Annual Report
2016-2017 Crop Year

Monitoring the Canadian Grain Handling and Transportation System

Government of Canada / Gouvernement du Canada

Quorum Corporation

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www.grainmonitor.ca

Foreword

The following report details the performance of Canada's Grain Handling and Transportation System (GHTS) for the crop year ended 31 July 2017, and focuses on the various events, issues and trends manifest in the movement of Western Canadian grain during the past year. This is the seventeenth 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 a number of measurement indicators. These are grouped into six series, comprised of:

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 2016-17 crop year is largely gauged against that of the 2015-16 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 quarterly data in a time series that extends through 18 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 time series, the full series can be obtained as an .XLSX spreadsheet from the Monitor's website (www.quorumcorp.net). Similarly, much of this same data can no longer be fully presented in many of the charts found throughout this report owing to space and legibility limitations. Where necessary, the Monitor has opted to graphically portray only a portion – often the last ten crop years – of the data. Additional .PDF copies of this report, as well as all past reports, can also be downloaded from the Monitor's website.

QUORUM CORPORATION

Edmonton, Alberta
March 2018

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Executive Summary

Western Canadian grain required an average of 40.6 days to move through the Grain Handling and Transportation System (GHTS) in the 2016-17 crop year. This represented a record low under the Grain Monitoring Program, and a 2.9% reduction from the 41.8-day average reported a year earlier. The 1.2-day improvement was shaped by reductions in the amount of time grain spent in storage, be it in the country (-1.2 days) or at port (-0.4 days), which were offset by an increase in the railways' loaded transit time (+0.4 days).

The improvement in overall performance of the grain supply chain also came with some operational issues. Most noteworthy was the fact that Western Canada's grain supply reached above the 70-million-tonne mark for a fourth consecutive year. At 80.1 million tonnes, this meant that the GHTS would have to contend with the second largest potential grain movement in its history. This led many stakeholders to be concerned about a possible repeat of the major difficulties encountered in the 2013-14 crop year, when the system grappled with record crop size production and an 81.9-million-tonne movement. While the railways generally improved their performance in the aftermath of these problems, service problems reappeared in the 2016-17 crop year, mainly tied to the realities of winter rail operational challenges.

Other aspects of the 2016-17 crop year reported on in this Annual Report are highlighted here:

Production and Supply

- Grain production increased 12.1 % to 72.6 million tonnes, the second largest crop recorded under the GMP.
  - Near-record outputs for all grain-producing provinces.
  - Cereals comprised 55.7% of the crop; oilseeds 30.4%; and other commodities 13.9%.
  - Oilseed and special-crop production rose to record levels.
- Opening carry-forward stocks decreased 18.1% to 7.5 million tonnes.
- Total grain supply (production and carry-forward) increased 8.4% to 80.1 million tonnes, the second largest potential movement on record.

Traffic and Movement

- Primary-elevator throughput increased 7.7% to 45.6 million tonnes, a GMP record.
  - Represented 78.8% of all producer deliveries.
- Railway shipments increased 5.0% to 50.7 million tonnes, a GMP record.
  - Traffic to Western Canada totaled 40.3 million tonnes, up 4.6%.
  - Traffic to Eastern Canada totaled 3.3 million tonnes, up 17.8%.
  - Traffic to the United States and Mexico totaled 7.2 million tonnes, up 2.1%.
- Terminal-elevator throughput increased 3.5% to 36.8 million tonnes, a GMP record.
  - Terminal unloads total 399,540 cars, up 5.1%.
  - CN / CP traffic share remained almost evenly divided at 50.4% and 49.6% respectively.
- Truck traffic to the United States decreased 0.8% to 2.3 million tonnes.

Infrastructure

- The number of country elevators increased 2.1% to 391, reflects licensing of previously unlicensed facilities.
  - Primarily tied to Alliance Pulse Processors, Canpulse Foods, ETG Commodities, Providence Grain Group and Scoular Canada.
  - Storage capacity increased to 8.2 million tonnes, up 4.1%.
- Railway network decreased by 0.1% to 17,276.1 route-miles.
  - CN abandoned their final 12-0 route-miles of its Athabasca subdivision.
  - Hopper cars in service increased to 24,133, up 1.2%.
- The number of terminal elevators increased 6.7% to 16, reflects relicensing of MobilEx Terminal in Thunder Bay.
  - Storage capacity increased to 2.5 million tonnes, up 3.8%.
  - Richardson International expansion adds 81,720 tonnes of storage capacity to its Vancouver terminal.

Commercial Relations

- Country elevator handling charges - generally increased.
  - Elevation rates increased 1.1%; dockage rates decreased 6.8%; and storage rates increased 1.8%.
- Railway freight rates show seasonal variability with mixed changes.
  - CN rates to Vancouver increased 3.3%; Prince Rupert rates increased 2.4%; and Thunder Bay rates increased 4.7%.
  - CP rates to Vancouver decreased 4.1%; and Thunder Bay rates decreased 7.5%.
  - Multiple-car block discounts remain unaltered; range from $4.00 per tonne to $8.00 per tonne.
  - Maximum Revenue Entitlement exceeded by $5.8 million for CN; and $1.1 million for CP.
- Terminal Country elevator handling charges moved generally higher.
  - Elevation rates increased 0.4%; and storage rates increased 0.7%.
- Commercial Developments
  - Federal government introduced the Transportation Modernization Act after lengthy review and stakeholder consultations.
  - Saskatchewan government sells hopper-car fleet to three provincial shortline railways.
  - Hudson Bay Railway suspends service to Churchill indefinitely following severe damage caused by spring flooding.
  - Construction begins on new G3 Terminal Vancouver.
  - Parrish and Heimbecker / Paterson Grain joint venture proposes Fraser Grain Terminal for Fraser Surrey Docks.
  - Ray-Mont begins building transload facility in Prince Rupert.
  - Columbia Containers begins modernization of its transload facility in Vancouver.
  - Roquette announces investment in new pea-protein manufacturing facility in Portage la Prairie.
  - Chinese and Indian non-tariff restrictions threaten Canadian grain exports of canola and peas.

System Efficiency and Performance

- Country elevator operations reflect heightened activity.
  - Capacity turnover ratio increased 1.6% to 6.4 turns.
  - Average weekly stocks increased 2.9% to 3.2 million tonnes; reaches record high of 3.9 million tonnes in March 2017.
  - Average days-in-store decreased 4.5% to 24.9 days; reflects tighter relative stocks.
  - Stock-to-shipment ratio decreased 7.7% to 3.6; reflects tighter relative stocks.

System Efficiency and Performance (continued)

- Railway operations reflect increased workload amid winter difficulties in Western Canada.
  - Average car-cycle to Western Canada increased 6.1% to 14.1 days; average loaded transit time increased 8.3% to 5.2 days.
    - Reflects the effect of winter operating difficulties.
  - Average car-cycle to Eastern Canada decreased 10.7% to 20.9 days; average loaded transit time decreased 11.5% to 8.7 days.
    - Reflects increased use of larger block movements (Eastern Canada) and shorter lengths of haul (US destinations)
  - Average car-cycle to United States decreased 6.8% to 24.8 days; average loaded transit time decreased 11.9% to 9.8 days.
  - Multiple-car block movement share in Western Canada decreased to 83.9% from 85.7%.
    - Annual freight savings increased 2.6% to an estimated $244.7 million.
- Terminal Elevator operations reflect heightened activity and irregular grain deliveries.
  - Capacity turnover ratio increased 16.3% to 21.4 turns.
  - Average weekly stocks decreased 3.8% to 1.1 million tonnes.
  - Average days-in-store decreased 3.7% to 10.5 days; reflects effects of tighter grain stocks and irregular rail deliveries.
  - Out-of-car time increased to 12.1% from 11.7%.
- Port operations
  - Vessels calls increased 1.6% to 959 ships.
  - Average vessel time in port increased 30.4% to 10.3 days.
  - Net outlay for delayed vessels increased 96.6% to $28.9 million; reflects delays incurred along Pacific seaboard.
    - Demurrage costs increased 16.1% to $39.7 million; dispatch earnings decreased 44.6% to $10.8 million.
- System performance
  - Average time spent in the system decreased 2.9% to 40.6 days; reaches new record low.

Producer Impact

- Producer Netback
  - 1CWRS wheat: Average price increased 8.2%; export basis increased 13.8%; netback increased 6.1% to $227.98 per tonne.
  - 1CWA durum: Average price decreased 6.7%; export basis increased 0.6%; netback decreased 9.7% to $263.35 per tonne.
  - 1 Canada canola: Average price increased 4.0%; export basis increased 0.6%; netback increased 4.5% to $463.30 per tonne.
  - Large yellow peas: Average price decreased 12.2%; export basis increased 11.2%; netback decreased 16.5% to $285.03 per tonne.

- Producer cars
  - Producer-car loading sites decreased 8.9% to 288; reflects closure of 20 sites served by CP and 8 by Big Sky Rail.
  - Scheduled producer-car shipments decreased 6.0% to 5,519 carloads; reflects lowest volume in over a decade.

Section 1: Production and Supply

Indicator Description	Table	1999-00	2014-15	2015-16	2016-17 Q1	Q2	Q3	Q4	YTD	% VAR
Production and Supply										
Crop Production (000 tonnes)	1A-1	55,141.7	62,854.9	64,738.6	72,580.9				72,580.9	12.1%
Carry Forward Stock (000 tonnes)	1A-2	7,418.2	14,196.0	9,162.6	7,504.9				7,504.9	-18.1%
Grain Supply (000 tonnes)		62,559.9	77,050.9	73,901.2	80,085.8				80,085.8	8.4%
Crop Production (000 tonnes) – Special Crops	1A-3	3,936.7	6,554.2	6,379.5	8,774.8				8,774.8	37.5%

DISCUSSION AND ANALYSIS

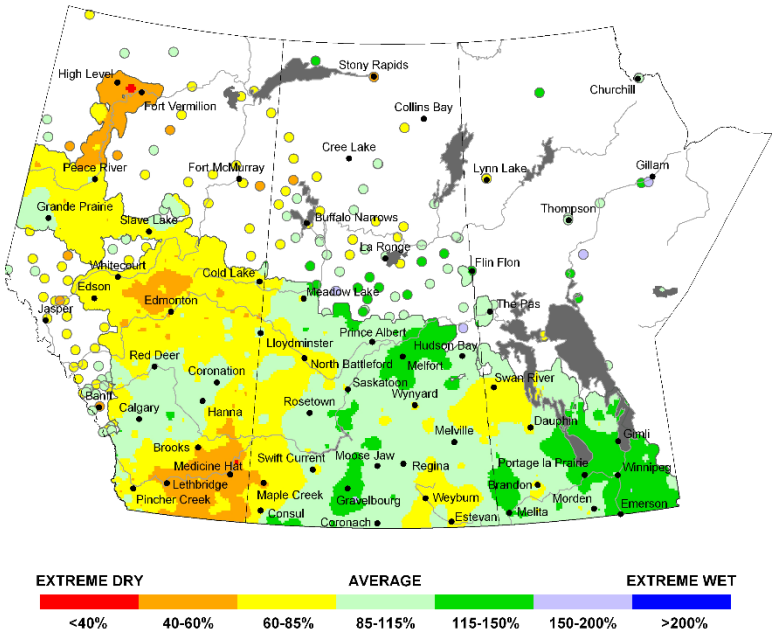
PRODUCTION AND SUPPLY
[See TABLES 1A-1 through 1A-3]

Western Canadian grain production rose to 72.6 million tonnes in the 2016-17 crop year, a 12.1% increase over the previous crop year's 64.7-million-tonne crop. This marked the fourth consecutive growing season in which total production exceeded 60 million tonnes, and the second to have surpassed 70 million tonnes.

Early seeding and plentiful rain initially led to optimistic projections for a bountiful harvest in 2016. By mid-summer, heavy stands of grain in the field suggested another year of above-average production. But as August advanced and the rains continued, farmers' attempts to take crop off the field were frustrated. Concern grew that, although there would likely still be a large crop, the wet weather would adversely affect its quality as well as the industry's ability to fulfill early sales requirements. As the cool, wet weather continued into the fall, efforts at taking off the crop stalled. Fortunately, an unseasonably warm period in early November allowed the harvest to progress, and near completion. Although most crops were of average to below average quality, by the start of December the grain from an estimated 2.5 million acres would have to wait until spring to be collected.

Despite these challenges, generally favourable growing conditions led to near-record outputs in all four grain-producing provinces. Production gains ranged from a low of 5.1% for Manitoba, through 11.3% for Saskatchewan, and to a high of 17.1% for Alberta. These variances did not materially change their relative standings: Saskatchewan still accounted for just over half, 50.4%, of the total tonnage harvested, or 36.6 million tonnes; followed by Alberta with 33.4%, or 24.3 million tonnes; Manitoba with 15.6%, or 11.4 million tonnes; and British Columbia with 0.5%, or 392,100 tonnes. These rankings proved consistent with what had been observed throughout the GMP.

Percent of Average Precipitation (1 April to 31 August 2016)



Changing Face of the Harvest

The most striking changes in production are to be found in both the quantity and mix of grains now harvested. While growing conditions have always resulted in significant swings in the size of the overall crop, until 2013 prairie grain production seldom reached beyond an average of 55.0 million tonnes annually. Moreover, it was not until 2013 that production sharply surpassed this benchmark level, to reach record 77.0 million tonnes. Since that historic harvest, the amount of grain drawn from prairie fields has effectively risen 10.0 million tonnes beyond what it had been previously, to around 65.0 million tonnes. In fact, even this stands a full 10% below the 72.6 million tonnes harvested in the 2016-17 crop year.

Such enlarged outputs reflect the higher yields now being achieved through advances in plant genetics and agronomic practices. This has prompted many in the grain handling industry to refrain from dismissing larger-than-normal crops as isolated aberrations but, rather, to consider them as milestones along the path to a "new normal."

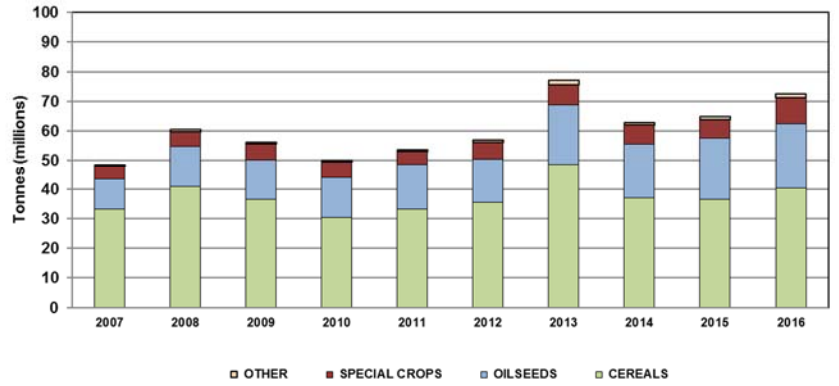
At the outset of the GMP, cereals constituted about three-quarters of all grains grown in Western Canada. By the 2016-17 crop year, however, these same commodities accounted for just over half of the total tonnage brought to market. To be clear, the actual output of cereals did not decline during this period. In fact, production has deviated little from an average of nearly 40 million tonnes annually. Rather, its significance has simply been diminished in the wake of a 17-million-tonne gain posted by other commodities.

There are two primary facets in this expansion: the first is tied to increased oilseed production; and the second to that of pulses. By far, the most significant contributor to the overall gain has been the former, which has seen the harvesting of an additional 12 million tonnes of canola, soybeans and flaxseed each year. Another 5 million tonnes were attributable to the growth in special crops, especially dry peas and lentils.

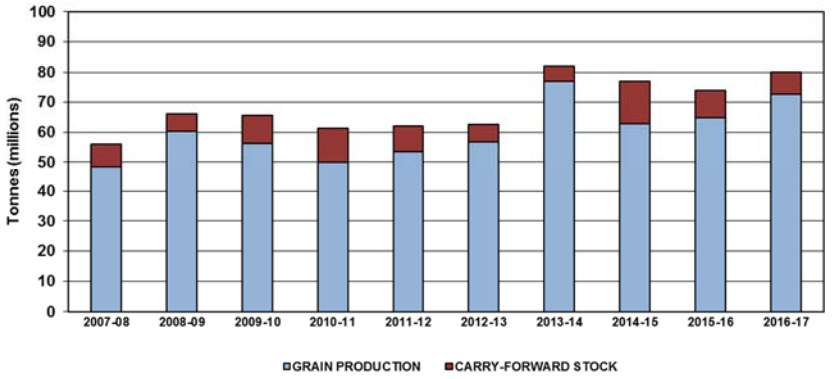
Increased Grain Supply and GHTS Workload

The amount of grain that the GHTS moves 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 typically inflate current-year production values by another 15%.[1] Thus, as production has moved into the realm of a "new normal," so too has the overall grain supply. While the total grain supply reached 80.1 million tonnes in the 2016-17 crop year –up 8.4% from the previous year – it was little removed from the 81.9-million-tonne record set just three years earlier. In effect, the GHTS is now being called upon to handle roughly 15 million tonnes more than it was a decade earlier.

Grain Production - Principal Commodities
(Western Canada)



Grain Supply and Originating Workload
(Western Canada)



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).

These changes to both the size and makeup of today's crops has spurred the GHTS into adding new capacity. The most immediate manifestation of this has been in the establishment of extra storage, be it on individual farms or at country elevators. The need has spread to other areas of the grain supply chain as well. Some terminal operators have already augmented their storage capacities while other companies are engaged in the construction of brand new facilities to meet these emerging handling needs. All of this suggests that the face of the GHTS is changing, and that the system is evolving to meet these challenges. These same demand pressures have also suggested the need for additional railway handling capacity along with reliable and consistent service.

While financial resources have clearly been directed into addressing the immediate physical needs of handling a larger crop, they have also been funnelled into new investments brought on by the surge in non-traditional crop production. Chief among these are the large investments made by Cargill, Louis Dreyfus and Richardson International in four new domestic canola-crushing facilities. And there is mounting pressure to invest in the domestic processing of a burgeoning soybean crop as well.

Investments also continue to be made in a variety of pulse-processing facilities across the prairies. This includes investments aimed at serving export markets and, increasingly, the domestic market. Moreover, many of the newest investments have been in facilities that reach beyond the conventions of bulk exporting, and include those engaged in processing, packaging and selling value-added food products to foreign and domestic consumers alike.

