally the Friday of any given week.[5] The 2021-22 crop year began with a weekly in-transit average of 4,962 cars for the month of August 2021. Traffic volumes increased sharply through the next two months, ultimately peaking with a weekly average of 10,086 cars in October 2021. Thereafter, the combined effects of a smaller crop, massive flooding in the lower BC Mainland, and the onset of winter operations served to reduce volumes, which reached a low of 4,585 cars in May 2022.

5 The measure cited here relates only to railway-supplied equipment. It specifically excludes the private equipment also employed by shippers in moving grain.

Loads on Wheels



Collectively, an average of 7,043 loaded cars were in transit to their destinations during any given week of the 2021-22 crop year, 38.4% less than the 11,438-car average recorded a year earlier. As with other traffic measures, a large majority of these cars, some 66.3%, were tied to the movement of grain to destinations in Western Canada, 28.3% to markets in Eastern Canada, and 5.4% to those in the United States.

Tank-Car Shipments
[See Table 2B-21]

From its outset, the GMP has largely been focused on the movement of Canada's traditional grain exports. Whereas cereals represented more than three-quarters of the grain grown in 2000, it now constitutes less than 60%. As cited earlier, much of this dilution is attributable to increased oilseed production, with canola accounting for much of the overall growth.

Although canola seed remains a significant export commodity, roughly 40% of the crop is directed into one of 14 domestic crushing operations (11 of which are in Western Canada), which then extract the seed's oil for sale to consumer and industrial markets. The processing of canola oil has increased along with canola-seed production. The enlargement of this segment, coupled with canola oil's comparatively higher value, has fueled interest in more specific reporting and the addition of related measures.

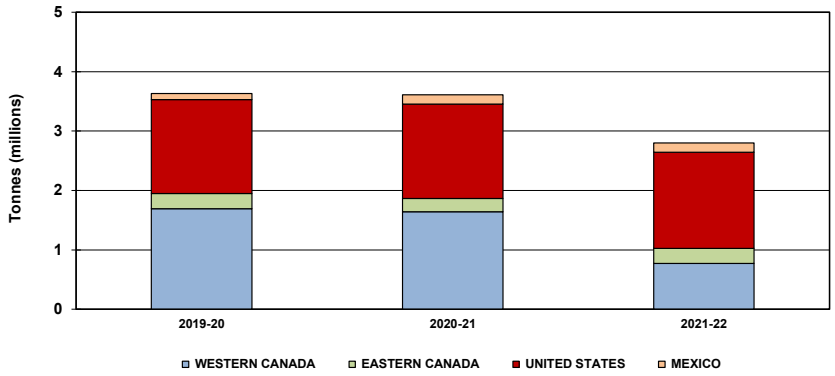
Canola-oil shipments from origins in Western Canada totaled slightly more than 3.6 million tonnes in both the 2019-20 and 2020-21 crop years. Roughly 90% of these shipments were concentrated in near equal 1.6-million-tonne movements to Vancouver and the United States. This was supplemented by much smaller movements into Eastern Canada and Mexico. The 2021-22 crop year saw total shipments decline by 22.5%, to 2.8 million tonnes from 3.6 million tonnes. This reduction was confined to the Vancouver corridor, where shipments fell by 56.7%, to 679,200 tonnes from nearly 1.6 million tonnes a years earlier. Conversely, shipments into Eastern Canada posted a 15.7% gain, with volume rising to 254,000 tonnes from 219,600 tonnes. Lesser increases were noted for movements into the United States and Mexico, which rose by 1.7% and 0.9% respectively.

TERMINAL ELEVATOR THROUGHPUT
[See TABLES 2C-1 through 2C-2]

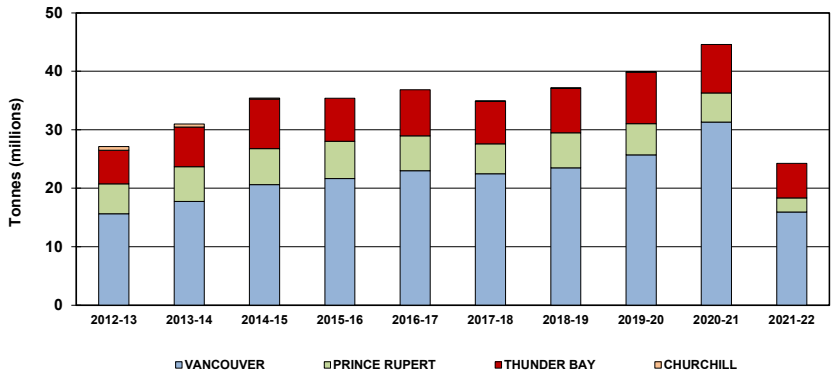
Ultimately, a large portion of the traffic handled by the railway system was directed to the various terminal elevators and bulk loading facilities located at the four ports in Western Canada. Port throughput, as gauged by the amount of grain shipped through these facilities, decreased by 45.7% in the 2021-22 crop year, to 24.3 million tonnes from a GMP record of 44.7 million tonnes a year earlier.

The most significant grain volumes continued to move through the west-coast ports of Vancouver and Prince Rupert. For Vancouver, total terminal elevator throughput decreased by 49.0%, to just under 16.0 million tonnes, from a GMP record of 31.3 million tonnes a year earlier. Prince Rupert posted a decline of 52.4%, with terminal shipments falling to 2.4 million tonnes from 5.0 million tonnes. Combined, the tonnage passing through

Railway Tankcar Shipments - Main Destinations



Terminal Elevator Throughput - Port
(Western Canada)



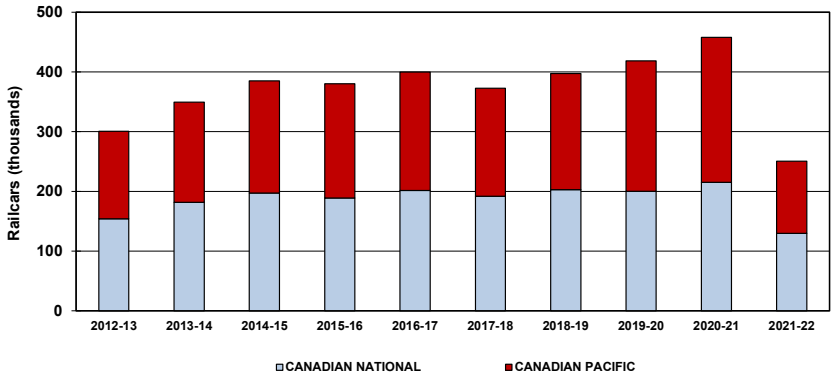
these two west-coast ports represented 75.6% of the overall handle, down from the 81.2% share held a year earlier.

Traffic directed through the eastern gateway of Thunder Bay fell by a notably lesser 28.5%, to 5.9 million tonnes from the previous crop year's 8.3 million tonnes. As a result, the port's overall share rose to 24.4% from 18.5%. This gain was bolstered by the closure of the port of Churchill, which saw its throughput fall to zero from 95,700 tonnes a year earlier.

Terminal Elevator Unloads

Carrier activity is reflected in the number of covered hopper cars unloaded at Western Canadian bulk grain terminals. The total number of railcars unloaded during the 2021-22 crop year decreased by 45.3%, falling to 250,400 cars from 457,559 cars a year earlier. CN unloaded 129,524 hopper cars, down 39.8% from the 215,145 cars delivered a year earlier, while CP's handlings decreased by 50.1%, to 120,876 cars from 242,414 cars. This made CN the largest serving railway to bulk grain terminals in Western Canada, with a share of 51.7% against 48.3% for CP.

Terminal Elevator Unloads - Carrier
(Western Canada)

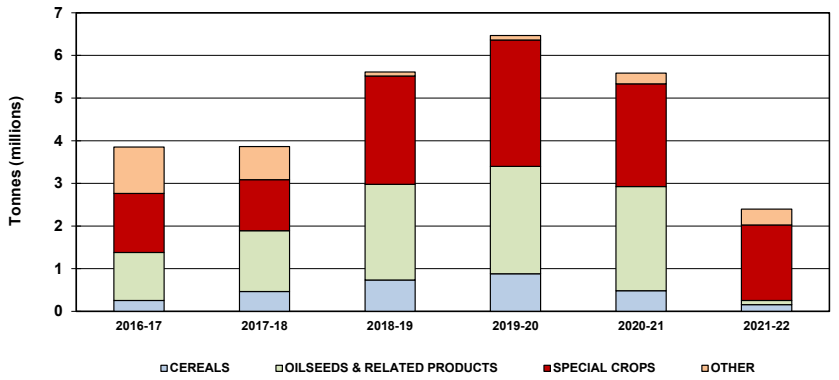


EXPORT CONTAINER TRAFFIC
[See TABLE 2C-3]

For well over a century, Canadian grain exports have been reliant on bulk ocean shipping to reach offshore markets. With the advent of larger ships, the preponderance of grain exports now physically moves in shipload lots of 50,000 or more tonnes. Yet an increasingly larger share of total grain exports has been moving in containers. This share hit a highwater mark in the 2019-20 crop year, when it reached roughly 11% compared to just 4% in the GMP's base year. Central to this growth was the emergence of new, state-of-the-art transloading facilities, which allowed grain carried to port in railway hopper cars to be efficiently reloaded into containers for shipment overseas.

Containerized export grain shipments are tied to the servicing of much smaller-lot purchasers catering to the needs of niche markets, be it specialty flour mills, brewers or processors. In large measure, these movements are made possible by employing the empty container

Export Container Shipments - Canadian Ports



equipment being returned by steamship lines to their offshore origins (predominantly Asia-Pacific countries) for reloading. Using this returning equipment typically engenders lower "backhaul" freight rates that make foreign purchases of Canadian-sourced grain in small quantities more price competitive.

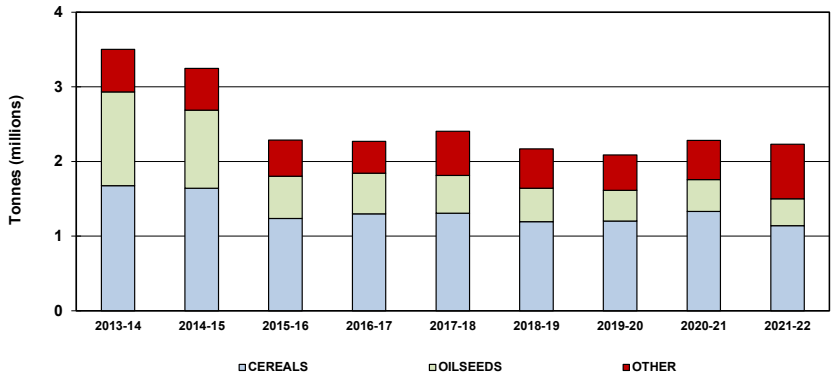
Containerized grain shipments from the ports of Montreal, Vancouver and Prince Rupert totaled almost 2.4 million tonnes in the 2021-22 crop year. This denoted a 57.1% reduction from the 5.6 million tonnes shipped a year earlier, and a second consecutive decline in as many years. The comparatively deeper decline reflected not only a smaller crop, but the ongoing constriction in the supply of empty container equipment made available by steamship lines since late 2020.

Until the 2020-21 crop year, containerized grain traffic had been increasing by almost 900,000 tonnes annually, with significant volume gains for cereals, oilseeds and related products, and special crops alike. Special crops, which figured most prominently in the growth of containerized shipments, accounted for almost 1.8 million tonnes, or 73.9%, of the total volume in the crop year just ended. This share proved substantially higher than the 43.1% claimed just a year earlier, with the gain chiefly attributable to the virtual elimination of oilseed and related product movements, which totalled a mere 95,400 tonnes compared to 2.4 million tonnes a year earlier. This was supported by 67.1% decline in cereal movements, which fell to 159,800 tonnes from 485,500 tonnes. These extreme swings in the commodity mix largely reflected the preference given to domestic and transborder movements in the face of prevailing supply-chain problems.

TRUCK TRAFFIC TO THE UNITED STATES
[See TABLES 2D-1 through 2D-3]

Shipments of Western Canadian grain into the United States by truck totaled slightly over 2.2 million tonnes in the 2021-22 crop year. This proved to be 2.2% less than the 2.3 million tonnes shipped a year earlier. Here again, the comparatively modest decline reflected the preference that was given to satisfying short-haul transborder demand. Volume reductions were noted for most commodity groups, with a 14.4%, or 191,900-tonne, decrease in cereals accounting for the largest share. This was enlarged by a 15.5%, or 65,800-tonne, decrease in oilseeds. A 39.4%, or 206,400-tonne, increase amongst other commodities helped offset these broader declines.

Truck Shipments - United States Destinations



In contrast to railway shipments, much of the grain trucked into the United States travels shorter distances. Almost 1.3 million tonnes, or 56.6% of the total volume, were directed into the US Midwest, a market closer to the international border. This was followed by destinations in the US West, with 638,500 tonnes; the US Northeast, with 208,500 tonnes; and the US South, with 121,000 tonnes.

Section 3: Infrastructure

Indicator Description	Table	1999-00	2019-20	2020-21	2021-22 Q1	Q2	Q3	Q4	YTD	% VAR
Country Elevator Infrastructure										
Delivery Points (number)	3A-1	628	286	287	287	286	285	285	285	-0.7%
Elevator Capacity (000 tonnes)	3A-1	7,443.9	8,875.4	9,269.2	9,269.2	9,355.3	9,430.8	9,406.4	9,406.4	1.5%
Elevators (number) – Province	3A-1									
Elevators (number) – Railway Class	3A-2	917	402	411	411	411	412	413	413	0.5%
Elevators (number) – Grain Company	3A-3									
Elevators Capable of MCB Loading (number) – Province	3A-4									
Elevators Capable of MCB Loading (number) – Railway Class	3A-5	317	260	269	269	269	269	265	265	-1.5%
Elevators Capable of MCB Loading (number) – Railway Line Class	3A-6									
Elevator Closures (number)	3A-7	130	24	35	0	7	6	4	17	-51.4%
Elevator Openings (number)	3A-8	43	27	44	0	7	7	5	19	-56.8%
Delivery Points (number) – Accounting for 80% of Deliveries	3A-9	217	101	104	n/a	n/a	n/a	n/a	104	0.0%
Railway Infrastructure										
Railway Infrastructure (route-miles) – Total Network	3B-1	19,390.1	17,265.7	17,265.7	17,265.7	17,265.7	17,265.7	17,265.7	17,265.7	0.0%
Railway Infrastructure (route-miles) – Class-1 Network	3B-1	14,503.0	14,596.1	14,596.1	14,596.1	14,596.1	14,596.1	14,596.1	14,596.1	0.0%
Railway Infrastructure (route-miles) – Non-Class-1 Network	3B-1	4,887.1	2,669.6	2,669.6	2,669.6	2,669.6	2,669.6	2,669.6	2,669.6	0.0%
Railway Infrastructure (route-miles) – Non-Grain-Dependent Network	3B-1	14,513.5	14,028.7	14,028.7	14,028.7	14,028.7	14,028.7	14,028.7	14,028.7	0.0%
Railway Infrastructure (route-miles) – Grain-Dependent Network	3B-1	4,876.6	3,237.0	3,237.0	3,237.0	3,237.0	3,237.0	3,237.0	3,237.0	0.0%
Railway Fleet Size (railcars) – Average Weekly	3B-2	n/a	26,381	25,679	23,173	21,705	19,339	20,631	21,226	-17.3%
Served Elevators (number)	3B-3	884	352	342	342	340	341	337	337	-1.5%
Served Elevators (number) – Class 1 Carriers	3B-3	797	321	310	310	309	308	304	304	-1.9%
Served Elevators (number) – Non-Class-1 Carriers	3B-3	87	31	32	32	31	33	33	33	3.1%
Served Elevators (number) – Grain-Dependent Network	3B-3	371	105	102	102	102	104	104	104	2.0%
Served Elevators (number) – Non-Grain-Dependent Network	3B-3	513	247	240	240	238	237	233	233	-2.9%
Served Elevator Capacity (000 tonnes)	3B-3	7,323.0	8,646.9	8,886.3	8,886.3	8,964.4	9,034.0	8,971.7	8,971.7	1.0%
Served Elevator Capacity (000 tonnes) – Class 1 Carriers	3B-3	6,823.2	8,416.4	8,610.1	8,610.1	8,659.3	8,720.1	8,657.8	8,657.8	0.6%
Served Elevator Capacity (000 tonnes) – Non-Class-1 Carriers	3B-3	499.7	230.4	276.1	276.1	305.0	314.0	314.0	314.0	13.7%
Served Elevator Capacity (000 tonnes) – Grain-Dependent Network	3B-3	2,475.4	2,011.0	2,084.4	2,084.4	2,163.6	2,167.3	2,167.4	2,167.4	4.0%
Served Elevator Capacity (000 tonnes) – Non-Grain-Dependent Network	3B-3	4,847.6	6,635.9	6,801.9	6,801.9	6,800.8	6,866.7	6,804.4	6,804.4	0.0%
Terminal Elevator Infrastructure										
Terminal Elevators (number)	3C-1	15	17	18	18	17	17	17	17	-5.6%
Terminal Elevator Storage Capacity (000 tonnes)	3C-1	2,678.6	2,695.5	2,767.5	2,767.5	2,752.5	2,752.5	2,752.5	2,752.5	-0.5%

DISCUSSION AND ANALYSIS

COUNTRY ELEVATOR INFRASTRUCTURE
[See TABLES 3A-1 through 3A-9]

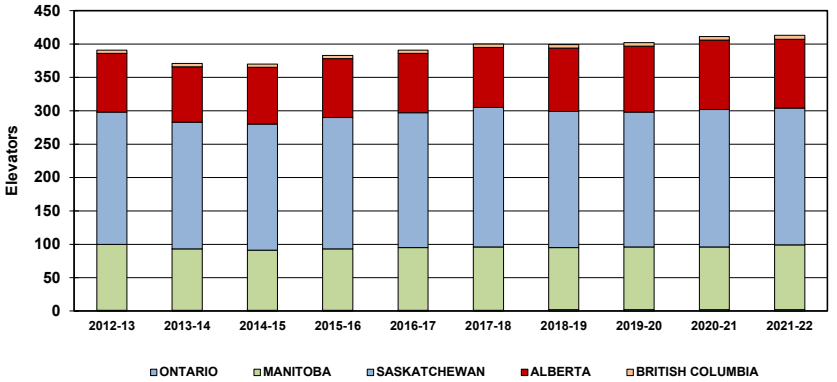
At the outset of the 1999-2000 crop year, there were 1,004 licensed primary and process elevators situated across the prairies. By the close of the 2021-22 crop year, what remained encompassed a total of 413 facilities, representing a reduction of 58.9% from the GMP's base year. This decline marks one of the most visible changes that have taken place in the GHTS. However, much of this rationalization was concentrated in the GMP's first seven years, with only modest changes having occurred after the 2006-07 crop year.

The 2021-22 crop year produced a two-elevator increase in the network. This came about through the closure of 17 elevators, chiefly smaller Class A and B facilities, along with the licensing of 19 others.[6] Among the latter were three recently constructed or retrofitted loop-track facilities: two operated by Viterra; and one by Richardson International.

