Monitoring the Canadian Grain Handling and Transportation System

Annual Report: 2000- 2001 Crop Year

Submitted to:

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Executive Summary

As the Monitor of Canada's Grain Handling and Transportation System (GHTS), Quorum Corporation is pleased to submit its first annual report for the crop year ended July 31, 2001. The report focuses on prairie grain that is moved to export position. The report compares changes between the 1999-2000 and 2000-2001 crop years, under the terms defined by the Grain Monitoring Program. In some cases, the year-over-year changes reflect on-going trends. In others cases, a longer timeline will be required before the Monitor can confirm whether or not new trends are taking place.

Industry Overview

Volumes

Our analysis reveals a system that responded well in the crop year 2000-01 in the face of decreased grain production, a changing infrastructure, and reduced volumes. The system moved a marginally smaller volume of grain than in the 1999-2000 crop year. Country elevator throughput increased by 2.4%, while rail volumes dropped 2.1%.

The sourcing of grain showed only modest change. There was a marginal decrease in the volume of export grain that originated on grain dependent branch lines (3.9%). In addition, the transfer of additional railway infrastructure to new shortline railways resulted in an 11.7% increase in the relative volume of grain originated by these carriers as a whole. The proportion of elevators located on grain-dependent lines relative to the whole system remained essentially unchanged at around 41%. Similarly, the proportion of grain originating on grain-dependent branch lines remained relatively constant at 34%.

Infrastructure

The face of the country elevator network changed significantly as another 14.8%, or 136 elevators dropped from the system. However, the storage capacity of the system decreased only 4.1% since, not surprisingly, the bulk of the facilities that were closed were of the smaller conventional variety. Nonetheless, 23 of the closed facilities were capable of handling more than 25 cars. This may mark the start of a new trend towards closing some larger elevators, rather than closing only smaller facilities having a loading capacity of less than 25 cars. Moreover, it appears that there is clear focus on those facilities capable of loading 50 or more cars at a time (the threshold we have used to distinguish conventional elevators from high throughput). At the same time, the remaining elevators are gathered around a smaller number of delivery points – 554 versus 639 a year earlier.

The railway network in Western Canada was reduced by 462 miles, or 2.4% through the monitoring period (August 1, 1999 to July 31, 2001). There were 377 miles removed from the grain dependent network and 85 miles from the balance of the system.

There was one line transfer in Western Canada during the 2000-01 crop year, from CP to Great Western Railway (GWR), of lines located in South Western Saskatchewan. However, further abandonments by GWR and other operators resulted in only modest growth in shortline mileage of 1% in the monitoring period for a total of 3,090 miles.

Commercial Relations

Commercial Impacts

A number of initiatives aimed at improving the commercial viability and competitive nature of the GHTS were undertaken or attempted during the crop year. These ranged from market and price initiatives to applications for running rights under the provisions of the *Canada Transportation Act* (CTA).

The expansion of the Canadian Wheat Board's (CWB) tendering program during the 2000-2001 crop year can be termed a limited success. The CWB issued in excess of 500 tenders calling for the movement of some 4.9 million tonnes of grain – a number representing almost a third of its total grain movement to Western Canadian ports for the crop year. The response to these tender calls was, however, significantly lower. Bids relating to 1.6 million tonnes, or 10% of the CWB's total movement were ultimately received. These bids resulted in only 204 contracts for 577,800 tonnes being awarded. When combined with 280,800 tonnes of malting barley awarded by tender, a total of 858,600 tonnes was shipped under the tendering program, representing 5.4% of the Board's total movement to Western Canadian ports. Less than 2% of the cars unloaded at destination were assessed with penalties for failing to meet the grade or protein specifications established under the tender.

The inability of the CWB and the industry to reach the tendering target of 25% stemmed largely from the challenges in negotiations between the parties on the specifics of the logistics for the movement of CWB grains, including tendering issues. Throughout much of the 2000-01 crop year, negotiations on the specifics of this program remained ongoing. These negotiations were not brought to a successful conclusion until August 2001. Early indications suggest broader participation in the next crop year, resulting in significantly larger volumes moving under tender in the 2001-02 crop year.

The second major element of the government's grain handling and transportation reforms was replacing regulated maximum rates with a cap on the revenues railways could earn from regulated grain movements (the Revenue Cap) effective August 1, 2000. This included a rollback on the level of revenues for crop year 2000-01 averaging some 18%, or almost $6.00/ tonne. This resulted in a general reduction in posted single car tariff rates of 4% on average, varying from 1% to 10% depending on the origin and destination involved. The railways were largely able to achieve their revenue cap targets through other initiatives such as incentive rates for multiple car movements and contributions to capital investments in industrial projects such as elevator trackage. The Canadian Transportation Agency determined that both CN and CP were under their revenue caps for crop year 2000-01. The Agency estimated that the revenue cap resulted in savings to shippers of about $173 million, consisting of $167 million due to the 18% reduction in revenues from what would have resulted without the May 2000 policy reforms plus $6 million as a result of the railways' revenues being below their caps.

Indications are that the volume of traffic moving under incentive rates is expanding, and that they will continue to be a pivotal factor in promoting economic efficiencies in the grain handling and transportation system.

There was little change in posted elevation tariffs in the country elevator network across Western Canada. Manitoba, Alberta and British Columbia saw only small adjustments in rates, while the total average increase in Saskatchewan was slightly more than 2%. Notwithstanding the larger increase, average elevation tariffs in Saskatchewan remained lower than in neighbouring provinces.

With the exception of Churchill – where terminal elevation charges remain unchanged – the average posted tariff rates for terminal elevator handling at each of the Western Canadian ports generally increased. At Vancouver and Prince Rupert, small increases were seen for most commodities, the exceptions being peas, rye and flaxseed, which experienced more significant hikes. At Thunder Bay, the average increase for major commodities was in the order of 1% or less.

Other Commercial Developments

There were a number of other developments of note. In the fall of 2000, the railways assumed responsibility for the allocation of railcars and the role of the industry-based Car Allocation Policy Group was terminated. Both CP and CN implemented policies that permit the advance booking of cars and now use this new system as one of the key vehicles for capacity planning and service delivery. Both CN and CP introduced "shuttle" services midway through the 2000-01 crop year. These services build upon the incentive loading programs that have been in place for some time, by giving shippers the ability to commit to the movement of multiple trainload lots – rather than just a multiple block of cars – over a specified period of time. The discounts accorded to such movements are correspondingly greater than those seen in the more "traditional" incentive programs.

The first high capacity producer loading facility was opened by West Central Road and Rail near Eston, Saskatchewan and began operating early in the 2001-02 crop year. It is the first in a series intended to provide individual or groups of producers with the ability to load their own cars in multiple car blocks.

During the crop year, two applications for running rights were made under the CTA, by Ferroequus Railway and OmniTRAX Ltd. Both applications were dismissed by the Canadian Transportation Agency on the basis that the Act does not give the Agency authority to grant solicitation rights, a key component of each application.

System Efficiency and Reliability

There were a number of changes in efficiency measures related to the GHTS during the crop year, most of which were positive. For example, average throughput time (for delivery to a country elevator to loading on a vessel) decreased to 67.1 days, a 5.5% improvement over the base year. This is an indication that there is better overall management of grain logistics.

The country elevator network realized a reduction in average time in store of 8.0% to 38.3 days. A standard measure that pits inventory in store against throughput also indicates improved management of inventory at country positions. The average weekly stock to shipment ratio declined 12.9%, from 6.2 to 5.4 this crop year.

Railways contributed significantly to the improved efficiency of the GHTS. A key measure for railway efficiency is the car cycle, and the improvements realized here were impressive: a reduction of 16.9% for an average of 16.4 days overall. The new service packages and incentive programs railways have added have supported the shift towards traffic moving in larger car blocks, likely the primary element in explaining the improved car cycles. Although data limitations prevent a more detailed analysis, it is hoped that future reports will provide more insight on the car cycle improvements.

Port terminal operations efficiency experienced mixed results. The average days in store saw slight improvement to 20.1 days, a decline of 1%. Conversely, decreases in efficiency were seen in average terminal elevator turn ratios (-1.8%).

The number of vessels calling at port remained essentially unchanged from the year before, with some 960 having been loaded during the 2000-2001 crop year. A particular area of concern, however, was the increase in the amount of time spent by these vessels in port at Pacific Seaboard ports – both in waiting to load, and actually loading. In Vancouver, the average number of days spent waiting increased from 2.4 to 4.4 days, while time loading increased from 3.4 to 3.7 days. In Prince Rupert, while the average amount of time spent waiting decreased marginally, loading time increased from an average 1.8 days in the 1999-2000 crop year to 5.9 days in 2000-01.

While no definitive conclusions are drawn as to cause, it can be observed that these results were largely influenced by events occurring during the second quarter of the 2000-01 crop year. Specifically, indications show that during the second and third quarters of this crop year there was a significant draw down of terminal stocks and the time spent by railcars at destination. The consequence of the increased amount of time spent by these vessels in port is reflected in the relative increase in reported Pacific Seaboard demurrage charges ($15 million versus the $6.6 million recorded the year before) and a reduction in dispatch revenues ($9 million as compared to $11 million the year before).

Producer Impacts

Measures for producer impacts – along with an appropriate methodology for the calculation of producer netback – were identified as areas requiring additional research and consultation before being brought under the full umbrella of the program. That work has now been completed and the report, which prescribes a methodology and a series of measures, has been submitted to government officials (Transport Canada and Agriculture and Agri-Food Canada) for consideration.

This report includes a brief analysis of the posted prices for single car movements and handling, which are generally recognized as the rates born by producers when they deliver product to an elevator. While the producer netback measures will enhance this indicator in the future, total posted rates for transportation and handling charged to producers suggest that on average the producer's position remained unchanged from the base year. Although reductions were realized in single car rail rates, they were partially offset by modest increases in both the country and port terminal elevation fees. Compounding this were increased demurrage charges at Pacific Seaboard ports.

Other system-based measures on infrastructure, efficiencies, and reliability contained in the report provide an indication of the broader impacts affecting all industry stakeholders, including producers. For example, as noted above there was a 5.5% reduction in the amount of time spent by grain in the system; an indication of improved system efficiency. On the other hand, with a reduction in the number of delivery points, it is fair to assume that there was a corresponding increase in the distance a truck must travel to reach an alternate delivery point; the additional cost of which must ultimately be borne by producers.

Once the netback methodology and processes have been completed, the detailed measures will be produced and included in future reports. The Monitor will continue to work with the industry to develop a methodology for measures related to producer benefits and how they flow back to producers.

Implementation

The data collected from the various stakeholders in Canada's grain handling and transportation system serves as the backbone of the grain monitoring program. As such, its collection has been Quorum Corporation's primary focus of concern. Following award of the monitoring contract in June 2001, the company moved immediately to provide for data collection through a dialog with potential data suppliers. It should be noted that the Grain Monitoring Program has received a remarkable degree of cooperation from the stakeholders that provided this data. Yet, some difficulties still remain to be addressed. The Monitor will continue to work with all stakeholders to overcome these problems, and improve the value of program itself.

1. Introduction

On May 10, 2000, the Government of Canada announced a series of reforms to policies on the handling and transportation of Western Canadian grain, some of which were implemented through amendments to the *Canada Transportation Act* that came into effect on August 1, 2000. These measures included six primary reform elements, specifically:

- The introduction and gradual expansion of tendering for Canadian Wheat Board shipments to port as provided in a Memorandum of Understanding with the Minister responsible for the Canadian Wheat Board that came into force on August 1, 2000;
- The replacement of the maximum rate scale for grain with a cap on the annual grain revenues of railways through amendments to the *Canada Transportation Act*;
- Improvements to the branch line rationalization process through amendments to the *Canada Transportation Act*;
- Improvements to the Final Offer Arbitration process through amendments to the *Canada Transportation Act;*
- A five year $175 million transitional funding program for prairie grain roads; and
- A mechanism for continuous monitoring, measurement and reporting on the overall performance of the grain handling and transportation system.

The objectives of these reforms centre on the promotion of a grain handling and transportation system that better serves the needs of Canadian grain shippers and customers, through improved efficiency, effectiveness, and accountability.

On June 19, 2001, the government announced that Quorum Corporation had been selected to serve as the Monitor of Canada's Grain Handling and Transportation System. Under its two-and-a-half-year mandate, Quorum Corporation is to provide the government with a series of quarterly and annual reports aimed at measuring system performance as well as assessing the results of these initiatives and their effects on:

- Producers;
- The marketing mandate of the Canadian Wheat Board;
- Grain handling efficiency;
- Railway efficiency;
- Port efficiency; and
- Overall performance of the grain handling and transportation system.

This report constitutes the first in a series of quarterly and annual submissions to the Federal Government as prescribed by the mandate of the Grain Monitoring Program. These reports will be supplemented by an ongoing monitoring initiative and a series of complementary studies to examine specific issues of interest and concern.

Chapter 2 of this report introduces the Grain Monitoring Program, followed by a discussion on the program's general implementation. The subsequent four chapters comprise the core of the report and discuss the measures used for monitoring, as well as the general findings arising from them. The appendices encompass an extensive package of supporting data tables from which these findings are drawn.

2. The Grain Monitoring Program

Scope of the Grain Monitoring Program

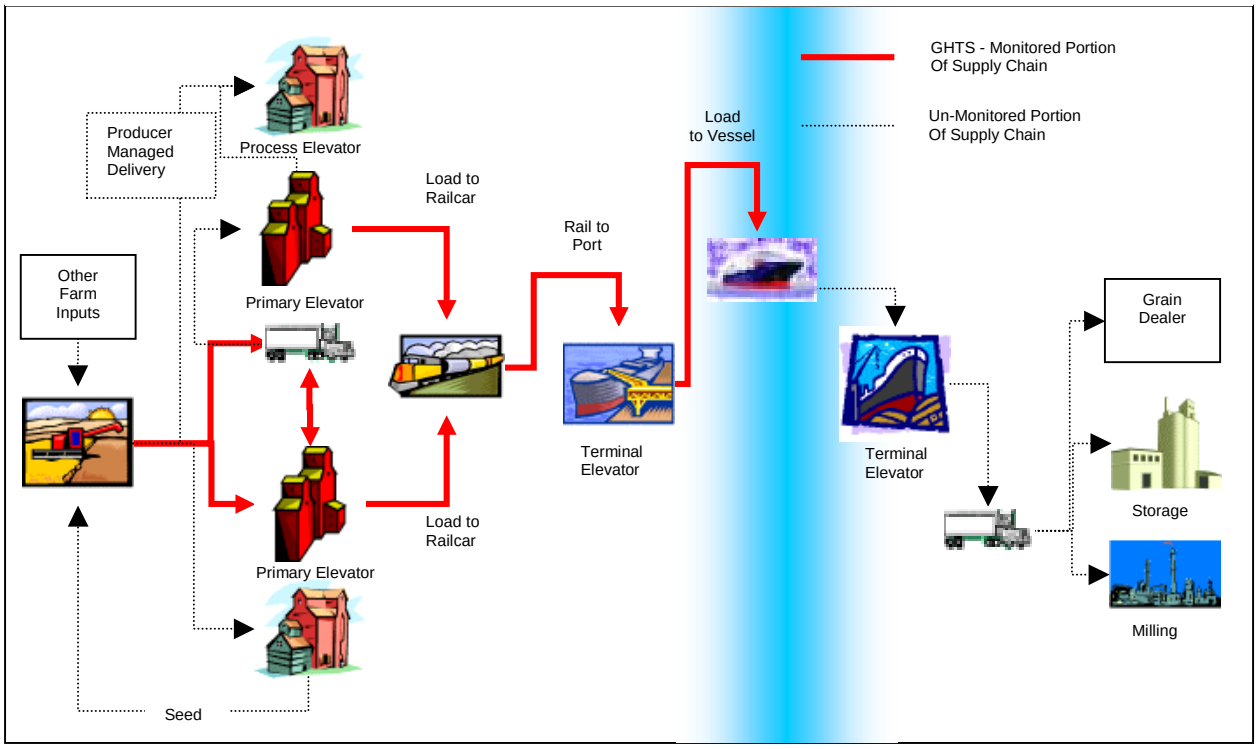
The Monitor's role chiefly consists of measuring the performance of Canada's Grain Handling and Transportation System (GHTS), and tracking changes over time. It is important, therefore, to explain the general approach, methodology, and specific measurements used in the Grain Monitoring Program (GMP).