Section 2: Traffic and Movement

Indicator Description	Table	1999-00	2014-15	2015-16	2016-17 Q1	Q2	Q3	Q4	YTD	% VAR
Country Elevator Throughput										
Grain Throughput (000 tonnes) – Primary Elevators	2A-1	32,493.9	42,369.2	42,380.8	11,400.6	11,909.7	11,928.1	10,404.4	45,642.8	7.7%
Railway Traffic										
Traffic to Western Canada										
Railway Shipments (000 tonnes) – Ports Only	2B-1	26,439.2	38,389.8	37,956.9	10,745.0	9,835.0	9,935.9	9,135.3	39,651.2	4.5%
Railway Shipments (000 tonnes) – Western Domestic	2B-1	n/a	562.3	540.2	130.9	155.1	160.9	168.8	615.6	14.0%
Traffic to Western Canada (Ports Only)										
Railway Shipments (000 tonnes) – All Grains	2B-1	26,439.2	38,389.8	37,956.9	10,745.0	9,835.0	9,935.9	9,135.3	39,651.2	4.5%
Railway Shipments (000 tonnes) – Hopper Cars	2B-1	25,664.6	37,332.4	36,680.6	10,356.3	9,408.2	9,521.5	8,798.3	38,084.3	3.8%
Railway Shipments (000 tonnes) – Non-Hopper Cars	2B-1	774.7	1,057.4	1,276.3	388.7	426.8	414.4	337.0	1,567.0	22.8%
Special Crop Shipments (000 tonnes) – All Grains	2B-2	2,102.9	4,566.4	4,732.5	2,540.2	1,170.1	1,518.8	576.5	5,805.7	22.7%
Special Crop Shipments (000 tonnes) – Hopper Cars	2B-2	1,844.1	4,306.2	4,480.6	2,447.0	1,095.0	1,437.4	511.7	5,491.0	22.6%
Special Crop Shipments (000 tonnes) – Non-Hopper Cars	2B-2	258.7	260.2	251.9	93.3	75.2	81.5	64.8	314.7	24.9%
Hopper Car Shipments (000 tonnes) – Origin Province	2B-3									
Hopper Car Shipments (000 tonnes) – Primary Commodities	2B-4	25,664.6	37,332.4	36,680.6	10,356.3	9,408.2	9,521.5	8,798.3	38,084.3	3.8%
Hopper Car Shipments (000 tonnes) – Detailed Breakdown	2B-5									
Hopper Car Shipments (000 tonnes) – Grain-Dependent Network	2B-6	8,685.9	11,071.2	10,807.3	3,013.0	2,502.9	2,585.3	2,284.7	10,385.9	-3.9%
Hopper Car Shipments (000 tonnes) – Non-Grain-Dependent Network	2B-6	16,978.7	26,261.3	25,873.3	7,343.3	6,905.3	6,936.2	6,513.6	27,698.3	7.1%
Hopper Car Shipments (000 tonnes) – Class 1 Carriers	2B-7	23,573.5	35,994.2	35,789.2	10,093.1	9,223.9	9,380.1	8,668.2	37,365.3	4.4%
Hopper Car Shipments (000 tonnes) – Non-Class-1 Carriers	2B-7	2,091.0	1,338.3	891.4	263.1	184.3	141.4	130.1	718.9	-19.3%
Traffic to Eastern Canada										
Railway Shipments (000 tonnes) – All Grains	2B-8	n/a	3,016.0	2,796.8	663.2	1,115.9	966.2	549.0	3,294.3	17.8%
Railway Shipments (000 tonnes) – Hopper Cars	2B-8	n/a	2,198.3	1,980.9	423.3	844.2	797.4	390.1	2,455.1	23.9%
Railway Shipments (000 tonnes) – Non-Hopper Cars	2B-8	n/a	817.8	815.9	239.9	271.6	168.8	158.9	839.2	2.9%
Special Crop Shipments (000 tonnes) – All Grains	2B-9	n/a	600.6	546.7	189.0	209.1	105.1	79.7	582.9	6.6%
Western Canadian Originated Traffic										
Railway Shipments (000 tonnes) – All Grains	2B-15	n/a	49,660.7	48,317.7	13,302.6	12,930.1	12,895.7	11,604.8	50,733.3	5.0%
Railway Shipments (000 tonnes) - Canada	2B-15	n/a	41,968.2	41,293.9	11,539.1	11,106.0	11,063.0	9,853.1	43,561.1	5.5%
Railway Shipments (000 tonnes) – United States	2B-15	n/a	7,502.6	6,759.3	1,699.8	1,752.9	1,749.4	1,679.6	6,881.6	1.8%
Railway Shipments (000 tonnes) – Mexico	2B-15	n/a	189.9	264.5	63.8	71.2	83.4	72.2	290.6	9.9%
Terminal Elevator Throughput										
Grain Throughput (000 tonnes) – All Commodities	2C-1	23,555.5	35,761.8	35,587.6	8,995.3	10,093.8	8,591.4	9,155.2	36,835.7	3.5%
Hopper Cars Unloaded (number) – All Carriers	2C-2	278,255	384,782	380,306	100,643	102,384	100,670	95,843	399,540	5.1%
Hopper Cars Unloaded (number) – CN	2C-2	144,800	197,011	188,753	49,768	53,834	51,142	46,569	201,313	6.7%
Hopper Cars Unloaded (number) – CP	2C-2	133,455	187,771	191,553	50,875	48,550	49,528	49,274	198,227	3.5%
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	3,247.6	2,287.1	570.4	492.9	602.0	604.5	2,269.7	-0.8%
Truck Shipments to US (000 tonnes) – Destination Region / Commodity	2D-3									

DISCUSSION AND ANALYSIS

COUNTRY ELEVATOR THROUGHPUT
[See TABLE 2A-1]

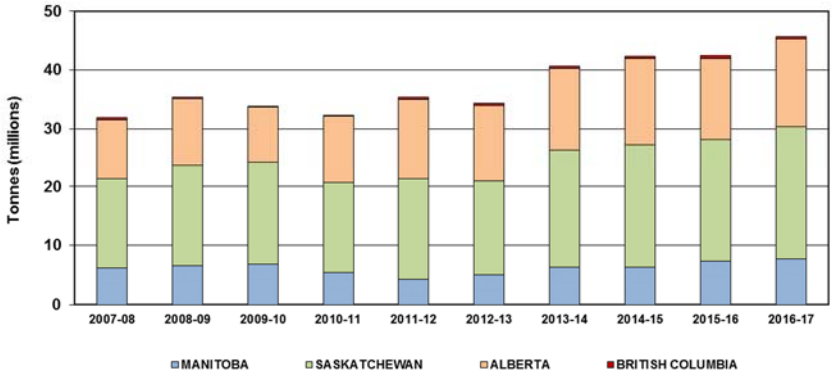
Country elevator throughput, as gauged by all road and rail shipments from the primary elevators situated across Western Canada, rose by 7.7% in the 2016-17 crop year, reaching a GMP record of 45.6 million tonnes. This marked a continuation of the heightened activity first exhibited by the GHTS three years earlier, and which again culminated in the acceptance of more grain into the system than at any prior point in the history of the GMP.

Despite the growth in overall tonnage, the proportion accorded to shipments from each province has remained largely unchanged. Since the beginning of the GMP, Manitoba has averaged a 17.7% share; Saskatchewan, 49.4%; Alberta, 32.0%; and British Columbia, 0.9%. The values recorded for the 2016-17 crop year proved little different.

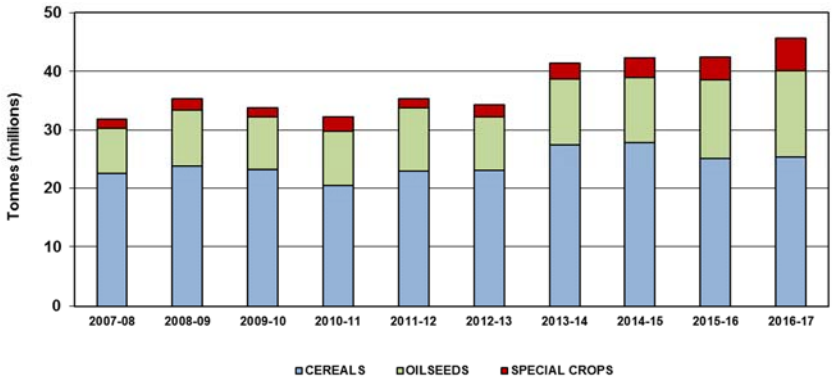
Cereals accounted for most of the grain shipped through the primary elevator network, but their share slipped to 55.8% from 59.5% a year earlier. This relative decline reflects the changing face of prairie grain production, with progressively larger harvests of oilseeds and special crops. In fact, cereal shipments grew by a marginal 0.9% in the 2016-17 crop year, rising to 25.5 million tonnes from 25.2 million tonnes. However, this tonnage gain was overshadowed by a 17.7% increase for oilseeds and special crops shipments, which climbed to an aggregated 20.2 million tonnes from 17.2 million tonnes the previous year.

Notwithstanding this compositional change, primary-elevator throughput provides the first physical signal to industry stakeholders of the attendant workload to be borne by the GHTS's railways and terminal elevators. With a year-over-year increase of 8.7% in August 2016, the first deliveries suggested a sizable grain movement to follow.

Primary Elevator Throughput - Originating Province



Primary Elevator Throughput - Principal Commodities



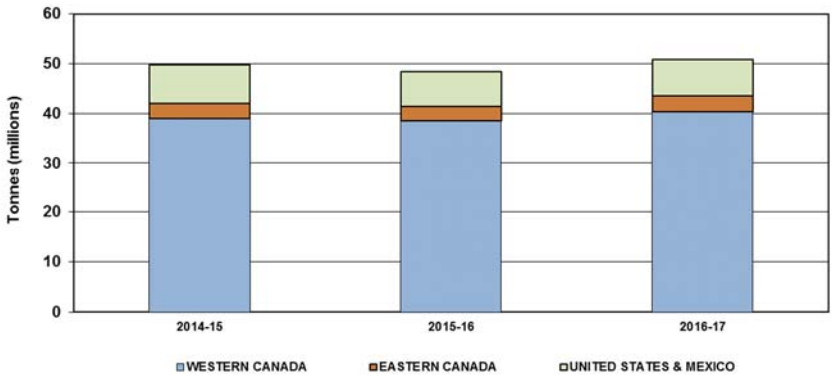
RAILWAY TRAFFIC
[See TABLES 2B-1 through 2B-20]

Although primary elevators are the principal gateway used in moving grain through the GHTS, grain also enters the system by way of process elevators and producer-car loading sites. The Canadian Grain Commission indicates that total producer deliveries to all of these facitities reached a record 57.9 million tonnes in the 2016-17 crop year. This was 10.0% greater than the 52.7 million tonnes delivered a year earlier. Ultimately, all of this grain gets moved by rail and road.[2]

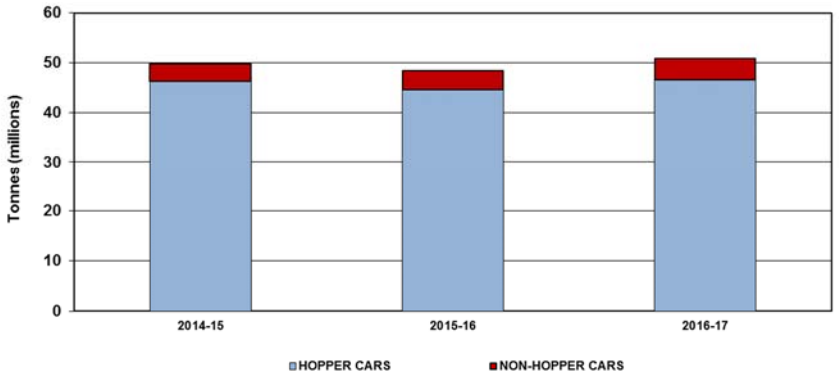
Railway grain shipments from Western Canada totaled 50.8 million tonnes in the 2016-17 crop year, up 5.0% from the previous crop year's 48.3 million tonnes. Almost 43.6 million tonnes of this traffic, or 85.9%, was directed to destinations within Canada itself, be it for export or domestic use. Traffic to Western Canada – represented heavily by the ports of Vancouver, Prince Rupert and Thunder Bay - constituted the larger of two regional segments; 40.3 million tonnes. This proved twelve times larger than the 3.3 million tonnes directed to Eastern Canada. The remaining 7.2 million tonnes, or 14.1%, were destined to the United States and Mexico.

Just over 46.5 million tonnes of the traffic originated in Western Canada, or 91.7%, moved to its destination in covered hopper cars. The remaining 4.2 million tonnes moved in some other form of railway equipment, including boxcars and containers for bulk and bagged grain products, and tankcars for liquids such as canola oil. It is worth noting that while these

Railway Grain Shipments - Principal Destinations



Railway Grain Shipments - Hopper and Non-Hopper Cars



2 This measurement underscores a growing dichotomy regarding the data collected under the GMP for railway movements, and the fact that not all grain is captured in the Monitor's railway traffic statistics. This applies to any grain outside of those specified under Schedule II of the *Canada Transportation Act*. Much of the deficiency relates to soybeans, where production now reaches 2 million tonnes annually. The reader is advised that the understatement of the railway traffic presented here can result in inaccurate comparisons with other workload measures under the GMP.

latter movements represented only 8.3% of total railway shipments in the 2016-17 crop year, its share has been climbing steadily from the 6.9% benchmarked just two years earlier. Much of this gain is traceable to an increase in canola oil shipments.

Traffic to Western Canada

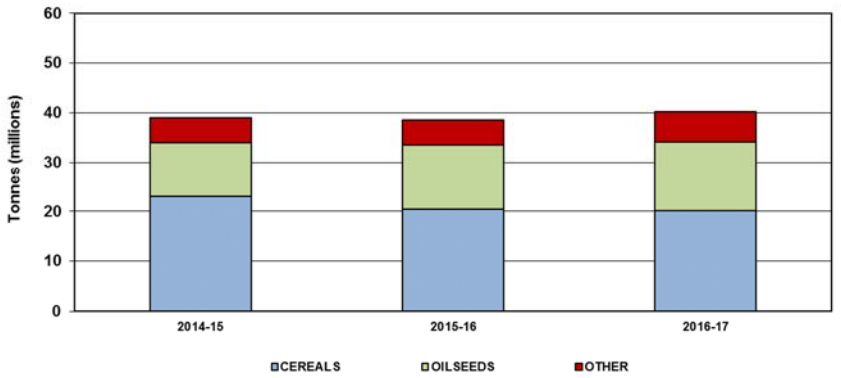
[See Tables 2B-1 through 2B-7]

Much of the 40.3 million tonnes of grain moved by rail to points in Western Canada during the 2016-17 crop year were directed to one of its four ports: Vancouver; Prince Rupert; Thunder Bay; and Churchill. These shipments amounted to just under 39.7 million tonnes, an increase of 4.5% over the 38.0 million tonnes handled a year earlier. Another 615,600 tonnes were directed to points outside of the ports themselves; denoted as Western Domestic. These shipments swelled substantially in the preceding twelve months, up 14.0% from 540,200 tonnes the previous year.

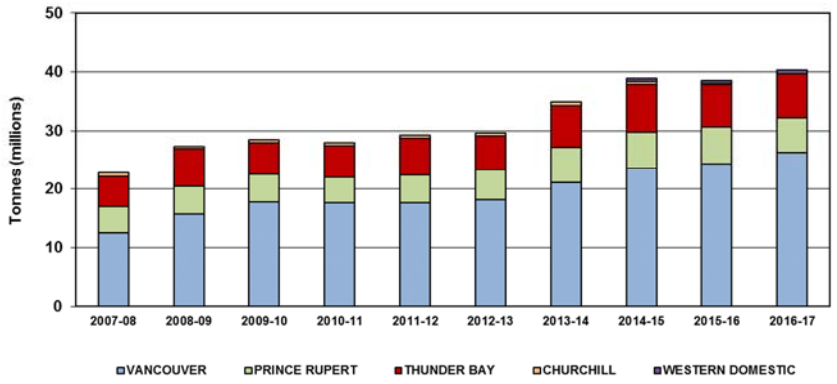
As the largest element in the movement of grain to points in Western Canada, cereals represented about half of all railway traffic, totalling just under 20.1 million tonnes in the 2016-17 crop year. This was followed by oilseeds at 14.1 million tonnes, and other commodities at 6.1 million tonnes. All traffic segments, except for that of cereals which saw tonnage decline by 1.9%, posted an increase over the previous year: 8.3% for oilseeds; and 21.3% for other commodities. Special-crop shipments, which encompass much of the latter segment, soared by 22.6% to 5.8 million tonnes, and accounted for 14.4% of the overall movement. This share has also been rising in the face of a heightened overseas demand for Canadian pulses, gaining 2.7 percentage points over the 11.7% share secured two years earlier.

Of the four ports in Western Canada, Vancouver continues to be the preferred destination for railway grain shipments. This is not only due to the ready access it provides to Asia-Pacific markets, but because of its favourable economics and year-round operations. During the 2016-17 crop year, Vancouver received 26.3 million tonnes of inbound grain, an increase of 8.2% over the previous year's 24.3-million-tonne handle. This denoted 65.3% of all port-bound railway shipments in Western Canada. Prince

Railway Grain Shipments - Main Commodities
(Western Canada)



Railway Grain Shipments - Main Destinations
(Western Canada)



Rupert, which represents an additional west-coast outlet for this traffic, received 5.9 million tonnes of inbound grain, down 7.0% from the 6.3 million tonnes handled a year earlier. This resulted in the port's share slipping to 14.6% from 16.4%. Still, on a combined basis, these two ports handled 79.9% of the grain directed into Western Canada; a marginal gain over the 76.3% share seen just a year earlier.

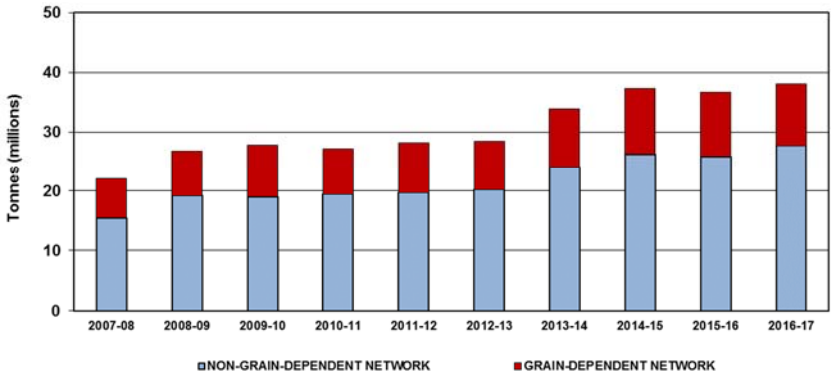
This relative gain in the west-coast's handle came at a loss for the region's other two ports, Thunder Bay and Churchill, which saw their share of the total tonnage decline to 18.6% from 19.0%. Even so, rail deliveries into Thunder Bay were buoyed by the increase in the grain supply and rose by 4.1%, to just under 7.5 million tonnes from 7.2 million tonnes a year earlier. Owing to the closure of the port, there were no rail shipments to Churchill in the 2016-17 crop year. Railway grain shipments to non-port destinations – designated as Western Domestic – accounted for just 1.5% of all traffic. This proved marginally greater than the 1.4% share garnered a year earlier, buoyed in large measure by a 14.0% increase in tonnage, which rose to 615,600 tonnes from 540,200 tonnes.

Covered Hopper Car Shipments

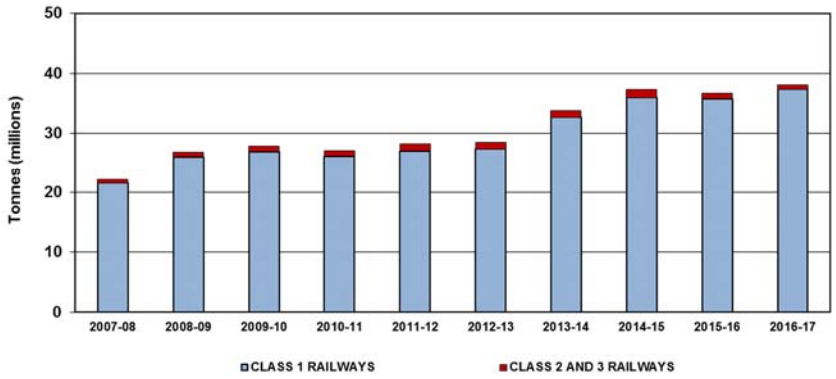
Covered hopper cars remain the primary means by which grain is conveyed to destinations within Western Canada. Of the 40.3 million tonnes shipped during the 2016-17 crop year, 38.6 million tonnes – or 95.9% – moved in covered hopper cars; just 1.6 million tonnes of grain and grain-related products moved in other forms of railway equipment, including boxcars, tankcars and containers.