At the close of the 2021-22 crop year, 205, or 49.6% of Western Canada's licensed elevators, were situated in Saskatchewan. This was followed by Alberta and Manitoba, with 103 and 97 elevators respectively, and corresponding shares of 24.9% and 23.5%. The GHTS's remaining eight facilities were divided between British Columbia, with six, and Ontario, with two. None of these proportions are far removed from those observed in the GMP's base year.

Much of the observed decline in elevators came from the closure of hundreds of the iconic wood-crib facilities that used to be found in virtually every small prairie town. Although some would be repurposed by new owners, 558 licensed Class A elevators, along with 132 Class B elevators, ultimately closed their doors during the last 23 years. These closures effectively drove a 401-community constriction in the grain-delivery network itself, which by the end of the 2021-22 crop year encompassed 285 locations as compared to the 686 benchmarked at the beginning of the GMP's base year.

Country Elevators - Provincial Distribution



However, the smaller, wood-crib facilities were not the only elevators to be closed. During this same period, some 43 of the smaller Class C high-throughput elevators have also been shuttered. Only the largest high-throughput facilities, the licensed Class D elevators, have increased in number, expanding to 180 from 38 in the base year. By the close of the 2021-22 crop year, high-throughput facilities accounted for 52.8% of total

6 The facility classes employed here mirror the thresholds delineated by Canada's major railways at the beginning of the GMP for the receipt of discounts on grain shipped in multiple-car blocks. At that time, these thresholds involved shipments of 25, 50 or 100 railcars. For comparative purposes, the GMP groups elevators into four classes, which are based on the loading capability of each facility as defined by the number of railcar spots each possesses. Those with less than 25 car spots are deemed to be Class A facilities; those with 25-49, Class B; those with 50-99, Class C; and those with 100 or more, Class D.

system elevators and 84.2% of its storage capacity. Both shares stand significantly above their respective base-year values of 11.9% and 39.4%.

While the overall number of elevators has increased moderately over the last decade, the network's storage capacity has risen steadily in conjunction with the overall grain supply. By the close of the 2021-22 crop year, the system's overall storage capacity stood at just over 9.4 million tonnes, a new GMP record. Moreover, this embodies a 65.4% increase over the 5.7-million-tonne low reached under the GMP 18 years earlier. Over the last decade, this expansion has advanced with roughly 250,000 tonnes of storage being added annually.

Loop-Track Facilities

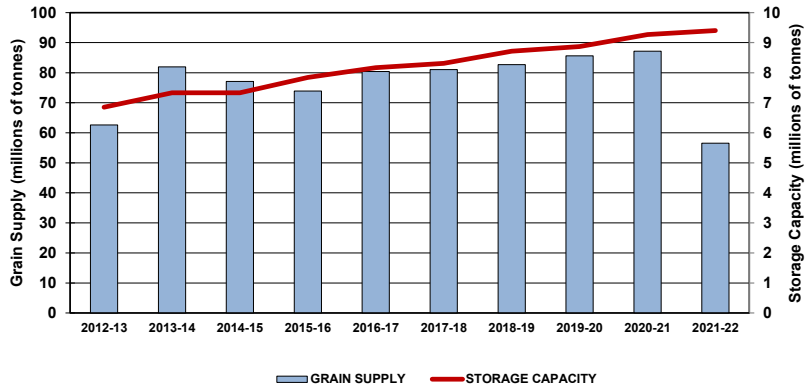
Much of the recent increase in elevators and storage capacity can be traced to the emergence of still more efficient Class-D facilities. Not only do these facilities have more storage capacity than their forerunners, but they also feature loop tracks with standing capacity for up to 150 covered hopper cars (or about 8,500 feet in total length), which conceptually allows for faster grain loading and more efficient unit-train operations.[7]

Pioneered in Canada by Paterson Grain almost a decade ago, the concept has been embraced by most major grain handlers. In fact, virtually all new elevator construction undertaken in Western Canada since 2015 has incorporated a loop-track. Furthermore, several established ladder-track facilities have also been retrofitted for loop-track operations. By the close of 2021-22 crop year, 37 loop-track facilities with 1.5 million tonnes of storage capacity had been established. Three such facilities commenced operations in the preceding twelve months. Loop-track facilities now account for 9.0% of total system elevators and 16.3% of its storage capacity.

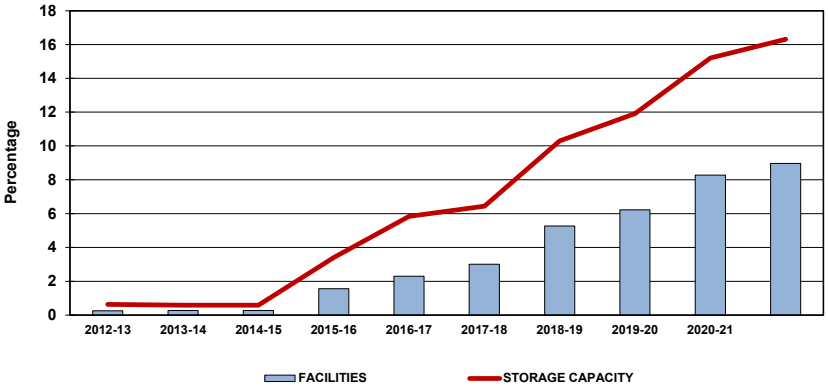
Impact on GHTS Operations

Yet this expansion also threatens to compound some of the service issues already associated with long-train movements. Much of this stems from the railways' efforts to leverage the operational efficiencies that come from

Grain Supply and Country Elevator Storage Capacity



Loop-Track Elevators - Share of Facilities and Storage



7 Covered hopper cars vary in physical capacity and length. Actual standing capacity can vary.

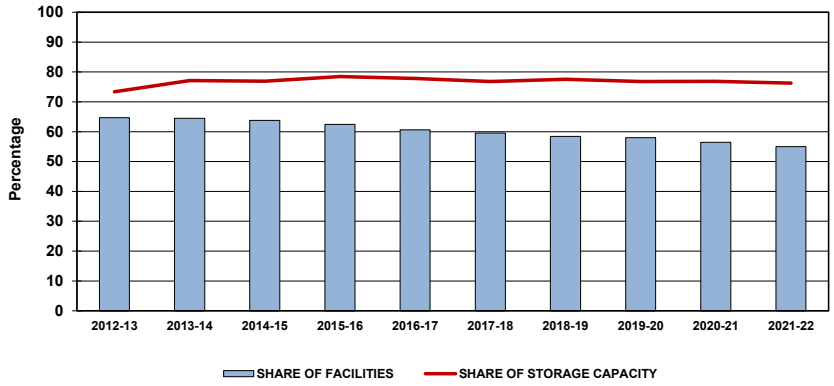
consolidating different shipments to maximize in-route train lengths, which can reach as much as 12,000 feet (roughly the equivalent of 200 standard railcars). This means that the consist of an originating 8,500-foot unit train may be reallocated for movement as part of two or more longer trains. Moreover, these longer trains must still traverse a rail network with sidings, intermediate yards and terminals designed to handle shorter trains.[8] This can necessitate the partitioning of the original consist into still smaller car-blocks along with additional delays.

Such railway practices frequently result in cars that originated as a single unit-train movement reaching their intended destination at widely different times. While this may be practical from the carriers' perspective, it often conflicts with the needs of shippers, who generally expect railcars moving from the same originating facility (be it as a small block of cars or an entire train) to arrive intact at destination. The grain industry has long voiced its frustration with this practice as it often interferes with the planned flow of grain into – and through – their port terminals. As the associated delivery delays are often measured in days, it frequently leads to postponed vessel loading and lengthier stays in port. While longer trains may potentially exacerbate these problems for terminals with shorter receiving tracks, those with longer tracks are less vulnerable and benefited from comparatively faster point-to-point service in the 2021-22 crop year.

Corporate Ownership

The 413 facilities comprising the country-elevator network are licensed by dozens of separate companies. Yet much of Western Canada's grain-handling assets are controlled by just seven companies. Chief among them are such established names as Cargill Limited, Parrish & Heimbecker Limited, Paterson Grain, Richardson International, and Viterra Inc. But their ranks have also increased with the emergence of newer market entrants, including G3 Canada Limited and GrainsConnect Canada. Together, these companies have driven much of the industry's modernization efforts, and collectively oversee the operation of 55.0% of its facilities and 76.3% of its associated storage capacity.

Largest Grain Companies - Facilities and Storage Capacity
(Western Canada)



Despite this dominance, non-major grain handlers continue to thrive, with the specialization of many in the pulse and special-crops sectors serving to fortify their positions in a highly competitive environment. These include firms like AGT Foods and Ingredients, Ceres Global Ag, Providence Grain Group and Scoular Canada, which, along with other players, jointly operate 45.0% of the GHTS's licensed facilities but only 23.7% of its associated storage capacity.

RAILWAY INFRASTRUCTURE
[See TABLES 3B-1 through 3B-3]

Changes to the GHTS's railway infrastructure have been substantially less than that of the country-elevator network. This is chiefly because elevator closures precede any railway rationalization effort that would ensue. Moreover, given the breadth of the railway network and the diversity of the traffic it supports, any rationalization can never fully mimic that of grain elevators alone. In fact, over the last 23 years, the railway network

8 Although CN and CP have been investing in longer sidings and receiving tracks, their networks are still largely designed to handle trains under 9,000 feet in length. Over-siding-length trains can easily present operational problems that detract from the efficiencies sought if not properly accommodated for.

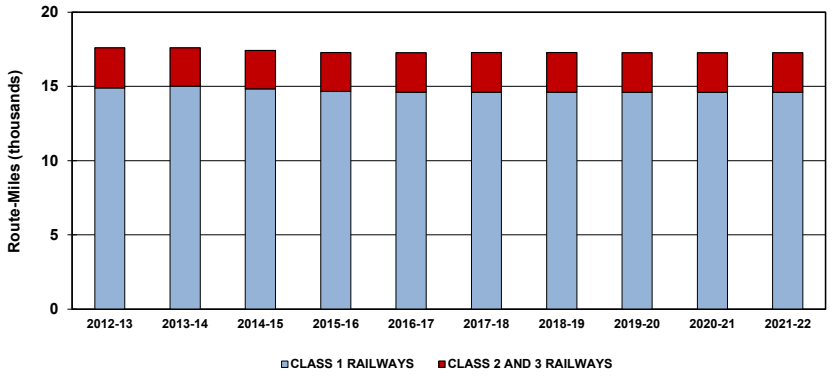
contracted only one-fifth as much as the country elevator network, shedding 2,202.5 route-miles, or 11.3%, of the 19,468.2 route-miles originally benchmarked in the GMP's base year. More importantly, this decline has all but ceased in the face of the last decade's minimal elevator changes. This was amply signalled in the 2021-22 crop year, where no changes were again recorded, and the railway network was left unaltered at 17,265.7 route-miles.

To date, over three-quarters of the network reduction has been tied to the discontinuance of some 1,717.7 route-miles of light-density, grain-dependent branch lines.[9] Other changes in the composition of the railway network came from the transfer of various branch lines to smaller shortline railways, although none were recorded in the last twelve months. At the close of the 2021-22 crop year Class-1 carriers operated 84.5%, or 14,596.1 route-miles, while the smaller Class-2 and 3 carriers operated the remaining 15.5%, or 2,669.6 route-miles.[10]

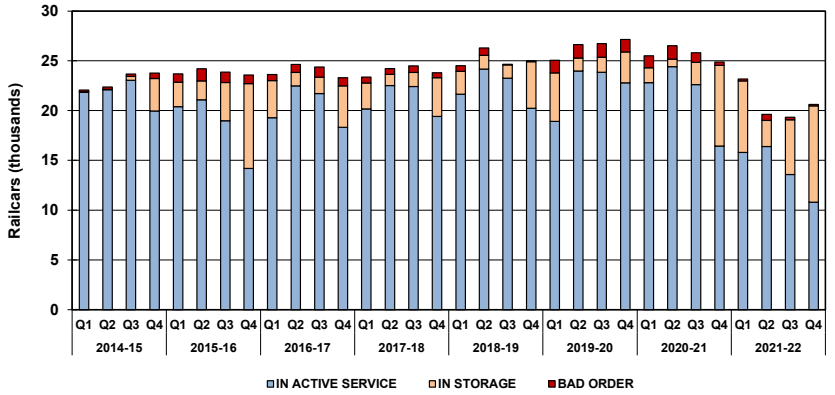
Covered Hopper Car Fleet

The GHTS's handling capacity is heavily influenced by the number of covered hopper cars employed by the railways in moving grain. The size of the fleet arrayed varies with prevailing market conditions, expanding and contracting with changes in traffic volume. The smaller crop put forward in the 2021-22 crop year led to a 17.3% contraction in this fleet, which fell to an average of 21,226 hopper cars from the 25,679-car average posted a year earlier.[11] It is worth noting that this marked the second overall reduction recorded since CN and CP both announced new hopper-car acquisition programs three years earlier. Part of this decline was also attributable to the near 20% gain in the carrying capacity of the new cars, which allows for a comparable reduction in the number of cars needed to

Railway Infrastructure - Route-Miles Operated
(Western Canada)



Covered Hopper Cars - Number and Status



9 The term "grain-dependent branch line", while largely self-explanatory, denotes a legal designation under the *Canada Transportation Act*. Since the Act has application to federally regulated railways only, grain-dependent branch lines transferred to provincially regulated carriers lose their federal designation. This can lead to substantive differences between what might be considered the physical, and the legally-designated, grain-dependent branch line networks. For comparison purposes only, the term has been affixed to those railway lines so designated under Schedule I of the *Canada Transportation Act (1996)* regardless of any subsequent change in ownership or legal designation.

10 The classes used here to group railways are based on industry convention: Class 1 denotes major carriers such as the Canadian National Railway or the Canadian Pacific Railway; Class 2, regional railways such as the former BC Rail; and Class 3, shortline entities such as the Great Western Railway.

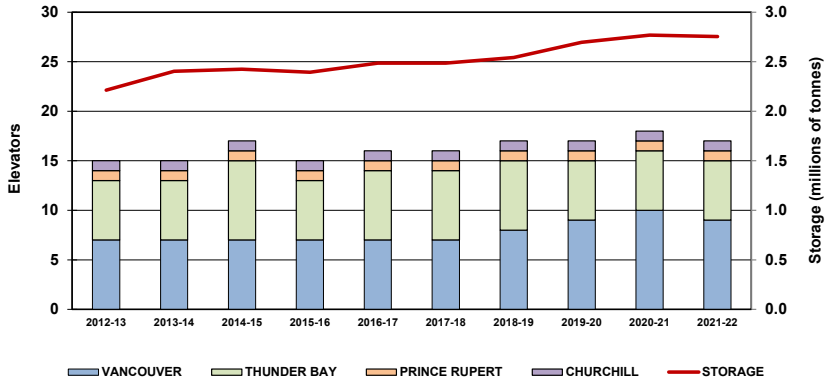
11 The fleet information supplied by the railways is believed to exclude many of the privately-owned or leased cars supplied by the grain companies themselves. The actual number of cars in grain service is, therefore, believed to be understated.

fully replace the government hoppers that are rapidly reaching the end of their useful lives and being withdrawn from service.

At any given moment in time, the equipment used for this purpose is categorized in one of three ways: as being in active service moving grain; in storage awaiting later use; or "bad order" (i.e., removed from active service for repair). Typically, the proportion assigned to active service rises to meet peak demand, usually reaching a zenith sometime in the fall or early winter.

While the proportion in active service rose to a height of 81.3% in October 2021, it proved markedly lower than the 94.0% height reached a year earlier. Even fewer cars remained in service through the latter half of the crop year, with the utilization rate falling to a low of 51.1% in June 2022. This meant that the average active fleet declined by 34.3%, to 14,166 cars from 21,550 cars a year earlier.

Terminal Elevators - Location and Storage Capacity
(Western Canada)



TERMINAL ELEVATOR INFRASTRUCTURE
[See TABLE 3C-1]

At the outset of the 1999-2000 crop year, there were 14 licensed terminal elevators operating in Western Canada. This network was largely tied to the traditional grain-handling ports of Thunder Bay and Vancouver, with outlying terminals at Churchill and Prince Rupert. By the close of the 2021-22 crop year, the overall number of facilities had risen to 17, a gain of 21.4% over those counted in the base year. The associated storage capacity increased by a lesser 8.2% during this same period, to somewhat under 2.8 million tonnes from 2.6 million tonnes.

Thunder Bay had long been home to the majority of the GHTS's terminal-elevators. But its position in the GHTS has steadily eroded in the face of a growing Asian grain trade. Recent facility closures have left the port with six facilities and more than 1.1 million tonnes of licensed storage capacity, garnering system shares of 33.3% and 41.0% respectively. Both values are down from the 50.0% shares benchmarked over two decades earlier.

Nevertheless, since the inception of the GMP, the growing handling needs of the GHTS – particularly along the west coast – has spurred the demand for additional handling capacity. Vancouver has been the focus of much of the ensuing investment, which largely started with an 81,720-tonne expansion of the Richardson International terminal in North Vancouver in 2016. This was followed by major upgrades to the ship-loading galleries at Viterra's Pacific Terminal and the Alliance Grain Terminal, and a significant enhancement of the Fibreco Export facility to permit handling of other commodities, including agricultural products. More noteworthy still was G3 Canada's construction of an all new 183,000-tonne loop-track terminal in North Vancouver, which opened officially in July 2020. This was followed a year later by the opening of the new 72,000-tonne Fraser Grain Terminal, whose development was spearheaded by Parrish & Heimbecker Limited in partnership with GrainsConnect Canada.

The 2021-22 crop year brought the planned closure of the older 15,000-tonne Parrish & Heimbecker facility in Surrey.[12] This reduced the number of licensed facilities at the port to nine from ten, giving the port a 52.9% share of total system elevators, and a 46.3% share of its licensed storage capacity.

Critical Observations

Notwithstanding the sharp downturn in volume witnessed in the 2021-22 crop year, the handling needs of the GHTS have risen steadily over the last two decades. This need is inextricably linked to a near 50% increase in grain production, with much of the increase coming in the last ten years. Such growth spurred the grain industry into investing in a new generation of higher-efficiency country and terminal elevator facilities. But the associated demand for additional carrying capacity has also brought more pressure to bear on the railway system. To be sure, CN and CP have made significant strides in this direction, making substantial investments in both plant and equipment. But the longer-term prospects for growth across a multitude of commodities continues to point to the need for still more railway capacity.

In crowded urban settings like Vancouver, established pinch points, such as the Thornton Tunnel and the Second Narrows Bridge, have become increasingly problematic in conducting grain and non-grain traffic to and from terminals on the North Shore as they provide the only practical physical access to these facilities.[13] This became an even more pressing issue once G3 Terminal Vancouver came into full operation in July 2020. With projected increases occasioned by other expansions (most notably that of Neptune Terminals to accommodate additional coal and potash movements), it is widely estimated that total volumes on this already congested route segment will surge from about 45 million tonnes to 65 million tonnes annually. While efforts to increase the capacity of the Thornton Tunnel and Second Narrows Bridge are advancing, it will likely still be a few years before they are fully realized.

Congestion also impedes rail service to the terminals situated on Burrard Inlet's south shore. This is complicated by the fact that access to the grain and container terminals located there is shared with scheduled commuter trains which, owing to their frequency, severely constrict the windows for both industrial switching and freight train movements. Adding capacity to alleviate these bottlenecks is neither easy, immediate nor inexpensive.