The GMP is an initiative of the Canadian Government, under the sponsorship of the departments of Transport and Agriculture and Agri-Food. Its focus centres on tracking changes in the system, including gauging the effects arising from the two principal governmental reforms, namely:

- The introduction, and gradual expansion of tendered grain movements by the Canadian Wheat Board; and
- The replacement of the maximum rate scale for rail shipments with a cap on the annual revenues that railways can earn from the movement of regulated grain.

In a broader sense, these reforms are 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 operations. Using a series of indicators, the GMP aims to measure the performance of both the system as a whole, and its constituent parts. With particular consideration to evolving logistics and contracting arrangements, the program is designed to reveal whether the movement of grain through the logistics chain (from the farm gate to lake and sea-going vessel) is being done more efficiently and with more reliability than before.

Figure 1: The Grain Handling and Transportation System



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

- *Series 1 – Industry Overview*
  Measurements relating to annual grain production, traffic flows and changes in the GHTS infrastructure (country and terminal elevators and rail lines).

- *Series 2 – Commercial Relations*
  Measurements focusing on the tendering activities of the Canadian Wheat Board as it moves towards a more commercial orientation as well as changes in operating policies and practices related to grain logistics

- *Series 3 – System Efficiency*
  Measurements aimed at gauging the operational efficiency with which grain moves through the logistics chain.

- *Series 4 – Service Reliability*
  Measurements focusing on whether the GHTS provides for the timely delivery of grain to port in response to prevailing market demands.

- *Series 5 – Producer Impacts*
  Measurements designed to capture the value to producers from changes in the GHTS. Focused largely on the calculation of "producer netback," these measures are currently under development and as such are not included in this report.[1]

Reporting Requirements

A cornerstone of the GMP is the assembly and presentation of the aforementioned measurements in a series of annual and quarterly reports to the Ministers of Transport; Agriculture and Agri-Food; and the Minister responsible for the Canadian Wheat Board. These reports are designed to provide a "high level" commentary on the performance of the GHTS as a whole, and to highlight any major changes or trends observed in the 30-month period under review. In addition, the Monitor is also charged with conducting:

- *On-going Monitoring*
  A program internal to the Monitor that provides for the assembly of weekly, and daily information aimed at early detection of short-term problems relating to capacity constraints, bottlenecks or other operational failures and is intended to provide insight that will be used in the preparation of quarterly and annual reports.

- *Supplementary Work Program*
  In developing the GMP, the government identified six areas, which required additional study to complete the monitoring design. A review of the specific projects covered by the Supplementary Work Program can be found in Appendix 2.

- *Ad hoc and Special Studies*
  The government, through its program design, envisioned that there could be a need for studies into specific issues from time to time. Such examinations are at the discretion of the government.

[1] The GMP calls for the development of an appropriate methodology for calculating "producer netback". A study outlining a proposed methodology was submitted to the Government of Canada in January 2002. It is anticipated that producer netback measures, dating back to the 1999-2000 crop year, will be included in the next annual report of the Monitor.

Program Implementation

The most critical step in the implementation process involved defining and securing the data that would ultimately form the foundation of the GMP. The groundwork for this was developed in a series of consultative sessions held with the stakeholder community throughout the summer and early fall of 2001. The Monitor met with representatives from five principal stakeholder groups:

- *Producer Groups*
  With the significant number of producer groups found in Western Canada, particular effort was given to ensuring that the Monitor met with representatives from a broad cross-section that reflected different commodity and geographic interests.

- *Grain Companies*
  The Western Grain Elevator Association (WGEA), and the Inland Terminal Association of Canada (ITAC), serve as the principal representatives for the major owners of the various primary, process and terminal elevators found in Western Canada.

- *Railway Companies*
  The Canadian National Railway Company, Canadian Pacific Railway Company and the Hudson Bay Railway Company are all key suppliers of data to the GMP. Other regional and shortline carriers were and will be contacted as needed.

- *Government*
  Consultative sessions have been held with representatives from the transport and agriculture departments of the three Prairie Provinces.

- *Other Organizations*
  Included within this group are representatives from the Canadian Grain Commission; the Canadian Wheat Board; the Canadian Transportation Agency; the Winnipeg Commodity Exchange; the Chamber of Maritime Commerce; and the Canadian Ports Clearance Association. A number of these organizations are key suppliers of data to the GMP.

During these initial meetings, the stakeholders were presented with an outline of the GMP's broader goals, and the general informational needs that arose from the program.[2] This was subsequently distilled into a series of specific data elements, identified within what came to be called the Data Matrix. Approved by the government and circulated to the stakeholders at large, the Data Matrix served as a template in delineating the data needed from each of the stakeholders and how it would be employed in producing the measurements prescribed under the GMP.[3]

Concurrent with these stakeholder consultations, the Monitor's office began to create the information management systems needed to support the GMP. Development of the programming needed to transform the data into useable information could only begin in earnest, however, once data was actually received from the various providers themselves. The provisions contained within the Government of Canada's data regulations provide for the filing of certain data related to grain transportation and handling. No substantive changes have been made to these regulations since December 1999, before the government's May 2000 decision to implement the Grain Monitoring Program. The Monitor collects the majority of the data under a series of voluntary private agreements with individual data providers.[4]

[2] It is worth noting that the Monitor considers its dialogue with stakeholders an important means by which to promote industry participation in the overall process. To this end, further consultations on a variety of issues, including those governed by the Supplementary Work Program – as well as feedback on the functioning of the GMP itself are envisioned for 2002.

[3] The Data Matrix defines each measurement to be developed under the GMP, the specific data elements needed for their calculation, as well as the prospective supplier for the data to be used.

[4] The term "data regulations" refers to the *Carrier and Transportation and Grain Handling Undertakings Information Regulations* issued pursuant to Section 50 of the *Canada Transportation Act*. Part II and Schedule II of these regulations pertain to the filings that must be made by railway companies, while Part IX and Schedule IX applies to that required of grain companies.

These agreements address not only the confidential treatment to be given to the data collected, but its storage and ultimate disposition at the conclusion of the program as well.

While data transfers to the Monitor were being received throughout the fall of 2001, a significant portion of the data required still remained outstanding well into 2002. The Monitor believes that the late delivery of data by certain data providers, while largely unavoidable during the implementation phase of the GMP, can be largely circumvented in future through the concerted effort of all stakeholders. Yet it must still be noted that not all of the data requested of stakeholders has been made available to the Monitor. As a result, the Monitor is unable to calculate, or present, a number of the measures originally contemplated under the GMP. These include – but are not limited to – measures addressing the available carrying capacity of the railways' fleet of hopper cars; the grain volume moved in single versus multiple-car lots; the grain volume moved under incentive versus non-incentive rates; and the grain volume moving from either conventional or high throughput elevators. The Monitor will continue to work with all stakeholders to overcome the obstacles that will ultimately enable these measures to be produced for future reports in both an efficient and timely manner.

The 2000-2001 Crop Year Measures

The preceding discussion establishes the context for the measures presented in the following chapters. By definition, these measures focus primarily on the accomplishments recorded during the 2000-2001 crop year and are depicted in accordance with the series structure cited earlier, namely:

- Series 1 – Industry Overview
- Series 2 – Commercial Relations
- Series 3 – System Efficiency
- Series 4 – Service Reliability

Chapters 3 through 7 of the report contain tables that summarise the findings derived from a detailed analysis of the data collected under the GMP. These summary tables serve as the basis for much of the discussion that ensues. More comprehensive data tables are presented in Appendix 3 and are frequently referenced in both the summary tables as well as the text. The reader is encouraged to consult these tables as required.

By design, the analysis compares performance in the 2000-01 crop year against that of the 1999-2000 crop year – the base year established under the GMP. It should be noted, however, that some stakeholders have questioned the appropriateness of the base year. In particular, a number have voiced the opinion that the base year should have been set further back in time – some suggesting by as much as a decade. Many of those holding this view believe that the changes manifest in the past ten years have spurred those seen more recently, and are likely to drive those yet to come.

The task of assembling data for just the two crop years in question, let alone an additional eight, has proven to be a formidable one. For the historical data that was available, significant effort was often needed to both collect and convert the data into a usable form.[5] In some cases, the data simply did not exist. These constraints would have rendered the reconstruction of the historical record more problematic had a longer period been brought under examination. With the intent of the GMP being centred on tracking the changes arising from the governmental reforms beginning with the 2000-01 crop year, however, there can be no assurance that any appreciable benefit would have been derived from having set the base year further back in time.

[5] By way of example, a comprehensive historic record outlining the number of elevators in operation across the prairies at any given moment in time, along with information pertaining to individual elevator storage and siding capacities could not be found. Using information supplied by the Canadian Grain Commission, the Canadian Wheat Board, as well as individual grain and railway companies, Quorum Corporation effectively recreated this record.

3.0 Industry Overview

The purpose of the Industry Overview series of indicators is to track changes in grain production, the structure of the industry itself and the infrastructure comprising the GHTS. Changes in these areas can have a significant influence on the efficiency, effectiveness and competitiveness of the GHTS as a whole. Moreover, they may also be catalysts that shift traditional traffic patterns, the demand for particular services, and the utilization of assets.

Highlights – 2000-2001 Crop Year

Volumes

- *Production was down 1.9% from the previous year, impacting the grain movements by - 2.1%.*
- *Carry forward stock increased 31.8%.*
- *Traffic originating on Shortlines increased 11.7%.*
- *The proportion of covered hopper traffic originating on grain-dependent branch lines decreased by 3.2%.*

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Country Infrastructure

- *Number of elevators reduced by 136 or 14.8%, but elevator capacity reduced only 4.1%, most of which was located on Non-Grain Dependent lines.*
- *Number of delivery points in the system dropped to 554 from 639 the previous year, a reduction of 13.3 %.*

Railway Infrastructure

- *Total network in Western Canada decreased by 2%, reflecting a decrease of 6.1% on the grain dependent lines and 0.6% on the Non-Grain Dependent.*

Port Terminal Infrastructure

- *One additional port terminal facility was licensed; Vancouver Wharves brings the total to 16.*

The rationalization of prairie elevators and railway branch lines that has taken place over the past three decades is well known. There has also been a significant change in the structure of the industry itself. Producer cooperatives have evolved into even larger corporate entities with broader geographic and commercial interests. At the same time, a greater portion of the country's overall grain supply is being directed towards livestock production. Even Canada's position as a supplier of grain to the world has waned in the face of increased foreign competition.

An understanding of the evolutionary forces at work in this dynamic environment provides valuable insight into the performance of the GHTS.

Production and Supply *[Measurement Subseries 1A]*

	1999 – 2000	2000 - 2001	% VAR	Table No.	Description
▼	55,141.7	54,072.6	-1.9%	1A-1	Crop Production (000 tonnes)
▲	7,418.2	9,775.6	31.8%	1A-2	Carry Forward Stock (000 tonnes)

Western Canadian production totalled some 54.1 million tonnes in crop year 2000-01, a modest decline of 1.9% from the 55.1 million tonnes recorded in the base year. This consolidated figure, however, obscures some of the more significant fluctuations that occurred provincially. A 19.5% increase in Manitoba's production came largely from the fact that a smaller number of hectares were seeded in 1999 as a result of excessive moisture. Conversely, Alberta's 13.1% decrease in production is attributable to the fact that 1999 was a bumper crop. Only production in Saskatchewan and British Columbia remained relatively steady through these two years. [See Table 1A-1 in Appendix 3.]

Although domestic production remained largely unchanged, a year-over-year comparison of Western Canadian carry-forward stock showed a dramatic increase of 31.8%, from 7.4 million tonnes to 9.8 million tonnes at the beginning of the 2000-01 crop year[6]. While the carry-forward stock for wheat climbed by approximately 0.8 million tonnes (or 33.4%), the largest gain was for canola. Increasing by some 1.2 million tonnes (or 235.3%), canola carry-forward stock at the beginning of the 2000-01 crop year totalled over 1.7 million tonnes. These increases reflect record canola production in 1998 and again in 1999. [See Table 1A-2 in Appendix 3.]

[6] Carry forward stock is measured as stock on farms and in primary elevators.

Combined, the grain stock carried forward into the beginning of the 2000-01 crop year, along with that harvested in 2000, yielded a total Western Canadian grain supply of 63.9 million tonnes, a modest gain of 2.1% over the previous year. It should be noted this will not be repeated in the 2001-02 crop year. Owing to the harsh growing conditions experienced on the prairies in 2001, the grain supply is estimated to fall by a factor of 20% from the 2000-01 level. [7]

Rail Traffic *[Measurement Subseries 1B]*

	1999-2000	2000-2001	% VAR	Table No.	Description
▼	26,440.0	25,883.9	-2.1%	1B-1	Railway Grain Volumes (000 tonnes) – Origin Province
				1B-2	Railway Grain Volumes (000 tonnes) – Primary Commodities
				1B-3	Railway Grain Volumes (000 tonnes) – Detailed Breakdown

Reflecting the modest decline in crop production for 2000, the grain volumes moved by rail to Western Canadian export positions fell by 2.1% to 25.9 million tonnes in the 2000-01 crop year.[8] This corresponds to approximately 40% of the overall Western Canadian grain supply. [See Tables 1B-1, 1B-2, and 1B-3 in Appendix 3.]

Volumes destined to both Vancouver and Thunder Bay varied little from those in the 1999-2000 crop year – declining by 0.4% in the case of the former, and climbing by 3.7% in the case of the latter. Significant shifts, however, occurred in the grain volumes directed to the northern ports. Receiving some 2.3 million tonnes, Prince Rupert's volume declined by 29.5% in comparison to the base year, while the volume handled at Churchill increased by 48.4% to 0.7 million tonnes.

Shifts were also noted in the origins for grains moving through West Coast ports. In particular, the volume of wheat and canola sourced from Manitoba during the 2000-01 crop year showed significant gains at both Vancouver and Prince Rupert. This, however, appears to have been rooted in the aforementioned swings in provincial production levels and a need to source quality specific stock, rather than in a fundamental change in sourcing strategies.

Country Elevator Infrastructure *[Measurement Subseries 1C]*

	1999-2000	2000-2001	% VAR	Table No.	Description
▼	639	554	-13.3%	1C-1	Grain Delivery Points (number)
▼	7,443.9	7,137.0	-4.1%	1C-1	Grain Elevator Storage Capacity (000 tonnes)
▼	917	781	-14.8%	1C-1	Grain Elevators (number) – Province
				1C-2	Grain Elevators (number) – Railway Class
				1C-3	Grain Elevators (number) – Grain Company
–	317	319	0.6%	1C-4	Grain Elevators Capable of Incentive Loading (number) – Province
				1C-5	Grain Elevators Capable of Incentive Loading (number) – Railway Class
				1C-6	Grain Elevators Capable of Incentive Loading (number) – Railway Line Class
▼	43	23	-46.5%	1C-7	Grain Elevator Openings (number) – Province
				1C-8	Grain Elevator Openings (number) – Railway Class
				1C-9	Grain Elevator Openings (number) – Railway Line Class
▲	130	159	22.3%	1C-10	Grain Elevator Closures (number) – Province
				1C-11	Grain Elevator Closures (number) – Railway Class
				1C-12	Grain Elevator Closures (number) – Railway Line Class
–	217	n/a	n/a	1C-13	Grain Delivery Points (number) – Accounting for 80% of Deliveries

Note: 1C-13 – At the time of release, detailed *grain deliveries to elevator* statistics had not been completed or released by the CGC, who is the source for this data

[7] The final estimate of crop production issued by Statistics Canada projects a 21.3% decline for 2001-02 crop year.

[8] The railway grain traffic referred to includes only that portion moving to a designated Western Canadian port in accordance with the provisions of the Canada Transportation Act. It does not include grain traffic originating in Western Canada and destined to either Eastern Canada or the United States of America.