For the most part, covered-hopper-car shipments continue to originate on the non-grain-dependent networks of the major Class 1 railways. Of the 38.1 million tonnes directed to the four ports, only 10.4 million tonnes, or 27.3%, was sourced from points on grain-dependent branchlines. This share ranks well ahead of the even heavier concentration exhibited among originating railways, where just 718,900 tonnes, or 1.9%, originated with the smaller Class 2 and 3 carriers (commonly referred to as shortlines). It is worth noting that both shares have continued to lose ground over the

Hopper-Car Shipments - Branchline Originations
(Western Canada)



Hopper-Car Shipments - Carrier Originations
(Western Canada)



last decade. These declines largely reflect the combined impacts of elevator and railway rationalization.

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

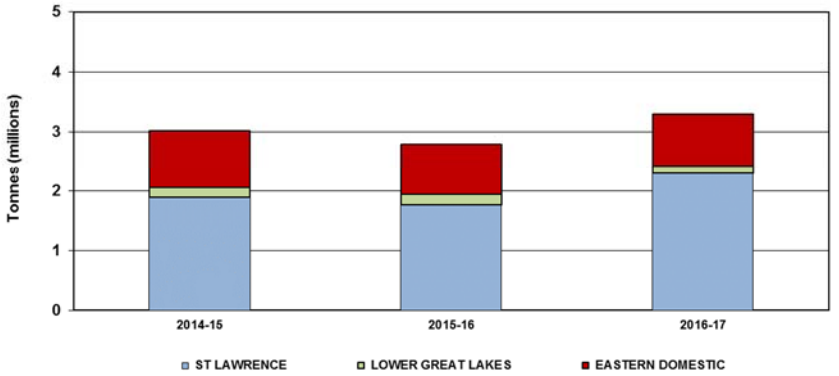
The movement of grain into Eastern Canada represents a fraction of that directed into Western Canada. During the 2016-17 crop year, these railway shipments amounted to a little under 3.3 million tonnes. However, they were up 17.8% from the 2.8 million tonnes shipped a year earlier. Comparatively, this amounted to less than 10% of the tonnage directed into Western Canada. Close to three-quarters of this traffic, 2.4 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 869,300 tonnes were directed to inland points, designated as Eastern Domestic.

As observed with respect to the traffic routed to destinations in Western Canada, much of this, almost 2.5 million tonnes, moved in covered hopper cars. The remaining 839,200 tonnes moved in other types of railway equipment. These latter movements represented a more substantive 25.5% of the regional total than the 4.1% they constituted in Western Canada.

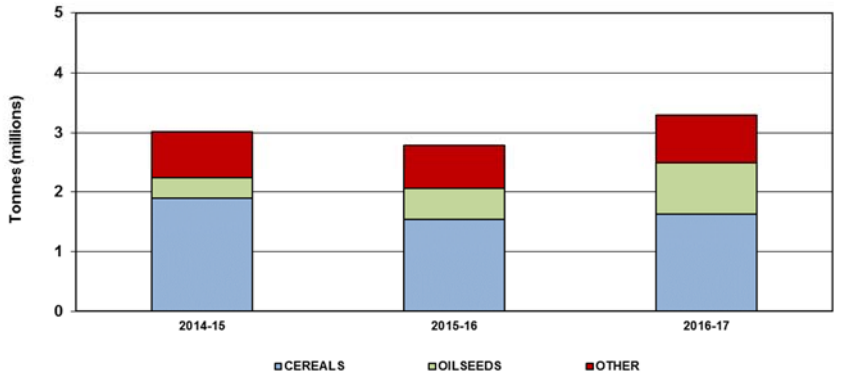
Equally reflective was the fact that a majority of the grain shipped was comprised of cereals, which rose by 6.1%, to 1.6 million tonnes from 1.5 million tonnes a year earlier. Oilseeds accounted for another 866,800 tonnes, up 65.5% from 523,600 tonnes, along with 798,200 tonnes in other commodities, up 8.2% from 738,100 tonnes.

Special-crop shipments, which comprised the bulk of the latter category, totalled 582,900 tonnes, up 6.6% from the 546,700 tonnes directed there the year previous. Like those directed to Western Canadian destinations, these shipments denoted a comparatively modest share of the overall volume, 17.7% against 14.4% respectively. Only 119,000 tonnes of this moved in covered hopper cars. Most special crops, representing 79.6% of the total volume, moved as non-hopper-car shipments (in either boxcars, tankcars or containers).

Railway Grain Shipments - Main Destinations
(Eastern Canada)



Railway Grain Shipments - Main Commodities
(Eastern Canada)



Covered Hopper Car Shipments

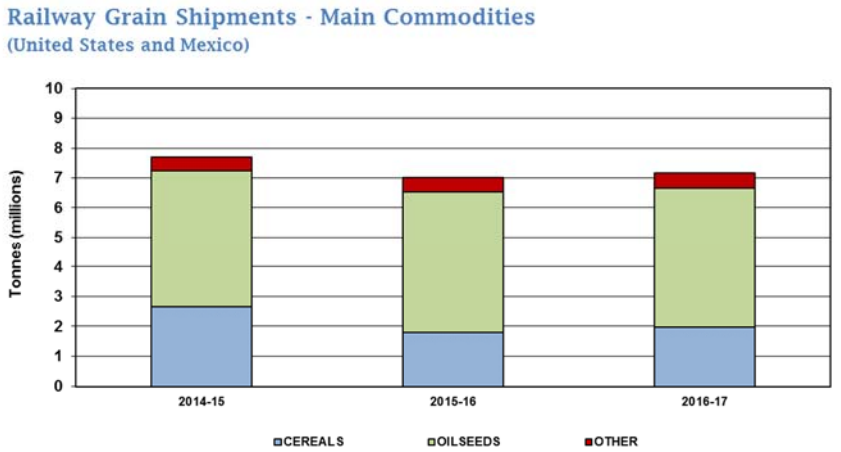
Most of the grain moving to Eastern Canada in covered hopper cars was sourced from points on the non-grain-dependent railway network in Western Canada. During the 2016-17 crop year this amounted to 1.8 million tonnes, up 30.3% from that originated a year earlier. Traffic originating at points on the grain-dependent network grew by a much lesser 8.5%, to 630,400 tonnes from 580,800 tonnes. With 74.3% accorded to the former, this division is not materially different from what was observed for traffic destined to points in Western Canada.

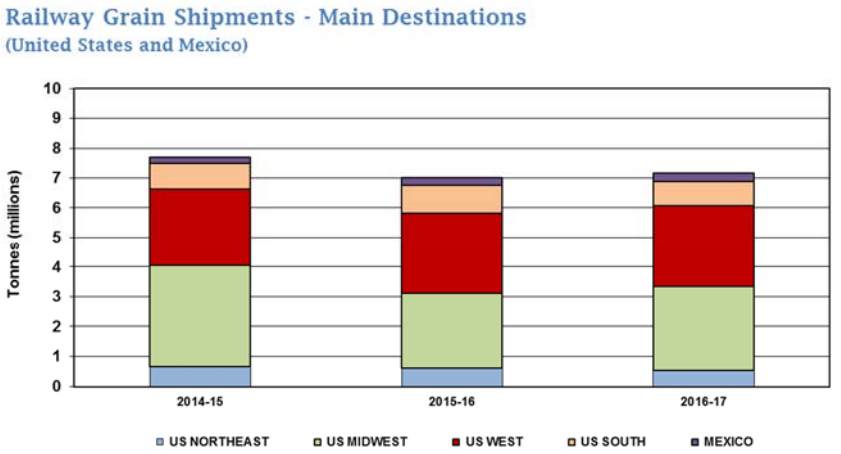
Similarly, almost 2.4 million tonnes, or 95.8% of the grain shipped to Eastern Canada in covered hopper cars, originated on the lines of the major Class-1 railways. The tonnage originated by the non-Class-1 carriers, which amounted to 102,100 tonnes, accounted for just 4.2%. These proportions are also consistent with the shares observed for traffic destined to points within Western Canada.

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 2016-17 crop year totaled almost 7.2 million tonnes. This marked a 2.1% increase over the 7.0 million tonnes directed into these markets a year earlier. Slightly less than 6.9 million tonnes of this was destined to the United States, up 1.8% from the 6.8 million tonnes handled the previous year. Although just 290,600 tonnes were earmarked for Mexico, shipments to that country rose more sharply, by 9.9%.

Some 5.2 million tonnes of US-bound traffic moved in covered hopper cars in the 2016-17 crop year. Although this represented a marginal gain of 0.5%, the tonnage was effectively unchanged from that handled a year earlier. Another 1.7 million tonnes moved in other types of railway equipment, which proved 6.3% greater than the 1.6 million tonnes shipped the previous year.





About two-thirds of US-bound shipments, amounting to just over 4.5 million tonnes, were tied to the movement of canola and canola-related products, be it in the form of seed, meal or oil. Approximately half of this volume, 2.3 million tonnes, was directed to states in the US West, chiefly California. This was followed by states in the US Midwest, which received another 1.2 million tonnes in canola-related shipments. Cereals and other commodities accounted for a significantly lesser 34.4% of the total tonnage.

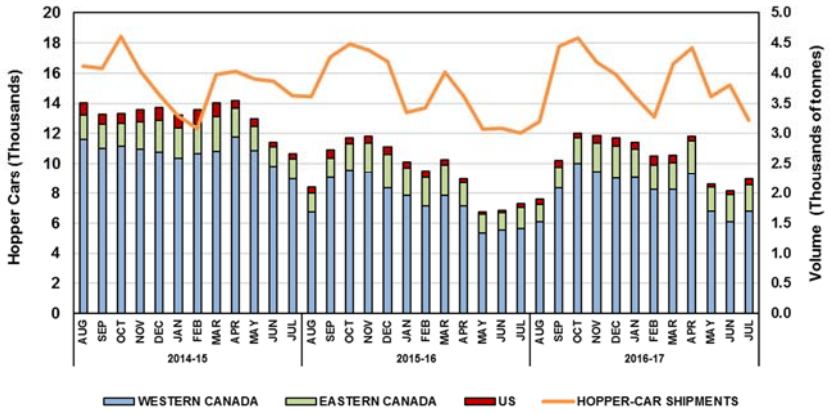
On a broader basis, the US Midwest proved to be the largest market for Western Canadian grain, drawing in 2.8 million tonnes. This was closely followed by destinations in the US West, with 2.7 million tonnes; the US South, with 797,700 tonnes; and the US northeast, with 521,000 tonnes. Special crops figured marginally within this framework, with a total of only 52,900 tonnes being shipped to US destinations.

Conversely, the amount of grain imported into Canada by rail from the United States during the 2016-17 crop year totaled only 192,900 tonnes. However, this marked a 21.5% increase over the 158,700 tonnes shipped a year earlier. The largest portion, amounting to 191,700 tonnes, was destined to points in Western Canada, with Eastern Canadian destinations drawing in just 1,200 tonnes. The bulk of this traffic, amounting to 114,400 tonnes, was comprised of non-mainstream commodities, chiefly feeds and allied products. Much of this traffic, 91,800 tonnes, moved as non-hopper-car shipments.

Loads on Wheels
[*See Table 2B-20*]

The pace at which grain traffic moves through the GHTS can best be gauged by examining the number of loaded hopper cars in transit at a specified moment in time; normally the Friday of any given week.[3] These are then assembled into an average weekly value for each month in the crop year.

Loads on Wheels



The 2016-17 crop year began with an in-transit average of 7,589 cars for the month of August 2016. This increased gradually through the first quarter, ultimately peaking with an average of 12,039 cars in October 2016. The average then began to decline progressively through to spring, ultimately falling to a low of 8,130 cars in June 2017, near the end of the crop year. Collectively, this resulted in a weekly average of 10,256 loaded cars for the 2016-17 crop year, 7.8% greater than the 9,510 recorded a year earlier. The broader characteristics proved consistent with other traffic measures: the heaviest movement period extends from the late fall through the early spring, with 79.1% of the equipment directed to destinations in Western Canada, 17.0% to markets in Eastern Canada, and 3.9% to those in the United States.

3 The measure cited here relates only to railway-supplied equipment. It specifically excludes the private equipment also employed by shippers in moving grain, mostly to destinations in the United States.

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

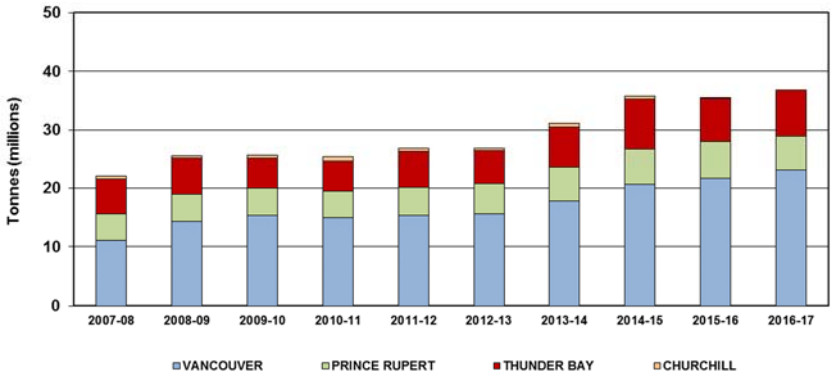
Ultimately, a large portion of the traffic handled by the railway system was directed to the various terminal elevators and bulk loading facilities located at the four ports in Western Canada. Port throughput, as gauged by the amount of grain shipped through these facilities, increased by 3.4% in the 2016-17 crop year, rising to a GMP record of 36.8 million tonnes, from 35.6 million tonnes a year earlier.

The most significant grain volumes continued to funnel its way through the west-coast ports of Vancouver and Prince Rupert, which account for about three-quarters of the total handle. For Vancouver, total marine shipments increased by 6.1%, to a GMP record of 23.0 million tonnes from 21.7 million tonnes a year earlier. Prince Rupert posted a decline, with shipments falling by 6.4%, to 5.9 million tonnes from 6.3 million tonnes. Combined, the tonnage passing through these two west-coast ports represented 78.6% of the overall total; down marginally from the 78.7 share seen a year earlier. This decline can be traced to a stronger showing by Thunder Bay, which reported a 6.8% increase, and saw throughput rise to 7.9 million tonnes from the previous crop year's 7.4 million tonnes.

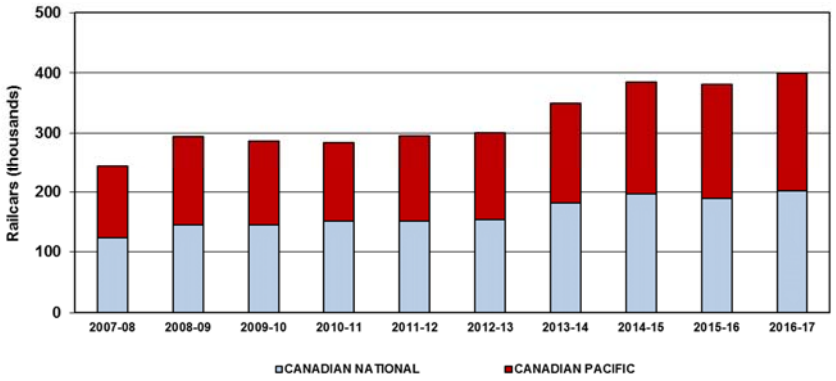
Terminal Elevator Unloads

Carrier activity is reflected in the number of covered hopper cars unloaded at Western Canadian terminals. The total number of railcars unloaded during the 2016-17 crop year increased by 5.1%, rising to 399,540 cars from 380,306 cars a year earlier. The division between handling carriers was again almost evenly divided, with the Canadian National Railway (CN) reporting 201,313 hopper cars unloaded, a gain of 6.7% over the 188,753 cars unloaded a year earlier. In comparison, the Canadian Pacific Railway's (CP) handlings increased by a lesser 3.5, to 198,227 cars from 191,553 cars. This made CN the largest grain-handling railway in Western Canada, with a share of 50.4% against 49.6% for CP.

Terminal Elevator Throughput - Port
(Western Canada)



Terminal Elevator Unloads - Carrier
(Western Canada)

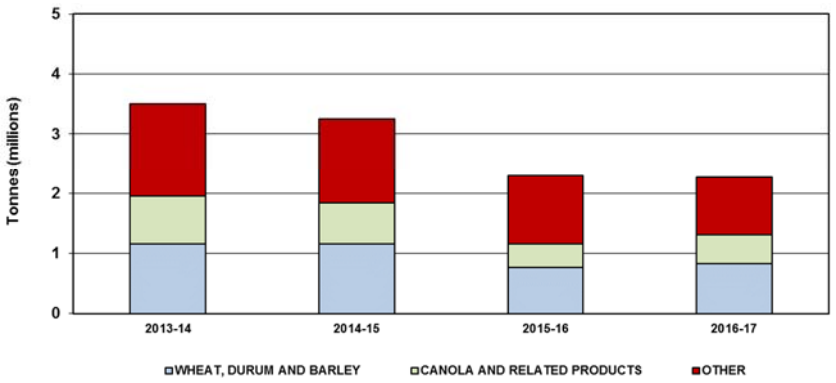


TRUCK TRAFFIC TO THE UNITED STATES
[See TABLES 2D-1 through 2D-3]

Shipments of Western Canadian grain into the United States by truck totaled almost 2.3 million tonnes in the 2016-17 crop year. This proved only 0.8% lower than what had been shipped a year earlier, and effectively unchanged. Even so, there were some sharp year-over-year contrasts. A substantive 21.5% increase in volume was noted on shipments of canola and canola-related products. This was followed by an 8.1% increase in wheat, durum and barley shipments. However, the gains from these increases were more than offset by a 14.5% decline in the movement of other commodities, especially peas and soybeans, which decreased due to weak price inducements for cross-border deliveries.

As with railway shipments, the preponderance of the grain trucked into the United States, amounting to almost 1.5 million tonnes, was directed into the US Midwest. This was followed by destinations in the US West, with 539,700 tonnes; the US Northeast, with 193,400 tonnes; and the US South, with 76,400 tonnes.