Recognizing that congested trade routes have hampered Canadian export activity, various public and private sector stakeholders have moved to address the need for additional investment in railway infrastructure. The federal government alone earmarked $10.1 billion for such projects through 2028 under its Trade and Transportation Corridors Initiative, with over $400 million having already been allocated by the National Trade Corridors Fund to several capacity-enhancing projects in the Vancouver and Prince Rupert areas. These projects largely focus on the building of new roads, grade separations, bridges, and railway sidings to lessen congestion. Although these investments help tackle some of the GHTS's more immediate infrastructure needs, they do not fully address the longer-term need for increased railway carrying capacity.

12 The Fraser Grain Terminal was intended to replace the existing 15,000-tonne Parrish & Heimbecker facility, which remained licensed until November 2021.

13 The north shore of Burrard Inlet is also accessible from the west using the former BC Rail line (now operated by CN) that runs south from Prince George to North Vancouver. However, traffic along this route is restricted by the extreme grades and curvatures, which dictate the employment of shorter trains and correspondingly lighter train loads.

Section 4: Commercial Relations

Indicator Description	Table	1999-00	2019-20	2020-21	2021-22 Q1	Q2	Q3	Q4	YTD	% VAR
Trucking Rates										
Composite Freight Rate Index – Short-haul Trucking	4A-1	100.0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Country Elevators Handling Charges										
Composite Rate Index – Receiving, Elevating and Loading Out	4B-1	100.0	138.4	138.2	137.7	137.7	137.7	137.7	137.7	-0.4%
Composite Rate Index – Dockage	4B-1	100.0	145.5	144.9	145.5	146.8	146.8	146.8	146.8	1.3%
Composite Rate Index – Storage	4B-1	100.0	229.8	250.7	250.7	250.8	250.8	256.4	256.4	2.2%
Railway Freight Rates										
Composite Freight Rate Index – CN Vancouver	4C-1	100.0	153.8	139.5	169.0	169.0	152.7	152.7	152.7	9.4%
Composite Freight Rate Index – CP Vancouver	4C-1	100.0	164.4	167.1	184.2	184.2	176.7	176.7	176.7	5.8%
Composite Freight Rate Index – CN Prince Rupert	4C-1	100.0	135.9	123.3	149.3	149.3	134.9	134.9	134.9	9.4%
Composite Freight Rate Index – CN Thunder Bay	4C-1	100.0	170.9	146.4	176.9	176.9	153.8	153.8	153.8	5.1%
Composite Freight Rate Index – CP Thunder Bay	4C-1	100.0	172.8	176.2	184.9	184.9	158.1	158.1	158.1	-10.3%
Effective Freight Rate ($ per tonne) – Maximum Revenue Entitlement	4C-3	n/a	$40.25	$39.36	n/a	n/a	n/a	n/a	$39.03	-0.8%
Terminal Elevator Handling Charges										
Composite Rate Index – Receiving, Elevating and Loading Out	4D-1	100.0	157.9	165.8	165.8	165.8	165.2	168.9	168.9	1.9%
Composite Rate Index – Storage	4D-1	100.0	185.9	186.1	186.1	186.1	186.8	186.8	186.8	0.4%

DISCUSSION AND ANALYSIS

COUNTRY ELEVATOR HANDLING CHARGES
[See TABLE 4B-1]

Grain companies assess fees for a variety of elevator-handling activities, predominantly the receiving, elevating and loading out of grain. These are accompanied by additional charges for the removal of dockage (cleaning) and storage, all of which differ according to the activity, grain, province, and company involved. Given the multitude of tariff rates involved, the GMP necessarily uses a composite price index to track their change over time. Throughout much of the GMP these rates have moved generally higher, albeit by varying margins.

Generally modest changes were again observed in the 2021-22 crop year. Elevation rates, which averaged $16.51 per tonne at the close of the 2021-22 crop year, decreased by a marginal 0.4% from the previous crop year's $16.58-per-tonne year-end average. This reduced the composite price index to 137.7 from 138.2.

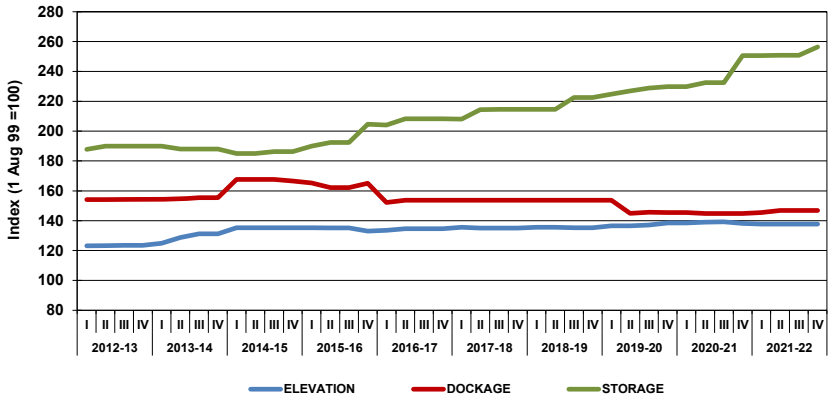
In contrast, dockage fees, which amounted to a lesser $6.59 per tonne at the close of the crop year, rose by 1.3%, lifting the index value to 146.8 from 144.9. Similarly, storage rates increased by 2.2% to an average of just under $0.15 per tonne for each day held, which raised the index value to 256.4 from 250.7.

RAILWAY FREIGHT RATES
[See TABLES 4C-1 through 4C-3]

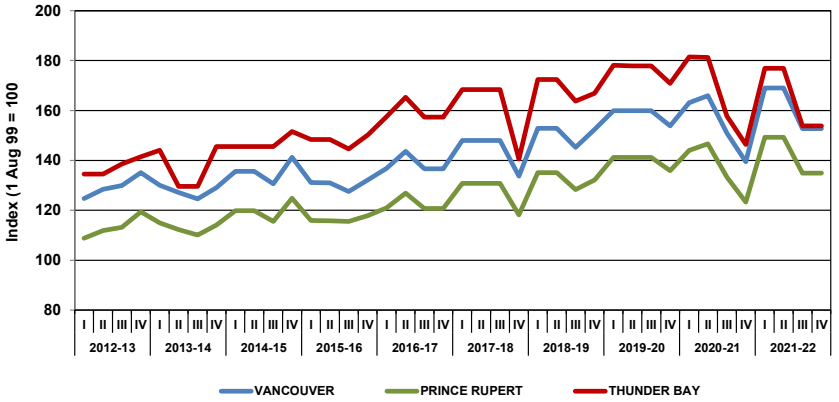
The single-car freight rates charged by the railways (CN and CP) for the movement of regulated grain have changed substantially since the beginning of the GMP, evolving from what were largely mileage-based per-tonne rates into a less rigidly structured set of more market-responsive per-car charges. Additionally, these per-car charges began to differentiate between commodities, size of railcar, destination, and the period in which the traffic was to move.

As with country elevator handling charges, the myriad of applicable freight rates makes the tracking of price changes over time difficult. As a result,

Primary Elevator Handling Charges



CN Single-Car Freight Rates - Primary Corridors
(Western Canada Destinations)



the GMP focuses only on changes in the single-car rates tied to the movement of wheat, deeming these to be reflective of general pricing action. Similarly, a composite price index is also used to track the longer-term change in rate levels. The 2021-22 crop year again saw significant swings in these rates throughout the year, with both CN and CP initially increasing their single-car freight rates in the first quarter.

In the case of the former, this amounted to an initial across-the-board increase of 10.0% in August, followed by consecutive increases of 5.0% in both September and October. These rates remained unaltered until March 2022 when CN reduced its westbound rates by 7.0% and its rates into Thunder Bay by 13.0%. A further 2.9% reduction was applied against its westbound rates in April. With no ensuing changes in the fourth quarter, these actions produced net rate increases of 9.4% on movements into Vancouver and Prince Rupert, and 5.1% into Thunder Bay. The posted per-tonne average rate in these corridors amounted to $56.03 on westbound movements into Vancouver and Prince Rupert, and $49.71 on movements into Thunder Bay.

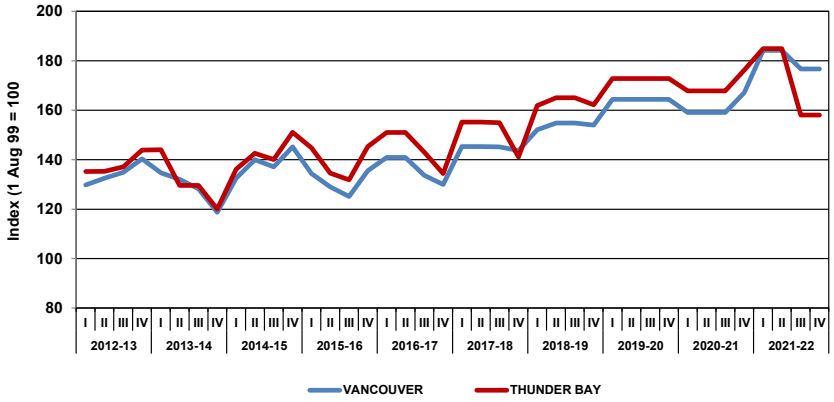
In comparison, CP left its 2020-21 year-end rates into Vancouver unchanged until September 2021, when it applied a 4.0% increase, followed by another 6.0% increase in October. Conversely, the carrier reduced its rates to Thunder Bay by 4.0% at the beginning of August before then applying increases of 4.0% in September and 5.0% in October. These remained unchanged until March 2022 when CP cut its Thunder Bay rates by 10.0%. This was followed in April by reductions of 3.9% for movements into Vancouver, and 5.0% into Thunder Bay. CP maintained these rates through the fourth quarter, effectively posting a net increase in its Vancouver rates of 5.8% while lowering its Thunder Bay rates by 10.3%. The posted per-tonne average rate in these corridors amounted to $65.13 on movements into Vancouver, and $47.48 on movements into Thunder Bay.

Multiple-Car-Block Discounts

The discounting of single-car freight rates has been the principal mechanism employed by the railways to entice shippers into moving grain in larger strings of hopper cars. Such discounting – widely known as multiple-car-block discounts – have evolved considerably since the beginning of the GMP. The first significant structural change in this evolution came nearly two decades ago when the discounts on movements in blocks of 50 or more cars were increased while those for smaller block movements were phased out. Together, these actions provided grain handlers with a powerful economic incentive to ship in trainload – or partial trainload – quantities.

The next important change came in the 2018-19 crop year, when CP withdrew the $4.00-per-tonne incentive that it had long been offering on movements in blocks of 56-111 cars. This left the carrier's $8.00-per-tonne discount for movements in blocks of 112 or more cars the only published incentive still being offered to grain shippers. In contrast, CN left its existing incentives unaltered, and continued to offer a $4.00-per-tonne discount on movements of 50-99 cars, and an $8.00-per-tonne discount on movements of 100 or more cars. However, the carrier also broadened its latter incentive to allow for as much as $2.00 per tonne in

CP Single-Car Freight Rates - Primary Corridors
(Western Canada Destinations)



additional discounts if shippers also complied with certain "heavy-loading" criteria.[14]

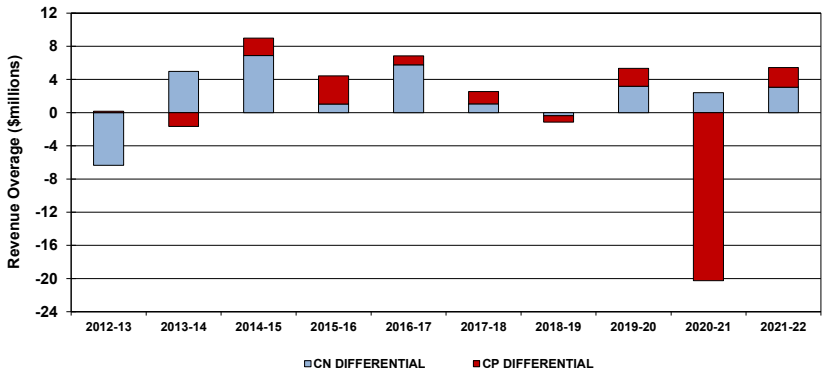
The resultant disparities occasioned by these actions were narrowed at the outset of the 2019-20 crop year when CN eliminated its $4.00-per-tonne discount on movements of 50-99 cars, effectively matching the commercial step taken by CP a year earlier. At the same time, CP brought forward a $10.00-per-tonne discount for movements under its newly introduced High-Efficiency-Product train program, which built on the deeper discounts previously made available by CN to qualifying trainload shippers.[15] These discounts remained effectively unchanged through the 2021-22 crop year.

Taken altogether, the railways' incentive programs are now clearly aimed at realizing the fullest economic potential of unit train operations. And while these incentives work to the financial benefit of the largest and most modern grain-handling facilities, those incapable of moving grain in trainload lots have seemingly been put at a commercial disadvantage. However, such impediments have not precipitated a sizable reduction in the number of smaller elevators.

Maximum Revenue Entitlement

Under the federal government's Maximum Revenue Entitlement (MRE), established in 2000, the unadjusted revenues that CN and CP are entitled to earn from the movement of regulated grain are based on a legislated maximum of $348.0 million and $362.9 million respectively. However, these limits, expressed in year-2000 dollars, are adjusted annually to reflect changes in volume, average length of haul, and inflation. Outside of the inflationary component, these adjustments are determined by the Canadian Transportation Agency (Agency) following a detailed analysis of the traffic data submitted to it by CN and CP at the end of any given crop year.

Maximum Revenue Entitlement - Carrier Compliance



The Volume-Related Composite Price Index (VRCPI), which provides for an inflationary adjustment to carrier revenues, is determined by the Agency in advance of each crop year. For the 2021-22 crop year, the Agency determined the value of the VRCPI to be 1.4572 for CN, and 1.4826 for CP. These values denoted a year-over-year increase of 0.9% for CN, and a 1.5% decrease for CP.[16] As a result, the MRE for CN and CP were set at $589.1 million and $513.1 million respectively.[17] The Agency also determined that, for the 2021-22 crop year, the statutory revenues derived from the movement of regulated grain by CN amounted to $592.2 million, and to $515.5 million for CP. Accordingly, the Agency cited CN and CP for having exceeded their maximum revenue entitlements by $3.1 million and $2.4 million respectively.

14 In addition to meeting all basic tariff requirements, a shipper of 100 or more cars could also receive an additional $0.50 per tonne (approximate) under CN's new "Ready Train Incentive" as well as another $1.50 per tonne under it's new "Loop/Tangent Track Incentive."

15 CP's High-Efficiency-Product train program is built around the carrier's plan to operate trains to an 8,500-foot standard and takes advantage of the efficiency gains to be had by using the higher-capacity hopper cars it is purchasing to increase trainloads by over 40%. When combined with the promise of faster and more efficient loop-track loading systems, these trains can help accelerate the flow of grain to market.

16 The Volume-Related Composite Price Index (VRCPI), which had been expressed as a single value applicable to both CN and CP, was re-established as separate values by amendment to the *Canada Transportation Act* in 2018.

17 See Canadian Transportation Agency Determination R-2022-183 dated 22 December 2022.

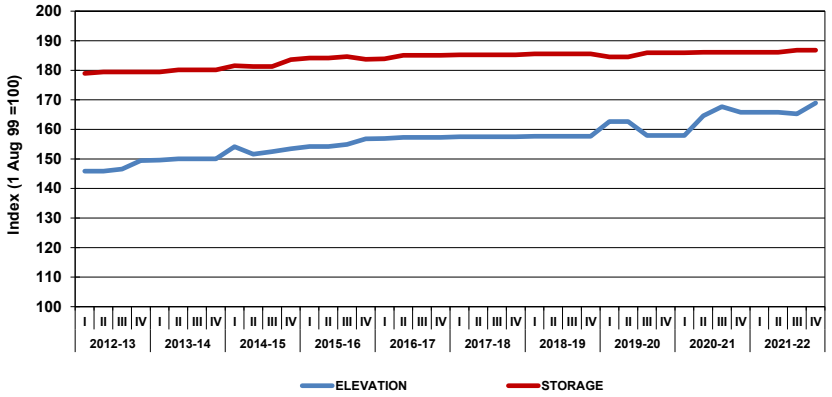
TERMINAL ELEVATOR HANDLING CHARGES
[See TABLE 4D-1]

About two-thirds of terminal-elevator revenues are derived from the charges levied for the receiving, elevating and loading out of grain. These are accompanied by additional charges for storage, all of which differ according to the activity, grain, province, and company involved. As with other price-related measures, the myriad of applicable tariff rates naturally lends itself to the use of composite indexes in gauging price movement over time.

The 2021-22 crop year again brought modest changes to these rates. The rates for elevation, which averaged $15.40 per tonne at the close of the crop year, increased by 1.9% from the previous crop year's $15.12-per-tonne year-end average. This lifted the composite price index to 168.9 from 165.8.

A more marginal 0.4% increase was observed in the daily charge for storage, which rose to a year-end average of over $0.12 per tonne and lifted the associated composite price index to 186.8 from 186.1 a year earlier.

Terminal Elevator Handling Charges



COMMERCIAL DEVELOPMENTS

Canola processing poised for expansion

In the span of less than five weeks beginning in March 2021, three of Canada's largest grain companies announced separate projects that would substantially increase domestic canola-crushing capacity over the next three years. This signaled a dramatic shift in expectations for the canola industry, which now saw the oilseed as a potential feedstock for renewable diesel production in addition to its well-established position as a healthy vegetable-oil for the food market. Canola oil had long been an important feedstock in the production of biodiesel, as it can be blended in a 5% – 20% proportion with petroleum diesel to make a usable fuel. But hydrotreating a vegetable oil, such as canola oil, can produce a cleaner-energy alternative fuel known as renewable diesel, which need not be blended and can be used directly in most diesel engines.[18]

Clean-energy initiatives gained significant traction following the 2011 introduction of California's Low Carbon Fuel Standard, which spread steadily to other jurisdictions and became the focus of federal strategies in both the United States and Canada. This has resulted in various incentives and mandates being employed to drive innovation, support sustainable jobs, and develop market-based programs focused on reducing carbon intensity.