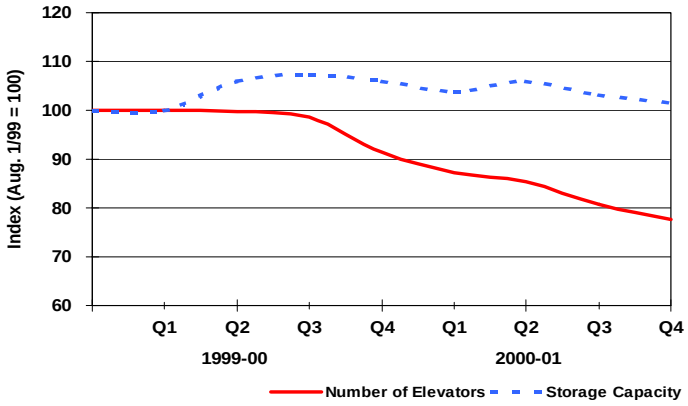
The effort to rationalize the GHTS infrastructure continues with both elevators and railway lines being shed in the process. By the end of the 2000-01 crop year, the number of primary and process elevators located in Western Canada had fallen to 781, a reduction of 14.8% from 917 the year before, and a 22.2% reduction from the 1,004 in place as at August 1, 1999. This network of elevators stands in dramatic contrast with a system that had almost 5,000 such facilities on the prairies some 30 years ago. [See Tables 1C-1, and 1C-2 in Appendix 3.]

The facilities within the remaining network are congregated around a fewer number of grain delivery points. By the end of the 2000-01 crop year, the number of active delivery points within Western Canada had fallen to 554, a reduction of 13.3% from 639 the year before and a 20.9% reduction from 700 at the beginning of the review period. More noteworthy is the fact that one-third of these points account for 80% of overall grain tonnage delivered by producers into the system. [See Table 1C-13 in Appendix 3.]

Continuing a well established trend, an additional 159 facilities were closed during the 2000-01 crop year. This marked a 22.3% increase over the 130 elevators closed the year before and brought the total number of closures for the two-year period to 289[9]. Some 266 (or 92.1%) of these facilities were relatively small in size; having an average storage capacity of only 3,130 tonnes and insufficient track capacity to support the loading of 25 or more railcars at a time.[10] [See Tables 1C-10, 1C-11, and 1C-12 in Appendix 3.]

While the general economic forces that have shaped the consolidation strategies of the grain companies undoubtedly parallel those at play in other industries, there can be little doubt that this strategy is also being influenced by the railway's use of financial incentives to promote the shipment of grain in multiple, rather than single, car blocks.[11] From the vantage point of an individual grain company, these incentives serve to promote the use of elevator facilities with higher car-loading abilities (Class B, C, and D elevators) over those with less (Class A).

Figure 2: Primary Elevators and Storage Capacity



Moreover, with the beginning of the 2000-01 crop year, both CN and CP increased the discounts accorded to shipments in blocks of 50 or more cars by a further $1.00 per tonne. In addition, both carriers also introduced additional incentives during the second quarter of the crop year favouring multiple trainload shipments. These changes served to further marginalize elevators capable of loading less than 50 cars at a time, namely the Class A and B elevators. It is perhaps worth noting that these actions coincide with the rise in the number of elevator closures recorded during the 2000-01 crop year.

These rationalization efforts are particularly manifest among the larger grain companies and are reflected most vividly in the decline in the number of elevators located in Saskatchewan and Alberta over the past two crop years, 129 (or 24.5%) in the case of the former, and 71 (or 28.2%) in the case of the latter. Saskatchewan Wheat Pool has proven the most aggressive; culling the number of its elevator facilities by 102 (or 33.4%) since the beginning of the 1999-2000 crop year. Agricore Cooperative Ltd. – accounting for the second largest number of closures during this period, reduced its network of elevators by 46 (or 17.8%). [See Table 1C-3 in Appendix 3]

[9] The net change in elevators reflects a combination of elevator closures and openings throughout the course of the crop year.

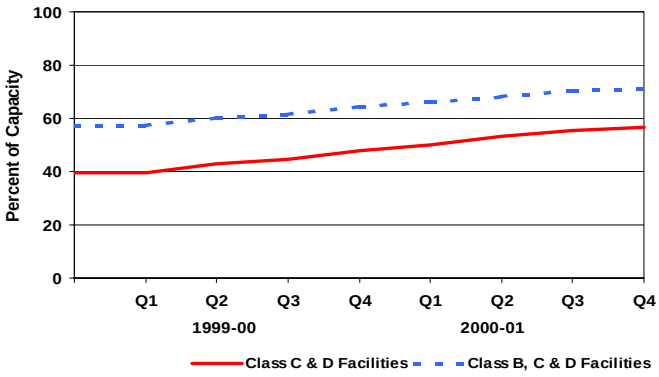
[10] For comparison purposes, primary and process elevators are grouped into classes that reflect their loading ability (as defined by the number of car spots at each facility). The facilities cited here, namely those having 0-24 car spots, are denoted as Class A elevators. Those having 25-49 car spots are denoted as Class B; those with 50-99, Class C; and those with 100 or more, Class D.

[11] These incentives are built around multiple car shipment thresholds of 25, 50 and 100 cars. As of August 1, 1999, shipments in blocks of 25-49 cars received a discount of $1.00 per tonne from the published tariff rate for single car movements; those in blocks of 50-99, $3.00; and those in blocks of 100 or more, $5.00.

Despite the more dramatic declines in the number of elevator facilities, the associated overall storage capacity for these facilities fell by only 4.1% in the 2000-01 crop year – from 7.4 to 7.1 million tonnes. The reason for this stems from the fact that while the grain companies were methodically closing their less-efficient Class A and B elevators, they were also enlarging, and adding to their Class C and D facilities. Indeed, the capacity added through their investment in these new or expanded facilities marginally outpaced that being removed through closure. As a result, the overall storage capacity actually increased from 7.0 million tonnes at the beginning of the 1999-2000 crop year, to a high of 7.5 million tonnes by the end of the third quarter. And while the rate at which new capacity was being introduced has since been eclipsed by that being closed, overall elevator storage capacity at the end of the 2000-01 crop year stood some 100,000 tonnes higher (or 1.6 %) than two years previously.

Since the decision to either expand or build new facilities is partially tied to a grain company's ability to realize the financial benefits from shipping grain in multiple car blocks, this redistribution can best be seen in the relative change in both the number and storage capacity of elevators capable of loading cars in incentive blocks. While the number of such facilities increased by a mere two – from 317 to 319 (or 0.6%) – in the 2000-01 crop year, the associated storage capacity increased by 284,000 tonnes (or 5.9%), from 4.8 to 5.1 million tonnes. The scope of this shift becomes more apparent when considering the corresponding increase over the full two-year period: 20 facilities (or 6.7%), and 1,043,700 tonnes (or 25.8%).[12] [See Tables 1C-4, 1C-5, and 1C-6 in Appendix 3.]

Figure 3: Share of Storage Capacity – Class B, C, and D



Collectively, these elevators now account for 40.8% of the overall number within the GHTS, and 71.4% of the storage capacity. This contrasts significantly with the relative proportions at the beginning of the 1999-2000 crop year; namely 29.8% and 57.7% respectively. The growing importance of the Class C and D elevators can also be seen when examined separately. These larger facilities now account for 21.5% of the elevators, and 56.5% of the overall capacity; a significant swing from the 11.9% and 39.4% they held respectively at the beginning of the 1999-2000 crop year.

Early indications suggest that the number of grain elevators is likely to continue declining and that the bulk of the system's storage capacity will increasingly be claimed by an even smaller number of larger facilities, driven partially part by the railways' incentive pricing structures and the grain companies' movement to higher capacity facilities.

Railway Infrastructure *[Measurement Subseries 1D]*

	1999-2000	2000-2001	% VAR	No.	Description
▼	4,876.6	4,577.7	-6.1%	1D-1	Railway Infrastructure (route-miles) – Grain-Dependent Network
–	14,513.5	14,428.1	-0.6%	1D-1	Railway Infrastructure (route-miles) – Non-Grain-Dependent Network
▼	8,680.7	8,403.9	-3.2%	1D-2	Railway Grain Volumes (000 tonnes) – Grain-Dependent Network
▼	16,977.3	16,751.7	-1.3%	1D-2	Railway Grain Volumes (000 tonnes) – Non-Grain-Dependent Network
▲	3,043.0	3,090.9	1.6%	1D-3	Shortline Railway Infrastructure (route-miles)
▲	2,087.7	2,331.8	11.7%	1D-3	Shortline Railway Grain Volumes (000 tonnes)
▼	23,570.3	22,823.9	-3.2%	1D-5	Railway Grain Volumes (000 tonnes) – Class 1 Carriers
▲	2,087.7	2,331.8	11.7%	1D-5	Railway Grain Volumes (000 tonnes) – Class 2 and 3 Carriers
▼	371	309	-16.7%	1D-6	Grain Elevators (number) – Grain-Dependent Network
▼	513	440	-14.2%	1D-6	Grain Elevators (number) – Non-Grain-Dependent Network
▼	2,475.4	2,234.6	-9.7%	1D-6	Grain Elevator Storage Capacity (000 tonnes) – Grain-Dependent Network

[12] The full measure of the relative gain in Class C and Class D facilities is obscured by the inclusion of Class B facilities – which declined from 180 to 151 during the same period. The relative gains for Class C and D facilities alone are: 49 elevators (or 41.2%) and 1,262,200 tonnes (or 45.6%)

▼	4,847.6	4,776.6	-1.5%	1D-6	Grain Elevator Storage Capacity (000 tonnes) – Non-Grain-Dependent Network

The railway infrastructure supporting these elevators has also continued to evolve. The pace of that evolution peaked in the mid-1990s after Canada's principal carriers were given greater freedom under the *Canada Transportation Act* to rationalize their networks through either the abandonment or sale of rail lines. From the 20,952.5 route-miles in place at the beginning of 1996, total railway infrastructure in Western Canada fell to some 19,468.2 route-miles (7%) at the beginning of the 1999-2000 crop year.[13] During this same interval, the nation's primary Class 1 carriers [14] also transferred 2,863.7 route-miles of infrastructure to existing and newly formed shortline railways.

Although the pace of change that characterized this earlier period has abated significantly, the railway industry's rationalization efforts in Western Canada continue. In the 24 months covered by this review, a further 462.4 route-miles (2.4%) have been culled from the system as a whole, with 384.3 route miles (or 83.1%) of this having been removed during the 2000-01 crop year. At the same time, expansion of the regional and shortline network has slowed noticeably, increasing by a mere 47.9 route-miles (or 1.0%) during the 2000-01 crop year, as compared to the 246.8 route-mile gain (or 5.3%) witnessed the year before. [See Table 1D-1 in Appendix 3.]

With the transfer of some 329.1 route-miles from the Canadian Pacific Railway to the Great Western Railroad during the first quarter of the 2000-01 crop year, the Western Canadian regional and shortline railway network reached a zenith – 5,216.2 route-miles of infrastructure. This, however, was soon followed by some abandonments that served to reduce the network to 4,935.0 route-miles by year-end.

The majority of this reduction was attributable to the actions of RailAmerica, which significantly culled its Alberta-based operations in response to continuing declines in its traffic base, and the closure of several local grain elevators.[15] More noteworthy is the fact that these railway lines were largely grain-dependent.[16] Indeed, of the 384.3 route-miles of infrastructure abandoned in the 2000-01 crop year, 289.9 (or 75.4%) were grain-dependent lines.

This attrition rate, however, appears to reflect the geographic concentration of these elevator closures rather than any differential between the rates of closure for those facilities located along grain-dependent, and non-grain-dependent, branch lines. The number of active elevators situated along the grain-dependent railway network fell by 16.7% during the 2000-01 crop year – from 371 to 309. This only marginally outpaced the 14.2% decline for facilities located along the non-grain-dependent network during the same period. Indeed, the relative decline in the proportion of elevators located along grain-dependent branch lines was slight – falling from 42.0% to 41.3%. On the whole, these patterns reveal that the elevator infrastructure is diminishing in roughly equal proportion. [See Table 1D-6 in Appendix 3.]

[13] Western Canadian railway infrastructure is measured by the route-miles associated with those lines wholly within Canada, and situated west of Armstrong and Thunder Bay, Ontario. They include not only those belonging to the country's primary Class 1 carriers, namely, Canadian National and Canadian Pacific, but to the less prominent Class 1, 2, and 3 carriers as well. Among the more significant of the latter grouping are the Burlington Northern Santa Fe Railway, the British Columbia Railway Company and the various shortline holdings of RailAmerica and OmniTRAX. This measurement of infrastructure excludes any mileage tied to sidings, yards or industrial trackage.

[14] The term "Class 1" carrier is a common railway industry classification used to denote carriers whose revenues exceed a prescribed threshold established by the American Association of Railroads. In Western Canada these carriers include Canadian National, Canadian Pacific and the Burlington Northern Santa Fe. Class 2 carriers have lower revenue thresholds, and largely refer to regional carriers such as the British Columbia Railway Company. Class 3 carriers have even lower thresholds, and generally refer to shortline railways.

[15] RailAmerica operates three shortline railways in Alberta: the Central Western Railway; the Lakeland and Waterways Railway; and the Mackenzie Northern Railway. The abandonments referred to here are largely tied to the company's Lakeland and Waterways Railway subsidiary.

[16] The term "grain-dependent branch line", while self-explanatory, also 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. As a result, the legally defined grain-dependent branch line network is a continuously changing one. 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.

Nevertheless, there are differences that have been observed between the Class I carriers (CN and CPR) and other carriers. The number of active elevators located along the grain-dependent branch lines of the former fell by 19.6% in the 2000-01 crop year – from 317 to 255. Conversely, those tied to the operations of other carriers remained unchanged at 54.[17] The statistics over the two crop years provides an even sharper contrast: the number of facilities located on CN and CPR lines dropped by 31.6%, while those located on lines operated by regional and shortline carriers actually increased by 14.9%. On the other hand, reductions in the number of facilities located along the non-grain-dependent networks of both carrier groups revealed little difference – 14.2% in the case of main line carriers and 15.1% in the case of other carriers.

Hidden by this, however, is the fact that elevator expansion and construction has generally favoured sites local to the non-grain-dependent network of Class 1 carriers by a factor of five to one. This is reflected in the associated storage capacity for these facilities. While the number of elevators local to non-grain dependent railway lines fell by 14.2%, the associated storage capacity fell by only 1.5%. These figures contrast sharply with the somewhat more "coupled" decline of 16.7% in the number, and 9.7% in the storage capacity, of elevators local to the grain-dependent railway network. Early indications for the 2001-02 crop year as well as the preponderance of the existing data suggests that this trend is likely to continue, if not accelerate in the face of the facility rationalization programs of the grain companies themselves.

The modest 2.1% decline in railway traffic volume cited earlier appears to have been borne somewhat more disproportionately by the grain-dependent, rather than the non-grain-dependent, network. Tonnage originating on the former declined by 3.2% – from 8.7 to 8.4 million tonnes – while that originating on the latter saw a reduction of 1.3% – from 17.0 to 16.8 million tonnes. Nevertheless, such modest overall shifts produced little real change in the relative proportion of the volume originated by the non-grain-dependent network – 66.6% versus 66.2% a year earlier. [See Table 1D-2 in Appendix 3.]

A gain of 11.7% was recorded in the grain volumes originating with prairie shortline carriers. Climbing from 2.1 to 2.3 million tonnes, this largely reflects the impact arising from the transfer of railway lines in Southwest Saskatchewan to new shortline operators during the first quarter of the 2000-01 crop year. This transfer also served to boost the proportion of tonnage originated by such carriers from 8.1% to 9.3%. Noteworthy too is the fact that this transfer also served to more than double the annual volume of durum originated by shortline carriers. [See Tables 1D-3, and 1D-5 in Appendix 3.]

Terminal Elevator Infrastructure *[Measurement Subseries 1E]*

	1999-2000	2000-2001	% VAR	Table No.	Description
▲	15	16	6.7%	1E-1	Terminal Elevators (number)
–	2,678.6	2,703.6	0.9%	1E-1	Terminal Elevator Storage Capacity (000 tonnes)
▼	278,255	271,606	-2.4%	1E-2	Terminal Elevator Unloads (number) – Covered Hopper Cars

Although the number of terminal elevators located in Western Canada has steadily declined over the course of the past quarter century, this decline largely preceded the period under review. In fact, the number of licensed terminal facilities in operation actually increased – climbing from 14 at the outset of the 1999-2000 crop year, to 16 at the end of the 2000-01 crop year. This arose from the establishment of two new licensed facilities towards the end of the 1999-2000 crop year: the first being the 121,000-tonne Mission Terminal facility in Thunder Bay; and the second being the 25,000-tonne Vancouver Wharves facility in North Vancouver. With the opening of the latter facility during the first quarter of the 2000-01 crop year, the overall licensed terminal storage capacity at Western Canadian ports increased by a modest 0.9% to stand at just over 2.7 million tonnes. [See Table 1E-1 in Appendix 3.]