Truck Shipments - United States Destinations



Section 3: Infrastructure

Indicator Description	Table	1999-00	2014-15	2015-16	2016-17 Q1	Q2	Q3	Q4	YTD	% VAR
Country Elevator Infrastructure										
Delivery Points (number)	3A-1	626	262	271	269	276	277	277	277	2.2%
Elevator Capacity (000 tonnes)	3A-1	7,443.9	7,334.8	7,844.6	7,952.1	7,987.4	8,163.2	8,163.2	8,163.2	4.1%
Elevators (number) – Province	3A-1									
Elevators (number) – Railway Class	3A-2	917	370	383	382	389	391	391	391	2.1%
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	235	249	249	255	254	254	254	2.0%
Elevators Capable of MCB Loading (number) – Railway Line Class	3A-6									
Elevator Closures (number)	3A-7	130	7	27	3	1	11	0	15	-44.4%
Elevator Openings (number)	3A-8	43	6	40	2	8	13	0	23	-42.5%
Delivery Points (number) – Accounting for 80% of Deliveries	3A-9	217	95	97	n/a	n/a	n/a	n/a	99	2.1%
Railway Infrastructure										
Railway Infrastructure (route-miles) – Total Network	3B-1	19,390.1	17,424.1	17,288.1	17,276.1	17,276.1	17,276.1	17,276.1	17,276.1	-0.1%
Railway Infrastructure (route-miles) – Class-1 Network	3B-1	14,503.0	14,835.4	14,664.2	14,606.5	14,606.5	14,606.5	14,606.5	14,606.5	-0.4%
Railway Infrastructure (route-miles) – Non-Class-1 Network	3B-1	4,887.1	2,588.7	2,623.9	2,669.6	2,669.6	2,669.6	2,669.6	2,669.6	1.7%
Railway Infrastructure (route-miles) – Non-Grain-Dependent Network	3B-1	14,513.5	14,135.6	14,009.8	14,009.8	14,009.8	14,009.8	14,009.8	14,009.8	0.0%
Railway Infrastructure (route-miles) – Grain-Dependent Network	3B-1	4,876.6	3,288.5	3,278.3	3,266.3	3,266.3	3,266.3	3,266.3	3,266.3	-0.4%
Railway Fleet Size (railcars) – Average Weekly	3B-2	n/a	22,997	23,833	23,618	24,498	24,396	23,981	24,133	1.3%
Served Elevators (number)	3B-3	884	335	348	347	354	353	353	353	1.4%
Served Elevators (number) – Class 1 Carriers	3B-3	797	312	319	320	321	318	318	318	-0.3%
Served Elevators (number) – Non-Class-1 Carriers	3B-3	87	23	29	27	33	35	35	35	20.7%
Served Elevators (number) – Grain-Dependent Network	3B-3	371	104	110	108	115	116	116	116	5.5%
Served Elevators (number) – Non-Grain-Dependent Network	3B-3	513	231	238	239	239	237	237	237	-0.4%
Served Elevator Capacity (000 tonnes)	3B-3	7,323.0	7,147.5	7,673.4	7,774.4	7,809.7	7,961.3	7,961.3	7,961.3	3.8%
Served Elevator Capacity (000 tonnes) – Class 1 Carriers	3B-3	6,823.2	6,950.5	7,467.6	7,574.6	7,591.2	7,732.5	7,732.5	7,732.5	3.5%
Served Elevator Capacity (000 tonnes) – Non-Class-1 Carriers	3B-3	499.7	197.1	205.8	199.8	218.5	228.8	228.8	228.8	11.2%
Served Elevator Capacity (000 tonnes) – Grain-Dependent Network	3B-3	2,475.4	1,895.5	1,956.3	1,976.1	2,008.1	2,017.5	2,017.5	2,017.5	3.1%
Served Elevator Capacity (000 tonnes) – Non-Grain-Dependent Network	3B-3	4,847.6	5,252.0	5,717.1	5,798.3	5,801.6	5,943.8	5,943.8	5,943.8	4.0%
Terminal Elevator Infrastructure										
Terminal Elevators (number)	3C-1	15	17	15	15	16	16	16	16	6.7%
Terminal Elevator Storage Capacity (000 tonnes)	3C-1	2,678.6	2,423.2	2,393.2	2,475.0	2,485.0	2,485.0	2,485.0	2,485.0	3.8%

DISCUSSION AND ANALYSIS

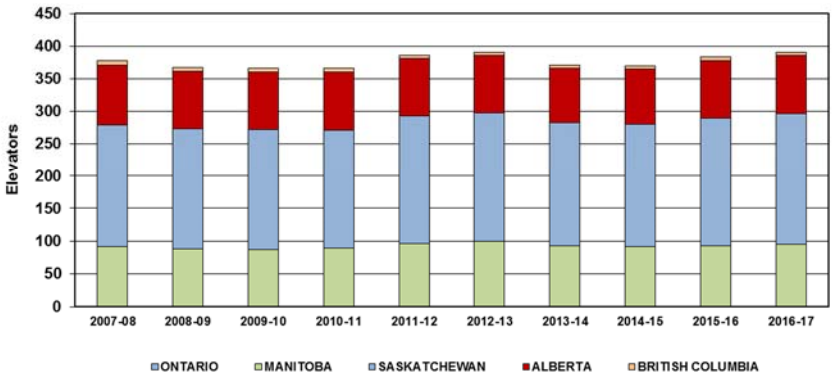
COUNTRY ELEVATOR INFRASTRUCTURE
[See TABLES 3A-1 through 3A-9]

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 2016-17 crop year, what remained encompassed a total of 391 facilities, representing a reduction of 61.1% from the base year. This decline marks one of the most visible facets of the changes that have taken place in the GHTS since the beginning of the GMP. However much of this rationalization was concentrated in the GMP's first seven years, with little change having occurred after the 2006-07 crop year.

The 2016-17 crop year brought a net increase of eight elevators to the network. Much of this increase related to the licensing of 23 facilities, many of which had previously been unlicensed. Most of these were operated by Alliance Pulse Processors Inc. (a subsidiary of AGT Foods and Ingredients Inc.), Canpulse Foods Ltd., ETG Commodities Inc., Providence Grain Group Inc., and Scoular Canada Ltd. However, they also included two newly commissioned, loop-track-equipped, high-throughput elevators: the 60,100-tonne Paterson Grain facility at Daysland, Alberta; and the 28,000-tonne Viterra facility at Ste. Agathe, Manitoba. These additions were partially offset by the closure of another 15 elevators – chiefly smaller Class A and B facilities – owned by a variety of grain companies.[4]

With the close of the 2016-17 crop year, 202 of Western Canada's licensed elevators were situated in Saskatchewan. These facilities constituted 51.7% of the system's total; a proportion not dissimilar from that held by the province at the beginning of the GMP. This was followed by Manitoba and Alberta, whose corresponding 94 and 89 elevators accounted for shares of

Country Elevators - Provincial Distribution



24.0% and 22.8% respectively. The GHTS's remaining six facilities were divided between British Columbia, with five, and Ontario, with one.

Perhaps the most striking aspect of this decline can be seen in the closure of the hundreds of iconic wood-crib elevators that were found in virtually every small prairie town. Although some would ultimately be repurposed by new owners, during the last 18 years a total of 570 licensed Class A elevators, and 128 Class B elevators, have closed their doors. These same closures were largely responsible for a 408-community constriction in the grain-delivery network itself, which was reduced to 277 locations from 685 locations as a result. Along with the uptick in elevators, the 2016-17 crop year also brought a modest six-location increase in delivery points.

4 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.

Similarly, the loss of these facilities has also been enlarged by the closure of 20 first-generation high-throughput Class C elevators. Only the largest high-throughput facilities, the licensed Class D elevators, have increased in number during this period, effectively expanding more than threefold, to 143 from 38 in the base year. By the close of the 2016-17 crop year, high-throughput facilities accounted for 52.2% of total system elevators and 82.1% of its storage capacity. Both shares stand significantly above their respective base-year values of 11.9% and 39.4%.

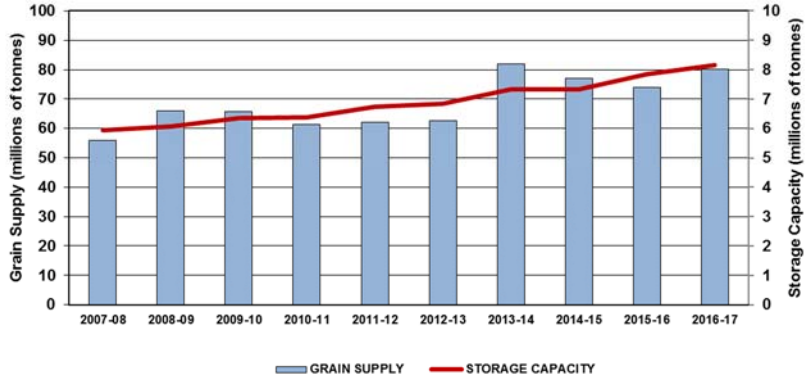
Of greater importance is the fact that an even more efficient generation of Class-D facilities has begun to emerge. Not only do these facilities have more storage capacity than their forerunners, they also feature loop tracks, with standing capacity for at least 115 railcars permitting faster loading and longer unit-train operations.

Owing to its smaller footprint, G3 has made the greatest strides in developing loop-track operations, adding four such country elevators to its original seven-facility network since its founding in 2015. However, most of the major grain handlers in Western Canada – among them Paterson Grain, Richardson International, and Viterra – have also embraced the concept, and are refitting several facilities with loop tracks of their own. Moreover, virtually all new elevator construction undertaken in the last two crop years – including those of such new entrants as Ceres Global Ag Corp., GrainsConnect Canada and Ilta Grain – have incorporated loop-track setups.

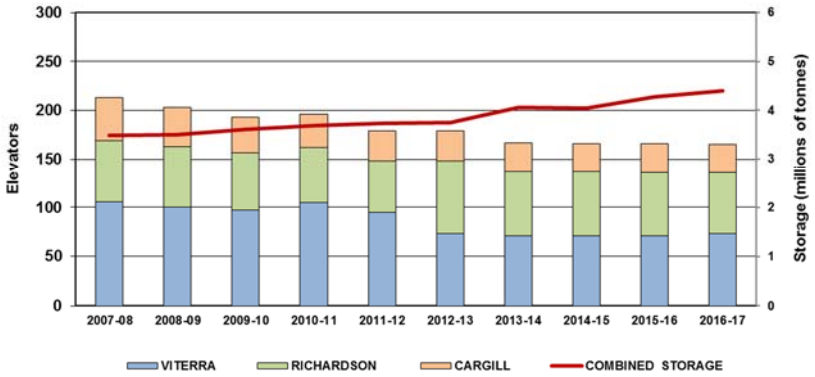
While the advent of these next-generation facilities strongly hints at potential future improvements in GHTS efficiency, it does not imply that the non-major grain handlers are being displaced as a result. In fact, the specialization of many has only served to fortify their positions in the marketplace, with firms like AGT Foods and Ingredients, Canpulse Foods, Delmar Commodities, Providence Grain Group and Scoular Canada all having expanded their presence in a highly competitive environment.

And although the overall number of elevators has remained largely unchanged over the last decade, the network's storage capacity has risen

Grain Supply and Country Elevator Storage Capacity

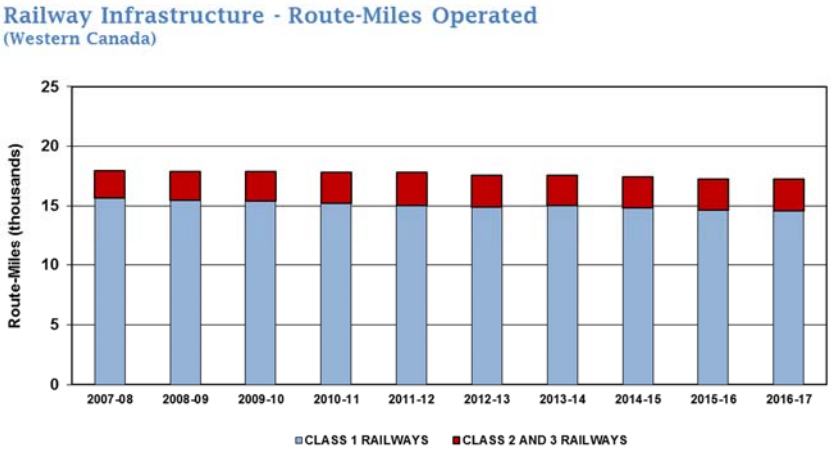


Largest Grain Companies - Elevators and Storage Capacity
(Western Canada)



steadily. By the close of the 2016-17 crop year it stood at just under 8.2 million tonnes, a new GMP record. Moreover, this embodies a 43.2% increase over the 5.7-million-tonne low reached under the GMP 14 years earlier. This expansion has effectively paralleled the rise in the grain supply, with roughly one tonne of storage being added for every ten-tonne increase in the grain supply.

The 391 facilities making up the country-elevator network are licensed by dozens of separate companies. However, there are three principal grain handlers in western Canada, accounting for approximately three-quarters of the annual export movement: Viterra Inc., Richardson International, and Cargill Limited. Together, they have driven much of the industry's modernization efforts, and collectively oversee the operation of 42.2% of its facilities while holding 54.0% of its associated storage capacity.



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

Compared to changes in the GHTS's country-elevator network, that of the railway infrastructure has largely been secondary. This is because, even with the liberalized line transfer and discontinuance process introduced under the *Canada Transportation Act* in 1996, the major railways could only respond with the-streamlining of their own networks once a sufficient number of elevators had been closed. Moreover, given the diversity of the traffic supported by the railways' infrastructure, its rationalization efforts could never match that of the grain companies. Over the last 18 years, this has resulted in the shedding of 2,192.1 route-miles, or 11.3%, of the 19,468.2 route-miles originally benchmarked. At the close of the 2016-17 crop year, this left a network of 17,276.1 route-miles.

To date, over three-quarters of this reduction came from the discontinuance of 1,688.4 route-miles of light-density, grain-dependent branch lines.[5] The 2016-17 crop year only saw the abandonment of another 12.0 route-miles of grain-dependent branch lines; all stemming from the discontinuance of the final section of CN's Athabasca subdivision. Even so, a more significant change in the composition of the railway network came from the transfer of various branch lines to smaller shortline railways. At the close of the 2016-17 crop year Class-1 carriers operated 84.5%, or 14,606.5 route-miles, while the smaller Class-2 and 3 carriers operated the remaining 15.4%, or 2,669.6 route-miles.[6] These proportions have changed little over the last decade.

5 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.

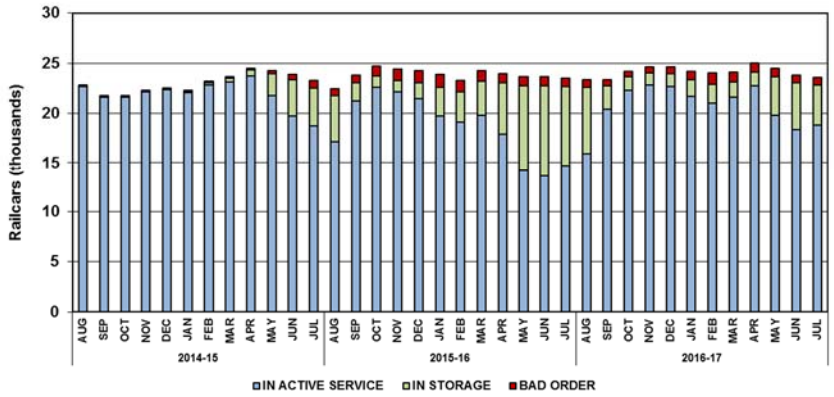
6 The classes used here to group railways are based on industry convention: Class 1 denotes major carriers such as the Canadian National Railway or the Canadian Pacific Railway; Class 2, regional railways such as the former BC Rail; and Class 3, shortline entities such as the Great Western Railway.

Covered Hopper Car Fleet

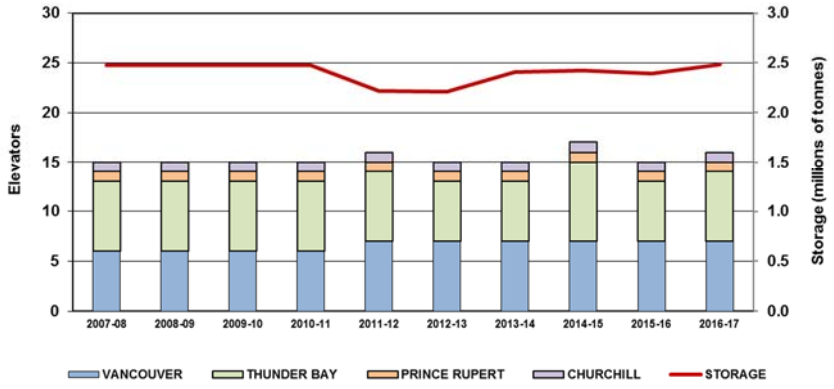
A significant portion of the GHTS's grain-handling capacity is tied to the number of covered hopper cars used by Canada's major railways in moving grain from the prairies. The size of the fleet arrayed to accomplish this task varies with prevailing market conditions, expanding and contracting as necessary. During the 2016-17 crop year, an average of 24,133 hopper cars were deployed to move grain, an increase of 1.2% over the 23,833-car average observed a year earlier. Of these, approximately 9,300 are publicly supplied, with roughly 8,400 cars provided by the Canadian government and another 900 cars furnished by the Alberta government. It should be noted that the publicly-supplied fleet was reduced in the wake of the Saskatchewan government's decision to sell the remainder of its fleet to provincially based shortlines (see discussion in Commercial Developments for additional details). The preponderance of the fleet, comprised of about 14,800 cars, is furnished using equipment either owned or leased by the railways and grain companies. This latter pool of railcars will continue to increase in number, ultimately replacing the government hoppers as they reach the end of their useful lives and are withdrawn from service.

At any given moment in time, the equipment used for this purpose can be 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 its zenith sometime in the fall. This pattern was again evident in the 2016-17 crop year, with the proportion in active service rising to 92.5% in November 2016. Thereafter, the utilization rate began to slowly decline as more cars were placed in storage through the spring months, ultimately falling to a low of 77.1% in June 2017.

Covered Hopper Cars - Number and Status



Terminal Elevators - Location and Storage Capacity
(Western Canada)



TERMINAL ELEVATOR INFRASTRUCTURE
[See TABLE 3C-1]

Terminal elevators represent the most enduring physical assets in the GHTS today. Numerically concentrated at the ports of Thunder Bay and Vancouver but complemented by stand-alone terminals in Churchill and

Prince Rupert, these facilities have remained largely unchanged since the beginning of the GMP. Much of this stems from the long-term nature of the structures themselves, the oldest of which has been in continuous operation since the 1920s.

The 2016-17 crop year saw a one-facility increase in the terminal elevator network, which rose to 16 from the 15 in service at the close of the previous crop year. This was attributable to the relicensing of the 10,000-tonne MobilEx Terminal at Thunder Bay. Although this also figured in lifting the network's associated storage capacity, to 2.5 million tonnes from 2.4 million tonnes, the increase was chiefly driven by an 81,720-tonne expansion of the Richardson International terminal in Vancouver.

This latter expansion, which involved the construction of an entirely new annex that nearly doubled the facility's size, marked the first substantive addition to the terminal system's storage capacity in over three decades. While aimed at enhancing Richardson International's own competitive position, the expansion also reflected the growing needs of a system called upon to handle ever larger offshore grain sales. Envisioned almost five years earlier, it denotes but one facet in a broader series of initiatives aimed at enhancing terminal throughput and efficiency. Among these were the addition and reconfiguration of track for better railcar handling at the Richardson International terminal in 2013, and the Cargill terminal in 2015. Other investments include the upgrading of the ship-loading galleries located at Pacific Elevators, completed in 2017, as well as the Alliance Grain Terminal, which is expected to see construction finished in 2018.

There are also additional projects currently underway that will result in the opening of several new facilities along the west coast over the next few years. The most noteworthy of these involves G3's construction of a state-of-the-art terminal in Vancouver. Begun in March 2017, this new 180,000-tonne facility is not expected to become operational until 2020. Similarly, Parrish and Heimbecker has also proposed a modernization of its terminal at the Fraser Surrey Docks, which will boost existing storage capacity by another 82,000 tonnes.

In addition, improvements to three other grain-handling facilities were also being advanced. The first of these, also in Vancouver, has Fibreco Export Inc. seeking approval to make major enhancements to its present terminal, which includes the addition of 171,200 tonnes of storage capacity, with 43,000 tonnes devoted to grain-handling activities. The second involves the building of a new transloading facility in Prince Rupert by Ray-Mont Logistics. This project, which saw construction begin in March 2017, was scheduled for completion in the first quarter of the 2017-18 crop year. Finally, Columbia Containers is also engaged in the modernization of its existing Vancouver transloading facility and is expected to be fully operational by summer 2018.