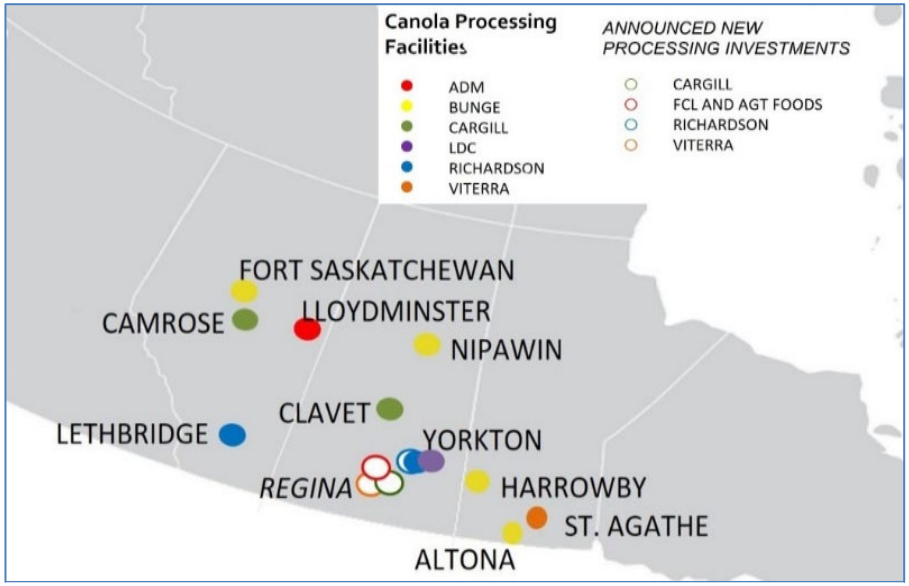
The first investment announcement came in late March 2021, when Richardson International unveiled its plan to effectively double the processing capacity of its existing canola plant in Yorkton, Saskatchewan, to 2.2 million tonnes annually. This was followed nearly a month later with Cargill stating that it intended to modernize both of its existing

18 Hydrotreating is accomplished by hydrogenating the triglyceride (fat) in order to eliminate metals or compounds containing nitrogen and oxygen.

facilities as well as invest in a new Regina-based facility capable of processing 1.0 million tonnes of canola seed per year. A few days later Viterra revealed that it would be building the world's largest canola-crushing facility, also to be situated in Regina, capable of processing 2.5 million tonnes of seed annually.[19] In January 2022 Federated Co-operatives Limited (FCL) and AGT Food and Ingredients Inc. announced their plan to build a canola-crushing facility in Regina – the third major crush project announced for that city in less than a year – capable of processing another 1.1 million tonnes of canola seed.[20]

All told, these facilities will add some 5.7 million tonnes of crush capacity, or over 50%, to Canada's current 11.0-million-tonne capacity.[21] Excluding 2021's drought-reduced output, western Canadian canola production has averaged 19.9 million tonnes annually over the last five years. Assuming capacity utilization of 90%, domestic canola processing would consume over 75% of the average canola supply, leaving a much smaller volume of seed available for export. Although the Canola Council of Canada (CCC) is targeting 26 million tonnes of canola production by 2025, the slowing growth rate brings its attainability into question. While the concentration of processing facilities in eastern Saskatchewan has led to the expectation that more acres in this region will be devoted to growing canola, the broader prairie-wide need for crop rotation is likely to limit a large-scale diversion of land to canola production. Improved genetics and agronomics are seen as more critical to securing the supplies necessary to meet future domestic and export demands.

Nevertheless, the surge in domestic processing expected to come onstream by 2025 will change the transportation needs for canola seed, oil, and meal. While crushing-plant receipts will remain truck dependent, the outbound movement of oil and meal will require more tank and hopper cars, most of which will likely be provided by the processors themselves.[22] Moreover, until canola production reaches the 26-million-tonne level envisioned by the CCC, a larger proportion of the crop will necessarily have to be directed into the more valuable and growing domestic-processing sector, leaving less seed for export to offshore markets. While the attendant reduction in bulk seed exports would ease some of the demand pressure normally exerted on the domestic hopper-car fleet, it would not materially change the longer-term need for additional railway carrying capacity. To be sure, canola meal, a by-product of the crushing process, would still need to move in hopper cars. However, the North American dairy-feed market might not be able to absorb this increased supply, resulting in more meal being shipped by hopper car to port position, and then to offshore feed and aquaculture markets. Conversely, the increase in oil production to serve markets in both Canada and the US would



Location of current and planned canola-processing facilities in Western Canada. (Graphic courtesy of Canadian Oilseed Processors Association)

19 A subsequent announcement by Ceres Global Ag Corp for a 1.1-million-tonne crushing facility adjacent to its Northgate, SK elevator was ultimately cancelled owing to higher-than-anticipated costs and changing economic conditions.

20 The project is part of a broader $2 billion investment by FCL in an integrated agriculture complex that includes construction of a renewable diesel plant capable of producing 15,000 barrels per day, which it had announced in November 2021.

21 A parallel expansion is underway in the United States with the American Soybean Association indicating that 13 new soybean crush plants and 10 expansions have been announced, adding 34% to the country's existing capacity if all are completed.

22 If the Eastern Saskatchewan focus for canola crushing cannot be fully serviced by seed grown within its logical truck-catchment area, canola seed will likely need to move by rail from more-distant production areas.

heighten tank-car movements, adding substantially to the need for equipment and carrying capacity.[23]

The view that Canadian canola growers could be well positioned to gain access to a substantially expanding market was strengthened significantly on 12 April 2022 when the United States Environmental Protection Agency (EPA) advanced a proposed rule that would pave the way for canola oil to be used in the making of renewable diesel, jet fuel and other products.[24] The proposal came following the EPA's determination that the greenhouse gas emissions from canola-oil-based fuels were more than 50% below petroleum-based fuels. The CCC estimates that the rule change could open the market to a further 5.0 million tonnes in Canadian canola sales by 2030.[25]

In addition, Canada's *Clean Fuel Regulations* were officially annexed under sections of the *Canadian Environmental Protection Act* and the *Environmental Violations Administrative Monetary Penalties Act* on 6 July 2022 with implementation set for 1 July 2023. Besides requiring that gasoline and diesel suppliers reduce the carbon intensity (CI) of the fuel they produce to ever-increasing levels by 2030, they established a credit market with three main categories for CI reduction: actions that reduce the CI of the fossil fuel throughout its lifecycle; supplying low-carbon fuels; and supplying fuel and energy in advanced vehicle technologies. The domestic recognition of canola's potential to reduce greenhouse gas emissions as a low-carbon feedstock for biofuels was welcomed by the industry, and widely viewed as supportive of its investments.

Container supply problems deepen

By the fall of 2021 a constriction in the supply of empty shipping containers had devolved into a full-blown crisis for many in Canada's soybean, pulse and special crops industries. Farmers found themselves unable to deliver their on-farm stocks because marketers simply could not secure the empty containers needed to accommodate their shipments, thereby reducing the outbound flow to about a quarter of the norm. This reduction was largely contained to the west-coast ports of Vancouver and Prince Rupert, which saw their combined volume plunge by roughly 60% from the previous year. In comparison, Montreal, which was largely insulated from the container-supply issues affecting the west-coast ports, saw a 15% increase in volume.

From the outset, the shortage appeared to have been triggered by a heightened demand for containers moving out of Asia as the global economy struggled to exit the COVID-induced downturn. But the supply remained restricted owing to the steamship lines' strategic decision to forego loaded back-haul movements in favour of returning containers empty to Asia and using them to supply the more lucrative head-haul market. This severely limited the supply of empty containers available for transloading in Vancouver and Prince Rupert. Moreover, the constriction spurred a near doubling of ocean-freight rates in just six months. The sharp rise in the demand for all nature of goods only aggravated matters further, placing still greater strain on global supply chains. As a result, many observers came to believe that what had initially been viewed as a temporary annoyance had, in fact, become a protracted problem, and one likely to continue well into 2022.

Moreover, by the end of 2021 these struggles were beginning to compound themselves, with port congestion reaching unprecedented levels. While fluidity was proving to be an issue at Vancouver, it was even worse at American ports, such as Los Angeles and Long Beach, where dozens of container ships were backlogged waiting to unload. The situation was exacerbated by the lack of dockside handling capacity as well as the COVID-related downsizing that had reduced railway and trucking capacity.

23 With the demand from emerging renewable-diesel plants such as the Calumet facility in Great Falls, Montana, and the Imperial Oil facility in Strathcona County, Alberta, (anticipated to come online in late 2022 and 2024 respectively) there will be greater need to improve the logistical and economic efficiency of the unit-train service given over to tank-car movements.

24 On 2 December 2022, the EPA issued their Final Rule, confirming canola oil's standing in meeting lifecycle requirement for advanced biofuels production.

25 As 2022 drew to a close, the industry was reminded of the capricious nature of regulatory decisions. The *Clean Air Act* promotes the production of renewable fuels in the US, including providing annual volume targets for most renewable fuels. On 1 December 2022 the EPA released the proposed Renewable Fuel Standard volume targets for the upcoming three years. The targets proved well below industry expectations, suggesting that the growth in crush capacity and renewable diesel production may ultimately be more gradual than originally envisioned. The final set of rules are to be issued by 14 June 2023.

All of this served to constrict the inland movement of traffic still further, and fuelled calls for governmental action.

Rail service in British Columbia halted by flooding

In mid-November 2021 a series of atmospheric rivers smashed rainfall records throughout the Lower British Columbia Mainland and the interior of the province. The deluge triggered rivers and streams to overflow, washing away dikes, roads, bridges, and railway lines throughout the Fraser River Valley. At its height, some 15,000 people were forced from their homes by floodwaters that reached up to two metres in depth. The scope of the damage wrought was unprecedented, and severed the crucial transportation arteries leading into, and out of, Vancouver in several places.[26] This included the CN and CP mainlines that thread their way through the affected area, which ranks among the busiest corridors in their networks. Both carriers mobilized to effect repairs as quickly as possible, but the damage extended over some 150 miles and 80 separate locations.

Despite 30 sites having sustained flood damage, with 20 incurring significant infrastructure losses, CP was able to reopen its line after an eight-day outage. This allowed for the resumption of limited rail service between Kamloops and Vancouver while CN pressed on with its own repairs, which were completed some 10 days later. These line outages left an extensive traffic backlog, which required weeks to fully clear. The commercial reverberations from this outage, which were still being felt as late as March 2022, only deepened the broader supply-chain problems that were being felt throughout North America and around the world.

Despite the extraordinary cause, the grain industry came to believe that the normalization of rail service was being undermined by longstanding operational weaknesses, including the carriers' chronic failure to deploy the resources required to safeguard adequate carrying capacity. Moreover, grain shippers pointed to the increasing shortfalls in railway-supplied equipment at country elevators as being symptomatic of the deteriorating service being provided. This led the Western Grain Elevator Association (WGEA) to ask the Canadian Transportation Agency (Agency) to initiate an own-motion inquiry into the railway service issues that had resulted in more than one-third of the grain industry's car orders going unfilled. However, the Agency decided against undertaking such an inquiry at that time.

Transport Canada creates Supply-Chain Task Force

In March 2022 the Government of Canada announced the establishment of a National Supply Chain Task Force to study the underlying issues that had made Canada's access to essential goods and supplies slower, more expensive, and less reliable. These problems were deemed to have made it more difficult for Canadian businesses to get their products to global markets. Moreover, they had been compounded by issues stemming from the ongoing COVID-19 pandemic, climate change, and other major events. The eight-member Task Force was expected to consult widely with industry stakeholders and develop recommendations regarding the short and long-term actions needed to alleviate supply chain congestion and improve its domestic and international linkages.

The Task Force's final report, released in October 2022, claimed that Canada's transportation supply chain was approaching a "breaking point" and that urgent action from both government and industry was needed to keep goods flowing. The Task Force advanced 21 immediate and longer-term recommendations. Among the higher-priority items were the need for measures to ease container congestion at ports; an expansion of the existing railway interswitching distance; and addressing pervasive labour shortages.

Ukraine conflict impacts global grain markets

Russia's invasion of Ukraine in late February 2022 sent shockwaves through various commodity markets, largely because of the potential trade disruptions it posed for the Black Sea region. Russia is the world's largest natural gas and fertilizer exporter, as well as its second largest crude oil exporter. Along with Ukraine, these two countries also accounted for nearly one-third of global wheat exports, a fifth of its corn exports, and

26 Marine carriers were formally advised by the Vancouver Grain Exchange of an uncontrollable disruption to railway service between 15 November 2021 and 6 December 2021.

80% of its sunflower oil exports. The conflict sent many commodity prices sharply higher in the weeks that followed.

Many observers, including the World Bank, speculated that the global food and fuel price shocks resulting from the war could extend well beyond 2022. The bank indicated that the war could result in the biggest commodity price shocks since the 1970s, building on the already elevated inflationary pressures that were likely to raise most global commodity prices by anywhere from 20% to 50% in 2022. The bank also warned that, in the event of a prolonged war or additional Western sanctions against Russia, prices could prove even more volatile and reach still higher.

By the close of the 2021-22 crop year, disruptions to the flow of grain from the Black Sea had already spurred prices to record highs, with international buyers scrambling to secure alternative supplies. Canadian grain suppliers were, however, largely unable to respond given 2021's smaller crop. Nevertheless, prevailing market conditions suggested that the demand for Canadian grain would remain strong well into the 2022-23 crop year.

Port of Vancouver launches Active Vessel Traffic Management program

With the growth in marine traffic through the Port of Vancouver has come an increasing need to optimize the movement of vessels through its busy and confined waterways. At the outset of the 2021-22 crop year the Vancouver Fraser Port Authority (VFPA) launched its Active Vessel Traffic Management (AVTM) program, with the goals of improving the port's efficiency, increasing collaboration between stakeholders, reducing environmental and social impacts, and ensuring the port remains capable of handling continued growth. The AVTM consists of five elements to be rolled out in stages. During the 2021-22 crop year, the first two elements entered their planning and engagement phases: a centralized scheduling system; and an anchorage management system.

The centralized scheduling system is a new digital technology with the aim of planning and directing the sequencing of all vessel movements within the port, in support of the existing duties performed by the Canadian Coast Guard and Pacific Pilotage Authority. Initial consultation and engagements for this system centered on vendor procurement and discussing challenges within the Second Narrows traffic control zone. Other traffic control zones will integrate into the new system during later phases of the AVTM. The Second Narrows Bridge is a critical intersection between marine and rail operations within the port, as the rail bridge must be raised to allow vessels to pass underneath. Canada's current regulations afford right-of-way to vessels, provided they can complete their transit safely, so rail operations across the bridge are subject to unscheduled pauses. As cargo volumes increase, the bridge will increasingly become a chokepoint for terminals on the north-shore or east of the Second Narrows, as there are competing interests for increased rail capacity across the bridge and increased vessel movement under it. It is believed that a centralized system could improve port efficiency through scheduled transit windows and increased collaboration between the various affected parties.

Anchorage management is focused on 33 anchorages located outside of port boundaries around British Columbia's Southern Gulf Islands. In 2018, Transport Canada introduced an interim protocol requesting that the VFPA manage the assignment and usage of these anchorages in response to the growth in vessels calling at the port. Consultations with residents, municipalities, and indigenous groups affected by nearby anchorages were conducted throughout 2022. While engagement remains ongoing, progress towards a draft code of conduct for vessels at anchor around the Southern Gulf Islands has been made. The code's purpose is to reduce the disruptions that vessel movements cause to communities and wildlife, without compromising safety. Much of this centered on light and noise pollution, dragging anchors, and the potential for oil spills.

As these anchorages lie outside the port's jurisdiction, policies or procedures put forth by the AVTM may require regulatory changes that extend the port authority's responsibilities beyond what the interim protocol has established. Although facets of the AVTM program will be implemented in 2023, development is expected to continue through 2024.

Grain shipments through Churchill effectively halted for two years

The Arctic Gateway Group (AGG), a consortium comprised of 29 Indigenous and a dozen non-Indigenous communities that own and operate the rail line from The Pas to Churchill, Manitoba, along with the grain terminal and other assets located there, confirmed that grain would likely not be

shipped through the northern Manitoba port before 2023. The suspension of export operations emanated from AGG's decision to undertake an extensive rehabilitation of the rail line, which was heavily damaged by washouts in 2017, and only returned to regular service in 2019. Much of this rehabilitation was to be centred on the laying of a honeycomb-like substructure, known as geocells, to help stabilize the long-problematic roadbed, which runs over an extensive expanse of muskeg.

Construction began in August 2021 after the federal government announced that it was providing $40 million towards the project, with much of the work focused on a 150-mile stretch of track between Gillam and Churchill. Although freight and passenger services continued despite the attendant delays, grain shipments were effectively suspended for the 2021 shipping season pending these repairs as well as upgrades to the 92-year-old grain terminal itself. Furthermore, 2021's reduced crop meant that little grain was likely to be available for movement to Churchill in 2022, thereby making the 2023 shipping season the most probable for resumption of grain shipments through the port.

In the week immediately following closure of the 2021-22 crop year, the governments of Canada and Manitoba announced that they would be providing another $133 million in new funding to the AGG to aid in the upgrading of its rail line between The Pas and Churchill. The federal government pledged a further $60 million while the Manitoba government promised to contribute $73 million to the project. This new investment came in addition to the $40 million provided by Ottawa just a year earlier, as well as a $117 million commitment made in 2018 that allowed First Nations and northern Manitoba communities to purchase AGG.

CP-KCS merger advances

Following a favourable vote by shareholders of Canadian Pacific Railway Ltd. (CP) and Kansas City Southern (KCS) in early December 2021, CP formally acquired KCS under a voting trust subject to final approval by the US Surface Transportation Board (STB). The STB's approval would create Canadian Pacific Kansas City Limited, the only single-line railroad linking Canada, the United States, and Mexico. Given the geographic reach of a combined CP-KCS rail system, many within the grain industry voiced support, suggesting that the merger would provide them with improved access to American and Mexican markets. The STB's decision is expected sometime in early 2023.

CP train and yard workers mount work stoppage

In early March 2022, following six months of protracted negotiations, the Canadian Pacific Railway (CP) found itself unable to reach an agreement with the Teamsters Canada Rail Conference (TCRC), which represents some 3,000 train and yard employees, on a new labour contract. Although a vote in favour of strike action by the TCRC's membership threatened a countrywide work stoppage by mid month, both parties continued to converse under the auspices of a federally appointed mediator. With frustrations mounting, both sides edged closer to a showdown. Worried shippers voiced their concerns over the adverse economic impact of a potential strike. Then, on 16 March 2022, CP issued a 72-hour notice providing for the lock-out of its TCRC-member employees, to become effective at 00h01 the following Sunday. Just two hours prior to the appointed hour, however, the TCRC called out its members, initiating a work stoppage. The stoppage proved short-lived as the union agreed to a settlement through binding arbitration less than 48 hours later. Ultimately, the two parties concluded a new two-year collective agreement in mid August 2022, which would run through to the end of 2023, and provides for wage increases of 3.5% in 2022 and 2023 along with other benefits.

CN weathers 17-day strike

On 18 June 2022, following several months of futile bargaining over higher wages, about 750 signals and communications employees of the Canadian National Railway (CN), represented by the International Brotherhood of Electrical Workers (IBEW), went out on strike. CN management and contract personnel filled in for the string unionized employees, who largely maintain the signals and trackside equipment, including the warning systems at railroad-highway crossings, along the railway's right-of-way. These measures proved effective as there was little impact on railway service. Following the IBEW's agreement to binding arbitration, the strike was lifted, with all member employees returning to work on 6 July 2022.

Additional federal funding for Saskatchewan shortlines

In late July 2022 Transport Canada announced that it was allocating another $18.3 million in investments for Saskatchewan shortline railways under the National Trade Corridors Fund. The new funding was aimed at improving the efficiency of rail operations through four separate infrastructure upgrades advanced by Big Sky Rail, the Last Mountain Railway, the Great Western Railway, and the Stewart Southern Railway. The shortline industry at large has been seeking new funding to aid in track maintenance and improvement, with the recipient railways all heavily vested in moving prairie grain.