[17] It should be noted that the additional transfer of railway lines in southwest Saskatchewan effectively increased the number of elevators tied to shortline operations to 71 during the first quarter of the 2000-01 crop year. The subsequent closure of 17 of these elevators (or 23.9%) effectively saw this number fall back to that in place at the beginning of the crop year.

The number of covered hopper cars unloaded at these licensed terminal facilities during the 2000-01 crop year shows a modest decline of 2.4% over those unloaded the year before – falling from 278,255 to 271,606 cars.[18] Although the handlings observed here reflect the same general traffic patterns cited earlier (See Measurement Subseries 1B – Rail Traffic), some differences are worthy of note.

Canadian National Railway (CN) either serves or provides the principal access to the northern ports of Prince Rupert and Churchill[19]. Although there was a 32.6% overall fall in the total number of covered hopper cars unloaded at Prince Rupert, from 38,492 in the 1999-2000 crop year, to 25,952 in the 2000-01 crop year, CN's overall handlings remained largely unchanged. In fact, CN's overall handlings increased from 144,800 to 145,630 cars (or 0.6%). This denotes a shift in the relative mix of traffic moving to Western Canadian export positions. Indeed, CN's handlings into the ports of Vancouver, Thunder Bay, and Churchill increased by 10.8%, 11.6%, and 44.9% respectively, representing a combined gain of 13,370 cars over the previous year. This volume served to more than offset the 12,540-car decline posted at Prince Rupert.

CP's covered hopper car handlings at Vancouver and Thunder Bay declined by 5.6% overall, from 133,455 in the 1999-2000 crop year, to 125,976 in the 2000-01 crop year. Such modest overall shifts produced little real change in the relative proportion of the volume terminated by CP, 46.4% versus 48.0% a year earlier. It should be noted that this is not necessarily a trend depicting a shift in market share but could be the result of a temporary shift in production. [See Table 1E-2 in Appendix 3.]

Industry Overview – Summary and Observations

A review of the data and measures pertaining to the structural aspects of the grain industry and specifically the GHTS provides for the following observations:

- A 1.9% decline in annual crop production was alleviated by a nominal increase in stock carried forward from the previous crop year resulting in a relatively constant volume available for movement;
- A net reduction of 2.1% in total grain moved to port was experienced, while total tonnes shipped from Western Canadian ports increased by 1.6%;
- Volumes moved through the country elevator network increased by 2.4% over the base year in spite of reduced crop production levels;
- The face of the country elevator network changed significantly during the 2000-2001 crop year with a net reduction of 136 elevators (14.8%). The bulk of facilities closed were smaller conventional operations, although there was 23 facilities closed that had the capacity of loading 25 car blocks. This marks a shift in the trend of closing only smaller elevators or perhaps the traditional definition of such elevators. This is confirmed by the measures of network capacity, which reveal a decline of only 4.1%;
- In concert with a reduction in country elevators is a decline in the number of grain delivery points, which was reduced by 85 locations or 13.3%.
- Changes were also observed in the sourcing and origin of grains. While shortline railway route miles did not increase appreciably, volumes shipped from these lines increased 11.7%. Originated volume from grain dependant and non-grain dependant rail lines decreased by 3.2% and 1.3% respectively.

Many of the changes represent a continuation of existing trends, and in some instances a variation in the pace of such change. It is not possible, nor prudent, at this time to conclude that these changes will continue in the future. Continued monitoring and measurement will provide further insight with respect to the nature of these structural changes and their impact on the overall performance of the grain handling system.

[18] The statistics cited here are drawn from the records of the Canadian Grain Commission. Although consistent with the volumes cited as having been handled by the railways, these counts differ as a result of differing data collection and tabulation processes.

[19] The Hudson Bay Railway directly serves the Port of Churchill. Traffic destined to Churchill is received in interchange from CN at The Pas, Manitoba.

4.0 Commercial Relations

One of the objectives of the government's regulatory reforms was to provide the GHTS with a more commercial orientation. To this end, a cornerstone element of these reforms is the introduction, and gradual expansion of tendering for Canadian Wheat Board (CWB) grain shipments to Western Canadian ports. By the 2002-03 crop year, the CWB is committed to tender at least half of its grain shipments to the ports of Vancouver, Prince Rupert, Thunder Bay and Churchill.

Of course, putting the GHTS on a commercial footing implies more than just the introduction of CWB tendering. The government expects that industry stakeholders will also forge new commercial processes that will lead to improved accountability. Examples of such potential changes include the introduction of new service packages from the railways, and revisions to the traditional role of the CWB in allocating railcars for the movement of grain.

Highlights

Tendering

- ***509 tender calls issued*** *during the crop year for 4.9 million tonnes of grain, which would account for 30.7% of CWB movements.*
- ***408 bids were received*** *offering 1.6 million tonnes, representing 10.2% of the total movements.*
- ***204 contracts were concluded****, for 577,800 tonnes, plus an additional 21 contracts for 280,800 tonnes of malting barley, for a total of 858,600 tonnes, representing* ***5.4% of the total CWB movements****.*
  - *242 tender calls representing 2.3 million tonnes received no bids at all.*
- *85.9% moved in multiple car blocks.*
- *90.5% of all movements originated in Saskatchewan*
- *Participation in the tendering program was limited due to ongoing negotiations between the major Grain Companies and the CWB.*
  - *Agreement between the parties was concluded in August of 2001.*

Other

- *Railway managed car allocation processes replaced the Car Allocation Policy Group (CAPG) process.*
- *Railways introduced shuttle programs allowing shippers to program multiple trainload lots over specified period of time.*
- *Producer car loading increased 37%.*
- *Revenue cap replaced regulated maximum rates.*

The purpose of this monitoring element is twofold: to track and assess the impact of the CWB's tendering practices as well as the accompanying changes in the commercial relations existing between the various stakeholders within the grain industry. This report focuses mainly on the implementation phase of tendering. Future reports will include a greater assessment of the impact of this initiative on the GHTS and its stakeholders[20].

Commercial Relations – Tendering
[Measurement Subseries 2A]

	2000-2001	% VAR	Table No.	Description
–	4,888.0	n/a	2A-1	Tenders Called (000 tonnes) – Grain
			2A-2	Tenders Called (000 tonnes) – Grade
–	1,629.2	n/a	2A-3	Tender Bids (000 tonnes) – Grain
			2A-4	Tender Bids (000 tonnes) – Grade
–	858.6 *	n/a	2A-5	Tendered Movements (000 tonnes) – Grain
			2A-6	Tendered Movements (000 tonnes) – Grade
–	4,297.0	n/a	2A-7	Unfilled Tender Movements (000 tonnes)
–	0.0	n/a	2A-8	Tendered Movements (000 tonnes) – Not Awarded to Lowest Bidder
–	280.8 *	n/a	2A-9	Tendered Movements (000 tonnes) – FOB
–	577.8	n/a	2A-9	Tendered Movements (000 tonnes) – In-Store
–	Note	n/a	2A-10	Distribution of Tendered Movements – Port
–	Note	n/a	2A-11	Distribution of Tendered Movements – Railway
–	Note	n/a	2A-12	Distribution of Tendered Movements – Multiple-Car Blocks
–	Note	n/a	2A-13	Distribution of Tendered Movements – Penalties
–	Note	n/a	2A-14	Distribution of Tendered Movements – Province / Elevator Class
–	Note	n/a	2A-15	Distribution of Tendered Movements – Month

* Note: Includes tendered malting barley volumes; Distribution measures cannot be summarized for this table

[20] The supplementary program calls for the review and development of a methodology for tracking tendered and non-tendered movements in the GHTS – see Appendix 2 – Supplementary Program

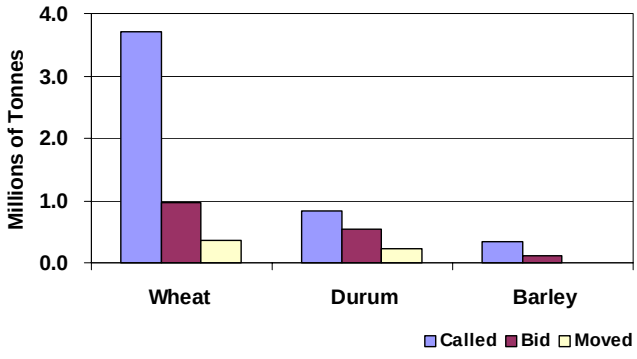
The introduction and gradual expansion of CWB tendering for grain shipments was implemented through a Memorandum of Understanding (MOU) between the CWB and the Minister responsible for the CWB that came into force on August 1, 2000. The MOU commits the CWB to commercially tender the movement of at least 25% of its business through the ports of Vancouver, Prince Rupert, Thunder Bay and Churchill, during the 2000-01 and 2001-02 crop years. It further commits the CWB to raise the level of its tendering activities to at least 50% in the 2002-03 crop year. Under the tendering program the successful bidder (grain company) is to become fully responsible for grain logistics. This includes full decision-making power with respect to where grain is sourced; which railway will transport it to port; the terminal facilities to be employed at the designated port; and all other arrangements to satisfy the tender.

The implementation of the tendering commitments has not gone unfettered. Throughout the 2000-01 crop year the CWB and the members of the Western Grain Elevator Association (WGEA) were unable to agree upon the means by which the program would be implemented. During this time frame, only a limited number of grain companies bid on the tender calls advanced by the CWB. It was not until August 10, 2001, that the CWB, the WGEA, and the Inland Terminal Association of Canada (ITAC)[21], announced that they had struck a three-year agreement (the Agreement) laying the groundwork for the adoption of the more commercially oriented system envisioned by the Government. In broad terms, the Agreement delineates how the tendering program is to be managed, and includes provisions relating to administration of the Car Awards Program for the balance of CWB movement, assignment of shipper status for wheat and barley sold through the CWB as well as performance incentives and penalties.

Before proceeding further, it should be noted that tendering is not an entirely new process for the CWB. It has, in fact, been used by the CWB in sourcing export malting barley for many years – including the 232,000 tonnes exported to China through the port of Vancouver in the 1999-2000 crop year. As this program predates the tendering activities initiated by the CWB as a result of the MOU – and is distinct from it – many of the measures under the GMP address the issue of malting barley tenders separately. In order to avoid confusion, the reader is cautioned that the measures discussed in this chapter refer largely to the tendering program implemented pursuant to the MOU.[22] The exception is found in those measures relating total tendered movements to overall CWB movements, and in FOB sales relative to in-store sales. This arises as a result of the fact that tendered malting barley is included in the tendering targets of the CWB, and also constitutes the only tendered FOB sales made by the CWB during the 2000-01 crop year.

During the 2000-01 crop year, the CWB issued 509 tender calls for shipments totalling approximately 4.9 million tonnes of grain. Half of the tender calls related to tonnage for delivery to the port of Vancouver, another 28% to Thunder Bay, 20% to Prince Rupert and 2% to Churchill. Collectively, this volume represented 30.7% of the 15.9 million tonnes ultimately shipped by the CWB to Western Canadian ports in the 2000-01 crop year. [See Tables 2A-1 and 2A-2 in Appendix 3.]

Figure 4: Tenders Called, Bids Received, and Tonnage Moved



From these calls, a total of 408 bids offering approximately 1.6 million tonnes of grain, or about a third of the tender volume called for were received by the CWB. This represents 10.2% of the overall shipments made by the CWB in the 2000-01 crop year. [See Tables 2A-3, and 2A-4 in Appendix 3.]

[21] The WGEA membership is drawn from major grain companies, and acts as a representative body on matters of broad interest to the membership. ITAC is comprised of inland terminals, and acts in a similar capacity for its membership.

[22] Additional details regarding the malt barley tendering program are included in the tables in Appendix 3.

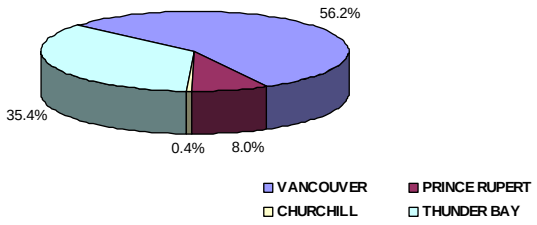
A total of 204 contracts were subsequently signed for the movement of approximately 577,800 tonnes of grain. In addition, another 21 contracts were signed for the movement of some 280,800 tonnes of malting barley. Accordingly, a total of 858,600 tonnes, accounting for 5.4% of the CWB's overall grain shipments moved under tender to Western Canadian port positions. [See Tables 2A-5, and 2A-6 in Appendix 3.]

This volume fell well below the 25% target called for under the MOU due to the lack of participation by most of the major grain companies in the program. Indeed, tender bids were received from only twelve grain companies, ten of which were ultimately awarded with tender contracts. Of the 509 tender calls issued by the CWB, 242 (or 47.5%) – representing 2.3 million tonnes – failed to secure any bids whatsoever. An additional 110 tender calls (or 21.6%) resulted in no award being granted as a result of the bidders' failure to comply with the specifications set out in the tender itself. [See Table 2A-7 in Appendix 3.]

The GMP includes a measure reporting the number of tenders and tonnage not awarded to the lowest bidder. All tender bids meeting contract specifications were candidates for contract awards. All contracts were awarded to candidates with the lowest bids. A number of low bids, which did not meet contract specifications were received, but were not considered for awards.

As part of the Agreement, the CWB also committed to issuing a number of Free on Board (FOB) tenders[23]. In FOB sales, the transfer of grain ownership from seller to buyer – and the assumption of all accompanying risk – occurs at the moment the grain exits the terminal spout and is loaded onto the awaiting vessel. The CWB indicates that, "the degree to which we issue FOB tenders will depend on the competitiveness of these tenders."[24] During the 2000-01 crop year, no such tenders were called under the new program. [25] Tender calls for malting barley, however, did incorporate FOB sales. During the 2000-01 crop year, some 280,800 tonnes of malting barley – comprising 32.7% of the overall tendered volume – was moved in this manner. [See Table 2A-9 in Appendix 3.]

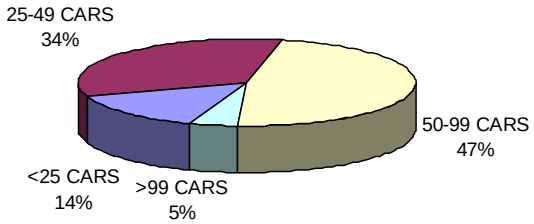
Figure 5: Tendered Movement by Destination Port



Of the 577,800 tonnes moved under the general tendering program, 56.2% was shipped to Vancouver, 35.4% to Thunder Bay, 8.0% percent to Prince Rupert, and 0.4% to Churchill. These proportions contrast significantly with those reflected in the tender calls, where almost a quarter of the overall volume was earmarked for the northern ports of Prince Rupert and Churchill. Nevertheless, these patterns underscore the continued dominance of the southern ports – and particularly that of Vancouver – in the workings of the GHTS. [See Table 2A-10 in Appendix 3.]

With respect to the use of the railway system, it was noted that CN secured a greater overall share of the movement of tendered grain than did CP, 55.4% vs. 44.6%.

Figure 6: Tendered Movement by Car Block Size



[23] CWB *Grain Matters, Sept. – Oct. 2001*
[24] Ibid.
[25] 2000-01 Sales were "in store", with either the CWB or the customer paying the "fobbing" costs.

A high proportion of this volume – some 85.9% – was also shipped in the multiple-car blocks prescribed under the incentive loading programs of these carriers. A total of 301,900 tonnes (or 52.3%) is estimated to have moved in blocks of 50 or more cars.[26] An additional 194,300 tonnes (or 33.6%) is gauged to have moved in blocks of 25-49 cars. It is noted that less than 2% of the cars unloaded at destination were assessed with penalties for failing to meet the grade or protein specifications established under the tender. [See Tables 2A-12, and 2A-13 in Appendix 3.]