Section 4: Commercial Relations

Indicator Description	Table	1999-00	2014-15	2015-16	2016-17 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	135.3	133.1	133.5	134.7	134.7	134.7	134.7	1.1%
Composite Rate Index – Dockage	4B-1	100.0	166.6	165.0	152.3	153.8	153.8	153.8	153.8	-6.8%
Composite Rate Index – Storage	4B-1	100.0	186.3	204.6	204.1	208.2	208.2	208.2	208.2	1.8%
Railway Freight Rates										
Composite Freight Rate Index – CN Vancouver	4C-1	100.0	141.3	132.2	136.9	143.6	136.6	136.6	136.6	3.3%
Composite Freight Rate Index – CP Vancouver	4C-1	100.0	145.2	135.5	140.9	140.9	133.7	130.0	130.0	-4.1%
Composite Freight Rate Index – CN Thunder Bay	4C-1	100.0	151.6	150.2	157.5	165.3	157.3	157.3	157.3	4.7%
Composite Freight Rate Index – CP Thunder Bay	4C-1	100.0	151.1	145.3	151.0	151.0	143.0	134.4	134.4	-7.5%
Effective Freight Rates ($ per tonne) – CTA Revenue Cap	4C-3	n/a	$35.57	$33.84	n/a	n/a	n/a	n/a	$35.50	4.9%
Terminal Elevator Handling Charges										
Composite Rate Index – Receiving, Elevating and Loading Out	4D-1	100.0	153.4	156.8	156.9	157.3	157.3	157.3	157.3	0.4%
Composite Rate Index – Storage	4D-1	100.0	183.6	183.7	183.9	185.1	185.1	185.1	185.1	0.7%

DISCUSSION AND ANALYSIS

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

Grain companies charge a variety of fees for elevator handling activities, predominantly for 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 widely based on the activity, grain and province involved. Given the complexity of these tariff rates, the GMP necessarily uses a composite price index to track changes in them over time.

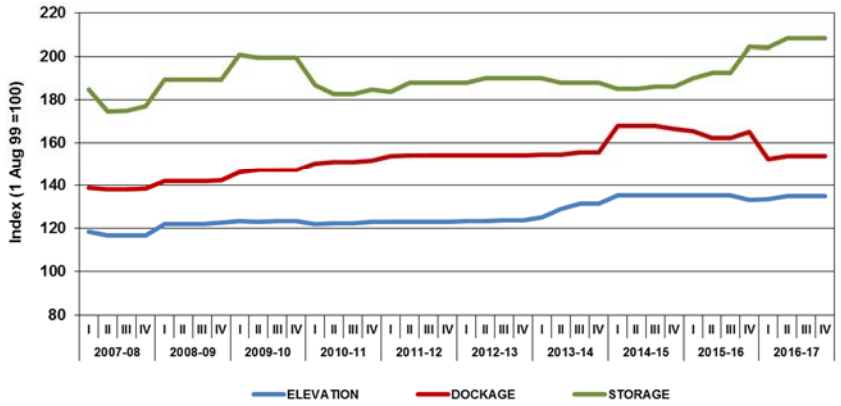
Throughout the last decade these rates have continued to rise, albeit by lower margins than in the initial years of the GMP. Comparatively modest changes were observed in the 2016-17 crop year: elevation rates increased by 1.2%, with the index rising to 134.7 from 133.1; storage charges increased by 1.8%, to 208.2 from 204.6; while dockage fees declined by 6.8%, to 153.8 from 165.0.

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

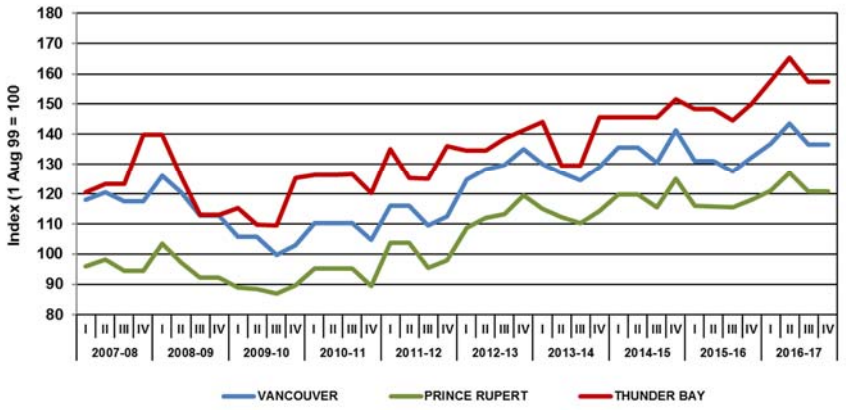
The single-car freight rates charged by CN and CP for the movement of regulated grain have changed substantially since the beginning of the GMP, evolving from what were largely mileage-based tariffs into a less rigidly structured set of more market-responsive rates. Likewise, these changes also employed differential pricing based on commodity, type of railcar, destination and period in which the traffic was to move.

CN cut its westbound rates into Vancouver and Prince Rupert at the beginning of the 2016-17 crop year by an average of 1.4% and 2.3% respectively. In comparison, the carrier's single-car rates into Thunder Bay and Churchill remained largely unchanged. These were followed in October 2016 with an across-the-board increase amounting to about 5%. CN initiated another 5% increase in December 2016, which remained in place until April 2017, when they were largely rolled back. By the close of

Primary Elevator Handling Charges



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



the 2016-17 crop year, CN's single-car rates had effectively increased by: 3.3% in the Vancouver corridor; 2.4% in the Prince Rupert corridor; 4.7% in the Thunder Bay corridor; and 4.9% in the Churchill corridor.

Unlike CN, CP initially extended the single-car rates it had in place at the close of the 2015-16 crop year through to the end of September 2016. The carrier then applied an across-the-board increase of about 4% in October 2016 . These rates remained in place until April 2017, when they were reduced by about 5.3%. This was followed in May 2017 with an additional cut of 2.8% on its westbound rates into Vancouver and 6.0% on its eastbound rates into Thunder Bay. By the close of the crop year, CP's single car rates in the Vancouver corridor had fallen by a factor of 4.1%, and by 7.5% in the Thunder Bay corridor.

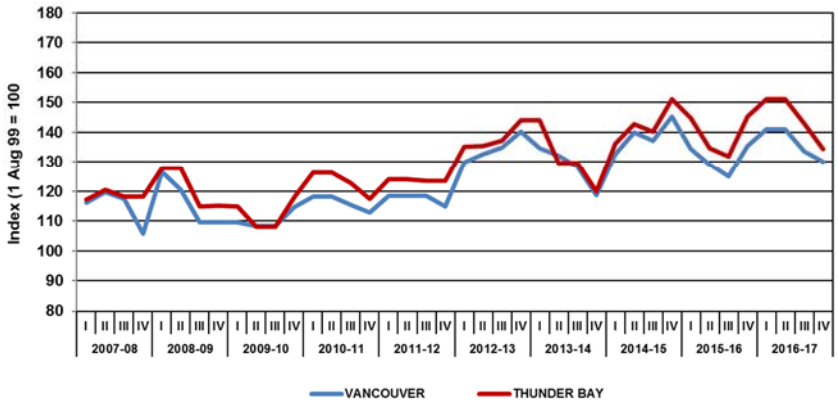
Multiple-Car-Block Discounts

There have been equally significant changes to the structure of the freight discounts used by both carriers in promoting the movement of grain in multiple car blocks. The most noteworthy aspect of this evolution was the gradual elimination of the discounts applicable on movements in blocks of less than 50 cars, along with a progressive escalation in those tied to blocks of 50 or more cars. These multiple-car block discounts remained unchanged throughout the 2016-17 crop year. CN continued to offer discounts on movements of 50-99 car blocks that equated to $4.00 per tonne, and to $8.00 per tonne on movements of 100 or more cars. The corresponding discounts for CP remained at $4.00 per tonne for shipments in blocks of 56-111 cars, and at $8.00 per tonne for shipments in blocks of 112 or more cars.

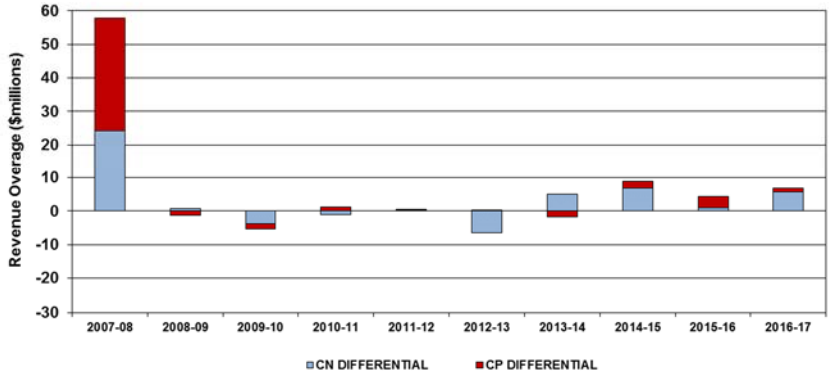
Maximum Revenue Entitlement

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 are adjusted annually to reflect changes in volume, average length of haul, and inflation. Outside of the inflationary component, these

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



Maximum Revenue Entitlement - Carrier Compliance



adjustments are determined by the Canadian Transportation Agency following a detailed analysis of the traffic data submitted to it by CN and CP at the end of any given crop year.[7]

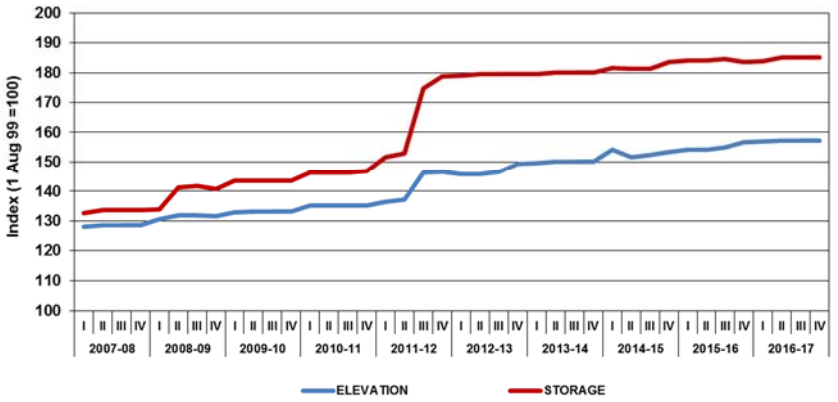
For the 2016-17 crop year, the MRE for CN and CP were set at $802.4 million and $724.4 million respectively, or $1,526.8 million on a combined basis.[8] This marked the sixth consecutive instance since the MRE's introduction that the carriers' combined revenue entitlement exceeded $1.0-billion.

The Agency determined that, for the 2016-17 crop year, the statutory revenues derived from the movement of regulated grain by CN and CP amounted to $808.2 million and $725.5 million respectively, or $1,533.7 million on a combined basis. These determinations resulted in both carriers exceeding their maximum entitlement: by $5.8 million in the case of CN; and by $1.1 million in the case of CP.[9] This meant that total carrier revenues reached $6.9 million, or 0.5%, above the prescribed maximum. Of note, total carrier revenues have not exceeded more than 1% of their stipulated MRE since the 2007-08 crop year.

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

The rates posted for the receiving, elevating and loading out of grain are typically the highest assessed by terminal elevator operators. As seen with earlier measures, an examination of price movement is best performed using a composite index, given the myriad of different tariff rates. The 2016-17 crop year saw negligible changes to these rates, which lifted the composite price index by 0.4%, to 157.3 from 156.8 in the prior year.
As with elevation, minor changes in the daily charge for storage led to a marginal 0.7% increase in the composite price index, which rose to 185.1 from 183.7 a year ago.

Terminal Elevator Handling Charges



COMMERCIAL DEVELOPMENTS

Government introduces Transportation Modernization Act

On 16 May 2017 the federal government introduced legislation in the House of Commons aimed at modernizing the *Canada Transportation Act* (CTA). Designated as Bill C-49, its introduction followed a lengthy statutory review of the CTA as well as consultations with stakeholders, and advanced several reforms in the area of freight rail transportation. Of particular interest to the grain-handling industry, which has long sought stronger shipper protections, were measures focused on rebalancing the railway-shipper relationship. These included a proposed definition of "adequate and suitable service," the establishment of reciprocal financial

7 The Volume-Related Composite Price Index (VRCPI), which provides for an inflationary adjustment to carrier revenues, is determined by the Canadian Transportation Agency in advance of each crop year. For the 2016-17 crop year, the Agency determined the value of the VRCPI to be 1.3275, which represented a year-over-year increase of 4.8%. See Canadian Transportation Agency Decision Number 131-R-2016, dated 29 April 2016.

8 See Canadian Transportation Agency Determination R-2017-210 dated 21 December 2017.

9 Excess revenues, along with applicable penalties, are payable by the carrier to the Western Grains Research Foundation.

penalties in arbitrated service-level agreements, the maintenance of the Maximum Revenue Entitlement with adjustments to better incentivize railway investment, and the proposed creation of a new Long-Haul Interswitching remedy. At the close of the 2016-17 crop year, the Bill was progressing through the Parliamentary process.

Saskatchewan sells hopper-car fleet

In tabling its budget in March 2017, the Saskatchewan government announced that it would be winding down the Saskatchewan Grain Car Corporation (SGCC) and selling the remnants of its aging fleet of 1,000 cylindrical hopper cars. Originally purchased in 1981 to supplement the federal government's fleet of 14,000 hopper cars, the Saskatchewan government indicated that it had decided to exit the business and would be putting its remaining 898 cars up for sale under a Request-for-Offer process giving the province's shortline railways the first opportunity in acquiring them. The decision also meant an end to a matching grant program, funded through the SGCC's leasing activities, which had been used in financing a portion of the shortlines' capital investment needs. This was followed by an announcement on 5 July 2017, that the Saskatchewan government had ultimately accepted three offers, worth a combined $9.7 million, that would see the cars apportioned between: Big Sky Rail, 663 cars; Great Western Railway, 150 cars; and Great Sandhills Railway, 85 cars. Sale of the cars, which were estimated to have a remaining serviceable life of about 14 years, was expected to be finalized in the fall of 2017.

Railway service to Churchill suspended indefinitely

In the aftermath of the flooding that led to the immediate closure of the Hudson Bay Railway's (HBR) line between Gillam and Churchill, Manitoba, in late May 2017, the carrier announced that, owing to the severity of the physical damage inflicted, a resumption of service was not likely before winter or the spring of 2018. Subsequent engineering assessments revealed that the track bed had been washed away in some 31 locations and that at least 13 bridges and 68 culverts had sustained damage. Associated repair estimates put the cost of restoring the line at anywhere between $20 and $60 million. As the transportation lifeline for many northern Manitoba communities, this meant that the critical northbound rail movement of foodstuffs, fuel and other supplies, which had already been halted, would continue for several months more. This effectively proved a death blow to any immediate efforts to move grain through the port of Churchill during the 2017 shipping season. Moreover, it prompted urgent calls for financial assistance from the federal and provincial governments when the HBR's owner, Denver-based OmniTRAX, revealed in June 2017 that it was not prepared to expend the money needed to return the line – which it had been trying to sell since late 2015 – to service. With the close of the 2016-17 crop year, it was becoming apparent that no immediate remedial action would be undertaken and that the federal government could be moving ahead with legal action to hold OmniTRAX accountable.

Hanjin receivership causes market turmoil

Succumbing to a prolonged depression in the ocean-shipping market, financially troubled Hanjin Shipping filed for receivership on 29 August 2016. The receivership followed on the heels of the Korea Development Bank's decision to withdraw any further financial support from the carrier effective 4 September 2016. The move into receivership by the world's seventh largest container carrier sent commercial ripples throughout the ocean-shipping industry. This left many of the carrier's 141 ships – along with the cargo they carried – stranded at sea or at anchor while interim financial arrangements were sought. Canadian pulse and specialty crops, which are often transported in containers to reach offshore markets, were affected by the resultant uncertainty. The Hanjin Vienna at Vancouver and the Hanjin Scarlet at Prince Rupert were both forced to anchor under arrest without offloading their cargo. One of the immediate commercial consequences of the Hanjin receivership was the realization by other shipping companies that transoceanic freight rates had fallen to unsustainable levels. This prompted an immediate industry-wide escalation in container rates as carriers around the world began to respond to the crisis. With many carriers vying to assume a portion of Hanjin's former market share, this led to a measure of disarray between Vancouver's various container-terminal operators, as each attempted to

contend with the redirection of traffic and equipment flowing to and from their facilities. Railway service to the south shore terminals of Centerm and Vanterm were also adversely impacted by these shifts.

Construction begins on G3 Terminal Vancouver

On 21 December 2016 G3 Global Holdings announced that it would be proceeding with the construction of a new state-of-the-art grain terminal in North Vancouver, British Columbia. The facility, which had received all necessary permit approvals in May 2016, represents the first all-new terminal to be built within the Port of Vancouver area since the 1960s. More importantly, it significantly advances the company's stated objective of building a coast-to-coast grain-handling network setting new standards for efficiency. The terminal will feature a loop track capable of holding three 134-car trains, a first for grain exporting terminals in Canada. In addition, it will also have over 180,000 tonnes of storage to be used in handling cereal grains, oilseeds, pulses and special crops, much of which will be supplied by affiliated G3 Canada Limited under a throughput agreement. Designed to allow arriving trains to unload while still in motion – without uncoupling from their locomotives – and then be returned to a G3 primary elevator for reloading, the terminal is expected to significantly increase the company's supply chain efficiency. The next-generation facility is generally regarded as a significant advancement in higher-velocity grain handling. Construction, which commenced in March 2017, is slated for completion in 2020.

Fraser Grain Terminal proposed

A new 4-million-tonne per annum grain-handling facility was proposed by Fraser Grain Terminal Ltd., a joint venture of Parrish and Heimbecker, Ltd. and Paterson Global Foods Inc. The terminal is to be located along the Fraser River in Surrey, British Columbia, adjacent to Fraser Surrey Docks. The new terminal is expected to include: an unloading station and transfer tower with fully enclosed conveying equipment and modern dust suppression system; 34 steel storage bins with 77,000 tonnes of storage capacity (in addition to 15,000 tonnes of existing storage); a travelling shiploader with telescopic cascading spout; semi-loop rail track and holding tracks to reduce shunting during unloading; a container loading facility and storage yard; a rail and truck loading facility; as well as an administration building and maintenance shop. By the close of the 2016-17 crop year the initial period for public comment under the Vancouver Fraser Port Authority's Project and Environmental Review Process had ended, and the formal submission of an application for a project permit was pending.

Ray-Mont begins building transload facility in Prince Rupert

On 20 March 2017 Ray-Mont Logistics announced that it would be developing an integrated container-loading facility at the south end of Ridley Island in Prince Rupert. The operation will focus on pulses and special crops shipped by hopper car from points in Canada as well as the US Midwest. These crops will then be transferred to ocean-going containers for export through the neighbouring Fairview Container Terminal (FCT), which is also undergoing expansion. The facility, which will be the first of its kind in Prince Rupert, denotes the extension of Ray-Mont's pioneering efforts in providing for the port-loading of export containers in both Montreal and Vancouver. Designs call for the ten-acre facility to have access to a 100-car loop track in taking delivery of inbound hopper-car shipments, which will see product offloaded into a grain dumper and through a state-of-the-art conveyance system for reloading into export containers. These containers will then be trucked to FCT for shipment to markets around the globe. The Ray-Mont facility was expected to employ up to 40 people when fully operational in the fall of 2017.