Section 5: System Efficiency and Performance

Indicator Description	Table	1999-00	2019-20	2020-21	2021-22 Q1	Q2	Q3	Q4	YTD	% VAR
Country Elevator Operations										
Average Elevator Capacity Turnover Ratio	5A-1	4.8	6.6	6.5	1.3	1.0	1.0	0.9	4.2	-35.4%
Average Weekly Elevator Stock Level (000 tonnes)	5A-2	3,699.3	3,433.3	3,847.2	3,443.9	3,955.5	4,082.7	2,740.9	3,548.6	-7.8%
Average Days-in-Store (days)	5A-3	41.7	23.7	25.4	28.9	46.0	48.2	34.2	38.3	50.7%
Average Weekly Stock-to-Shipment Ratio – Grain	5A-4	6.2	3.6	3.7	4.0	6.7	7.6	5.4	5.9	58.7%
Railway Operations										
Movements to Western Canada										
Railway Car Cycle (days) – Empty Movement	5B-1	10.7	7.8	7.3	9.1	9.6	8.8	12.0	9.7	33.1%
Railway Car Cycle (days) – Loaded Movement	5B-1	9.2	8.5	8.0	6.9	10.6	8.3	6.8	8.1	0.8%
Railway Car Cycle (days) – Total Movement	5B-1	19.9	16.3	15.3	15.9	20.3	17.1	18.9	17.8	16.2%
Railway Car Cycle (days) – Non-Special Crops	5B-2	19.3	15.9	15.0	15.5	20.1	16.6	18.6	17.5	16.7%
Railway Car Cycle (days) – Special Crops	5B-3	25.8	19.6	18.2	19.4	26.5	21.5	21.5	20.9	14.6%
Railway Loaded Transit Time (days)	5B-4	7.8	7.5	7.0	5.8	9.2	6.9	5.5	6.8	-2.3%
Movements to Eastern Canada										
Railway Car Cycle (days) – Empty Movement	5B-5	n/a	10.4	9.6	12.0	12.9	17.1	15.0	14.4	49.7%
Railway Car Cycle (days) – Loaded Movement	5B-5	n/a	12.6	12.3	14.0	13.8	18.2	15.5	15.5	26.3%
Railway Car Cycle (days) – Total Movement	5B-5	n/a	23.0	21.9	26.0	26.7	35.3	30.5	29.9	36.6%
Railway Loaded Transit Time (days)	5B-8	n/a	11.0	10.7	12.4	11.9	16.1	13.4	13.6	26.6%
Movements to the United States										
Railway Car Cycle (days) – Empty Movement	5B-9	n/a	11.7	11.5	10.7	11.6	14.1	13.1	12.3	7.3%
Railway Car Cycle (days) – Loaded Movement	5B-9	n/a	13.8	14.7	13.6	15.1	19.1	14.4	15.4	4.6%
Railway Car Cycle (days) – Total Movement	5B-9	n/a	25.7	26.2	24.3	26.7	33.1	27.4	27.7	5.8%
Railway Loaded Transit Time (days)	5B-12	n/a	10.0	10.7	10.1	11.0	14.8	10.1	11.4	6.9%
Traffic to Western Canada										
Hopper Car Grain Volumes (000 tonnes) – Non-Incentive	5B-13	12,718.7	8,088.9	7,724.1	1,457.9	1,009.8	1,179.5	1,133.9	4,781.2	-38.1%
Hopper Car Grain Volumes (000 tonnes) – Incentive	5B-13	12,945.9	37,155.7	40,725.3	7,811.6	5,459.3	4,429.9	4,073.4	21,774.2	-46.5%
Hopper Car Grain Volumes ($ millions) – Incentive Discount Value	5B-14	$31.1	$297.2	$325.8	$62.5	$43.7	$35.4	$32.6	$174.2	-46.5%
Traffic Density (tonnes per route mile) – Total Network	5B-15	330.4	654.9	701.5	536.9	374.7	324.9	301.6	384.5	-45.2%
Terminal Elevator Operations										
Average Terminal Elevator Capacity Turnover Ratio	5C-1	9.1	18.6	17.6	n/a	n/a	n/a	n/a	9.1	-48.3%
Average Weekly Terminal Elevator Stock Level (000 tonnes)	5C-2	1,216.2	1,222.1	1,265.3	1,120.7	1,096.6	1,156.9	1,098.5	1,118.4	-11.6%
Average Days-in-Store – Operating Season (days)	5C-3	18.6	10.7	9.8	13.3	14.5	19.6	19.4	16.5	68.4%
Average Weekly Out-of-Car Time	5C-5	n/a	12.6%	15.1%	12.9%	33.2%	9.1%	6.1%	15.3%	1.3%
Port Operations										
Average Vessel Time in Port (days)	5D-1	4.3	12.3	10.6	7.8	12.3	11.4	5.5	9.1	-14.3%
Average Vessel Time in Port (days) – Waiting	5D-1	1.9	7.4	5.7	3.7	7.1	5.6	2.2	4.6	-19.5%
Average Vessel Time in Port (days) – Loading	5D-1	2.4	5.0	4.9	4.1	5.2	5.8	3.2	4.5	-8.1%
System Performance										
Total Time in Supply Chain (days)	5E-1	68.1	41.8	42.2	48.0	69.7	74.7	59.1	61.6	46.0%

DISCUSSION AND ANALYSIS

COUNTRY ELEVATOR OPERATIONS
[See TABLES 5A-1 through 5A-4]

The combined effects of changes in primary elevator throughput and storage capacity are reflected in the system's capacity-turnover ratio. With primary elevator throughput having decreased by 36.1% to 34.4 million tonnes, the turnover ratio for the 2021-22 crop year declined by 35.4%, to 4.2 turns from 6.5 turns a year earlier. A further 119,500-tonne expansion in the storage capacity of the primary-elevator system, which has been steadily rising for several years, helped aggravate the decline.

Elevator Inventories

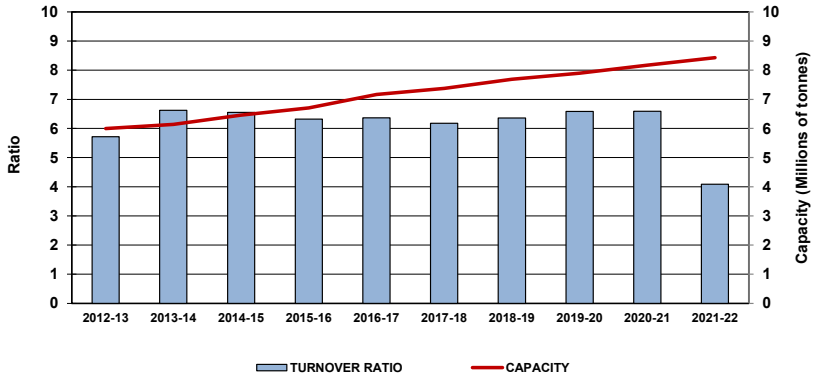
In assessing the operational efficiency of the primary elevator system, the GMP also considers the amount of grain maintained in inventory. Beyond measuring stock levels alone, this examination also considers the amount of time grain spent in inventory, along with its ability to satisfy immediate market needs.

Notwithstanding periodic fluctuations, approximately half of the GHTS's primary elevator storage capacity is employed in maintaining its operational grain inventories. Even as the system's associated storage capacity rose, stocks seldom moved above the 3.0-million-tonne mark until the 2013-14 crop year. It was not until then that the expansion in storage capacity, coupled with the need to accommodate larger harvests, allowed primary elevator stocks to consistently rise beyond this level without congesting the system. The 2021-22 crop year saw average primary elevator inventories reach above this threshold for a ninth consecutive year, although they decreased 7.8%, to 3.5 million tonnes from the previous crop year's record high of 3.8 million tonnes. The net addition of almost 2.5 million tonnes of storage capacity over this same period facilitated this buildup in primary elevator stocks.

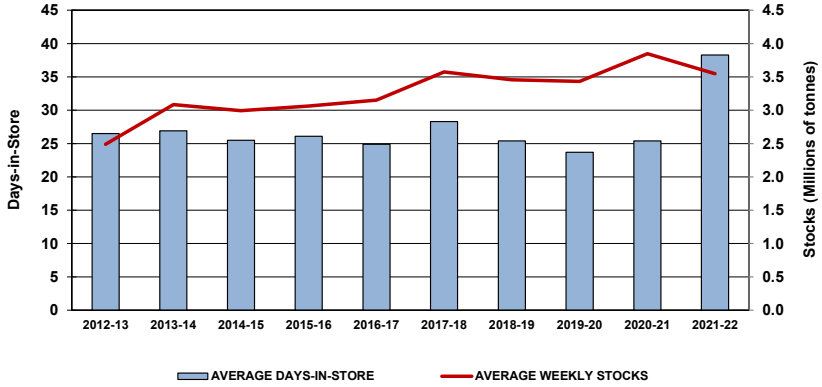
Days in Store

While stock levels have progressively risen, the amount of time spent by grain in inventory has declined. From a benchmark 41.7 days in the GMP's

Primary Elevator Capacity Turnover Ratio



Primary Elevator Inventories



base year, the average has moved gradually lower, breaking through the 30-day mark about a decade later. Further reductions brought the average closer to 25 days. This decline simply reflected the faster pace at which grain had to flow through an elevator to maintain its fluidity. Owing to a smaller crop, these pressures were significantly lessened in the 2021-22 crop year. As a result, stocks aged more than in the previous crop year, with the average days-in-store climbing by 50.7%, to 38.3 days from 25.4 days.

Stock-to-Shipment Ratios

The adequacy of country elevator inventories can be broadly gauged by comparing their level at the end of any given shipping week, with the truck and railway shipments that follow in the next seven days. Over a decade ago, the average stock-to-shipment ratio typically assumed a value around 4.5. In more recent years, however, the average ratio has repeatedly fallen below 4.0, suggesting the maintenance of tighter inventories in relation to the volume of grain slated for shipment in the coming week. Much of this was undone in the 2021-22 crop year as reduced throughput and slower rail service combined to lift the average ratio by 58.7%, to 5.9 from 3.7 a year earlier.

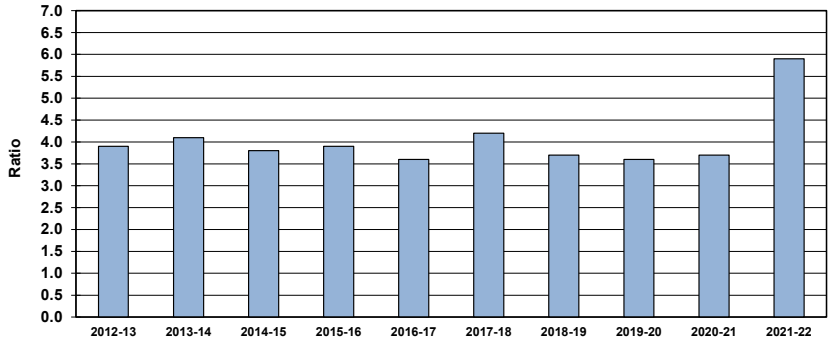
RAILWAY OPERATIONS
[See TABLES 5B-1 through 5B-15]

The average amount of time taken by the railways in delivering a load of grain to its destination and then returning the empty railcar back to the prairies for reloading is represented by the average car cycle. Since expansion of the GMP's measures in the 2014-15 crop year, car-cycle data are gathered on movements to Western Canada, Eastern Canada, and the United States.

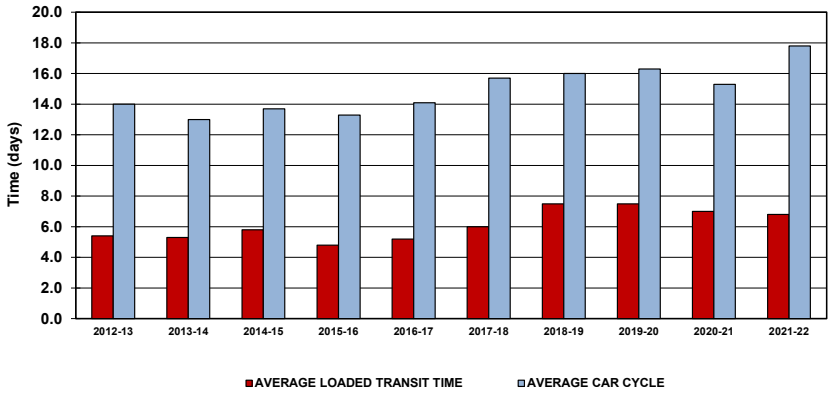
Hopper-Car Movements to Western Canada
[See Tables 5B-1 through 5B-4]

During the 2021-22 crop year the car cycle for shipments terminating within Western Canada averaged 17.8 days, a 16.2% increase from the 15.3-day average recorded a year earlier. The increase marked a resumption in the elongating trend that began several years earlier. The increase was driven by sharply higher values in each of the primary corridors, with the

Primary Elevators - Stock-to-Shipment Ratio



Railway Car Cycles and Loaded Transit Times
(Western Canada)



critical Vancouver average car cycle rising by 15.5%, to 18.2 days from 15.8 days a year earlier. This was reinforced by a 9.8% increase in the Prince Rupert average, which rose to 18.2 days from 16.6 days, and a 28.2% jump in the Thunder Bay corridor, where the average rose to 16.4 days from 12.8 days.

Owing to the heavy weighting of non-special crops in the overall traffic mix, the car cycle for these commodities showed an analogous increase, with the average rising 16.7%, to 17.5 days from 15.0 days a year earlier. The car cycle tied to special crops showed a similar gain, rising by 14.6%, albeit to a more elevated average of 20.9 days from 18.2 days. The higher average for special crops still appears linked to the handling traits of these shipments, which tend to move in smaller numbers in merchandise-train service rather than in the unit-train lots more typical of non-special crops.

Loaded Transit Time

A key component in the railways' average car cycle is its average loaded transit time. This measure focuses on the amount of time taken in moving grain from a country elevator to a port terminal for unloading. Changes in the average loaded transit time tend to move in tandem with changes in the overall car cycle. However, this was not the case in the 2021-22 crop year given a 2.3% reduction in the average loaded transit time, which declined to 6.8 days from 7.0 days a year earlier. Despite this improvement, the average ranks among the highest values observed since the 2004-05 crop year.

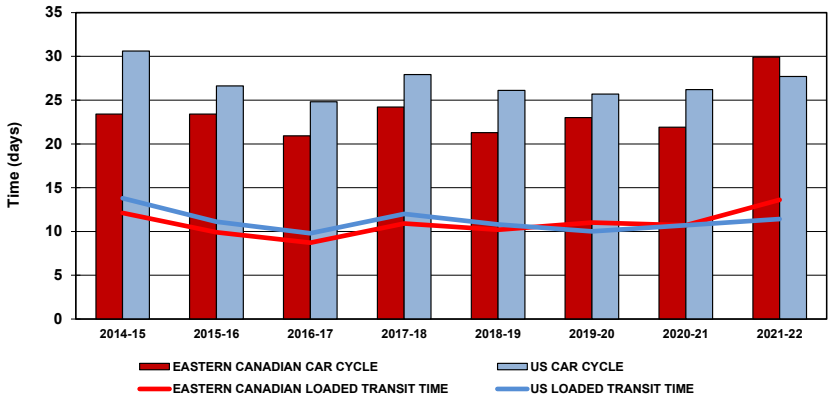
The irregularity in the underlying distribution, as gauged by the coefficient of variation, proved little different in the 2021-22 crop year, declining marginally to 39.5% from 41.5% a year earlier. Both values are not far removed from those observed in earlier years, indicating that the amount of time taken in moving a loaded hopper car to a port in Western Canada remains highly variable.

Hopper-Car Movements to Eastern Canada and the United States
[See Tables 5B-5 through 5B-12]

Parallel performance measures for grain shipments into Eastern Canada and the United States were added to GMP reporting in the 2014-15 crop year. Owing to the greater distances involved in reaching these markets, these data show noticeably higher averages than observed for Western Canadian destinations. In the case of movements into Eastern Canada, the car cycle increased 36.6% in the 2021-22 crop year, with the average climbing to 29.9 days from 21.9 days a year earlier. A 5.8% increase was observed on movements into the United States, with the average car cycle rising to 27.7 days from 26.2 days. It is worth noting that for the first time under the GMP the average car cycle into Eastern Canada rose above that of movements into the United States.

In equal measure, the average loaded-transit time associated with movements into Eastern Canada and the US are substantially higher than those to Western Canadian destinations. In the case of the former, this amounted to an average of 13.6 days, which represented an increase of 26.6% from the 10.7 days reported a year earlier. Movements into the United States saw an increase of 6.9%, with the average rising to 11.4 days from 10.7 days. Here again, the average tied to movements into Eastern Canada reached above that for movements into the United States. The

Railway Car Cycles and Loaded Transit Times
(Eastern Canada and the United States)



underlying distributions proved equally irregular, with the coefficient of variation on movements into Eastern Canada standing at 28.7% against 40.6% for those into the United States.

Multiple Car Blocks
[See Tables 5B-13 through 5B-14]

The amount of railway traffic moving in multiple car blocks has increased substantially over the past two decades. In fact, since the 2013-14 crop year, at least 80% of the regulated grain moving to the four ports in Western Canada has earned an incentive discount, against only half in the GMP's base year. However, the structure of these discounts has been changing, with ever greater emphasis being placed on larger block movements.

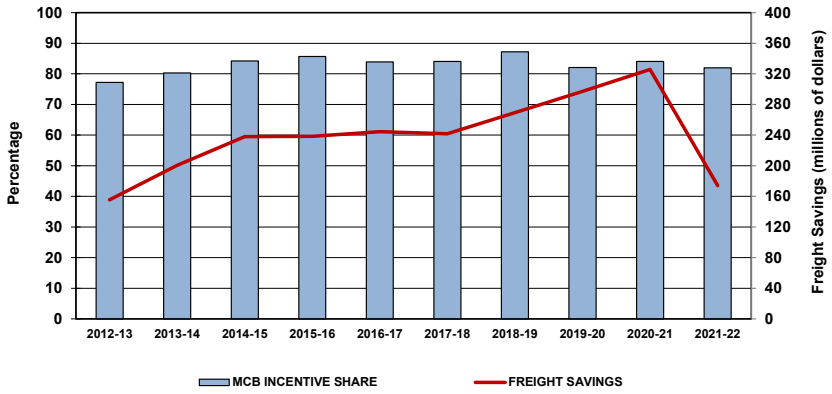
In effect, CN and CP now only offer an $8.00-per-tonne freight discount on trainload shipments of 100 or more cars (112 or more cars in the case of CP). A further $2.00-per-tonne discount can also be earned if such shipments meet certain high-efficiency train conditions, typically associated with loop-track originations. These requirements effectively preclude less-than-trainload shippers from receiving any discounts on what had previously been qualifying smaller car-block movements. Even so, the proportion of grain shipped in these qualifying multiple car blocks continues to reach above 80%, with 82.0% having done so in the 2021-22 crop year, down from 84.1% a year earlier.

The monetary value of the discounts earned by these qualifying grain shipments – estimated as gross savings in railway freight charges – has consequently risen over the span of the GMP.[27] However, owing to the 2021-22 crop year's smaller grain supply, these savings fell by an estimated 46.5%, to $174.2 million from $325.8 million a year earlier.