Comprising 90.5% of the overall total, the vast majority of tendered tonnage originated in Saskatchewan with Manitoba and Alberta originating 5.6% and 3.9% respectively. In addition, a high proportion of this total volume (90.3%) came from high throughput elevator facilities.[27] [See Table 2A-14 in Appendix 3.]

The distribution of tenders called shows a relatively even distribution throughout the crop year, with 49.5% having been called during the first half and 50.5% during the second. The actual movement of tendered grain, however, revealed a contrasting pattern with 65.5% of the tendered tonnage having been unloaded at port positions during the latter half of the year. [See Table 2A-15 in Appendix 3.]

Although the evidence that can be drawn from the CWB's and the industry's initial efforts at tendering is limited, there is sufficient indication that the program is generating financial returns that will ultimately be passed on to producers through the final payment they receive from the CWB. Grain companies bid on tendered grain using a discount or premium to the in-store initial price quoted at either Vancouver or the St. Lawrence. During the 2000-01 crop year, all tenders awarded were either at a discount to, or on a par with, the initial price. These bids are effectively redistributed back to producers through the CWB's pool accounts. Indeed, the CWB reports that the transportation reforms have earned in excess of $14 million for farmers during the 2000-01 crop year, and the first quarter of the 2001-02 crop year.[28] This is based on tendering results, freight and terminal rebates for meeting volume-related targets, and financial penalties for non-performance.

There are differences of opinion concerning the impact of the CWB tendering program. Supporters of the program claim that the tendering system forces grain companies to share the benefits derived from the system's increased efficiency with farmers. Critics of the current system suggest that recompense through the pool accounts masks the market signals that they claim would lead to increased efficiency within the GHTS. It is likely that this debate will continue until more experience is gained by the industry.

Commercial Relations – Other

In addition to the wider use of tendering by the CWB, there has been a profound change in the manner in which railcars are distributed for loading across the prairies. Until the fall of 2000, the industry-based Car Allocation Policy Group (CAPG) and the Non-Board Allocation Office addressed high-level railcar allocation issues, established rules for their allocation in times of tight supply or shortage, and allocated non-Board grains among individual shippers.[29] Since that time, the railways have assumed responsibility for, and internalized the processes supporting, the allocation of railcars between CWB and non-CWB commodities.

In late 2000, CP introduced MaxTrax – an Internet based system that allows grain shippers to advance-book a portion of their railcar needs for future loadings in accordance with the carrier's projected capacity. CN implemented a comparable program – known as GT Products – around the same time. Both carriers now use these as one of the key vehicles for capacity planning and service delivery.

[26] Data relating to the movement of non-tendered grain in conjunction with tendered grain as part of a multiple car block is unavailable. The estimates made here of cars moving in multiple car blocks should, therefore, be considered as a minimum.

[27] High throughput elevators are deemed to be those capable of loading in blocks of 50 or more cars (Class C and D facilities).

[28] CWB, "First Quarter Transportation Results"

[29] The Car Allocation Policy Group (CAPG) was established following the repeal of the Western Grain Transportation Act in 1995 and included representation from the railways, grain companies, CWB and producers. The Non-Board Allocation Office was established following the closure of the Western Grain Transportation Office in 1996 as an interim measure to provide non-Board car allocation while the industry worked out provisions for direct shipper-carrier negotiated allocations.

In addition, both railways have expanded their product offerings to meet the changing transportation needs of their customers. Perhaps most noteworthy was the introduction of "shuttle" services midway through the 2000-01 crop year. These services build upon the incentive loading programs that have been in place for some time, by giving shippers the ability to commit to the movement of multiple trainload lots – rather than just a multiple block of cars – over a specified period of time. The discounts accorded such movements are, of course, correspondingly greater.

While it might appear that such instruments benefit only the larger grain companies, there can be little doubt that smaller shippers are availing themselves of tools at their hands as well. The Canadian Grain Commission reports that producer car loadings during the 2000-01 crop year increased by 37% from the year before – from 3,441 to 4,724 cars. While this volume falls far short of the number from a decade earlier (nearly 14,000 in 1991-92 crop year), it has nevertheless been growing. With the advent of producer loading facilities such as the one established by West Central Road and Rail near Eston, Saskatchewan, this trend might well continue. The Eston facility – which began operating early in the 2001-02 crop year – is the first in a series intended to provide individual or groups of producers with the ability to load their own cars in multiple car blocks.[30]

In addition to the aforementioned, other forces were working to reshape the competitive environment.

The Prairie Alliance for the Future (PAFF) – a joint initiative of certain farm groups and the Brotherhood of Maintenance of Way Employees (BMWE) – entered into an agreement with CN to operate certain branch lines in central and northern Saskatchewan. PAFF's business concept envisions providing both local grain gathering (elevation) and rail transportation services under one umbrella, with an eye towards reducing direct producer costs. In a quest to secure the necessary capital and operational funding, PAFF approached a number of groups – including provincial governments. Although this effort has thus far proven unsuccessful, PAFF continues to actively solicit funds to initiate operations.

In February of 2001 there were two attempts by individual railway operators to provide shippers with alternative rail services. Filing applications under Section 138 of the CTA, these initiatives sought to establish a competitive service by using the Act's running rights provisions to secure access to the infrastructure of existing Class 1 carriers. Specifically, the cases brought before the Canadian Transportation Agency were:

- *Ferroequus Railway Company* [31] – Applied for running rights over CN trackage between North Battleford, Saskatchewan, and Prince Rupert, British Columbia, for the express purpose of moving grain to export position.

- *OmniTRAX Ltd*.[32] – Applied for running rights over a large section of CN trackage located in northern Saskatchewan and Manitoba, for the purpose of soliciting and moving traffic in conjunction with either CN or CP. Although the targeted traffic base was potentially broader, the vast majority involved the movement of grain.

In both cases, the Agency dismissed these applications ruling, in part, that the scope of the proposed alternative services were predicated on *"a running rights remedy which is legally beyond that which can be granted by the Agency under these provisions."*[33] The Agency concluded, that the applications for running rights which included traffic solicitation – (in effect making them applications for open access) were legally beyond the relief that could be granted by the Agency under section 138 of the CTA.

[30] Producer loading sites have traditionally been too small to support the loading of multiple car blocks. The Eston facility is intended to overcome these constraints by providing sufficient storage, and loading, capacity to allow for the efficient loading of multiple railcars by individual producers or groups of producers.

[31] Ferroequus Railway is a federally incorporated railway and holds a valid certificate of fitness as prescribed under Section 92 of the CTA.

[32] OmniTRAX Ltd. is the owner of the Hudson Bay, Carlton Trail and Okanagan Valley railways as well as the Port of Churchill.

[33] CTA Decisions 212-R-2001 (Hudson Bay Railway), and 213-R-2001 (Ferroequus Railway).

The question of running rights – and more importantly the right to solicit traffic from customers local to the railway lines over which running rights might be granted – was the subject of much discussion during the statutory review of the Act conducted by a five-member panel appointed by the Minister of Transport in June 2000. The Review Panel's terms of reference specifically included a requirement to "*consider proposals for enhancing running competition in the railway sector, including enhanced running rights, regional railways, and other access concepts.*" Although the Review Panel maintained that granting running rights as a measure for enhancing competition should continue to be an extraordinary step – to be imposed only in clear evidentiary instances of service failures or public interest – it nevertheless recommended in its final report that any capable railway operator be allowed to apply to the Agency for running rights, including the right to solicit traffic.

In matters more specific to the GHTS, the Review Panel also recommended that *"the grain handling and transportation system be moved to a more commercial basis, which could lead to the repeal of the revenue cap on grain rates."*[34] The Review Panel contended that the Act – with the adjustments as advanced in its recommendations – provides shippers with sufficient protection from any potential market abuse of the railways, and that grain shippers need not be treated differently from those engaged in the movement of any other commodity.[35] As of yet, Government has not formally responded to the recommendations advanced by the Review Panel.

In a decision by the Agency dated December 27, 2001, it was found that both CN and CP had revenues below the levels prescribed under the revenue cap for each in the 2000-01 crop year – CN, some $3.1 million lower, and CP, some $2.7 million lower.[36] The Agency also estimated that the revenue cap resulted in savings to shippers of about $173 million, consisting of $167 million due to the 18% reduction in revenues from what would have resulted without the May 2000 policy reforms, plus $6 million as a result of the railways' revenues being below their caps.

The Agency estimated that the $167 million saving was equal to $5.72 per tonne, and included: $1.37 per tonne due to the elimination of the scheduled "inflation" adjustment of 4.5%; $1.00 due to general rate reductions by the railways; $3.15 from the combined impact of lower charges due to multi-car block incentives, volume rebates, and other similar reductions, as well as allowances for industrial development funds; and $0.20 for other items.

The Canadian Transportation Agency issued its first decisions related to the revenue cap provisions of the Act, including technical decisions on how the revenue cap is determined [37]. Both CN and CPR changed their practices on demurrage for grain movements. The Agency found that some of the railways' revenues under these new practices were not demurrage revenues for the purposes of the revenue cap calculations [38]. CPR has appealed the Agency's decision to the Federal Court.

[34] Vision and Balance, Report of CTA Review Panel, June 2001 – Section 5, Recommendation 5.9.

[35] Vision and Balance, Report of CTA Review Panel, June 2001 – Section 5, page 73.

[36] CTA Decision No. 669-R-2001, fileT6650-2.

[37] CTA Decision No. 114-R-2001, file T6650-17.

[38] CTA Decision No. 664-R-2001, fileT6650-2.

5. System Efficiency

One of the chief aims in the government's decision to move the GHTS towards a more commercial orientation was to improve overall system efficiency. This stems from the belief that a more efficient system will ultimately enhance the competitiveness of Canadian grain in international markets to the benefit of all stakeholders.

The indicators presented here are intended to examine the relative change in the efficiency of the GHTS. A preceding chapter – Industry Overview – addressed changes observed in the basic components of the GHTS (country elevators, railways, and terminal elevators). In comparison, the following series of indicators will largely concentrate on the utilization of these assets; examining them from the vantage point of posted charges, operations and the overall logistics cycle (the time it takes to move grain through the system).[39]

Highlights of the 2000-2001 Crop Year

Commercial Trucking

- *Commercial truck rates have increased 2.5%*

Country Elevators

- *The country elevator network achieved increased efficiencies over the base year.*
  - *Throughput in the country elevator network increased 2.4%;*
  - *Average elevator turnover ratio improved 3.8%;*
  - *Days in store is down 8.0%;*
  - *Stock to shipment ratio is down 12.9%;*
-
- *Elevation, cleaning & storage tariffs rise.*

Railways

- *Railways also achieved increased efficiency over the base year.*
  - *Car cycles saw a decrease of 16.8% to 16.4 days*
  - *Published rail freight rates were down on average between 1% and 10%*
  - *Enhanced incentive rates were published, with increases of up to 33% for larger car blocks (50-99 cars)*
- *Total hopper car movement decreased 2.0%, in line with the decrease in production*
- *Both Railways met the provision of the Revenue Cap.*
  - *CN - $25.73 rev./tonne vs. allowable $25.94 rev./tonne.*
  - *CP - $25.93 rev./tonne vs. allowable $26.12 rev./tonne.*

Terminal Elevators and Ports

- *Some 960 vessels were loaded at Western Canadian Ports.*
- *Port Operations saw some areas of improvement*
  - *Ports realized a 1.6% increase in throughput over the base year*
  - *Average days in store down 5.9%*
- *… And some of decline.*
  - *At Vancouver, vessel time waiting on average increased to 4.4 days from 2.4 days; Loading time increased to 3.7 days from 3.4.*
  - *Average terminal elevator turnover ratio down 1.8%*
- *Some results were divided:*
  - *West Coast operations saw demurrage costs increase from $6.6 million in the base year to $15 million and dispatch earning decline from $11M to $9M.*
  - *Eastern Ports (Churchill, Thunder Bay and the Seaway) realized decreased demurrage ($.839M to .587M) and increased dispatch ($3.4M to $4.1 M)*

Trucking *[Measurement Subseries 3A]*

	1999-2000	2000-2001	% VAR	Table No.	Description
▲	100.0	102.5	2.5%	3A-1	Composite Freight Rate Index – Short-haul Trucking

The delivery of grain to the country elevator facilities of Canada's various grain companies is the first step in a logistics chain that serves domestic and international markets alike. This involves the truck movement of grain from the producer's gate to a country elevator. The distance traveled can be a few kilometres, or extend well beyond. There are a wide assortment of vehicles employed in this type of delivery service – from relatively small producer-owned utility vehicles, to the higher-capacity trucks typically used in commercial highway operations.

[39] It is acknowledged that improvements in the efficiency of the elevator and railway infrastructure can have an impact on other areas of the GHTS – for example, trucking and road costs. Due to data limitations, it is difficult to include measures relating to the use of trucking and its associated road impacts, as part of the Grain Monitoring Program.

Under the Supplementary Work Program [40], the Monitor initiated a survey of the freight rates tied to the "in-house" trucking services of the principle grain companies. The methodology employed centred on tracking the posted rates of these companies for local grain pick-up and delivery services in, and around, a representative sample of 37 specific grain delivery stations. These rates were then combined to create a composite rate scale depicting the cost of a typical commercial truck movement both as a proxy for, and a barometer of, trucking costs.

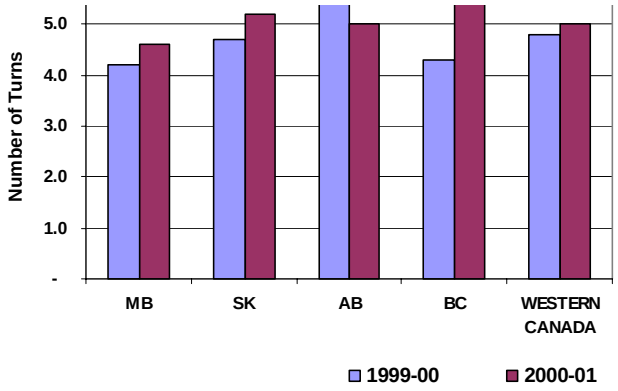
The results of this review indicated that the respective grain companies offer producers similar trucking services, albeit at marginally differing costs.[41] By the end of the 2000-01 crop year, these rates generally increased 2.5% over those in place at the end of the preceding crop year. [See Table 3A-1 in Appendix 3.]

Country Elevator *[Measurement Subseries 3B]*

	1999-2000	2000-2001	% VAR	Table No.	Description
▲	32,493.9	33,281.9	2.4%	3B-1	Grain Volume Throughput (000 tonnes)
▲	4.8	5.0	3.8%	3B-2	Average Elevator Capacity Turnover Ratio
▼	41.7	38.3	-8.0%	3B-3	Average Days-in-Store (days)
▼	6.2	5.4	-12.9%	3B-4	Average Weekly Stock-to-Shipment Ratio – Grain
	Note	Note		3B-5	Average Handling Charges – Country Delivery Points
Note: Average handling charges cannot be summarized for this table.					

The total tonnage throughput for the country elevator system, as measured by shipments from primary elevators, remained relatively constant over the review period. Throughput in the 2000-2001 crop year amounted to 33.3 million tonnes – an overall increase of 2.4% over the preceding year. Greater variability was observed on a provincial basis. Shipments from Manitoba, Saskatchewan and British Columbia increased by 19.0%, 5.2%, and 24.8% respectively, while those from Alberta declined by 10.8%.[42] On a quarterly basis, primary elevator throughput levels in Western Canada remained relatively constant at 8.2 million tonnes, although the second quarter showed a modest peak registering 8.7 million tonnes. [See Table 3B-1 in Appendix 3.]

Figure 7: Elevator Capacity Turnover Rates by Province



The average elevator capacity turnover rate improved slightly, from 4.8 turns to 5.0 turns. Higher throughput tonnages in Manitoba, Saskatchewan and British Columbia, served to increase the elevator capacity turnover ratios by 9.7%, 10.5% and 30.8% respectively. The lower crop yield in Alberta brought a 9.9% decline in that province's ratio [44]. [See Table 3B-2 in Appendix 3.]

[40] The Supplementary Program refers to additional measures and issues identified in the original monitoring program design as requiring further study and analysis, the details and status of which are discussed in Appendix 2 of this report.

[41] Neither of the trucking rates published by the respondents has changed materially since the 1999-2000 crop year, with the exception being the selective use of fuel surcharges.