Columbia Containers rebuilding transload facility in Vancouver

Columbia Containers Ltd., a wholly owned subsidiary of Fort-Saskatchewan based Providence Grain Solutions, commenced work on the construction on a new $26-million transloading facility on the south shore of Vancouver's Burrard Inlet. The project, which involves a full modernization of the company's existing operations, is intended to allow for a near threefold increase in throughput, which currently stands at about 650,000 tonnes annually. As with other transload operators, Columbia, which handles a variety of agricultural products ranging from

wheat to pulses, has witnessed the surge in container traffic moving through the port. However, the company's aging infrastructure limited its ability to accommodate any further growth in the demand for its grain-transloading services. Beyond a physical expansion of the facility, the initiative promises state-of-the-art features, including: twin receiving tracks for inbound railcars; a system of protected dumpers, conveyors and transfer towers to move the arriving grain; dual container load-out capabilities; and 11,000 tonnes of on-site storage. The project is scheduled for completion in April 2018.

Roquette to invest in new facility:

On 18 January 2017 Roquette, a private French-based company dealing in plant-based food ingredients, announced that it intended to invest more than $400 million in building a new pea-protein manufacturing facility in Portage la Prairie, Manitoba, to address the growing demand for plant proteins. Roquette's investment – believed to be one of the world's largest dedicated to pea-protein to date – is rooted in a corporate strategy aimed at accelerating its global growth through the development of products for the food, nutrition and health markets. The operation, which is expected to employ about 150 people and process 120,000 tonnes of peas annually, will expand Roquette's existing pea-protein production capacity in the face of the growing customer demand for plant-based proteins both in North America and around the world. Given the increasing scope of Western Canadian pea production, along with a centrally located transportation network, the new facility will be well positioned to leverage these logistical strengths. Subject to the company obtaining all needed permits, construction was expected to start in the latter half of 2017 with production following sometime in 2019.

Restrictions threaten Canadian grain exports

The potential restriction of grain imports into key Asia-Pacific markets presented serious threats to future Canadian grain exports in the 2016-17 crop year. The first of these related to long-standing Chinese concerns over the possible introduction of a virulent strain of blackleg, a fungal disease that can cause significant yield loss in susceptible varieties of canola, from the chaff or dockage that accompanies canola shipments. Despite an earlier agreement to adopt science-based standards, China's quality regulator moved to impose a 1% dockage limit on Canadian canola imports as of 1 April 2016. Amidst claims by the Canadian industry that this new standard was not achievable, and that no evidence existed to support a reduction from the existing 2.5% level, the deadline was pushed back to 1 September 2016. Given that China is Canada's top foreign customer for canola seed, there was considerable relief when the governments of both countries agreed to defer the deadline as they worked towards a more permanent solution. At the close of the 2016-17 crop year an adequate solution had yet to be found.

The second is related to India's decision not to extend the exemption to its methyl bromide fumigation policy on the importation of agricultural products. This policy, which called for inbound shipments of all agricultural commodities to be fumigated in the country of export, meant that any grain shipments not meeting this test would be rejected beginning 1 April 2017. Since 2004, Canadian exports have landed in India under an exemption that permitted fumigation to occur at destination rather than at the port of exit. The removal of this exemption concerned many in the Canadian pulse industry since India constituted the single largest market for domestically-grown peas and lentils, and enforcement of the policy could undermine trade worth more than $1 billion annually. Although an extension to 30 September 2017 was later issued, the matter still loomed large in the minds of many at the close of the crop year.

Section 5: System Efficiency and Performance

Indicator Description	Table	1999-00	2014-15	2015-16	2016-17 Q1	Q2	Q3	Q4	YTD	% VAR
Country Elevator Operations										
Average Elevator Capacity Turnover Ratio	5A-1	4.8	6.6	6.3	1.6	1.7	1.7	1.4	6.4	1.6%
Average Weekly Elevator Stock Level (000 tonnes)	5A-2	3,699.3	2,993.7	3,062.8	2,777.8	3,371.1	3,683.6	2,794.3	3,152.8	2.9%
Average Days-in-Store (days)	5A-3	41.7	25.5	26.1	21.8	25.4	27.8	24.4	24.9	-4.5%
Average Weekly Stock-to-Shipment Ratio – Grain	5A-4	6.2	3.8	3.9	3.1	3.5	4.3	3.5	3.6	-7.7%
Railway Operations										
Movements to Western Canada										
Railway Car Cycle (days) – Empty Movement	5B-1	10.7	6.8	7.3	7.2	7.4	7.3	8.7	7.6	4.1%
Railway Car Cycle (days) – Loaded Movement	5B-1	9.2	6.9	6.0	6.4	7.0	6.5	6.3	6.5	8.3%
Railway Car Cycle (days) – Total Movement	5B-1	19.9	13.7	13.3	13.1	14.4	13.8	15.0	14.1	6.0%
Railway Car Cycle (days) – Non-Special Crops	5B-2	19.3	13.5	13.0	12.7	14.0	13.8	15.0	13.9	6.6%
Railway Car Cycle (days) – Special Crops	5B-3	25.8	16.0	15.2	14.8	18.5	14.0	14.9	15.4	1.4%
Railway Loaded Transit Time (days)	5B-4	7.8	5.8	4.8	4.8	5.6	5.4	5.2	5.2	21.8%
Movements to Eastern Canada										
Railway Car Cycle (days) – Empty Movement	5B-5	n/a	9.6	10.9	9.3	9.0	9.9	10.8	9.6	-11.9%
Railway Car Cycle (days) – Loaded Movement	5B-5	n/a	14.8	12.4	11.3	11.0	11.1	11.9	11.3	-8.9%
Railway Car Cycle (days) – Total Movement	5B-5	n/a	23.4	23.4	20.6	20.0	21.0	22.7	20.9	-10.7%
Railway Loaded Transit Time (days)	5B-8	n/a	12.1	9.9	8.3	8.4	9.1	9.0	8.7	-11.5%
Movements to the United States										
Railway Car Cycle (days) – Empty Movement	5B-9	n/a	11.2	11.4	10.5	10.3	11.2	13.3	11.2	-1.8%
Railway Car Cycle (days) – Loaded Movement	5B-9	n/a	19.3	15.2	13.1	14.2	13.2	13.9	13.6	-10.5%
Railway Car Cycle (days) – Total Movement	5B-9	n/a	30.6	26.6	23.6	24.5	24.4	27.2	24.8	-6.8%
Railway Loaded Transit Time (days)	5B-12	n/a	13.8	11.1	9.8	10.5	9.4	9.6	9.8	-11.9%
Traffic to Western Canada										
Hopper Car Grain Volumes (000 tonnes) – Non-Incentive	5B-13	12,718.7	5,983.1	5,313.3	1,345.8	1,839.2	1,615.8	1,411.2	6,211.9	16.9%
Hopper Car Grain Volumes (000 tonnes) – Incentive	5B-13	12,945.9	31,872.0	31,837.9	9,119.9	7,709.5	8,042.1	7,536.6	32,408.1	1.8%
Hopper Car Grain Volumes ($ millions) – Incentive Discount Value	5B-14	$31.1	$238.1	$238.6	$68.6	$58.7	$61.2	$56.3	$244.7	2.6%
Traffic Density (tonnes per route mile) – Total Network	5B-15	330.4	541.7	536.3	605.8	552.7	559.0	517.9	605.8	13.0%
Terminal Elevator Operations										
Average Terminal Elevator Capacity Turnover Ratio	5C-1	9.1	17.1	18.4	n/a	n/a	n/a	n/a	21.4	16.3%
Average Weekly Terminal Elevator Stock Level (000 tonnes)	5C-2	1,216.2	1,281.8	1,179.4	959.1	1,165.0	1,314.3	1,109.8	1,138.8	-3.8%
Average Days-in-Store – Operating Season (days)	5C-3	18.6	10.7	10.9	9.7	9.5	10.8	11.0	10.5	-3.7%
Average Weekly Out-of-Car Time	5C-5	n/a	17.1%	11.7%	14.4%	14.9%	11.2%	7.9%	12.1%	3.3%
Port Operations										
Average Vessel Time in Port (days)	5D-1	4.3	10.2	7.9	7.7	11.5	13.9	8.6	10.3	30.4%
Average Vessel Time in Port (days) – Waiting	5D-1	1.9	4.6	3.2	3.4	5.5	6.7	3.3	4.7	46.8%
Average Vessel Time in Port (days) – Loading	5D-1	2.4	5.6	4.7	4.3	6.0	7.2	5.3	5.6	19.1%
System Performance										
Total Time in Supply Chain (days)	5E-1	68.1	42.0	41.8	36.3	40.5	44.0	40.6	40.6	-2.9%

DISCUSSION AND ANALYSIS

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

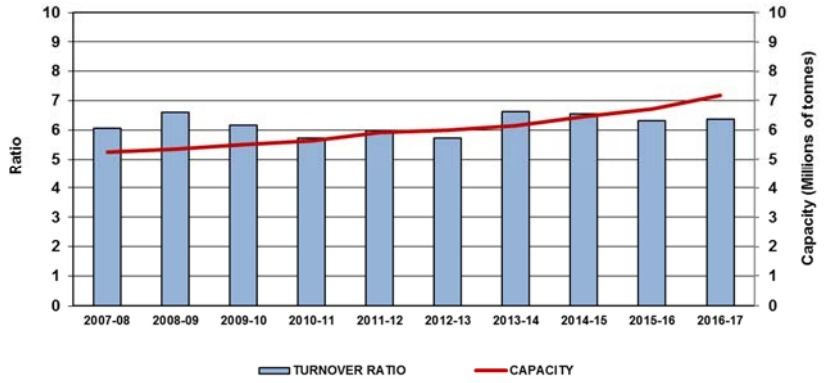
The net effect of changes in primary elevator throughput and storage capacity is reflected in the system's capacity-turnover ratio. Although primary elevator throughput increased by 7.7% to 45.6 million tonnes, the turnover ratio for the 2016-17 crop year rose by 1.6%, to 6.4 turns from the 6.3 turns reported a year earlier. This lower growth rate was largely attributable to the dampening effect of a further 320,100-tonne expansion in the storage capacity of the primary-elevator system, which has been steadily rising for several years.

Elevator Inventories

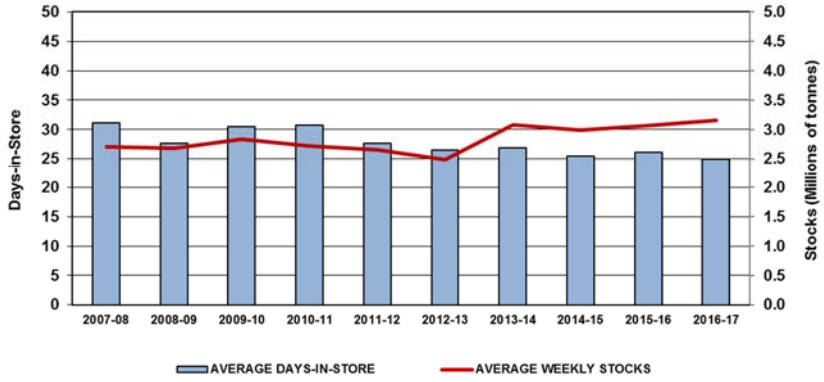
In assessing the operational efficiency of the primary elevator system, the GMP also considers the amount of grain maintained in inventory. Beyond measuring stock levels alone, this examination also considers the amount of time grain spent in inventory, along with its ability to satisfy immediate market 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. In fact, the 2016-17 crop year saw average primary elevator inventories reach above this threshold for a fourth consecutive year, rising by 2.9%, to 3.2 million tonnes from 3.1 million tonnes a year earlier. Moreover, the net addition of 1.3 million tonnes of storage capacity over the last four crop years permitted stocks to climb to 3.9 million tonnes – a GMP record – in March 2017.

Primary Elevator Capacity Turnover Ratio



Primary Elevator Inventories

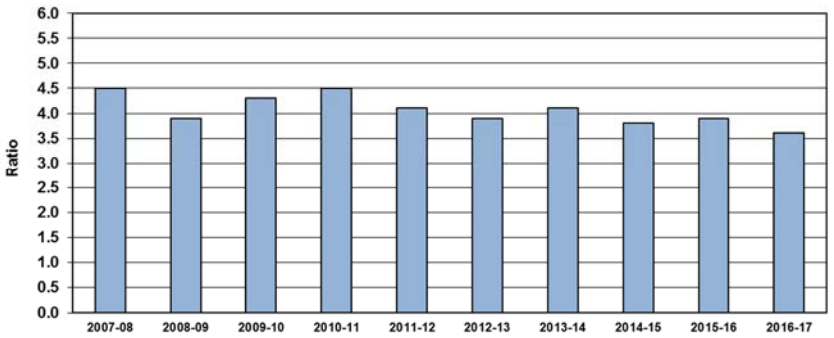


While stock levels continue to rise, the amount of time spent by grain in inventory has continued to decline. After having fluctuated around 30 days for several years that average has drifted closer to the 25-day mark. The higher volume of grain now passing through the GHTS has contributed significantly to this reduction. The overall average for the 2016-17 crop year fell by 4.5%, to a record GMP low of 24.9 days, from 26.1 days a year earlier.

Stock-to-Shipment Ratios

The adequacy of country elevator inventories can be 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. A decade ago, the average stock-to-shipment ratio generally stood somewhere around a value of 4.5. In more recent years, however, the average 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. The posting of a still lower ratio for the 2016-17 crop year indicates an even greater tightening of stocks in the face of heavy shipments, with the annualized average falling by 7.7%, to a record GMP low of 3.6, from 3.9 a year earlier.

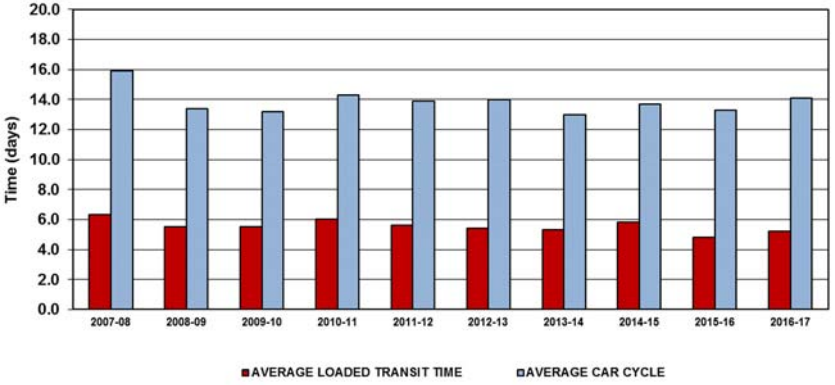
Primary Elevators - Stock-to-Shipment Ratio



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, data pertaining to these times are gathered on movements to Western Canada, Eastern Canada and the United States.

Railway Car Cycles and Loaded Transit Times
(Western Canada)



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

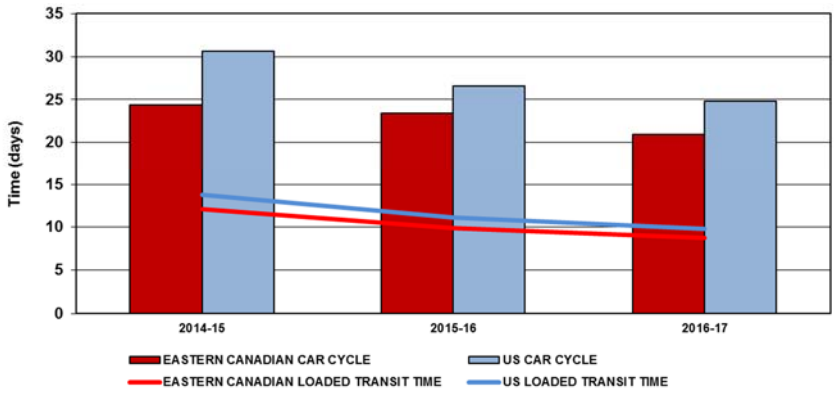
During the 2016-17 crop year the car cycle for shipments terminating within Western Canada averaged 14.1 days, a 6.1% increase over the 13.3-day average recorded a year earlier. This rise reflected increased cycle times in all corridors, although much of it was tied to west-coast movements. The biggest gain, 12.7%, was recorded in the Prince Rupert corridor, where the average car cycle increased to 13.8 days from 12.2 a year earlier. This was accompanied by a 5.8% increase in the Vancouver-corridor average, which rose to 14.3 days from 13.5 days in the prior year. A lesser influence came from movements in the Thunder Bay corridor, where the average rose 1.1%, to 13.5 days from 13.4 days. These increases were largely related to the elongation of the car cycle during winter months, which hampered the movement of grain to the west coast.

Owing to the heavy weighting of non-special crops in the overall traffic mix, the car cycle for these commodities showed a similar increase, with the average rising 6.6%, to 13.9 days from 13.0 days a year earlier. A lesser increase was noted for the car cycle tied to special crops, which rose by 1.4%, to an average of 15.4 days from 15.2 days. The comparatively higher average for special crops still appears linked to the handling characteristics of such shipments, which tend to move in smaller numbers in regular merchandise-train service rather than in the unit-train lots typical of non-special crops.

Loaded Transit Time

More important than the railways' average car cycle, is the 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. As with the overall car cycle, the average loaded transit time has gradually decreased since the beginning of the GMP. However, in keeping with the observed upturn in the overall car cycle for the 2016-17 crop year, the railways posted an 8.3% increase in its loaded transit time, which rose to an average of 5.2 days from 4.8 days a year earlier.

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



The irregularity in the underlying distribution, as gauged by the coefficient of variation, also rose in the 2016-17 crop year, to 33.9% from 31.6% a year earlier. Despite the year-over-year gain, this value is 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 still varies significantly, and remains highly inconsistent.

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

Parallel statistical and 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, this data shows noticeably higher averages than observed for Western Canadian destinations. Even so, both groupings showed reductions in the 2016-17 crop year.

In the case of movements into Eastern Canada, the car cycle was reduced by 10.7% in the 2016-17 crop year, with the average falling to 20.9 days from 23.4 days a year earlier. A smaller but meaningful 6.8% reduction was observed on movements into the United States, with the average car cycle declining to 24.8 days from 26.6 days.

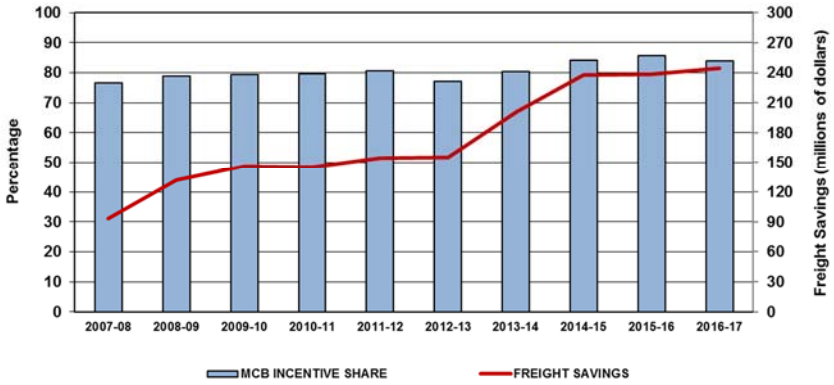
In equal measure, the average loaded-transit time associated with movements into Eastern Canada and the US are substantially higher than those to Western Canadian destinations. In the case of the former, this amounted to an average of 8.7 days, down 11.5% from the 9.9 days reported a year earlier. For movements into the United States, the reduction amounted to a marginally greater 11.9%, with the average declining to 9.8 days from 11.1 days. The underlying distributions showed an even sharper difference, with the coefficient of variation on movements into Eastern Canada standing at 26.6% against 55.3% for those into the United States.