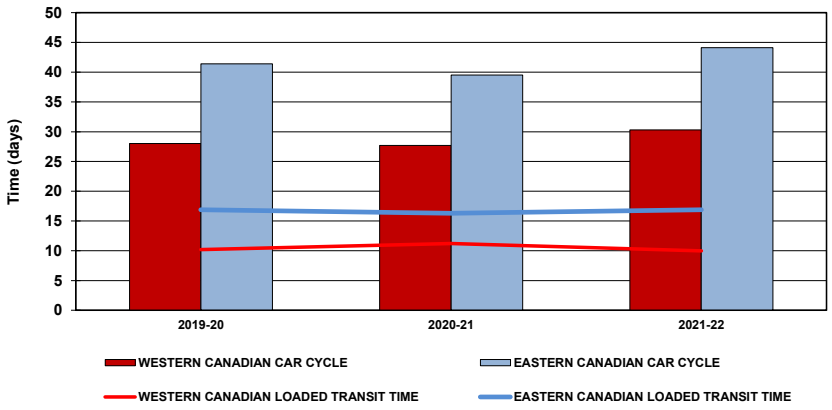
Tank-Car Movements
[See Tables 5B-16 through 5B-17]

As outlined earlier, the GMP has been expanded to include more specific measures relating to the movement of canola-oil from origins in Western Canada. This expansion encompasses the calculation of average car-cycles

MCB Movements and Freight Savings
(Western Canada)



Tank Car Cycles and Loaded Transit Times
(Western Canada and Eastern Canada)



27 Data supplied by CN and CP does not allow for the identification of grain movements earning the maximum $10.00-per-tonne discounts made available on qualifying trainload shipments. As a result, the gross savings in railway freight charges estimated here are based on a nominal $8.00-per-tonne minimum, effectively understating the actual value of these discounts.

and loaded-transit times on domestic movements. During the 2021-22 crop year the car cycle for shipments terminating within Western Canada averaged 30.3 days, up 9.3% from the 27.7-day average recorded a year earlier. Movements to Eastern Canada showed a significantly longer car cycle, with the average reaching 44.1 days, 11.8% higher than the 39.5-day average attained a year earlier.

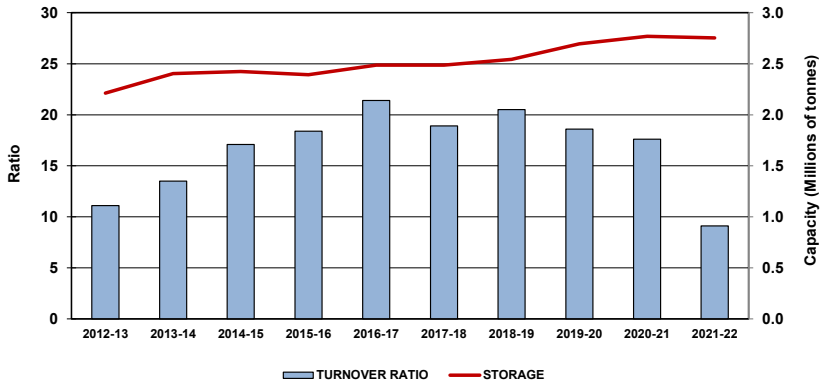
The movements' average loaded transit time delineates how long it takes to move canola oil from a prairie crushing facility to port terminals for unloading. As with the movement of covered hopper cars, changes in the average loaded transit time of tank cars tends to mimic that of the overall car cycle. However, this was not the case in the 2021-22 crop year given a 10.2% reduction in the average loaded transit time for movements terminating in Western Canada, which declined to 10.0 days from 11.2 days a year earlier. Conversely, the average on movements into Eastern Canada rose by 4.1%, to 16.9 days from 16.3 days a year earlier.

TERMINAL ELEVATOR OPERATIONS
[See TABLES 5C-1 through 5C-5]

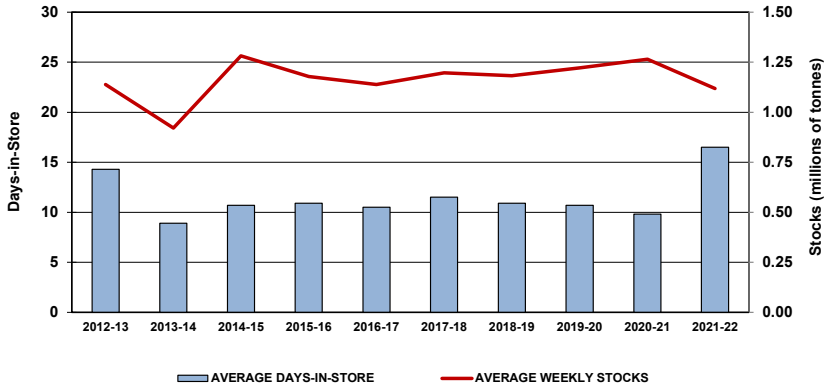
A key indicator of terminal activity is the system's capacity-turnover ratio, which gauges terminal-elevator throughput against storage capacity. The 2021-22 crop year saw this measure fall by 48.3%, to an average of 9.1 turns from 17.6 turns a year earlier. This decrease reflected the 45.7% decline in terminal-elevator throughput noted earlier. However, changes in the turnover ratio are often amplified because, as a simple composite value, it is sensitive to any significant swing in the tonnage handled through, or the storage capacity of, individual facilities. The turnover values tied to some of the smaller terminals at the ports of Vancouver and Thunder Bay can be especially distortionary. A 15,000-tonne reduction in storage capacity also figured into the ratio's calculation.

Notwithstanding the growth that saw terminal throughput reach a record 44.7 million in the 2020-21 crop year, throughput declined to 24.3 million tonnes in the 2021-22 crop year. This ranked just above the 23.5 million tonnes benchmarked at the beginning of the GMP. The west-coast gateways of Vancouver and Prince Rupert bore much of the reduction, posting capacity-turnover ratios that were half that posted a year earlier.

Terminal Elevator Capacity Turnover Ratio



Terminal Elevator Inventories



Moreover, the decline was reflected in an overall turnover ratio that equalled the 9.1 first recorded in the GMP's base year.

Terminal Elevator Inventories

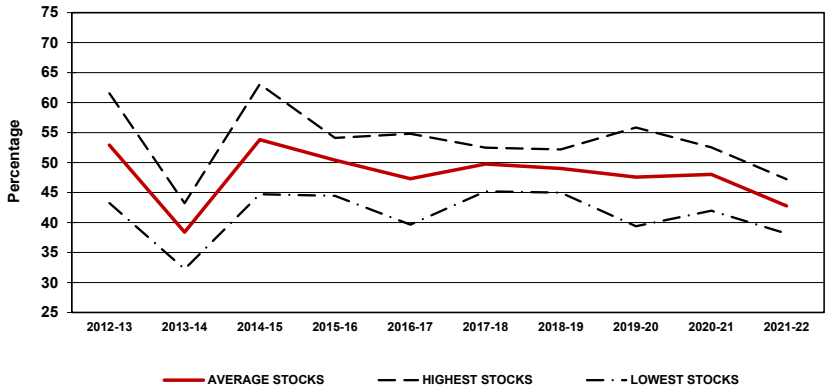
Despite recent changes to the physical makeup of the GHTS's terminal elevator system, grain inventories have not varied substantially since the beginning of the GMP. In fact, average weekly stock levels have tended to fluctuate in a band between 1.0 million tonnes and 1.5 million tonnes. This was again the case in the 2021-22 crop year, with the average weekly stock level decreasing by 11.6%, to 1.1 million tonnes from almost 1.3 million tonnes a year earlier.

Although terminal stocks are typically maintained at about half of the system's licensed storage capacity, they fluctuate from week to week, rising and falling in conjunction with the workings of the supply chain itself. This means that stocks normally occupy anywhere from 40% to 60% of the licensed storage capacity at any given time. A utilization rate that exceeds these bounds, such as was the case in the 2013-14 crop year, typically denotes a major exception in the orderly flow of grain through the GHTS. Although weekly terminal stocks varied throughout the 2021-22 crop year, they represented an average of 42.8% of the system's stated storage capacity, down from the previous crop year's 48.0% average. Moreover, with quarterly utilization rates ranging from a low of 38.1% to a high of 47.2%, the inbound flow of grain proved substantially below normal.

Days in Store

The reduced throughput eased the pressure brought to bear on the maintenance of adequate terminal stocks. Average stocks rose to 4.6% of the system's annual throughput, up from 2.8% a year earlier. Although this led to relaxed just-in-time inventory practices, it did not relieve the need for the consistent flow of the right grain, to the right terminal, at the right time. Stock adequacy was reflected in the amount of time grain spent in terminal inventory, which, despite having been cut almost in half over the life of the GMP, rose sharply in the 2021-22 crop year, to an annualized average of 16.5 days. This proved another indication of the slower speed with which grain was moving through the system.

Terminal Elevator Capacity Utilization



The 2021-22 crop year's average of 16.5 days climbed 68.4% from the previous crop year's 9.8-day average, denoting the highest recorded since the 2008-09 crop year. Much of the elongation was shaped by a time increase at Vancouver, which climbed by 79.7%, to an average of 13.3 days from 7.4 days a year earlier. This was sustained by escalations at the ports of Prince Rupert and Thunder Bay, which posted increases of 76.0% and 21.8% respectively, and produced corresponding averages of 13.2 days and 21.8 days.

However, these annual averages disguise some of the more significant monthly swings, among them: Vancouver's increase from an average of 9.5 days in September 2021 to a record high of 28.3 days in June 2022. Such highs underscore the slower pace at which grain moved through the GHTS in the latter half of the 2021-22 crop year.

Stock-to-Shipment Ratios

Equally indicative of the reduced pressure on terminal inventories was the increase in many of the grain-specific stock-to-shipment ratios. Although most commodities showed overall averages that stood comfortably above 1.0, all had minimums that fell substantially below this threshold. Moreover, these minimum ratios show that almost every grain was in short supply at various points during the crop year, which indicates that there were problems in getting the right grain in terminal position when needed.

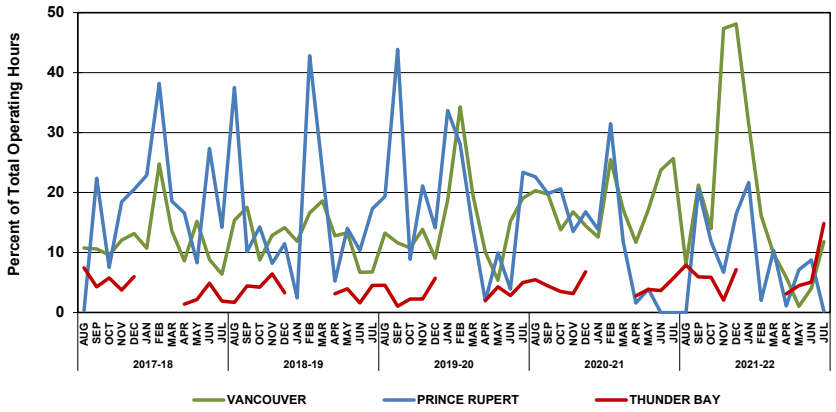
Beyond the service issues that shaped the 2021-22 crop year, this is consistent with long-standing indications that inbound rail deliveries are often out of sequence, which leads to erratic grain stocking and interruptions in vessel loading. Non-sequential railcar deliveries can be highly disruptive to the efficient flow of grain through a terminal. Oftentimes, vessel loading schedules must be juggled to deal with the grain on hand. This commonly requires the exporter to contend with the additional costs incurred, be it from the need for multiple berthings or vessel demurrage.

Port Terminal Out-of-Car Time

A related measure, out-of-car time, gauges how often a port terminal had no railcars to unload while staffed, operating, and expecting cars to arrive. The proportion suggests how consistently grain flowed through the terminal system during the period specified. This measure offers some insight into how the pace of inbound rail deliveries matches with the terminals' handling capacity, and whether a slowdown in the flow of traffic has generated any undue idle activity. These statistics tend to show a degree of seasonality, with out-of-car time often peaking in the winter months, typically the most difficult operational period of the crop year. Taken collectively, terminal elevators were left without grain to unload 15.3% of the time in the 2021-22 crop year, up marginally from 15.1% the previous year.

With its greater operating hours, Vancouver's out-of-car time is most indicative of the system's overall efficiency. Proportionately, 18.4% of the port's total terminal operating hours were idled during the 2021-22 crop year, up marginally from the 18.2% recorded in the previous year.

Terminal Elevator Out-of-Car Time



However, the underlying monthly values showed much greater variability, ranging from a low of just 1.0% to a high of 48.1%, with sharp swings among terminals on both the north and south shores. These gyrations continue to suggest that terminal efficiency is highly dependent on consistent railway service.

Much the same can be said of Prince Rupert, which has reported substantially elevated out-of-car times in the preceding four crop years. Even so, the port saw its idle-time proportion fall by 27.9% in the 2021-22 crop year, to 9.3% from 12.9% a year earlier.

As was the case with Vancouver, Thunder Bay also saw an increase in the 2021-22 crop year, with its out-of-car time proportion rising moderately, to 6.0% from 4.1% a year earlier. It should be noted, however, that while Thunder Bay has regularly posted the lowest proportion among the three principal ports in Western Canada, its monthly scores belie an equally irregular pattern. This was particularly evident in the last month of the 2021-22 crop year when the out-of-car proportion reached 14.8%.

PORT OPERATIONS
[See TABLES 5D-1 through 5D-8]

A total of 635 vessels called for grain at Western Canadian ports during the 2021-22 crop year. This represented a 42.8% decrease from the 1,110 ships that arrived for loading a year earlier. Over half of these, 322, called at Vancouver. This was followed by Thunder Bay with 266, and Prince Rupert with 47.

Average Vessel Time in Port

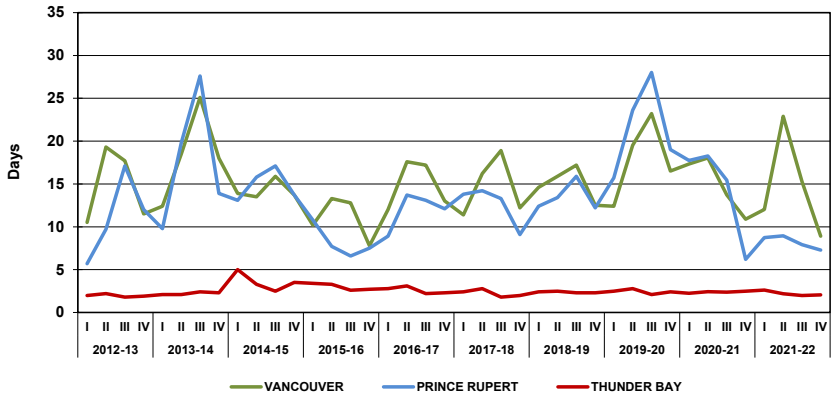
The amount of time spent by vessels in port is generally indicative of the GHTS's overall efficiency: when low, it suggests that grain is moving through the system in a timely and uniform manner; when high, it hints at some underlying impediment. The 2021-22 crop year saw a 14.3% decrease in this average, which fell to 9.1 days from 10.6 days a year earlier. This was chiefly due to a 19.5% reduction in the amount of time vessels spent waiting to load, which declined to an average of 4.6 days from 5.7 days a year earlier. This was supported by an 8.1% decrease in the amount of time vessels spent loading, which fell to an average of 4.5 days from 4.9 days.

Similar patterns were observed at each of the three operating ports in Western Canada, with each contributing to reduce the overall average. At Vancouver, a vessel's average time-in-port decreased by 1.7%, to 14.9 days from 15.1 days a year earlier. This was accompanied by a 46.9% decrease for Prince Rupert, which saw its average fall to 8.3 days from 15.6 days. For Thunder Bay, the decline amounted to a substantially lesser 4.4%, with the average falling to 2.3 days from 2.4 days a year earlier.

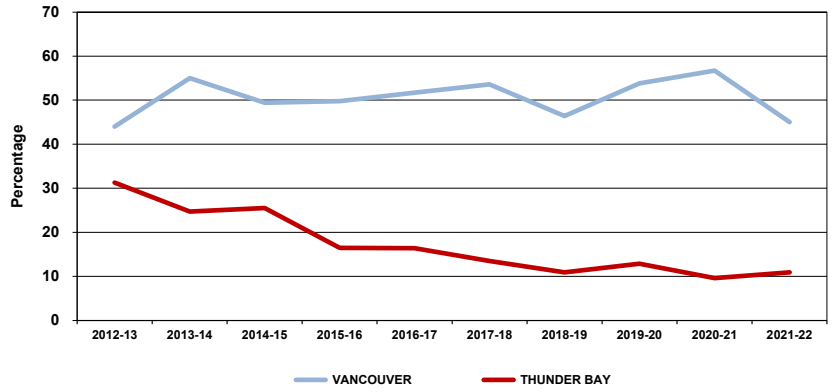
It is worth noting that the time spent by vessels in port rose sharply in the second quarter, with the overall average reaching a high of 12.3 days. This was driven by the disruption in railway service occasioned by major inland flooding. The impact was most manifest in the amount of time ships spent in the west-coast ports of Vancouver and Prince Rupert, which posted averages of 28.6 days and 13.8 days respectively, in January 2022.

The variations cited here point yet again to the critical underpinnings inherent in coordinating the inbound movement of grain by rail with its

Vessel Time in Port
(Western Canada)



Multiple Vessel Berthing Rate



scheduled outbound movement by ship. The better synchronization of these flows led to fewer waiting vessels, and the better use of available achorages.[28] All of which helps to limit harbour congestion and reduce vessel demurrage costs.

Distribution of Vessel Time in Port

Impediments to the flow of grain through the terminal network are also reflected in the number of ships spending long periods of time in port. The proportion of ships with stays of more than five days fell moderately in the 2021-22 crop year, to 47.2% from 55.6% a year earlier. Moreover, ships in port for an unusually long time also declined, with the proportion of vessels spending 16 or more days in port decreasing to 21.1% from 26.1%. This, however, was more than double the 8.7% level witnessed just a decade earlier. These averages suggest that even with a decline in shipments, exports remain vulnerable to impediments in the inbound flow of grain by rail.

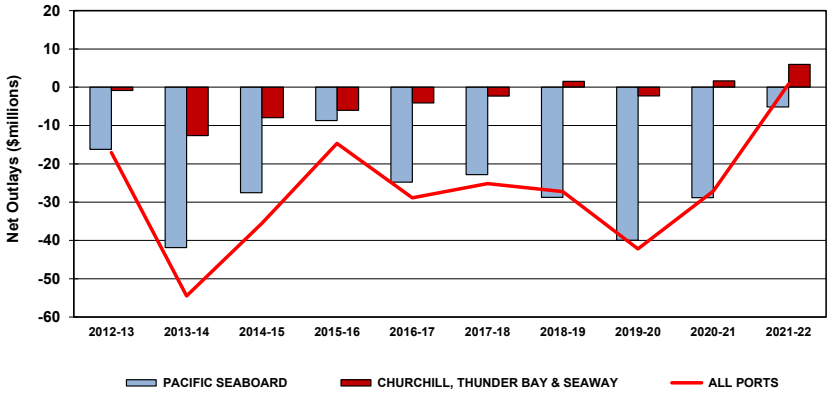
Distribution of Berths per Vessel

Similarly, there were moderate changes in the proportion of vessels needing to berth more than once during the 2021-22 crop year. At Vancouver, this proportion fell to 45.0% from 56.7% a year earlier. While at Thunder Bay the proportion rose to 10.9% from 9.6%. Although the Vancouver proportion remains generally consistent with those observed in the first years of the GMP, the percentage accorded Thunder Bay has moved significantly lower.