[42] The 1999-2000 crop year was widely deemed to be a "bumper" crop year for Alberta. Comparisons with 2000-01 reflect the return to average production levels.

[43] Canadian Grain Commission, Grain Elevators in Canada.

[44] Although the timeframes are not directly comparable, these turnover rates are consistent with those reported by the Dominion Bond Rating Service. Their report, "The Grain Industry in Canada" indicates that in calendar year 2000, country elevator turnovers ranged from 4.1 to 7.2 turns for the four major grain companies. Dominion Bond Rating Service Ltd. "The Grain Industry in Canada", August 2001.

The average number of days in store for major grains is derived using an average inventory turnover ratio. During the 2000-01 crop year, the overall average number of days in store fell from 41.7 to 38.3 days (or 8.0%). This, however, varied widely by province and commodity. Running counter to the general improvement observed for most grains were durum and canola, which saw average increases of 3.9 days (or 6.1%) and 1.3 days (or 6.3%) respectively. [See Table 3B-3 in Appendix 3.]

The average weekly stock-to-shipment ratios for major grains in Western Canada experienced a 12.9% reduction from the 1999-2000 crop year – falling from 6.2 to 5.4. Significant reductions occurred in wheat, barley and oat ratios. Durum and canola showed relatively little overall change, while smaller crops – such as rye and flaxseed – experienced significant increases in their stock-to-shipment ratios. On the whole, these indicators reveal that tighter elevator inventories were generally being maintained across the system. [See Table 3B-4 in Appendix 3.]

Changes in the posted tariff rates for primary elevator handling over the course of the review period were mixed. The average tariffs for receiving, elevating and loading grain increased marginally, while those for removal of dockage and terminal cleaning, saw more substantive increases [45]. Although most commodities saw marginal increases in the average charges for cleaning, significant price hikes were observed for barley and flaxseed: 8% and 7.5% respectively in Saskatchewan; 12.5% and 11.1% respectively for Alberta and British Columbia; and 15.4% and 11.1% respectively in Manitoba. Average country elevator storage charges for major grains also increased by between 3.1% and 6.9% across the prairies. [See Table 3B-5 in Appendix 3.]

Rail Operations *[Measurement Subseries 3C]*

	1999-2000	2000-2001	% VAR	No.	Description
▼	25,658.0	25,155.6	-2.0%	3C-1	Hopper Car Grain Volumes (000 tonnes) – Province
				3C-2	Hopper Car Grain Volumes (000 tonnes) – Primary Commodities
				3C-3	Hopper Car Grain Volumes (000 tonnes) – Detailed Breakdown
▼	19.7	16.4	-16.8%	3C-4	Railway Car Cycles (days)
–	330.3	328.7	-0.5%	3C-7	Railway Traffic Density – Railway Line Class
▼	Note	Note		3C-8	Composite Freight Rates – Rail
▲	Note	Note		3C-9	Multiple-Car Shipment Incentives – Rail
▼	n/a	Note		3C-10	Effective Freight Rates – CTA Revenue Cap

Note: These measures cannot be summarized for this table.

As cited earlier, the overall grain volumes moved by the nation's railway system to Western Canadian export positions fell by 2.1% to 25.9 million tonnes in the 2000-01 crop year (See Industry Overview Measurement Subseries 1B). These figures, however, include traffic that was not handled through the terminal elevator system and which also moved in boxcars, trailers or containers. In order to allow for more consistent comparisons, the indicators presented here deal exclusively with that portion of the grain traffic that moved in covered hopper cars.[46]

Totalling 25.2 million tonnes, the overall volume of grain moved in covered hopper cars shows a 2.0% decline from the volume handled in the 1999-2000 crop year. Volumes destined to both Vancouver and Thunder Bay varied little from the 1999-2000 crop year – declining by 0.1% in the case of the former, and climbing by 3.7% in the case of the latter. Significant shifts, however, occurred in the grain volumes directed to the northern ports. Receiving some 2.3 million tonnes, Prince Rupert's volume declined by 29.5% in comparison to the base year, while the volume handled at Churchill increased by 48.7% to 0.7 million tonnes.

Shifts were also noted in the origins for grains moving through West Coast ports. In particular, the volume of wheat and canola sourced from Manitoba during the 2000-01 crop year showed significant gains in the origin mix at both Vancouver and Prince Rupert. This, however, appears to have been rooted in the previously discussed swings in provincial production levels and a need to source quality

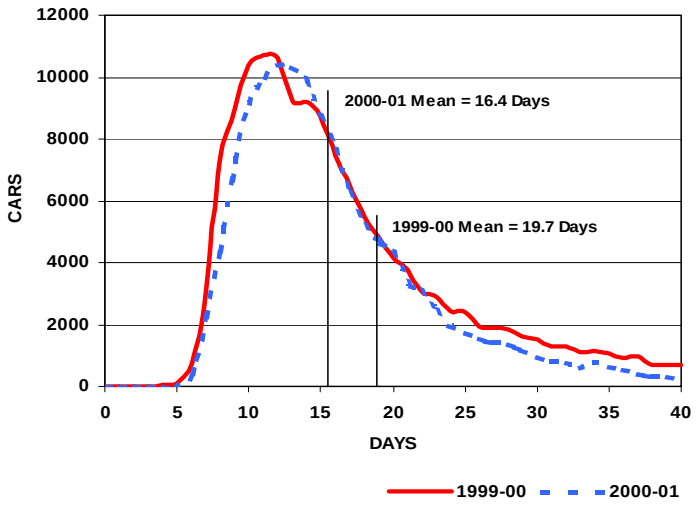
[45] Charges for the removal of dockage and terminal cleaning fall under the provisions of Licensed Primary Elevator Tariffs and are assessed at the time producers deliver their grain.

[46] Such adjustments represent a reduction of less than 3% from the overall traffic volume cited.

specific stock, rather than in a fundamental change in sourcing strategies. [See Tables 3C-1, 3C-2, and 3C-3 in Appendix 3.]

One of the chief indicators used within the railway industry to gauge the efficiency with which traffic is moved is the car cycle. In the context of the GHTS, a car cycle effectively measures the time taken by a railway to deliver a load of grain to port and then return the empty car to the prairies for reloading. The car cycle for the regulated movement of Western Canadian grain averaged 16.4 days during the 2000-01 crop year. This represents a 16.8% reduction from the 19.7 days the year before. Examined in terms of the principal corridors, movements to Vancouver show a corresponding improvement of 13.4% – falling from an average of 19.4 to 16.8 days. The relative weighting of movements to Vancouver, however, effectively obscures the greater improvement in the Thunder Bay corridor – where the average cycle fell from 20.5 to 15.7 days (or 23.4%). [See Table 3C-4 in Appendix 3]

Figure 8: Railway Car Cycles - Histogram



A second measure of efficiency is traffic density. The indicators used in the GMP gauge density by relating total grain volumes to the total number of route-miles comprised within the Western Canadian railway network. Moreover, these measurements are based on quarterly rather than annual traffic volumes and the infrastructure in place at the end of each quarter of the crop year in order to assess the relative change over time.[47]

This analysis reveals that there has been little real change in traffic density during the 2000-01 crop year – the average number of tonnes per route-mile having fallen to 328.7 from 330.3 the year before. This largely reflects the parallel decline of 2.0% in overall railway volumes and infrastructure. Conversely, the abandonment of grain-dependent branch lines has served to improve the density on these lines by a modest 1.9% – from an average of 442.3 to 450.6 tonnes per route-mile. [See Table 3C-7 in Appendix 3]

Railway freight rates have been the subject of repeated examination. Effective August 1, 2000, the Canadian government changed its policy, replacing the regulated maximum rates with a “revenue cap” that provided greater latitude in pricing rail movements, but limited the gross revenues that could be derived from this portion of the railway industry’s business. In addition, this policy change provided for a general 18% rollback in the revenue levels that would have been expected without the reform.

In practical terms, the revenue cap did not require an across-the-board 18% reduction in posted rates, including single-car rates. The general reduction in posted rates for single-car movements amounted to 4%, although some corridor-specific rates showed greater variation. By way of example, posted rates from CN origins to Prince Rupert were reduced approximately 10%, while those to Armstrong were virtually unchanged. [See Table 3C-8 in Appendix 3.]

[47] The use of annualized data does not allow for direct comparison with quarterly data due to the fact that the number of route-miles tied to the infrastructure cannot be apportioned over time. Although the quotient derived from a year-over-year comparison is directly comparable, its calculation provides limited insight into changes that may be better observed using the longer time series derived from the use of quarterly data.

Instead, the railways appear to have employed another means by which to pass on an effective freight rate reduction to the grain industry – volume incentives. Long used in other sectors of the railway industry as a competitive tool, they were increased for facilities with 50 or more car spots at the beginning of the 2000-01 crop year. It seems clear that the strategy of the railway companies rests in drawing significantly greater volumes of grain into facilities that can provide for movement in either full, or partial, trainload lots. When measured against single car rates, these discounts can result in effective freight rate deductions of between $1.00 and $7.00 per tonne (or up to an estimated 25%). [See Table 3C-9 in Appendix 3.]

Although the Monitor has been unable to secure sufficiently detailed data on these movements and the elevators from which they originate, the information that is available suggests that incentive movements are indeed on the rise. Moreover it suggests that they may have increased by more than 30% during the 2000-01 crop year, and apply to over 60% of covered hopper car movements.

It must be noted, however, that these incentives largely accrue to the shipper – normally the grain companies – rather than to individual grain producers. The producer effectively receives the benefit of the reduction in the rates for single car movements – that is to say the 4% cited earlier – but does not share directly in any incentive rate savings realized by the grain company that actually moved grain as part of a larger consignment.[48]

More importantly, incentive rates also provide a powerful means by which each carrier can leverage the cost efficiencies derived from unit train operations, while managing its compliance with the revenue cap. In Decision Number 669-R-2001 dated December 27, 2001, the Canadian Transportation Agency determined that both CN and CP had met revenue cap requirements for the 2000-01 crop year. Indeed both had beaten their targets by 0.8% and 0.7% respectively. [See Table 3C-10 in Appendix 3]

Terminal Elevator and Port Performance *[Measurement Subseries 3D]*

	1999-2000	2000-2001	% VAR	Table No.	Description
▲	23,555.5	23,941.3	1.6%	3D-1	Annual Port Throughput (000 tonnes) – Grain
▼	9.1	8.9	-1.8%	3D-2	Average Terminal Elevator Capacity Turnover Ratio
▼	18.6	17.5	-5.9%	3D-3a	Average Days-in-Store – Operating Season (days)
▼	20.3	20.1	-1.0%	3D-3b	Average Days-in-Store – Crop Year (days)
	Note	Note		3D-4	Average Weekly Stock-to-Shipment Ratio
–	Note	Note		3D-5	Average Weekly Stock-to-Shipment Ratio for major grains and grades by port
–	Note	Note		3D-6	Average Vessel Time in Port (days)
	Note	Note		3D-7	Distribution of vessel time in port
	Note	Note		3D-8	Distribution of number of berths per vessel by port
	Note	Note		3D-9	Annual demurrage costs and dispatch earnings by port for Board and Non-Board grains
	Note	Note		3D-10	Average handling charges by port based on posted rates for each terminal for major grains
Note: These measures cannot be summarized for this table					

Port throughput for the 2000-01 crop year, as measured by the volume of grain shipped from the terminal elevator and bulk loading facilities located at the four Western Canadian ports, totalled 23.9 million tonnes. [49] This represents an increase of 1.6% over the 23.6 million tonnes recorded during the 1999-2000 crop year. [See Table 3D-1 in Appendix 3.]

[48] The producer may share in these savings – but only indirectly. To the extent that these savings are passed on to the Canadian Wheat Board through the tendering programs, they manifest themselves in the residuals passed back to farmers in the Board's pool account. Grain Companies have several mechanisms in place through which these benefits may be passed as well. e.g. Truck premiums and other incentives, etc.

[49] Includes grains, oilseeds and special crops covered by the Canada Grain Act as recorded by the Canadian Grain Commission.

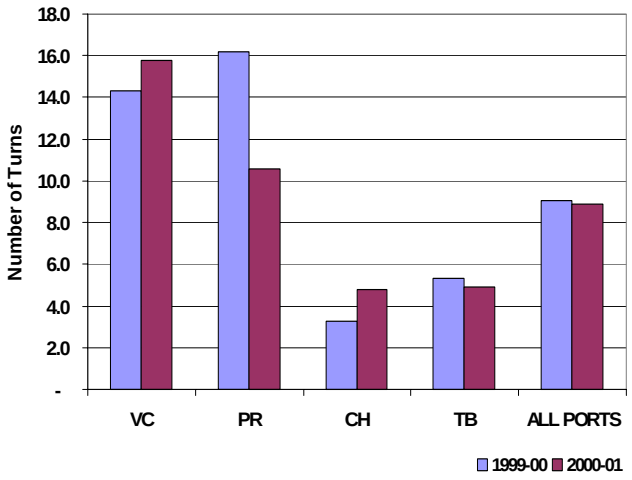
Almost 16.3 million tonnes (or 67.8%) of this volume was directed through the West Coast ports of Vancouver and Prince Rupert, with the former accounting for some 14.0 million tonnes (86.3% of West Coast volume). Although the overall coastal throughput remained relatively unchanged – increasing by just 53,000 tonnes – Prince Rupert posted a substantive 34.5% decline, while shipments from Vancouver increased by 9.5%.[50]

With 7.0 million tonnes, Thunder Bay achieved a 1.9% gain in throughput for the 2000-01 crop year. While movement of most grains increased, wheat volume fell by over 216,900 tonnes (or 7.0%) from the previous year. The most impressive gain occurred at the port of Churchill, which posted a 43.1% increase in throughput over the 1999-2000 crop year.

The average terminal elevator capacity turnover ratio declined slightly, from 9.1 to 8.9 turns, largely as a result of the 7.5% decline experienced at Thunder Bay – which fell from 5.3 to 4.9 turns. Although the overall throughput at the port increased relative to the 1999-2000 crop year, the proportion moving through unlicensed and bulk loading facilities resulted in lower turnover rates for the licensed terminals. The turnover ratios for Vancouver, Prince Rupert, and Churchill, coincided with the relative change in their respective throughputs. [See Table 3D-2 in Appendix 3.]

A similar pattern is seen with respect to the average number of days in store for major grains during the operating season at ports. While the overall average for the four Western Canadian ports declined from 18.6 to 17.5 days (or 5.9%), significant variability was observed for individual ports. For those ports with increased throughput, the average number of days in store fell: Vancouver's by 18.6% to 12.4 days; Churchill's by 33.6% to 16.8 days; and Thunder Bay's by 2.5% to 27.6 days. At Prince Rupert – where throughput declined – the average jumped by 24.9% to 15.2 days. [See Table 3D-3a in Appendix 3.][51]

Figure 9: Terminal Elevator Capacity Turnover Rates



Average weekly stock-to-shipment ratios for major grains at each of the four Western Canadian ports are calculated using statistics produced by the Canadian Grain Commission. This measure indicates how well stocks are managed at port. Due to the uneven nature of grain unloading, stock levels, and actual vessel shipments, a great deal of variability is experienced in the week-to-week comparison of these ratios. Notwithstanding that variability, some patterns emerge when annual averages are calculated and compared. [See Table 3D-4 in Appendix 3.]

As might be expected given larger throughput, the average stock-to-shipment ratios at Vancouver declined for all major grains in the 2000-01 crop year, while that for wheat at Prince Rupert increased by nearly 13%.[52] Churchill saw a significant decline in its averages for wheat and durum over the same period. At Thunder Bay, the results were more mixed: declines were observed for wheat, canola and oats, while durum, barley and flax all increased. The most significant increase was for barley, but given the overall low level of barley shipments from Thunder Bay (which declined by 46% during the period) the results from just two years of data provide limited insight into the efficiency of stock movements though these terminals. As a greater time series of data is developed, the Monitor believes that the patterns exhibited by shifts in stock-to-shipment ratios will become more meaningful.

[50] It should be noted that the Prince Rupert Grain terminal was effectively shutdown for a four-month period during each of the last two crop years.