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

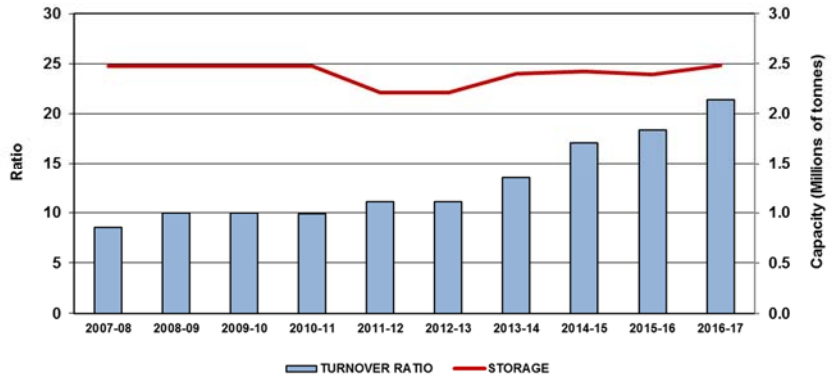
The amount of railway traffic moving in multiple-car blocks remains substantial. Since the 2005-06 crop year, at least three-quarters of the regulated grain moving to the four ports in Western Canada was earning a discount, against only half in the GMP's base year. While this value is subject to seasonal variations, it continues to rise, and regularly reaches beyond the 80% mark. The 2016-17 crop year saw 83.9% of the grain shipped moving in blocks of 50 or more cars; down marginally from the 85.7% recorded a year earlier.

The monetary value of the discounts earned by grain shippers – estimated as gross savings in railway freight charges – now stands several times greater than in the GMP's base year. These savings are estimated to have risen by 2.6% in the 2016-17 crop year, to a GMP record of $244.7 million from $238.6 million a year earlier. For the most part, this was indicative of the continuing shift towards movements in blocks of 100 or more cars, aided in part by the physical conversion of more Class C elevators into larger Class D facilities. This shift was also reflected in a marginal rise in

MCB Movements and Freight Savings
(Western Canada)



Terminal Elevator Capacity Turnover Ratio



the average discount earned, which reached an estimated $7.55 per tonne against $7.49 per tonne a year earlier.

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

The net effect of changes in terminal-elevator throughput and storage capacity is reflected in the system's capacity-turnover ratio. Although terminal-elevator throughput increased by 3.4% to 36.8 million tonnes, the average turnover ratio for the 2016-17 crop year rose by 16.3%, to a record-setting 21.4 turns from 18.4 turns a year earlier. However, the rise witnessed over the last several crop years is exaggerated through the influence of the larger volumes handled through facilities with smaller storage capacities. This is especially true of the turnover values tied to a few terminals at the port of Vancouver.

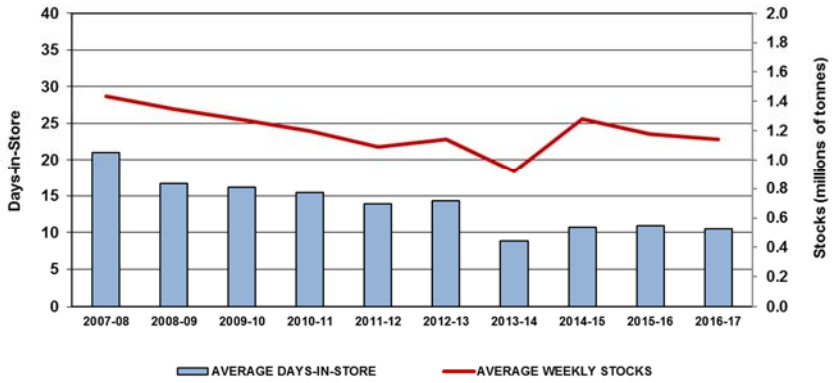
Nevertheless, the GHTS's total terminal throughput has risen by over 50% since the beginning of the GMP. More significantly, the west-coast gateways of Vancouver and Prince Rupert have shouldered much of the additional workload, as both ports have virtually doubled their grain handlings during this period. Storage capacity has remained largely static, and has only recently begun to increase in the wake of expansionary investments.

Terminal Elevator Inventories

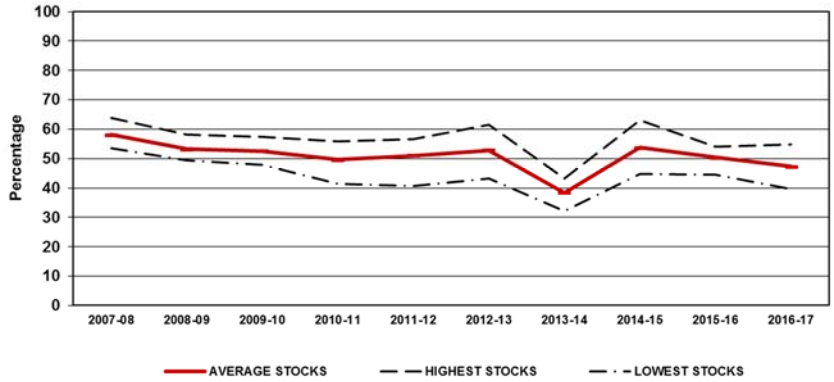
Given the system's physical constraints, terminal grain inventories have not changed significantly over the life of the GMP, with the average weekly stock level fluctuating around the 1.2-million-tonne mark throughout. The 2016-17 crop year proved equally consistent, with the average weekly stock level decreasing by 3.8%, to 1.1 million tonnes from 1.2 million tonnes a year earlier.

The limited scope of this change can best be viewed when gauging stocks against the terminal elevator system's total storage capacity. Within this framework, terminal stocks can typically be seen to employ just over half of the system's available storage capacity. Stocks fluctuate from week to

Terminal Elevator Inventories



Terminal Elevator Capacity Utilization



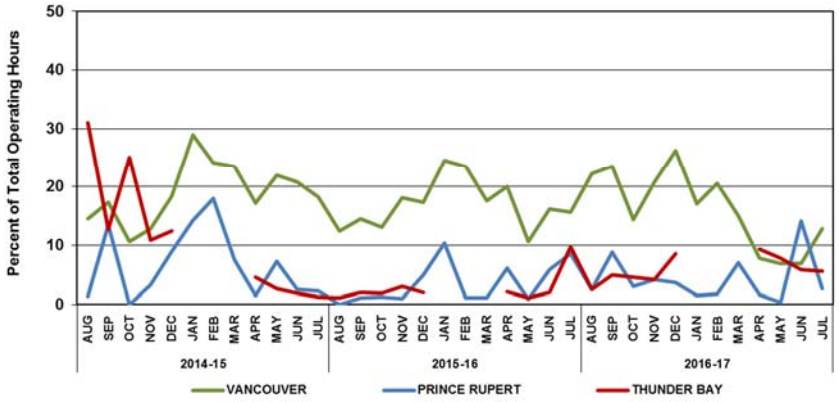
week, rising and falling in conjunction with the workings of the supply chain itself. Nominally, this defines a wider operating range where stocks can utilize anywhere from 40% to 60% of the available storage capacity. A utilization rate that reaches beyond these bounds, such as was the case in the 2013-14 crop year, typically denote major exceptions in the orderly flow of grain through the GHTS. Data from the 2016-17 crop year reveals that while weekly terminal stocks varied more than in the previous crop year, they remained within this operating band, suggesting that adequate terminal grain inventories were maintained.

Even so, the growth in throughput has brought even more pressure to maintain sufficient terminal stocks. This is reflected in the fact that the average weekly stock level, which had typically stood at about 5% of the system's annual throughput, now stands closer to 3%. This reduction has placed even greater emphasis on just-in-time inventory practices, heightening the need for a consistent and reliable flow of grain.

Emblematic of these practices was the decrease in the amount of time grain spent in terminal inventory, where the average number of days-in-store fell by a factor of one-third – or five days – in the face of a 15% surge in traffic during the 2013-14 crop year. This sharp reduction in terminal storage time has endured alongside the heavier throughput of subsequent crop years. The 2016-17 crop year proved no less relatable with its 10.5-day average, down 3.7% from the previous crop year's 10.9 days. Much of the reduction, however, was traced to the heightened activity surrounding a sharp increase in canola shipments through Thunder Bay.

Equally indicative of tighter terminal inventories was the further decline in many of the grain-specific stock-to-shipment ratios, particularly along the Pacific Seaboard. Although most commodities showed averages that stood comfortably above 1.0, all had minimums that fell substantially below this threshold. As such, every grain was in short supply at some point during the crop year.

Terminal Elevator Out-of-Car Time



Port Terminal Out-of-Car Time

A related measure, denoted as out-of-car time, gauges how often a port terminal had no railcars to unload while staffed and operating. The indicated proportion points to how consistently grain flowed through the terminal system during a specified period. 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 a more difficult operational period.

With its greater operating hours, Vancouver's out-of-car time is most indicative of the system's overall efficiency. Proportionately, 16.2% of the port's total terminal operating hours were idled during the 2016-17 crop year. This was followed by: Thunder Bay, which was idle 5.0% of the time; and Prince Rupert, 4.2% of the time. Taken collectively, this meant that terminal elevators were left without grain to unload 12.1% of the time.

Although this proved marginally greater than the 11.7% average posted a year earlier, the opening months of the 2016-17 crop year showed consistently higher out-of-car times. This meant that inbound terminal elevator activity was idle more often in the first half of the crop year than it was a year earlier.

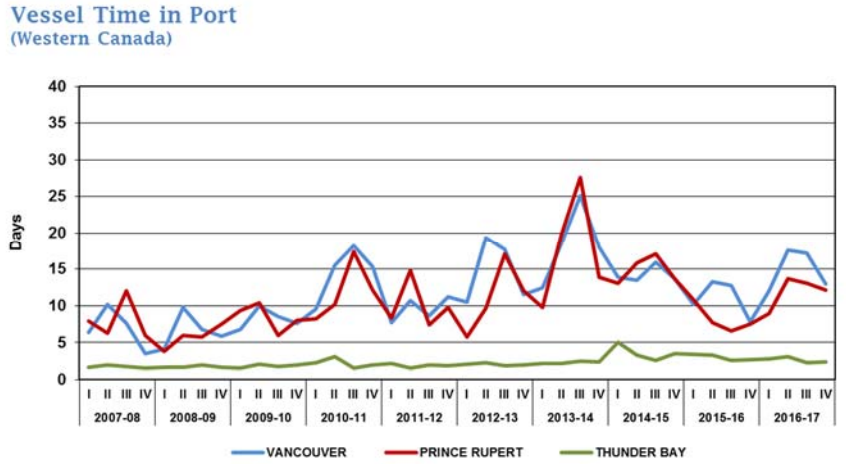
PORT OPERATIONS
[See TABLES 5D-1 through 5D-8]

A total of 959 vessels called for grain at Western Canadian ports during the 2016-17 crop year. This represented a 1.6% increase over the 944 ships that arrived for loading a year earlier. Over half of these, 493, called at Vancouver. This was followed by Thunder Bay with 341, and Prince Rupert with 125. Owing to its closure for the 2016 shipping season, no vessels called at the port of Churchill.

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 2016-17 crop year saw a 30.4% increase in this average, which climbed to 10.3 days from 7.9 days a year earlier. This was chiefly due to a 46.9% increase in the amount of time vessels spent waiting to load, which climbed to an average of 4.7 days from 3.2 days a year earlier. It was also supported by a 19.1% increase in the amount of time vessels spent loading, which rose to an average of 5.6 days from 4.7 days.

These escalations reflected a change in the nature of the activity along the Pacific Seaboard. The most significant upturn was posted by Prince Rupert, where a vessel's average time-in-port climbed by 49.4%, to 12.1 days from 8.1 days a year earlier. This was accompanied by a 34.8% increase for Vancouver, which saw its average rise to 15.1 days from 11.2 days. These increases were partially offset by a 12.9% reduction at Thunder Bay, where the average fell to 2.7 days from 3.1 days a year earlier.



It is worth noting that these increases marked the first observed hikes in the averages since the 2013-14 crop year. Undoubtedly, a portion of these increases arose out of the longer car cycles taken in getting grain to port during the winter months, which gave rise to complaints from many grain handlers regarding the consistency of railway service. However, as outlined in previous editions of the Monitor's Annual Report, a sharp rise in grain volumes – especially when sustained over an extended period – has implications beyond railway service alone. Not to be overlooked is the number of vessels calling at the west-coast ports of Vancouver and Prince Rupert, which has jumped by a factor of 25% over the last five crop years, to 618 from 491. With a combined 3,566 foreign vessels arriving in 2016, grain ships accounted for roughly 17% of the marine movements at these two ports. This marked a five-point gain over the estimated 12% share garnered five years before.

Beyond the need to coordinate with the inbound movement of grain by rail, there are the physical demands of these additional ships to deal with as

well. For a commercially active centre such as Vancouver, this frequently involves the disproportionate allocation of available achorages. Accordingly, there have been instances during the last four 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. Not only does this necessitate additional pilotage services, it contributes to harbour congestion and drives up demurrage costs. Such congestion, however, may be indicative of a "new normal" given that terminal operators often appear desirous of having one vessel at berth and at least one waiting at anchor to minimize the idle time between ship-loadings.

At the same time, the ships calling for grain at west-coast ports have also been getting larger. The aggressive building programs of various ship owners has resulted in newer and bigger vessels replacing the smaller bulk vessels that were reaching the end of their serviceable lives. Ships taking on loads of 45,000 or more tonnes are now commonplace at both Vancouver and Prince Rupert. This has also resulted in more time being taken in loading at terminal elevators, and the investments by various terminal operators to increase their ship-loading efficiency through modernization and expansion.

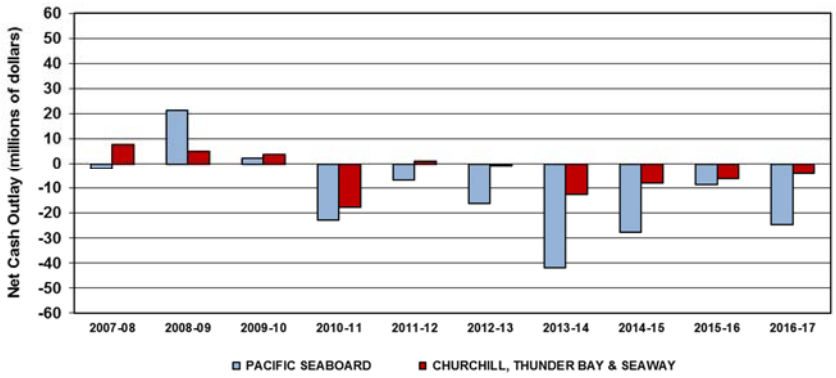
Distribution of Vessel Time in Port

In keeping with the increased time taken by ships in port, the proportion of ships spending more than five days in port also rose, to 54.4% from 50.0% a year earlier. Moreover, there was a marked increase in the number of ships that remained in port for an unusually lengthy time, with the proportion of vessels spending 16 or more days in port virtually doubling, to 25.8% from 14.5% a year earlier. With almost all latter delays tied to ships calling at Vancouver and Prince Rupert, it was clear that west-coast exports were more adversely affected.

Distribution of Berths per Vessel

There were, however, only modest changes in the relative number of vessels needing to berth more than once during the 2016-17 crop year. At Vancouver, the proportion of vessels needing to berth two or more times rose to 51.7% from 49.8% a year earlier. While at Thunder Bay the proportion fell marginally, to 16.4% from 16.5% a year earlier. These values are consistent with the decline that has been evident since the beginning of the GMP.

Annual Demurrage and Dispatch



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 WGEA, which provides a monetary indication of how efficiently grain flowed through Western Canadian ports. For the seventh consecutive year, these two elements dovetailed to produce a net cash outlay for grain handlers. Moreover, the outlay virtually doubled in the 2016-17 crop year, rising to $28.9 million from the previous year's $14.7 million. This financial result was shaped chiefly by a near halving of dispatch earnings, which fell to $10.8 million from $19.5 million the year previous, but was also

compounded by a 16.1% increase in demurrage costs, which rose to $39.7 million from $34.2 million.[10]

Owing to its dominance, these results largely mimicked activity along the Pacific Seaboard, which incurred a net cash outlay of $24.8 million against $8.7 million a year earlier. The results from activity at Churchill, Thunder Bay and points along the St. Lawrence Seaway were more positive, with reduced demurrage costs driving the net cash outflow down to $4.1 million from $6.0 million.

SYSTEM PERFORMANCE
[See TABLE 5E-1]

The supply chain model provides a useful framework by which to examine the speed with which grain moves through the GHTS. During the 2016-17 crop year, it was observed that this process required an average of 40.6 days, a reduction of 2.9% from the 41.8-day average reported a year earlier and the lowest yet recorded under the GMP.

This 1.2-day improvement was driven by reductions in the amount of time grain spent in storage, be it in the country or at port. The largest decrease was attributable to the average amount of time grain spent in inventory at a country elevator, which fell by 1.2 days, to a record GMP low of 24.9 days from 26.1 days. This was complemented by another 0.4 days in reduced storage time at terminal elevators, which declined to an average of 10.5 days from 10.9 days the previous year. Detracting from this was a 0.4-day increase in the railways' loaded transit time, which rose to an average of 5.2 days from the previous crop year's record low of 4.8 days.

The improvement in overall GHTS performance came along with some operational issues. Most noteworthy was the fact that Western Canada's grain supply reached above the 70-million-tonne mark for a fourth consecutive year. At 80.1 million tonnes, this meant that the GHTS would

10 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.

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	
2013-14	26.9	5.3	8.9	41.1	-40.4%
2014-15	25.5	5.8	10.7	42.0	
2015-16	26.1	4.8	10.9	41.8	
2016-17	24.9	5.2	10.5	40.6	

have to contend with the second largest grain movement in its history. This led many stakeholders to be concerned about a possible repeat of the major difficulties encountered in the 2013-14 crop year, when the system grappled with record crop production and an 81.9-million-tonne movement.

The ensuing years already witnessed the grain industry beginning to make the strategic investments required to deal with the handling needs of consistently larger harvests. Although much of this is reflected in the addition of 1.3 million tonnes of country-elevator storage capacity, it also extends to the modernization of existing facilities and the construction of even more efficient ones. Similarly, the expansion and modernization of existing terminal-elevator operations added 272,100 tonnes of new storage capacity to the system; and the current or planned construction of new facilities promises still more.

However, the addition of permanent storage capacity is but one element in addressing the needs of a complex supply chain. In addition to bolstering the handling capacity of the installations at either end of that chain is the need to ensure that the service offering of the railways moving grain between them is sufficient, reliable and consistent.

Although the railways have made strides in this regard, their record remains uneven. While CN and CP generally improved their performance in the aftermath of the problems that arose in the 2013-14 crop year, service problems reappeared in the 2016-17 crop year. Much of this was shaped by the realities of winter operations, which necessitated the allocation of additional resources, either equipment or people, to compensate for the requisite reduction in train lengths and train speeds. However, inadequate deployment of these resources can result in the GHTS's reduced fluidity, which is reflected in longer car cycles and loaded transit times. These in turn lead to the constriction of railway carrying capacity, a steady deterioration in service, and a backlog of traffic.

Ultimately, several grain companies reported being frustrated with the service they were receiving from at least one carrier. This has ripple effects throughout the GHTS, beginning with the late delivery of grain to the system's terminal elevators and a buildup of stocks in the country. Eventually, it manifests itself in an inability to load vessels at port in a timely manner and gives way to higher demurrage and lower dispatch earnings.