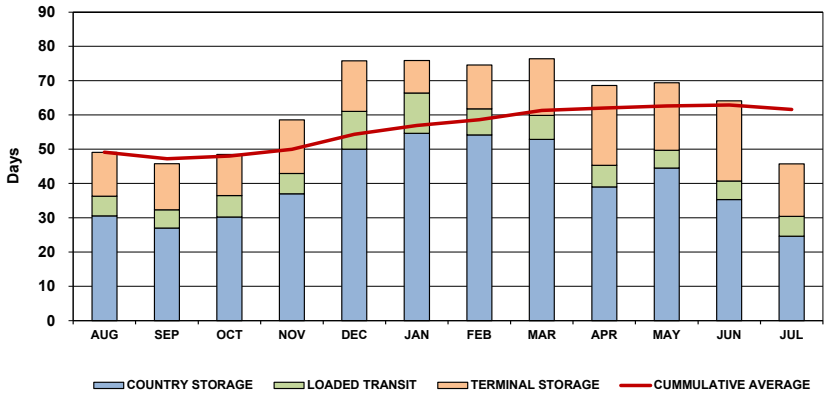
Demurrage and Dispatch

Changes to the amount of time vessels spend in port are often reflected in the demurrage costs and dispatch earnings reported by the Western Grain Elevator Association, which provides a monetary indication of how efficiently grain flowed through Western Canadian ports.[29] For the first time in twelve years, these two elements dovetailed to provide grain handlers with a net cash inflow of $824,900. This financial result was

Annual Demurrage and Dispatch



Time in the System



28 There have been instances in the last several crop years where vessels waiting to load grain in Vancouver have tied up all of the nearby anchorages, with the overflow then forced to moor further to the west along the coast of Vancouver Island.

29 Demurrage is charged when an ocean vessel remains in port for a period longer than that contracted with the shipper in the charter party agreement. Dispatch is paid when the contracted vessel loads and departs the port in less time than stated in the agreement.

shaped chiefly by a 55.8% decrease in demurrage costs, which fell to $19.4 million from $43.8 million the previous year. The financial gain was bolstered by a 20.9% increase in dispatch earnings, which rose to almost $20.2 million from $16.7 million, effectively countering all the demurrage costs.

These results were driven by a reduction in the financial penalties incurred along the Pacific Seaboard, which produced a net cash outlay of $5.1 million against $28.8 million a year earlier. Similarly, the results from activity at Churchill, Thunder Bay and points along the St. Lawrence Seaway were also less punitive, with reduced demurrage costs leading to a net cash inflow of almost $6.0 million, up 259.7% from the $1.7 million earned a year earlier.

SYSTEM PERFORMANCE
[See TABLE 5E-1]

Overall GHTS performance can most readily be gauged by the amount of time taken by grain in moving through the system. For the 2021-22 crop year, it took an average of 61.6 days for grain to move from the Prairies to export positions within Western Canada, a 46.0% increase from the 42.2-day average posted a year earlier. This average ranked as the fifth highest recorded under the GMP, and only 9.5% below the 68.1-day average first benchmarked in the base year.

The 2021-22 crop year's 19.4-day worsening was largely the product of increases in country-elevator and terminal-elevator storage times, which rose by 12.9 days and 6.7 days respectively. Nevertheless, these increases were marginally offset by a 0.2-day reduction in the railways' loaded transit time. The net increase reflected what proved to be problematic performance for the GHTS throughout much of the crop year.

With the total grain supply having fallen to 56.3 million tonnes from the previous crop year's record of 87.2 million tonnes, it was apparent that the GHTS would not be required to handle the output of another banner year. From the outset, grain entering the country elevator system proved to be about one-third less than what had been handled the previous August. This decline foreshadowed what would be a decidedly lighter-than-normal workload, with weekly grain deliveries proving substantially

Days Spent Moving Through the GHTS Supply Chain

FARM OPERATIONS

COUNTRY ELEVATOR STORAGE TIME

RAILWAY LOADED TRANSIT TIME

TERMINAL ELEVATOR STORAGE TIME

MARINE OPERATIONS

				TOTAL	NET CHANGE
1999-00	41.7	7.8	18.6	68.1	
2018-19	25.4	7.5	10.9	43.8	
2019-20	23.7	7.4	10.7	41.8	
2020-21	25.4	7.0	9.8	42.2	
2021-22	38.3	6.8	16.5	61.6	-9.5% ▼

below 2020-21 crop year levels throughout the first quarter. Ultimately, Western Canadian producers delivered 42.6 million tonnes of grain into the GHTS.

With the probability of a much smaller crop looming, the railways had already begun placing more of their hopper-car fleets into storage. At the outset of the 2021-22 crop year, just under half of their combined fleet was reported to be in active service. This, coupled with reduced crew and motive power availability, suggested that the railways' carrying capacity had already been sharply reduced. As the 2021 harvest progressed, grain shippers soon began reporting that their car-orders were not being filled in a timely manner. Much of the delay appeared to be rooted in the slower return of empty equipment to the prairies for reloading, which elongated the railways' first-quarter average car cycle by 1.2 days, to 15.9 days from 14.7 days a year earlier. As a result, elevator inventories began to climb along with storage times. Stock aging alone added 8.6 days to the first quarter's overall in-system average, which rose to 48.0 days from 40.4 days the previous year.

But the real difficulties began in mid-November 2021 when a series of atmospheric rivers smashed rainfall records throughout the Lower British Columbia Mainland as well as the interior of the province. The deluge caused rivers and streams to overflow, washing away dikes, roads, bridges, and railway lines throughout the Fraser River Valley. The scope of the damage wrought was unprecedented and severed the essential road and rail arteries leading into, and out of, Vancouver. The damage inflicted on the CN and CP mainlines alone extended over some 150 route-miles.

Although CN and CP were able to rebuild their heavily damaged routes through the Fraser River Valley within weeks of November's disastrous rainfalls, the attendant service outage backlogged the flow of grain and other traffic well into the opening months of 2022. Not surprisingly, the average amount of time taken by grain to move through the system rose dramatically: to 58.6 days in November; to 75.8 days in December; and to 75.9 days in January 2022. Much of the additional time was again tied to country-elevator storage times, which reached a never-before seen average of 54.6 days in January 2022, as the average car cycle lengthened to an unparalleled 25.6 days.

The downstream effects were equally pronounced. With the flow of grain interrupted, Vancouver terminal stocks began to decline, falling to an average of 391,900 tonnes in December from 765,500 tonnes in October. Moreover, deprived of the grain needed for loading at Vancouver, vessels began spending more time in port, with the posted average climbing to 28.6 days in January 2022 from 12.6 days in October 2021.[30]

Despite the extraordinary cause, the grain industry came to believe that the normalization of rail service was being undermined by longstanding operational weaknesses, including a chronic failure by carriers to deploy the resources required to provide adequate carrying capacity. With time-in-the-system hovering around the 75-day mark through March 2022, grain shippers began to point to the mounting shortfalls in railway-supplied equipment as symptomatic of larger service failings.

This led the Western Grain Elevator Association to ask the Canadian Transportation Agency to initiate an own-motion inquiry into the matter. While the Agency declined this request, and service improved during the fourth quarter, shippers remained concerned over the railways' potential inability to move a more normalized volume in the approaching 2022-23 crop year.

The stresses imposed on the GHTS would have undoubtedly been even greater had the 2021 crop reached the previous year's 78.8-million-tonne level. As it stands, the strains experienced in the movement of grain were not unique, as they extended to other commodities as well. Moreover, the vulnerability of global supply chains were again exposed as the flow of all essential goods and supplies slowed, became more expensive, and less reliable.

30 Marine carriers were formally advised by the Vancouver Grain Exchange of an uncontrollable disruption to railway service between 15 November 2021 and 6 December 2021.

Section 6: Producer Impact

Indicator Description	Table	1999-00	2019-20	2020-21	2021-22 Q1	Q2	Q3	Q4	YTD	% VAR
Export Basis										
1CWRS Wheat ($ per tonne) – Original Methodology	6A-10A	$54.58	n/a	n/a						
1CWRS Wheat ($ per tonne) – Revised Methodology (1)	6A-10A	n/a	$92.29	$101.43					$97.19	-4.2%
1CWA Durum ($ per tonne) – Original Methodology	6A-10B	$67.63	n/a	n/a						
1CWA Durum ($ per tonne) – Revised Methodology (1)	6A-10B	n/a	$117.46	$105.97					$161.87	52.8%
1 Canada Canola ($ per tonne)	6A-10C	$52.51	$50.79	$54.75					$68.45	25.0%
Canadian Large Yellow Peas – No. 2 or Better ($ per tonne)	6A-10D	$54.76	$62.11	$39.08					$82.64	111.5%
Producer Cars										
Producer-Car-Loading Sites (number) – Class 1 Carriers	6B-1	416	142	142	142	142	142	142	142	0.0%
Producer-Car-Loading Sites (number) – Class 2 and 3 Carriers	6B-1	122	130	130	130	130	130	130	130	0.0%
Producer-Car-Loading Sites (number) – All Carriers	6B-1	538	272	272	272	272	272	272	272	0.0%
Producer-Cars Scheduled (number) – Covered Hopper Cars	6B-2	3,441	2,771	2,734	379	329	276	129	1,113	-59.3%

(1) The methodology used to calculate the export basis in the 2012-13 through 2021-22 crop years does not allow for direct comparison with those of previous crop years.

DISCUSSION AND ANALYSIS

CALCULATION OF THE EXPORT BASIS

One of the GMP's principal objectives involves gauging the logistics cost associated with moving prairie grain to market – commonly referred to as the "export basis" – along with the resultant "netback" earned by producers after subtracting these costs from a grain's sale price. Both the export basis and the producer netback are location-specific calculations that include provisions for the elevation, cleaning, storage and transportation costs tied to the handling of grain.

There are well over 1,000 distinct origin-destination pairs that arise from tying together the hundreds of grain-delivery points scattered across the prairies with the four principal export gateways in Western Canada. Moreover, given the number of differing grains, grain grades, grain company service charges, and freight rates, the permutations inherent in calculating the export basis and netback of individual producers takes on extraordinary dimensions.

The only practical means of addressing these calculations rests in standardizing the estimates around a representative sample of grains, and grain stations. As a result, the GMP consciously limits its estimations to four specific grains: wheat; durum; canola; and peas.[31] The export basis and producer netback for each commodity is then calculated for each of the 43 grain stations in the sample. These location-specific calculations are then clustered to portray the averages for nine geographic areas, comprised of four to six grain stations each, namely: Manitoba East; Manitoba West; Saskatchewan Northeast; Saskatchewan Northwest; Saskatchewan Southeast; Saskatchewan Southwest; Alberta North; Alberta South; and Peace River.

Components of the Calculation

It is important to remember that every individual producer's cost structure differs. As a result, no general calculation can be expected to precisely depict the export basis and netback that is specific to each farmer. The methodology employed here is intended to typify the general case within each of the nine geographic areas identified. Caution, therefore, must be exercised in any comparison between the general values presented, and those arising to individual producers within each of these areas. The specific assumptions employed in these determinations are delineated in the table that follows. The reader is encouraged to consider these before drawing any specific conclusions from the calculations presented.

31 In addition to the grains themselves, the GMP also specified the grades to be used, namely: 1 CWRS Wheat; 1 CWA Durum; 1 Canada Canola; and Canadian Large Yellow Peas (No. 2 or Better).

ELEMENT	WHEAT AND DURUM	CANOLA AND YELLOW PEAS
Grain Price	The price for 1 Canada Western Red Spring Wheat and 1 Canada Western Amber Durum are tonnage-based weighted averages of the West Coast export quotation from Canadian Grain Exporters and the St. Lawrence export quotation from the International Grains Council (ICG), as reported by AAFC.	As of the 2015-16 crop year, the price for 1 Canada Canola is represented by the Track Vancouver Cash price (as reported by AAFC). For all previous crop years, the price for 1 Canada Canola was the weighted average Vancouver cash price provided by ICE Futures Canada. The weights used reflect monthly exports as recorded by the Canadian Grain Commission (CGC). The price for Canadian Large Yellow Peas is based on the average weekly dealer closing price, track Vancouver, reported by Stat Publishing for the months of October and November.[1]
Trucking Costs	The trucking costs are based on the commercial short-haul trucking rates for an average haul of 40 miles as presented in Table 4A-1. Although current data is unavailable, the last published value is still employed for the purpose of continuity.	The trucking costs are based on the commercial short-haul trucking rates for an average haul of 40 miles as presented in Table 4A-1. Although current data is unavailable, the last published value is still employed for the purpose of continuity.
Price Differential	A price differential – or spread – is used to estimate certain costs for 1 Canada Western Red Spring Wheat and 1 Canada Western Amber Durum. For the 2012-13 through 2014-15 crop years this spread was based on the difference between the weighted average of the West Coast and St. Lawrence export quotations and the average Saskatchewan producer spot price (both reported by AAFC). However, the average Saskatchewan producer spot price encompassed all grades and, therefore, provided an imperfect comparison to the export quotations. As of the 2015-16 crop year the latter element in this comparison was altered, with it now being made against an average of the daily bid prices within each region as reported by PDQ.[2] Readers should consider this when attempting to draw conclusions from the data.	A price differential – or spread – is used to estimate certain costs for 1 Canada Canola. Prior to the 2015-16 crop year this spread was based on the difference between the weighted Vancouver cash price and the weighted average spot price in each of the nine regions as reported by ICE Futures Canada. For 2015-16 to 2019-20 crop years this was replaced by a differential based on the Track Vancouver Cash Price (as reported by AAFC) and the average of the daily bid prices within each region reported by PDQ.[2] As of 2020-21, the spread is the differential between the Par Region Cash Price and the Track Vancouver Cash Price (as reported by AAFC). For yellow peas, a price differential is calculated using the average weekly dealer closing price, track Vancouver, and the average weekly grower bid closing price for the months of October and November. These differentials effectively represent the incorporated per-tonne cost of freight, elevation, storage and any other ancillary elements. As such, it encompasses a large portion of the Export Basis.
Grower Association Deductions	Elevator deliveries of wheat and durum are subject to various per-tonne "check-offs" in order to fund variety research, market development and technical support to the industry. The check-offs are administered by the appropriate provincial wheat commission.	Elevator deliveries of canola and peas are subject to various per-tonne "check-offs" in order to fund variety research, market development and technical support to the industry. The check-offs are administered by the appropriate provincial canola and pulse-grower association.
Trucking Premiums	Grain companies report on the trucking premiums they pay to producers at each of the facilities identified in the sampling methodology.[3] The amounts depicted reflect the average per-tonne value of all premiums paid for the designated grade of wheat or durum within the reporting area. In the post-monopoly environment, grain companies have increased the use of their basis (the spread between their cash and the nearby futures price) as the mechanism to attract producer deliveries. This has been accompanied by a significant decline in the use of trucking premiums.	Grain companies use their basis (the spread between their cash and the nearby futures price) as the mechanism to attract producer deliveries. Narrowing their basis, resulting in higher return to producers, is the signal that a company needs a commodity. Conversely a wide basis signals a lack of demand for the product. Some companies, however, offer premiums over and above their basis in order to attract delivery of some commodities. These premiums are presented as a producer benefit when factored into the export basis. Owing to the limited use of this mechanism, they assume relatively small values when weighted by the applicable tonnage at a regional level.
Other Deductions	Other deductions, such as drying charges, GST on services, etc., may also be applied to, and appear as an itemized entry on the cash ticket of, any grain delivery. No attempt is made to capture these deductions within the framework employed here.	Other deductions, such as drying charges, GST on services, etc., may also be applied to, and appear as an itemized entry on the cash ticket of, any grain delivery. No attempt is made to capture these deductions within the framework employed here.

1) – Data provided by Stat Publishing. Using a "snapshot" period of two months during the fall, when pricing of the new crop is relatively heavy, was deemed to be an appropriate representation of producer prices, thereby avoiding the need to incorporate a weighting factor.
2) – PDQ (Price, Data, Quotes) is a web-based information service operated by the Alberta Wheat Commission which publishes cash grain market price and related statistical data (www.pdqinfo.ca).
3) – Various terms are used by grain companies to describe the premiums they offer to producers in an effort to attract deliveries to their facilities – i.e., trucking premiums, marketing premiums, and location premiums. The most common term, however, remains "trucking premium," and it is utilized generically in the calculation of the Export Basis.

WHEAT AND DURUM
[See TABLES 6A-1A through 6A-10B]

In its earlier reports, the Monitor described how higher prices have generally been responsible for any improvement in the per-tonne returns accruing to producers of wheat and durum. In comparison, reductions in the export basis have proven to be secondary. Whether it be price or the export basis, their periodic rise and fall have been the prime determinants in the financial returns for producers.

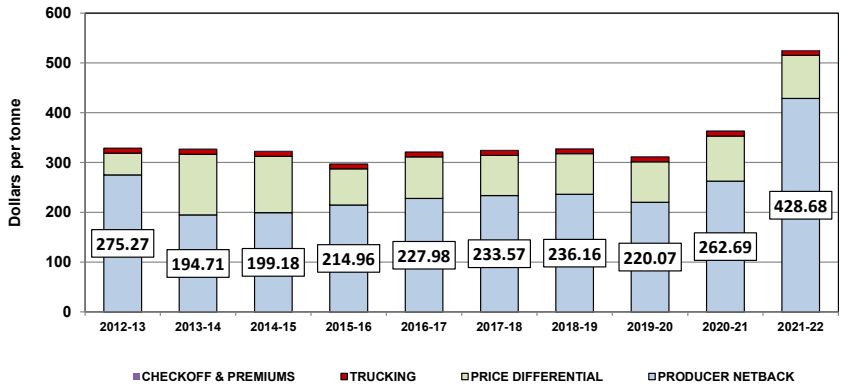
The 2021-22 crop year saw an unprecedented run-up in commodity prices. These commodity-price increases were shaped by several overarching elements. The first, of course, was a drought that resulted in a 40% reduction in Western Canadian grain production and the constriction of grain supplies. The reverberations coming out of COVID-induced supply-chain problems only amplified the demand pressure and helped lift prices still further. Finally, Russia's invasion of Ukraine in February 2022, which jeopardized the international flow of wheat and other grains altogether, spurred grain prices to unprecedented heights in the last half of the crop year.

1CWRS Wheat
[*See Tables 6A-1A through 6A-10A*]

The financial return to farmers of 1CWRS wheat amounted to an estimated $428.68 per tonne in the 2021-22 crop year. This represented a 63.2% increase over the $262.69 estimated a year earlier. Much of the increase was attributable to an escalation in the average price, which is constructed around a tonnage-based weighted average export quotation for 1CWRS wheat (13.5% protein), and which rose by 44.4%, to $525.87 per tonne from $364.12 per tonne a year earlier. This price increase reflected the strong international demand for quality wheat in the face of tighter global supplies. Limited supplies from major export competitors kept a large, diverse number of buyers continuing to seek Canadian wheat despite the higher prices. Dwindling supplies also led to the tightest carry-out stocks recorded under the GMP.