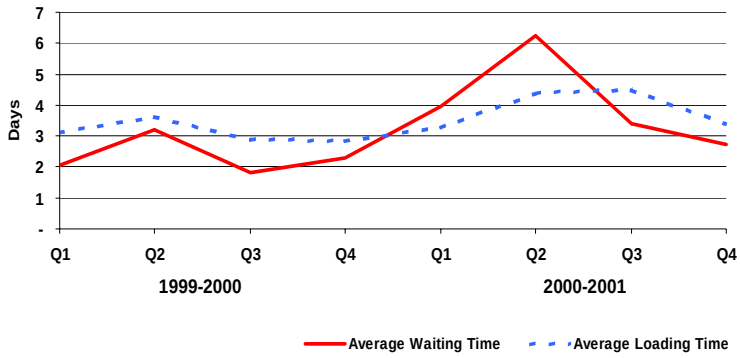
[51] Table 3D-3b in Appendix 3 presents Average Days in Store for the entire year at each port.

[52] Wheat is the only grain with sufficient consistency in shipments from Prince Rupert over two years for comparison.

Average weekly stock-to-shipment ratios, based on grade, show even greater degrees of variability. This arises largely as a result of the distortions caused by the blending often used to produce "Western Canada Wheat" – which is not a stored grain grade – for overseas shipments. As mentioned earlier, it will be necessary to develop a longer time series before meaningful conclusions can be drawn regarding these stock-to-shipment ratios. [See Table 3D-5 in Appendix 3.]

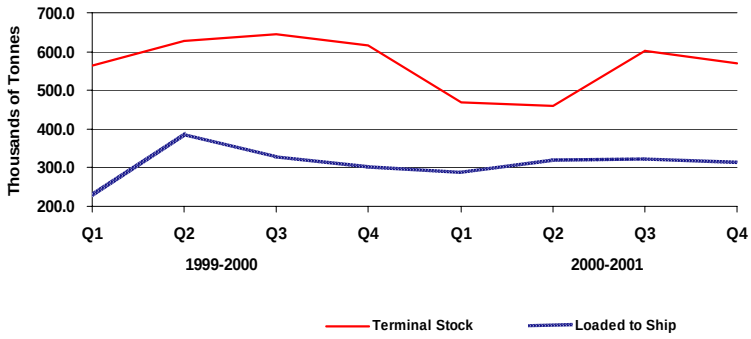
Some 960 vessels called for grain at Western Canadian ports during the 2000-01 crop year. The average time spent by these vessels in port showed a generally marked increase over the 1999-2000 crop year. At Vancouver – where just over half of the total vessel calls were made – the average time spent in port increased from 5.8 to 8.1 days (or 39.7%). Most noteworthy perhaps is the fact that the average number of days spent waiting to load nearly doubled – jumping from 2.4 to 4.4 days (or 83.3%).[53] At the same time, the average number of days required for loading also rose – increasing from 3.4 to 3.7 days (or 8.8%). At Prince Rupert, a 10% decline in average waiting time was offset by a lengthy increase in the time required for loading, thus pushing the overall average stay in port up from 3.8 to 7.7 days. [See Table 3D-6 in Appendix 3.]

Figure 10: Pacific Seaboard Vessel Waiting and Loading Time– By Quarter



The increased time vessels spent in port was most pronounced at West Coast ports during the second quarter of the 2000-01 crop year. Figure 10 illustrates the average number of days vessels spent waiting and loading at the ports of Vancouver and Prince Rupert. In concert with the noticeable rise observed during the second quarter, there is a corresponding decline in the average stock levels reported at West Coast terminal elevators (see Figure 11). Throughout this period, no noticeable fluctuations are observed in the tonnage loaded to vessels. The evidence would suggest, however, that the increased time spent by these vessels in port was due, at least in part, to the GHTS's failure to provide for an adequate supply of the right grain in terminals at port. This is supported – to some extent – by an observable rise in the average number of days spent by railcars at destination terminals.

Figure 11: Pacific Seaboard – Terminal Stocks and Loaded to Vessel – By Quarter

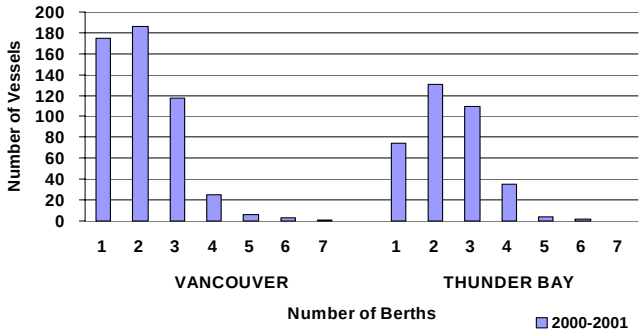


[53] The number of days a vessel spent waiting is determined using the difference between the time the vessel passed inspection by the Port Warden and Canadian Food Inspection Agency and the time at which loading was commenced.

Waiting time at Churchill remained essentially unchanged, while the time required to load vessels increased from 2.5 to 2.9 days (or 16%). At Thunder Bay, the data necessary to track waiting time for vessels during the last two crop years was not readily available, although loading times were recorded as having increased from 1.2 to 1.4 days (or 16.7%).[54] These observations are reflected in the noticeable decline in the proportion of vessels having spent a maximum of five days in port: at Vancouver, 16.7%; Prince Rupert, 37.1%; and Churchill, 4.5%. [See Table 3D-7 in Appendix 3.]

The proportion of vessels requiring multiple berths to load at Vancouver remained largely unchanged from the 1999-2000 crop year – increasing from 63.4% to 66.0%. At Thunder Bay, the proportion was somewhat higher – 79.2%.[55] It should be noted that the number of berths that each vessel may make prior to the assessment of additional charges is negotiated as part of the charter contract. Larger vessels may have terms permitting them to berth more frequently than smaller ones without incurring financial penalty. [See Table 3D-8 in Appendix 3.]

Figure 12: Number of Berths per Vessel



Members of the WGEA and the CWB provided total vessel demurrage costs and dispatch earnings for the two crop years under review.[56] Along the Pacific Seaboard, demurrage costs for the 2000-01 crop year rose significantly – from $6.6 to $15 million (or 126.8%). This is consistent with the substantial increase cited earlier in the average number of days spent waiting and loading of vessels at these ports. At the same time, dispatch earnings declined from about $11.0 to $9.0 million (or 18.1%). Conversely, annual vessel demurrage at Churchill, Thunder Bay, and along the St. Lawrence Seaway, declined by 30.0% – from $839,000 to $587,000. Dispatch earnings in the eastern system increased by 22.2% – from $3.4 million to $4.1 million. [See Table 3D-9 in Appendix 3.]

The Monitor is of the opinion that demurrage costs and dispatch earnings must be viewed in context. As negotiated items, the rates and number of lay days are only a part of the merchandising activity. Trade-offs are continuously made when negotiating the terms and conditions of vessel charters.

With the exception of Churchill – where terminal elevation charges remain unchanged – the posted tariff rates for terminal elevator handling at each of the Western Canadian ports generally increased. At Vancouver, small increases in the average charges for receiving, elevating and loading of grain were observed for wheat, durum, barley, canola and oats. The average increase for peas and flaxseed was marginally higher at 5.9% and 4.4% respectively. The average tariff rate for rye, however, jumped significantly – from $8.24 to $10.19 per tonne (or 23.7%). At Prince Rupert, the rates for receiving, elevating and loading of grain saw small increases for wheat and barley, and a more significant 15.6% increase for flaxseed. At Thunder Bay, the average increase for major commodities was in the area of 1% or less. [See Table 3D-10 in Appendix 3.]

The posted tariff rates for terminal elevator storage also increased at most ports – the exception once again being Churchill. At Thunder Bay and Vancouver, the average increase ranged from approximately 1.0% to 4.0% over the period. Prince Rupert posted higher tariff rates for the storage of oats, rye and flaxseed – increasing by 7.1%, 9.1% and 14.8% respectively. However, no shipments for these commodities were recorded during the 2000-01 crop year.

[54] Arrival date on Thunder Bay vessels was not recorded consistently in past years. Canadian Food Inspection Agency personnel only inspect and pass ocean-going vessels, lakers destined for the U.S.A. and lakers previously under detention due to infestation. The remaining lake-going vessels – representing over half of all arrivals at port – are not subject to inspection.

[55] Only data pertaining to the 2000-01 crop year is available relative to the number of multiple berths at Thunder Bay.

[56] Notice should be made of the fact that the data – which is both un-audited and aggregated – pertains to vessel shipments made during each crop year and, as such, may vary from the figures presented in the financial statements of the respective organizations.

System Efficiency - Summary and Observations

The overall time spent by grain in the GHTS decreased by 5.5% – an improvement of 4 days. The individual elements contributing to this performance are summarised below, and include improvements derived from the reduced number of days spent in store at both country and terminal elevators, as well as from reduced loaded car cycle times.

Table No.	Measure	99-00	00-01	Var.	Var. %
3B-3	Country Elevator - Avg. Days in Store	41.7	38.3	-3.4	-8.0%
3C-4	Loaded Railway Car Cycle[57]	9.1	8.7	-0.4	-4.4%
3D-3b	Terminal Elevator - Avg. Days in Store	20.3	20.1	-0.2	-1.0%
	Total	71.1	67.1	-4.0	-5.5%

A review of the data and measures pertaining to the efficiency aspects of the grain industry and specifically the GHTS yields the following observations:

- The country elevator network on average, showed increased efficiency with improvements in most areas: increased throughput; improved average elevator capacity turnover ratio; reduced stock-to-shipment ratios; and a reduction in the average number of days in store.

- A key measure of railway efficiency is the car cycle. Falling to an overall average of 16.4 days – an improvement of 16.8% – this measure showed a marked gain in the efficiency with which the railway system is delivering grain to export position.

- The railways have increased the incentive used to encourage movements in larger car blocks. This combined with the elevator network's continued shift towards the use of larger capacity facilities contributed to improved car cycle times. The limited data currently available to the Monitor prevents a more comprehensive perspective on the reasons for this improvement, but future reports will endeavour to provide a more detailed analysis.

- Lower railway freight rates and enhanced incentive discounts for traffic moving in larger car blocks has been influenced – at least in part – by the government's policy initiatives. Both CN and CP achieved the targets established for them under the first year of the new revenue cap regime.

- While handling essentially the same volumes as in the base year, port operations experienced a minimal decrease in terminal elevator capacity turnover ratios, a slight increase in the number of berths required to load vessels, but a marked increase in vessel waiting and loading times at the Pacific Seaboard.

- Significantly increased demurrage costs were incurred at Pacific Seaboard ports due to large increases in the time vessels spent in port. The delays were particularly high during the second quarter of the crop year.

[57] Loaded railcar cycle is calculated by adding the times in each of the events in the loaded portion of the cycle: Origin Dwell Time, Loaded Transit Time, Destination Dwell Time, Unloading Time (days). The complete car cycle includes the Empty Return Time (7.7 days)

6. Service Reliability

The true test of any logistics chain is its ability to provide for the timely delivery of product, as it is needed – whether it is raw materials, semi-processed goods, component parts, or finished products. This applies in equal measure to both industrial and consumer products, and is summarized by a widely used colloquialism within the logistics industry: "to deliver the right product, to the right customer, at the right time."

All of the stakeholders to the GHTS agree that it is crucially important for Canada to continue to be recognized as a reputable and *reliable* supplier of grain to the world. Having product out of place can not only disrupt the normal flow of grain through the system, it can lead to terminal congestion, higher costs, and a damaged international reputation. The indicators that follow are largely used to determine whether grain is indeed moving through the system in a timely manner, and whether the right grain is in stock at port when a vessel calls for loading.

Highlights

Port Performance

Port reliability was good and efficiency increased over the base year

- *Stock to Vessel Ratios decreased (i.e. Wheat and Canola at Vancouver down 19.5% and 21.5% respectively and at Thunder Bay down 5.5% and 31.3%) indicating tighter controls on inventory.*
- *Stock to Shipment Ratios at Vancouver and Thunder Bay reinforce these findings with an overall decrease of 27.1% and 5.8% respectively for wheat and 18.4% and 27.1% for canola.*
- *The reported terminal storage and handling revenues at Vancouver increased 3.2% on throughput that increased 9.5%.*
- *The annual number of stored tonne days decreased significantly at most ports:*
    - *Vancouver down 13.9%*
    - *Prince Rupert down 17.7%*
    - *Churchill down 15.1%*
    - *Thunder Bay up 11.4%*

Country Performance

Country Performance also was good and reflected some improvements in efficiency.

- *Throughput increased 2.4%*
- *Annual average stored tonne days decreased 5.8%*
- *Average stock to shipment ratios decreased 12.9%*

Port Performance *[Measurement Subseries 4A]*

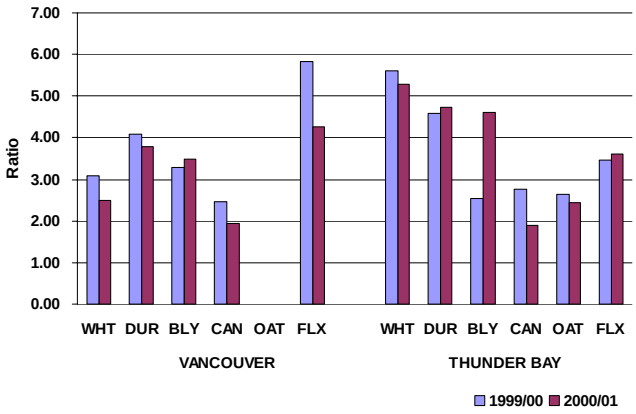
	1999-2000	2000-2001	% VAR	Table No.	Description
▼	3.10	2.50	-19.5%	4A-1	Avg. Weekly Stock-to-Vessel Requirements Ratio – Vancouver – Wheat
▼	2.47	1.94	-21.5%		Avg. Weekly Stock-to-Vessel Requirements Ratio – Vancouver – Canola
▼	5.60	5.29	-5.5%		Avg. Weekly Stock-to-Vessel Requirements Ratio – Thunder Bay – Wheat
▼	2.76	1.89	-31.3%		Avg. Weekly Stock-to-Vessel Requirements Ratio – Thunder Bay – Canola
-	Note	Note	Note	4A-2	Avg. Weekly Stock-to-Vessel Requirements Ratio – Grade
▼	3.53	2.92	-17.5%	4A-3	Avg. Weekly Stock-to-Shipment Ratio – Vancouver - Board Grains
▼	3.57	2.60	-27.0%		Avg. Weekly Stock-to-Shipment Ratio – Vancouver - Non-Board Grains
▲	4.55	5.20	14.2%		Avg. Weekly Stock-to-Shipment Ratio – Thunder Bay - Board Grains
▼	3.30	2.81	-14.8%		Avg. Weekly Stock-to-Shipment Ratio – Thunder Bay - Non-Board Grains
▲	192,744	198,888	3.2%	4A-4	Terminal Handling Revenue –Vancouver ($000)
▼	82,103	75,490	-8.1%		Terminal Handling Revenue – Thunder Bay ($000)
▼	63,344	48,240	-23.8%		CWB Carrying Costs – Pacific Seaboard ($000)
▲	31,313	34,378	9.8%		CWB Carrying Costs – Thunder Bay ($000)
▼	374,442	352,275	-5.9%	4A-5	Annual Stored Tonne Days – Board Grains (days x 1000)
▲	71,137	81,672	14.8%		Annual Stored Tonne Days – Non-Board Grains (days x 1000)
▼	445,579	433,947	-2.6%		Annual Stored Tonne Days – Board and Non-Board Grains (days x 1000)

Add. Measures in 4A-1 can be found in Data Tables – Appendix 3; Measures in Subseries 4A -2 do not lend themselves to summary reporting.

Average weekly stock-to-vessel requirement ratios were calculated for major grains at Vancouver and Thunder Bay using data collected by the Canadian Grain Commission (CGC) and the Canadian Ports Clearance Association (CPCA). The actual tonnage reported in stock by the CGC was then matched with the requirements per the CPCA's vessel arrival forecasts. This measure provides an indicator of terminal stocks in store as compared to the demand requirements of vessels scheduled to arrive and is used to illustrate the accuracy and timeliness of port stock in position to meet incoming vessel demand. As such an increase in the ratio indicates a negative trend.