Section 6: Producer Impact

Indicator Description	Table	1999-00	2014-15	2015-16	2016-17 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	$124.20	$82.87					$94.30	13.8%
1CWA Durum ($ per tonne) – Original Methodology	6A-10B	$67.63	n/a	n/a						
1CWA Durum ($ per tonne) – Revised Methodology (1)	6A-10B	n/a	$206.35	$116.14					$116.86	0.6%
1 Canada Canola ($ per tonne)	6A-10C	$52.51	$69.22	$65.24					$65.63	0.6%
Canadian Large Yellow Peas – No. 2 or Better ($ per tonne)	6A-10D	$54.76	$108.51	$62.16					$69.11	11.2%
Producer Cars										
Producer-Car-Loading Sites (number) – Class 1 Carriers	6B-1	415	179	179	159	159	159	159	159	-11.2%
Producer-Car-Loading Sites (number) – Class 2 and 3 Carriers	6B-1	122	135	137	130	130	129	129	129	-5.8%
Producer-Car-Loading Sites (number) – All Carriers	6B-1	537	314	316	289	289	288	288	288	-8.9%
Producer-Cars Scheduled (number) – Covered Hopper Cars	6B-2	3,441	9,867	5,871	1,930	1,793	1,096	700	5,519	-6.0%

(1) The methodology used to calculate the export basis in the 2012-13 through 2016-17 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. Such calculations can easily swell into thousands of separate estimates.

The only practical means by which to manage this undertaking 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.[11] Sampling techniques were used to select 43 separate grain stations as a representative sample in the calculation of the export basis and producer netback. These grain stations are grouped into 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.[12] 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.

11 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).

12 Owing to competitive pressures, many of the stakeholders in the GHTS use some form of financial incentive to draw grain volumes into their facilities (i.e., country elevators) or over their systems (i.e., railways). Many of these incentives are of a highly sensitive commercial nature. In order to safeguard all such information, estimates of the export basis and producer netback are calculated at a higher-than-grain-station level of aggregation.

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.[1] 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.[2]
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.[3] 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. As of the 2015-16 crop year 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.[3] 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	All elevator deliveries of wheat and durum are subject to a $0.48 per tonne "check-off" in order to fund variety research, market development and technical support to the industry. The current Western Canada Deduction is administered by the Alberta Barley Commission. The Alberta Wheat Commission implemented a refundable service charge (for research, market development, policy and advocacy initiatives and education) of $0.70 per tonne on all commercial wheat and durum in Alberta on 1 August 2012. A similar deduction of $0.52 per tonne was implemented by the Saskatchewan Wheat Development Commission on 1 August 2013. The Manitoba Wheat and Barley Growers Association implemented a $0.52 per tonne deduction on 1 February 2014.	All elevator deliveries of canola in Saskatchewan are subject to a $0.75 per tonne "check-off" for provincial canola association dues. The applicable "check-off" on deliveries made in Manitoba and Alberta are somewhat higher, amounting to $1.00 per tonne in both provinces. Similarly, a levy of 0.5% is deducted for the Manitoba Pulse Growers Association on the delivery of yellow peas, while 1.0% has been deducted for the Pulse Growers Associations in Saskatchewan and Alberta. The Saskatchewan Pulse Growers temporarily reduced their levy for the 2016-17 crop year to 0.67%.
Trucking Premiums	Grain companies report on the trucking premiums they pay to producers at each of the facilities identified in the sampling methodology.[4] 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) – ICE Futures Canada (formerly the Winnipeg Commodity Exchange) collects Vancouver cash prices and spot prices at selected country elevator locations daily.
2) – 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.
3) – 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).
4) – 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]

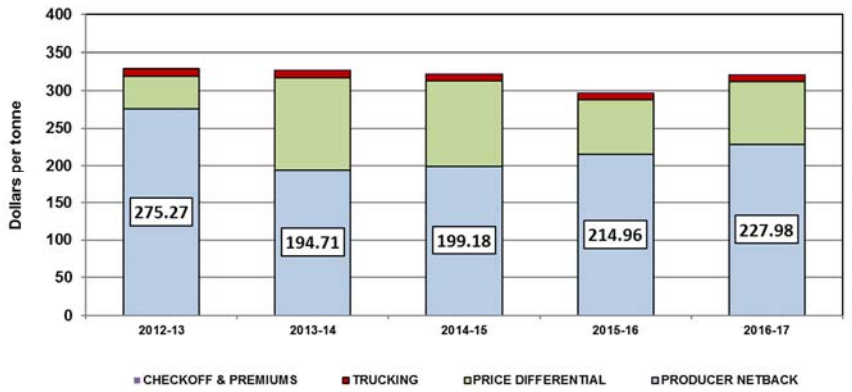
In its earlier reports, the Monitor described how higher prices have generally been responsible for any improvement in the per-tonne returns accruing to producers of wheat and durum. In comparison, reductions in the export basis have proven to be secondary. Whether it be price or the export basis, their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

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

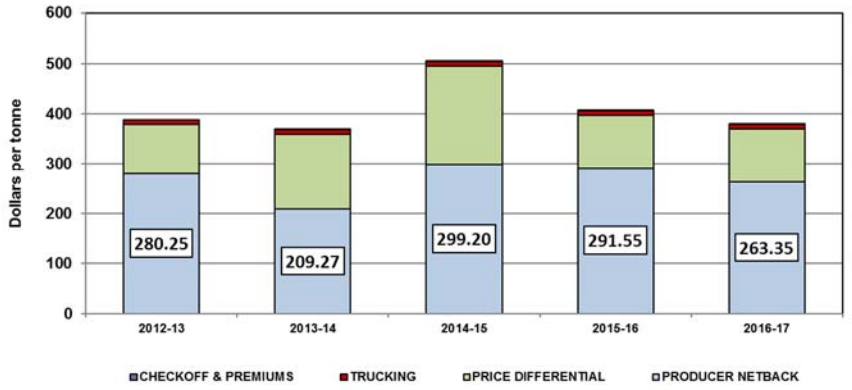
The financial return to farmers of 1CWRS wheat amounted to an estimated $227.98 per tonne in the 2016-17 crop year. This represented a gain of 6.1% over the $214.96 realized a year earlier. Much of this improvement was attributable to an increase in the average price, which is constructed around a tonnage-based weighted average export quotation for 1CWRS wheat (13.5% protein), and that rose by 8.2% during this period, to $322.28 per tonne from $297.83 per tonne a year earlier. Supported by a weaker Canadian dollar, this increase reflected the sustained demand for high-quality wheat despite ample global production and stocks.

The full benefit of the $24.45-per-tonne increase in wheat prices was partially offset by an $11.43-per-tonne escalation in the export basis, which rose by 13.8%, to $94.30 per tonne from $82.87 per tonne a year earlier. Much of this added cost was attributable to an increase in the price differential – or spread – between the export quotation and the spot price given to the producer at the elevator, which rose by 15.5%, to $83.53 per tonne from $72.35 per tonne a year earlier. In effect, this price differential includes the cost of freight, handling, cleaning, storage, weighing and inspection, as well as an opportunity cost or risk premium. Provisions for trucking and the payment of a check-off remained unchanged at $9.82 per tonne and $1.06 per tonne respectively. Only a $0.25-per-tonne reduction in the trucking premiums paid to producers by the grain companies added marginally to the export basis.

Producer Netback - 1CWRS Wheat



Producer Netback - 1CWA Durum



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

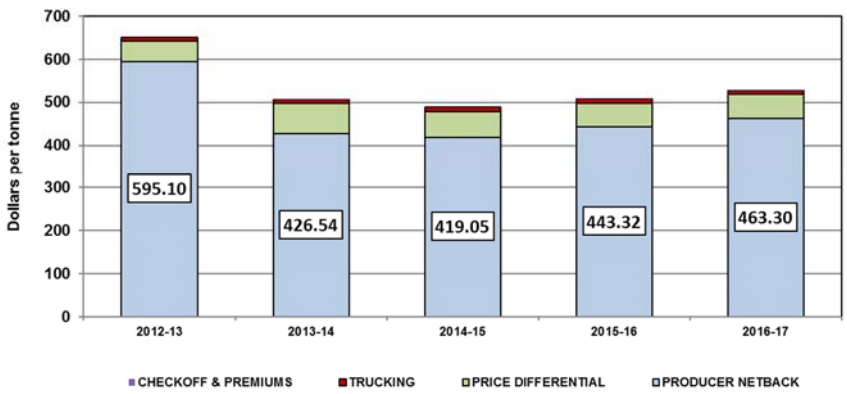
The financial return to farmers of 1CWA durum amounted to an estimated $263.35 per tonne in the 2016-17 crop year. This represented 9.7% less than the $291.55 per tonne reported in the 2015-16 crop year. The decline was driven almost entirely by lower durum prices, which fell to $380.21 per tonne, 6.7% below the $407.69-per-tonne average recorded a year earlier. Much of this price decline was occasioned by record Canadian durum production, which contributed to a general oversupply and the softening of international prices.

In addition to falling prices, the producer's netback was also adversely affected by a marginal increase in the export basis, which rose by 0.6%, to $116.86 per tonne from $116.14 per tonne. Virtually all this $0.72 increase was attributable to a $0.78 rise in the price differential, which inched up to $106.08 per tonne from $105.30 per tonne a year earlier. As outlined with respect to 1CWRS wheat, the costs derived from trucking and the payment of a check-off did not change in the 2016-17 crop year, so did not factor into a worsening of the producer netback. Like 1CWRS wheat, these were estimated at $9.82 per tonne and $1.06 per tonne respectively. Only a $0.06-per-tonne increase in the trucking premiums paid to producers served to help offset the rise in the price differential.

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.

Producer Netback - 1 Canada Canola



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

The netback to producers of 1 Canada canola increased by 4.5% in the 2016-17 crop year, rising to $463.30 per tonne from $443.32 per tonne a year earlier. This result was almost exclusively driven by higher canola prices, with the average Vancouver cash price gaining 4.0% to reach $528.93 per tonne from $508.56 per tonne. This reflected the strong international demand for oilseeds which also helped lift Canadian canola production to a new record.

The export basis showed no real change in the 2016-17 crop year, increasing by a mere 0.6%, to $65.63 per tonne from $65.24 per tonne. As was witnessed with durum, virtually all the increase stemmed from an escalation in the price differential, which inched up to $55.36 per tonne from $55.06 per tonne a year earlier. Here too the costs derived from trucking and the payment of a check-off did not change in the 2016-17

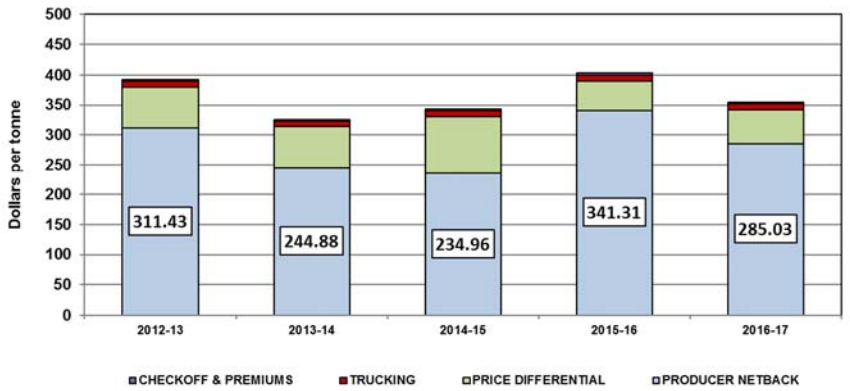
crop year, so did not contribute to a varying in the producer netback. As with other grains, these were estimated at $9.82 per tonne and $0.92 per tonne respectively. Only a $0.09-per-tonne reduction in the trucking premiums paid to producers aided in raising the export basis.

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

The visible netback to producers of large yellow peas has proven the most volatile of the four commodities monitored under the GMP. Producers experienced a 16.5% decline in these returns during the 2016-17 crop year, which fell to $285.03 per tonne from $341.31 per tonne a year earlier. Much of this reduction was attributable to lower market prices. Although Canadian large yellow peas exercise significant sway in the marketplace, its price is sensitive to wider international influences. Record production alongside existing stockpiles led to an increase in global supplies and downward price pressure. As a result, the dealer's closing price fell by 12.2%, to $354.14 per tonne from $403.47 per tonne.

The export basis for large yellow peas has proven equally erratic in the face of everchanging global markets. Following a sharp reduction in the previous crop year, the 2016-17 crop year saw it rebound by 11.2%, to $69.11 per tonne from $62.16 per tonne. As with other commodities, much of the increase was rooted in the escalation of the price differential, which stands in for the cost of freight as well as other handling activities, and that rose by 17.5%, to $57.44 per tonne from $48.90 per tonne. This was mitigated by a $1.56-per-tonne reduction in Pulse Growers Association fees along with a $0.03 increase in trucking premiums. Since trucking costs remained unchanged at $9.82 per tonne, it had no contributory effect on the export basis.

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 provide producers with a competitive alternative to the movement of the producers' grain through a traditional grain-handling company.

Loading Sites
[See Table 6B-1]

The number of producer-car loading sites situated across Western Canada has continued to decline from the 709 originally benchmarked at the beginning of the GMP. The 2016-17 crop year saw the closure of another 28 sites, with the overall number falling by 8.9%, to 288 from 316. Most of the reduction came by way of CP's decision to close 20 sites local to its lines but was augmented by another eight served by Big Sky Rail following their licensing as primary elevators by AGT Foods and Ingredients (which

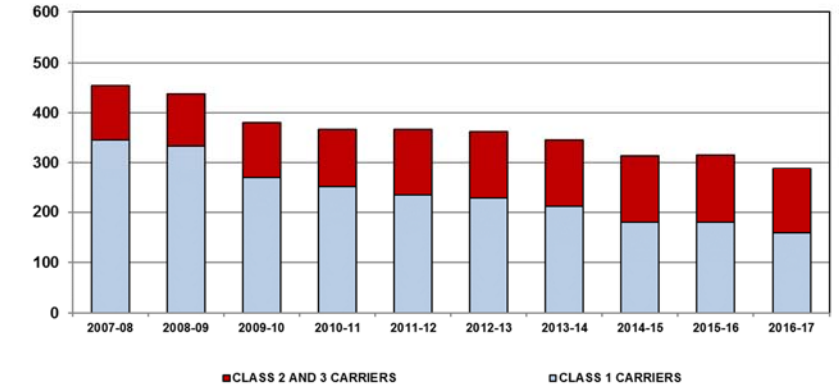
acquired the producer-car loading assets of the former West Central Road and Rail). This resulted in an 11.2% cutback in the number of sites operated by Class 1 carriers, which fell to 159 from 179, and a 5.8% reduction for those serviced by Class 2 and 3 carriers, which fell to 129 from 137.

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

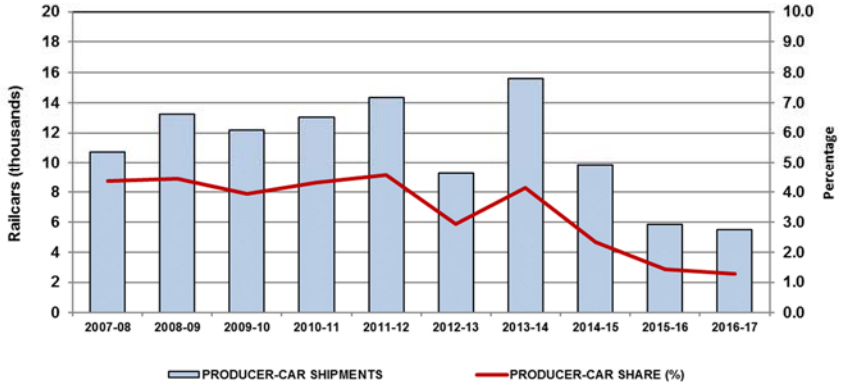
Producer-car shipments have declined significantly since reaching a high of 15,603 carloads in the 2013-14 crop year. With the 2016-17 crop year, scheduled shipments had fallen by almost two-thirds, to 5,519 carloads, its lowest level in over a decade. This reduction mirrors a waning interest among producers to use the producer loading option.

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. The 2016-17 crop year saw the share given over to wheat, durum and barley decline still further, to 28.0% from 34.1% a year earlier. Conversely, shipments of oilseeds, special crops and oats continued to increase, increasing its share to 72.0% share against 65.9% a year earlier. This marked the second 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 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.

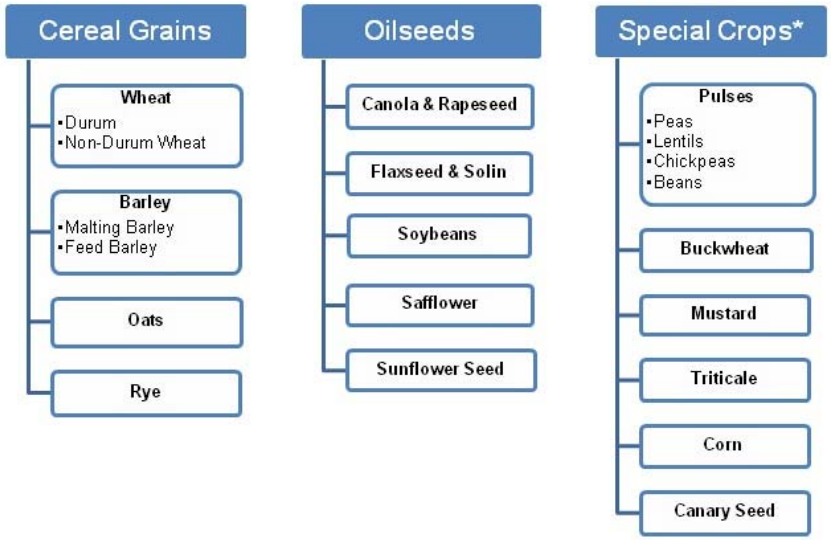
- Series 4 – Commercial Relations: Measurements relating to the rates applicable on various grain-handling and transportation services.

- 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.



* Not all special crops as defined by the CGC are included under the umbrella of the Canadian Special Crops Association

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, sunflower, and triticale.

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 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 implement the Grain Monitoring Program. 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 quality of the program as a whole. We look forward to their continued input and cooperation throughout the duration of the Monitoring Program.

Agricultural Producers Association of Saskatchewan
Agriculture and Agri-Food Canada
Alberta Agriculture, Food and Rural Development
Alberta Barley Commission
Alberta Federation of Agriculture
Alberta Transportation
Alberta Wheat Commission
Alliance Grain Terminal Ltd.
AGT Food and Ingredients
Battle River Railway
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 Terminals
FARMCO
Fife Lake Railway Ltd.
G3 Canada Limited
Gardiner Dam Terminal
Government of British Columbia
Grain Growers of Canada
Great Western Railway Ltd.
ICE Futures Canada, Inc.
Inland Terminal Association of Canada
Keystone Agricultural Producers
Kinder Morgan Canada
Lake Line Railroad Inc.
Long Creek Railroad
Louis Dreyfus Canada Ltd.
Manitoba Agriculture, Food and Rural Development
Manitoba Infrastructure and Transportation
Manitoba Wheat and Barley Growers Association
National Farmers Union
North West Terminal Ltd.
Northern Lights Rail
OmniTRAX Canada, Inc.
Parrish & Heimbecker Ltd.
Paterson Grain
Port of Vancouver
Port of Churchill
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 and Infrastructure
Saskatchewan Association of Rural Municipalities
Saskatchewan Barley Development Commission
Saskatchewan Wheat Development Commission
South West Terminal
Statistics Canada
Stewart Southern Railway
Transport Canada
Viterra Inc.
Western Barley Growers Association
Western Canadian Short Line Railway Association
Western Canadian Wheat Growers Association
Western Grain By-Products Storage Ltd.
Western Grain Elevator Association