The $161.75-per-tonne increase in wheat prices was supported by a $4.24-per-tonne decrease in the export basis, which fell by 4.2%, to $97.19 per tonne from $101.43 per tonne a year earlier. Virtually all of the decrease was attributable to a narrowing of the price differential – or spread – between the export quotation and the elevator spot price, which fell 4.6%, to $86.42 per tonne from $90.62 per tonne a year earlier. In effect, the price differential includes applicable freight, handling, cleaning, storage, weighing and inspection charges, as well as an opportunity cost or risk premium. With trucking charges and check-offs remaining unchanged at $9.82 per tonne and $1.03 per tonne respectively, a doubling of trucking premiums to $0.08 per tonne was the only other cost element to help reduce the export basis.

Producer Netback - 1CWRS Wheat



1CWA Durum
[*See Tables 6A-1B through 6A-10B*]

The financial return to farmers of 1CWA durum amounted to an estimated $620.71 per tonne in the 2021-22 crop year. This represented 110.7% more than the $294.63 per tonne reported in the 2020.21 crop year. The gain was driven primarily by higher durum prices, which rose to an average of $782.58 per tonne, 95.4% above the $400.60-per-tonne average recorded a

year earlier. Owing to its prominent role in the global durum trade, much of the price gain stemmed from Canada's reduced production. Additional declines in American and Italian production only accentuated these price pressures in the face of continuing strong demand.

The price gain was undermined by an increase in the export basis, which climbed 52.8%, to $161.87 per tonne from $105.97 per tonne. Virtually all of this $55.90 gain was attributable to a $55.94 increase in the price differential, which rose to $151.08 per tonne from $95.14 per tonne a year earlier. As outlined with respect to 1CWRS wheat, the $9.82-per-tonne trucking cost did not change in the 2021-22 crop year, so did not factor into the improvement of the producer netback. Nor did an unchanged check-off charge of $1.03 per tonne. However, a $0.04-per-tonne increase in trucking premiums marginally added to the larger producer netback.

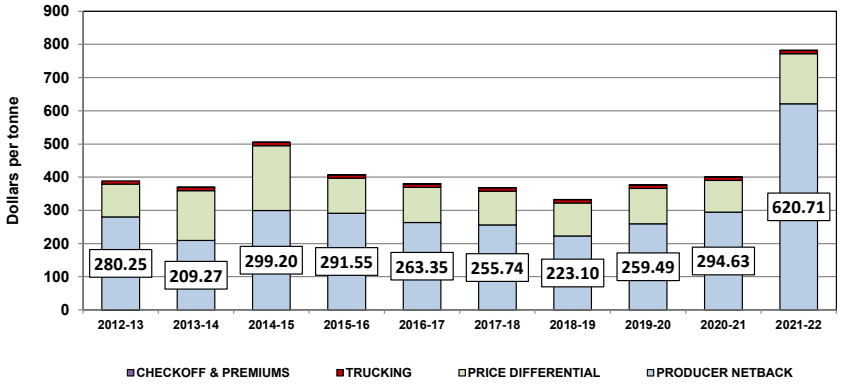
CANOLA AND YELLOW PEAS
[See TABLES 6A-1C through 6A-10D]

Like wheat and durum, the data used in calculating the financial return to producers of canola and large yellow peas shows that they have also been heavily influenced by the prevailing prices for these commodities. While the export basis has also risen over time, it has proven to have far less sway over these returns.

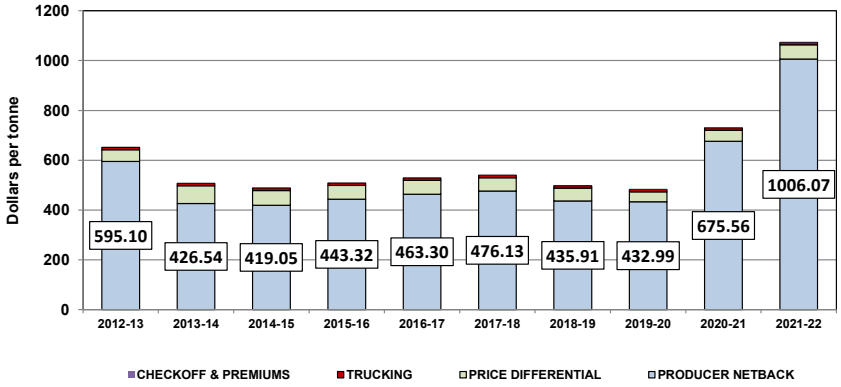
1 Canada Canola
[See Tables 6A-1C through 6A-10C]

The netback to producers of 1 Canada canola increased sharply in the 2021-22 crop year, rising to $1,006.07 per tonne from $675.56 per tonne a year earlier. This result was driven by significantly higher canola prices, with the average Vancouver cash price surging 47.1%, to $1,074.52 per tonne from $730.31 per tonne. The increase reflected the significant tightening in canola supplies, exacerbated by the use of vegetable oils (including canola oil) as a feedstock in biodiesel production, which were also swept up in rising energy prices. Prices pushed ever higher as the market attempted to ration demand. The curtailment of sunflower oil exports from war-ravaged Ukraine along with Indonesia's announcement that palm oil exports would be banned due to rising domestic prices only added new shocks to an already tight global vegetable oil market. Demand

Producer Netback - 1CWA Durum



Producer Netback - 1 Canada Canola



remained high through spring with uncertainty over 2022 production (excess rain in Manitoba and continued dryness in the western prairies at seeding time) helping to propel prices to record highs.

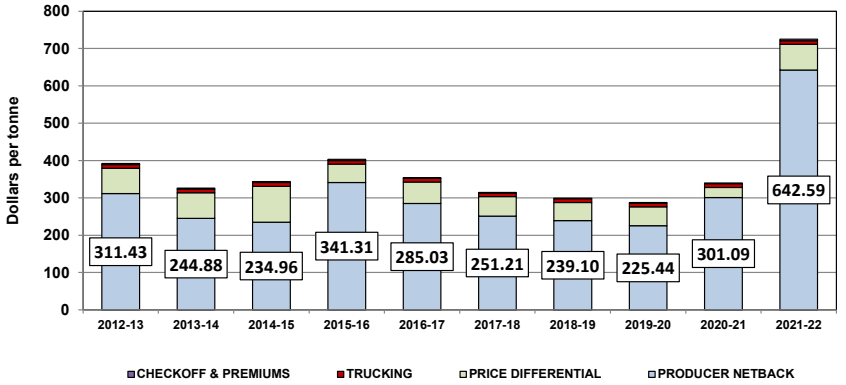
The gain was dulled by a 25.0% increase in the export basis, which rose to an average of $68.45 per tonne from $54.75 per tonne a year earlier. As observed with wheat and durum, virtually all the increase was tied to a change in the price differential, which rose to $57.83 per tonne from $44.87 per tonne a year earlier. The costs derived from trucking and the payment of a check-off did not change in the 2021-22 crop year, so did not contribute to the variance in the producer netback. These were estimated at $9.82 per tonne and $0.92 per tonne respectively. However, a $0.74-per-tonne decrease in the trucking premiums paid to producers served to marginally enlarge the rise in the export basis.

Large Yellow Peas
[*See Tables 6A-1D through 6A-10D*]

The visible netback to producers of large yellow peas has proven the most erratic of the four commodities monitored under the GMP. Producers experienced a 113.4% increase in these returns during the 2021-22 crop year, which rose to $642.59 per tonne from $301.09 per tonne a year earlier. Much of this gain was attributable to the strong demand from China, which bought 80% of Canada's international exports. Drought-reduced production, steady demand and the prospect of tight ending stocks provided additional price support. As a result, the dealer's closing price rose by 113.2%, to $725.23 per tonne from $340.17 per tonne.

The export basis for large yellow peas rose by 111.5% in the 2021-22 crop year, to $82.64 per tonne from $39.08 per tonne a year earlier. As with other commodities, much of the increase was rooted in a higher price differential, which stands in for the cost of freight as well as other handling activities, and which rose by 151.8%, to $68.44 per tonne from $27.18 per tonne. This was supported by a modest $2.30-per-tonne increase in Pulse Growers Association fees. No impact on the export basis was derived from changes in either trucking costs or trucking premiums, which remained at $9.82 per tonne and $0.02 respectively.

Producer Netback - Large Yellow Peas



PRODUCER CARS
[See TABLES 6B-1 through 6B-2]

Producer-car loading increased substantially through the first decade of the GMP. This was due in large measure to the advent of modern producer-car loading groups that invested significantly in fixed trackside storage and carloading facilities. Some even went so far as to purchase the branch lines then being abandoned by CN or CP to establish shortline railways that became integral elements in their broader grain-handling operations. Ultimately, their aim was to safeguard a cost-competitive alternative for producers in moving their grain to market.

Loading Sites
[*See Table 6B-1*]

The number of producer-car loading sites situated across Western Canada has continued to decline from the 710 originally benchmarked at the beginning of the GMP. However, the 2021-22 crop year proved to be the fifth consecutive year in which the overall number remained unchanged at

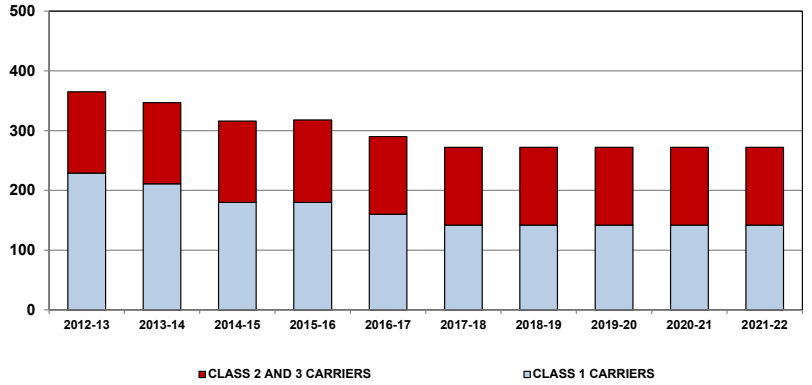
272, with Class 1 carriers operating 142, while Class 2 and 3 carriers operated 130.

Producer-Car Shipments
[See Table 6B-2]

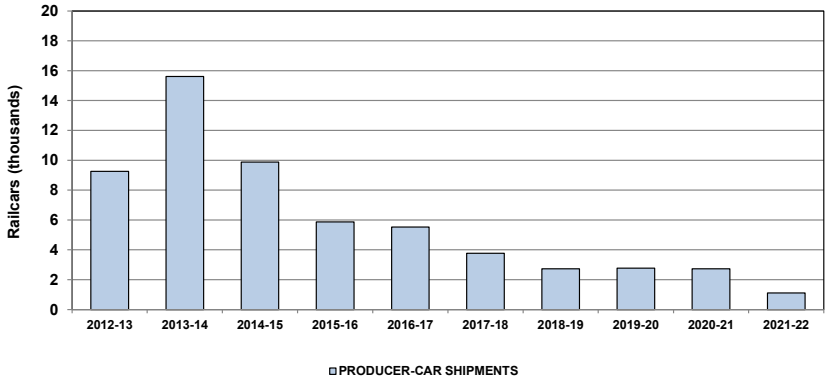
Scheduled producer-car shipments fell by 59.3% in the 2021-22 crop year, to 1,113 cars from 2,734 a year earlier. This marked a 92.9% decline from the 15,603-car high reached in the 2013-14 crop year. Much of this decline reflects the realities of today's competitive environment, where the limited financial reward of the producer-loading option is often outweighed by its broader commercial risks. Simply stated, few producers feel that it is worth the trouble. Still, what remains has largely been refocused on serving the American market for select grains, with almost 70% of total producer-car shipments now being directed into the United States.

Equally noteworthy is the attendant shift in the mix of commodities handled. Until the 2009-10 crop year, wheat, durum and barley were dominant, representing virtually all the traffic moved. But the proportion accorded to oilseeds and other commodities soon began to climb. With the close of the 2021-22 crop year the share given over to wheat, durum and barley had fallen to an estimated 34.6%, up modestly from the 30.5% share estimated a year earlier. Conversely, shipments of oilseeds, special crops and oats slipped, claiming a 65.4% share, down from 69.5% the previous year. This marked the seventh consecutive crop year in which the shipment of these commodities displaced those of wheat, durum and barley.

Producer-Car Loading Sites



Producer-Car Shipments



Appendix 1: Program Background

The Government of Canada selected Quorum Corporation to serve as the Monitor of Canada's Grain Handling and Transportation System (GHTS) in June 2001. Under this mandate, Quorum Corporation provides the government with a series of regular reports relating to the system's overall performance, as well as the effects of the various policy reforms enacted by the government since 2000.

In a larger sense, these reforms were expected to alter the commercial relations that have traditionally existed between the primary participants in the GHTS: producers; the former Canadian Wheat Board; grain companies; railway companies; and port terminal operators. Using a broad series of indicators, the government's Grain Monitoring Program (GMP) was designed to measure the performance of the GHTS as this evolution unfolded. Moreover, these indicators are intended to reveal whether grain is moving through the supply chain with greater efficiency and reliability.

To this end, the GMP provides for a number of specific performance indicators grouped under six broad series, namely:

- Series 1 – Production and Supply: Measurements relating to grain production in western Canada. In addition to the major cereal grains, this also includes oilseeds and special crops.

- Series 2 – Traffic and Movement: Measurements focusing on the amount of grain moved by the western Canadian GHTS. This includes shipments from country elevators; by rail to western Canada, eastern Canada, the United States and Mexico; by vessel from terminal elevators at the four ports in western Canada; and by truck to the United States.

- Series 3 – Infrastructure: Measurements illustrating the makeup of the GHTS. These statistics include both the number and capacity of the country as well as terminal elevator systems, and the composition of the western Canadian railway network.

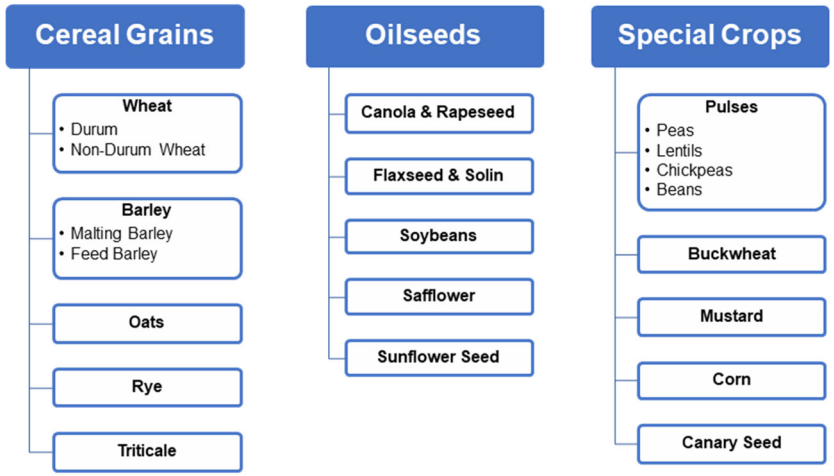
- Series 4 – Commercial Relations: Measurements relating to the rates applicable on various grain-handling and transportation services.

- Series 5 – System Efficiency and Performance: Measurements aimed at gauging the operational efficiency with which grain moves through the logistics chain.

- Series 6 – Producer Impact: Measurements designed to capture the value to producers from changes in the GHTS, and which are focused largely on the calculation of the "producers' netback."

Appendix 2: Commodity Guide

The following provides a high-level overview of the various commodities discussed in this report. The delineations made here are drawn from the Canadian Grain Commission's Official Grain Grading Guide Glossary.



Cereal Grains: Cereal grains are any grain or edible seed of the grass family which may be used as food.

Oilseeds: Oilseeds include flaxseed and solin, canola and rapeseed, soybeans, safflower and sunflower seed.

Canola: The term "canola" was trademarked in 1978 by the Western Canadian Oilseed Crushers' Association to differentiate the new superior low-erucic acid and low-glucosinolate varieties and their products from older rapeseed varieties.

Special Crops: Special crops are considered to be beans, buckwheat, chick peas, corn, fababeans, lentils, mustard, peas, safflower, soybeans, and sunflower.

Pulses: Pulses are crops grown for their edible seeds, such as peas, lentils, chick peas or beans.

Screenings: Screenings is dockage material that has been removed by cleaning from a parcel of grain.

Appendix 3: Acknowledgements

The scope of this review is far-reaching and could not have been completed without the assistance of the various stakeholders that submitted views on the detailed monitoring design and provided the data in support of the Grain Monitoring Program (GMP). Quorum Corporation would like to thank the following organizations, and more particularly the individuals within them, for the cooperation they have extended in our efforts to develop the GMP. We have come to appreciate not only their cooperation as suppliers of data under the program, but to value their assistance in helping to improve the GMP itself. We look forward to their continued input and cooperation.

Agricultural Producers Association of Saskatchewan
Agriculture and Agri-Food Canada
AGT Food and Ingredients
Alberta Agriculture and Irrigation
Alberta Barley Commission
Alberta Federation of Agriculture
Alberta Transportation and Economic Corridors
Alberta Wheat Commission
Alliance Grain Terminal Ltd.
Archer Daniels Midland Co.
Battle River Railway
BC Chamber of Shipping
BC Maritime Employers Association
Boundary Trail Railway Company Inc.
Canada Grains Council
Canadian Canola Growers Association
Canadian Federation of Agriculture
Canadian Grain Commission
Canadian Maritime Chamber of Commerce
Canadian National Railway
Canadian Pacific Railway
Canadian Ship Owners Association
Canadian Special Crops Association
Canadian Transportation Agency
Canadian Transportation Research Forum
Cando Contracting Ltd.
Canola Council of Canada
Cargill Limited
Cereals Canada
Ceres Global Ag Corp.
Chamber of Shipping of British Columbia
CMI Terminal Ltd.
Fibreco Export Inc.
Fraser Grain Terminal
G3 Canada Limited
Government of British Columbia
Grain Growers of Canada
GrainsConnect Canada
Great Western Railway Ltd.
Inland Terminal Association of Canada
Intercontinental Exchange / ICE
Keystone Agricultural Producers
Lake Line Railroad Inc.
Long Creek Railroad
Louis Dreyfus Canada Ltd.
Manitoba Agriculture
Manitoba Crop Alliance
Manitoba Transportation and Infrastructure
National Farmers Union
North West Terminal Ltd.
Northern Lights Rail
OmniTRAX Canada, Inc.
Parrish & Heimbecker Ltd.
Pacific Pilotage Authority
Paterson Grain
PKM Canada Marine Terminal Limited Partnership
Port of Churchill
Port of Hamilton
Port of Montreal
Port of Thunder Bay
Prairie Oat Growers Association
Prince Rupert Grain Ltd.
Prince Rupert Port Authority
Pulse Canada
Railway Association of Canada
Red Coat Road and Rail Ltd.
Richardson Pioneer Ltd.
St. Lawrence Seaway Management Corporation
Saskatchewan Agriculture
Saskatchewan Highways
Saskatchewan Association of Rural Municipalities
Saskatchewan Barley Development Commission
Saskatchewan Wheat Development Commission
South West Terminal
Statistics Canada
Stewart Southern Railway
The Scoular Company
Transport Canada
Vancouver Fraser Port Corporation
Viterra Inc.
Western Barley Growers Association
Western Canadian Short Line Railway Association
Western Canadian Wheat Growers Association
Western Grain Elevator Association