As is seen in the stock-to-shipment ratios, a great deal of variability is also noted in the week-to-week stock-to-vessel requirements ratios. This is due largely to the uneven nature of the flow of grain into, and through, the ports. At Vancouver, an improvement was in evidence through a decline in the weekly average ratio for wheat, durum, canola and flax. The average ratio for wheat fell by 19.5% – from 3.10 to 2.50. By comparison, the average ratio for canola fell from 2.47 to 1.94 (or by 21.5%). The average weekly ratio for barley experienced a 6.0% increase – climbing to 3.48 from 3.28. [See Table 4A-1 in Appendix 3.]

Figure 13: Stock to Vessel Requirements Ratio



At Thunder Bay, declines were noted in the average stock-to-vessel requirements ratios for wheat, canola and oats. The average for wheat fell from 5.60 to 5.29 (or 5.5%). The average ratio for canola declined by 31.3% – from 2.76 to 1.89. At the same time, the averages for durum, barley and flaxseed increased. Durum showed a small increase of 3.5% – from an average of 4.58 to 4.74 – while the ratio for barley jumped from 2.54 to 4.60 (or by 81.1%). As with the stock-to-shipment ratios discussed earlier in chapter 5 (System Efficiencies), it will be necessary to develop a longer time series before meaningful conclusions can be drawn from these measures.

Average weekly stock-to-vessel requirement ratios by grade were calculated using the same methodology. The variability in the weekly ratios is significant. As with stock-to-shipment ratios by grade, matching vessel requirements to the stock in terminal is distorted by the blending that takes place, as is done for the annual shipment of two to three million tonnes of "Western Canada Wheat." [See Table 4A-2 in Appendix 3.]

The average weekly stock-to-shipment ratios were aggregated for CWB and non-CWB grains. For purposes of segmentation, the ratios for wheat, durum and barley were attributed to the CWB – although it is acknowledged that a small portion of wheat and barley stocks, as well as shipments at Thunder Bay, are non-Board feed. Non-CWB ratios include those for canola, oats and flaxseed. This measure provides an indication of how stocks in store matched to the demands of the ships loading through the week, and as is seen in stock to vessel measures, a decrease in the ratio indicates a positive trend. The average stock-to-shipment ratio for Board grains at Vancouver declined by 17.5% during the 2000-01 crop year – from 3.53 to 2.92. Similarly, the average ratio for non-Board grains declined by 27% – from 3.57 to 2.60. At Thunder Bay, the average ratio for CWB grains increased from 4.55 to 5.20 (or 14.2%), while the average for non-CWB grains declined from 3.30 to 2.81 (or 14.8%). [See Table 4A-3 in Appendix 3.]

The GMP provides for the measurement of annual storage and inventory carrying costs (or storage days) – for country as well as terminal elevators – for both CWB and non-CWB grains. The ability to collect data on carrying costs has proved challenging. The WGEA indicated that their members were unable to determine an appropriate or accurate method of reporting non-CWB carrying costs due to the nature of non-CWB grain marketing. All costs for handling and carrying non-Board grains are included in the basis. Segregating these costs was not considered feasible.

As a substitute, the WGEA members developed a method of reporting total terminal revenues using a number of key financial measures, and provided total revenue data for their terminals at Thunder Bay and Vancouver. The CWB provided a breakdown of their terminal costs using an aggregate for Pacific Seaboard terminals, in addition to those supplied for Thunder Bay. It should be noted here, however, that differences in accounting practices make direct comparisons between total revenues and CWB costs difficult. The terminal revenue and cost data presented here is un-audited. [See Table 4A-4 in Appendix 3.]

The total reported terminal revenues remained relatively consistent at Vancouver. Total revenue climbed from $192.7 to $198.9 million (or 3.2%). At Thunder Bay, total reported revenue fell from $82.1 to $75.5 million (or 8.1%). This occurred in part from the fact that, despite increased throughput, a greater portion of the grain shipped at Thunder Bay moved through terminals operated by non-WGEA members.

Total CWB carrying costs along the Pacific Seaboard declined by 23.8% – from $63.3 to $48.2 million. The greatest portion of this decline was due to reduced elevation expenditures – much of which can be attributed to the decline in throughput at Prince Rupert. At Thunder Bay, CWB costs climbed from $31.3 to $34.4 million (or 9.8%).

Gross indicators of storage activity at terminal elevators for CWB and non-CWB grains were calculated by multiplying the average number of days in store by total terminal throughput. At Vancouver CWB grain storage fell by 21.1% during the 2000-01 crop year – from 139.5 to 110.1 million stored tonne-days. This is attributed to slightly lower throughput for CWB grains, and a significant reduction in the average number of days in store for wheat and barley. The number for non-CWB grains increased from 44.1 to 48.1 million stored tonne-days (or 9.0%). Although average days in store declined for the non-board grains, throughput volume increased substantially, especially for canola (24.7%) escalating the total number of stored tonne-days. It should be noted that stock information for other non-CWB products and special crops is deficient for the purpose of calculating average days in store, and effectively understates the values for non-CWB grains. [See Table 4A-5 in Appendix 3]

At Prince Rupert, the total number of stored tonne-days for CWB grains declined by 28.9%, a reflection of the significant reduction in throughput at that port. At Churchill, the indicator for CWB grains fell by 16.9% – from 15.3 to 12.7 million stored tonne-days. There was insufficient non-CWB movement through the ports of Prince Rupert and Churchill in the 1999-2000 crop year to make any meaningful comparisons.

At Thunder Bay, the number of stored tonne-days for CWB grains increased by 12.1% – from 178.7 to 200.4 million. For non-CWB grains, the storage activity was significantly smaller and increased a more modest 6.3% – from 27.0 to 28.7 million stored tonne-days.

Country Performance *[Measurement Subseries 4B]*

	1999-2000	2000-2001	% VAR	Table No.	Description
▼	1.066 M	.973 M	-8.7%	4B-1	Annual Stored Tonne Days – CWB Grains
▲	.288 M	.302 M	5.1 %		Annual Stored Tonne Days – Non-CWB Grains

Annual storage activity at country elevators for CWB and non-CWB grains were calculated by multiplying average days in store by shipments from primary elevators. A prairie wide allocation of CWB and non-CWB handlings for wheat and barley was made using Canadian Grain Commission data. In aggregate, the total number of stored tonne-days for CWB grains fell by 8.7% – from 1.1 to 1.0 billion tonne-days. Declines in Saskatchewan, Alberta and British Columbia were offset by increases in Manitoba. Non-CWB grain storage activity increased by 5.1% – from 287.6 to 302.3 million stored tonne-days – with declines in Manitoba and British Columbia being offset by increases in Saskatchewan and Alberta. Stock and shipment data for other non-CWB products and special crops were inadequate to include them in the calculation of storage activity, resulting in an understatement of the stored tonne-days for non-CWB grains. [See Table 4B-1 in Appendix 3.]

As mentioned previously, the design of the GMP envisioned enhancements and further study in specific areas as is covered under the Supplementary program (see item in Appendix 3). Two supplementary studies relative to service reliability are expected to be completed prior to the release of the next annual report. These studies will examine the feasibility of developing additional measures relative to both the tracking of sales and tendered movements.

System Reliability – Summary and Conclusions

A review of the data and measures pertaining to the reliability of the GHTS provides for the following observations:

- Port reliability was improved and efficiency increased over the base year. Stock to vessel and stock to shipment ratios both decreased at Vancouver and Thunder Bay indicating tighter controls on inventory.

- Revenues for Terminal operators increased marginally. In particular, the reported terminal storage and handling revenues at Vancouver increased 3.2% on throughput that increased 9.5%.

- Country Performance was also good and reflected some improvements in efficiency, specifically a reduction in average stored tonne days (5.8%) on increased throughput (2.4%) through fewer facilities (23%).

- Average stock to shipment ratios in the country decreased 12.9%, again indicating tighter controls on inventory.

- Total CWB carrying costs along the Pacific Seaboard declined by 23.8%. The decline was due to reduced elevation expenditures – much of which can be attributed to the decline in throughput at Prince Rupert.

- At Thunder Bay, CWB carrying costs climbed 9.8%, associated with increased costs in elevation and special services in particular.

7. The Supply Chain

As mentioned elsewhere in this report – and in other undertakings relating to the grain industry in Canada[58] – viewing the GHTS in the context of larger supply chain provides an effective framework for analyzing and summarizing observations on the wor kings of the GHTS as a whole. To this end, the Monitor's approach to the GMP was itself styled in accordance with typical supply chain analytical models.

While the process is alternatively referred to as a logistics chain, it has become a standard model for the management of inventory, transportation, logistics and sourcing strategies for global businesses.

The essence of SCM theory is to analyze and develop a common view of the logistics process, from the sourcing of raw materials, to the delivery of the final product to the ultimate consumer. Supply chain optimization requires the mapping and measurement of various processes that bind together all of the commercial partnerships and transactions needed to do this in the most efficient and effective way possible. While the concept was first employed in manufacturing it has found broad application in businesses ranging from retail store inventory management (e.g. Wal-Mart) to the movement of lumber and wood products (e.g. Weyerhaeuser).

The Western Canadian GHTS is by necessity a supply chain with heavy demands on capital investment for capacity, and subsequently the management of capacity is the focus of all of the participants. Therein lies the greatest challenge in monitoring the GHTS. A comparison to other supply chains reveals similar challenges and issues. The following excerpt dealing with supply chain measures references the semi-conductor industry, but applies to many others, including the GHTS:

> *"Some traditional manufacturing metrics can reinforce silo behavior or otherwise be an impediment to supply chain integration. One example is capacity utilization. In industries where capital costs are overwhelming, such as the semiconductor industry, there is a tremendous pressure to focus on utilization of capacity, since most of the costs of producing the product reside in allocation of capacity costs (both physical plant and equipment). The danger here is not recognizing that there is always a trade-off between capacity utilization and responsiveness. As long as there is any variability present, either in the order/ demand stream or in processing time, then as one loads a facility closer to 100%, the queuing or waiting time increases exponentially"*[59]

Effectively managed supply chains optimize asset utilization and provide lower inventory carrying costs and more rapid response to market signals. In a relatively low value commodity industry such as grain, the largest benefits of SCM will be in improved asset and capacity utilization rather than in reduced inventory carrying costs.

The realization of benefits within a supply chain may require investments, which may outweigh the benefits to single participant, but could achieve broad improvements in efficiency and benefits to other participants. The challenge lies in how these issues are managed by the industry as a whole.

A generally accepted view of SCM metrics looks to the provision of three essential areas of measure, and the Grain Monitoring Program accomplishes this through its design:

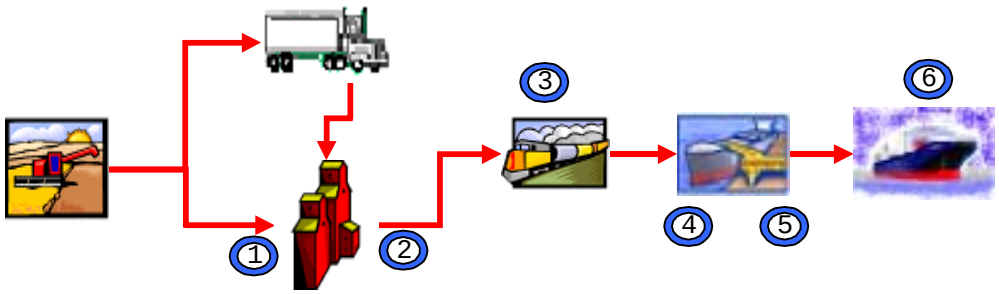
Service:	Stock to vessel requirement ratios; delivery velocity; stock to shipment ratios
Assets:	Terminal and elevator turn and stock to shipment ratios; car cycle times
Speed:	Delivery velocity; time in store at country and terminal elevators; vessel waiting and loading times at port, and car cycle times.

[58] For example, the concepts of supply chain, logistics chain, transportation chain, and market chain management were all discussed during the earlier Estey and Kroeger reviews.

[59] Supply Chain Performance Metrics, Warren H. Hausman, Management Science and Engineering Department, Stanford University, December 14, 2000; Page 12 – Links to Other Traditional Metrics.

The design of the GMP realizes the limitations that access to data can place on such a practice and prudently does not attempt to measure the whole of the supply chain. It focuses the measures on the portion most effected by the policy reforms announced on May 10, 2000 (as discussed in Chapter 2). The supplemental program (discussed in Appendix 2) will develop further service related measures, most particularly those associated to the sales and tendering processes.

The chart below outlines that portion of the supply chain monitored under the GMP. In general, the GHTS realized a modest improvement in efficiency and reliability during the 2000-2001 crop year. The chart refers to six primary measurements (also depicted in the tables in Appendix 3) that serve as general indicators of the effectiveness of the supply chain. These measures follow grain as it moves from country origins through to the ports where it is loaded onto awaiting vessels, and reflects upon the overall speed and efficiency with which grain products move through the system.



		Measure ID	1999-2001	2000-2001	% Change over Base Year	Supply Chain Effect *
1.	**Average Country Elevator Turnover Ratio**	**3B-2**	**5.1**	**4.9**	**-3.9%**	**-**
2.	**Country Elevator – Avg. Days in Store**	**3B-3**	**41.7**	**38.3**	**-8.0%**	**+**
3.	**Car Cycle**	**3C-4**	**19.7**	**16.4**	**-16.9%**	**++**
4.	**Average Terminal Elevator Turnover Ratio**	**3D-2**	**9.1**	**8.9**	**-1.8%**	**-**
	Vancouver		*14.3*	*15.8*	*10.5%*	**+**
	Prince Rupert		*16.2*	*10.6*	*-34.6%*	**-**
	Churchill		*3.3*	*4.8*	*45.5%*	**+**
	Thunder Bay		*5.3*	*4.9*	*-7.5%*	**-**
5.	**Terminal Elevator - Avg. Days in Store**	**3D-3**	**20.3**	**20.1**	**-1.0%**	**+**
	Vancouver		*15.3*	*12.4*	*-18.6%*	**++**
	Prince Rupert		*12.2*	*15.2*	*24.9%*	**-**
	Churchill		*39.2*	*23.9*	*-39.0%*	**++**
	Thunder Bay		*33.1*	*36.8*	*11.2%*	**-**
6.	**Avg. Days in Port/ Vessel** [60]	**3D-6**	**6.3**	**8.8**	**39.7%**	**-**
** A "+" denotes an improvement in supply chain performance, - denotes a decline in performance*						

In reviewing these measures the Monitor concludes that despite a marginal decrease in grain volumes when compared to the base year, the GHTS proved itself readily capable of moving the grain available with greater overall efficiency during the 2000-01 crop year. Nevertheless, there were areas where the performance proved somewhat less stellar.

System Velocity:

The combined effects of a reduction in the number of days spent in store at country and terminal elevators, as well as the time spent in transit by rail, saw a typical movement through the GHTS taking an average 67.1 days. This represents a reduction of 4 days (or 5.5%) from the 71.1 days for a movement typical of the base year. Moreover, it denotes that the system is still capable of further gains; along with which come the benefits of reduced inventory carrying costs, improved traffic fluidity, and enhanced system reliability.

[60] Includes Vancouver, Prince Rupert and Churchill

Asset Utilization:
The average country elevator capacity turnover ratio (tonnage handled/ storage capacity) declined by 3.9%. On the surface, this apparent worsening in asset utilization came despite a steep decline in the number of country elevators comprised within the GHTS. However, the decline in country elevators fails to reflect the fact that the system's net storage capacity actually increased through both the expansion of existing facilities, and the opening of new ones. The modest change in turnover ratio does not reflect the larger grain volumes that were increasingly being directed through the remaining – and frequently, higher throughput – facilities. The Monitor does not have the requisite data that would allow for a fuller examination of their utilization on a class-specific basis.

Conversely, the 1.8% decline in the average capacity turnover ratio for terminal elevators fully reflects the diminished volumes passing through these facilities during the 2000-01 crop year. Despite the addition of a new licensed terminal facility in Vancouver, its relatively small storage capacity had a negligible influence on the system's overall performance.

Service Reliability:
While the velocity with which grain moved through the system, and the utilization of the assets employed to achieve that speed, showed improvement, the reliability of the system as a whole had decidedly more mixed results. Although reduced stock-to-shipment and stock-to-vessel-requirement ratios, along with reduced time spent by grain in storage can also be indicators of better logistics management practices, there is sufficient evidence to indicate that grain – and more specifically, grades of grain – were not always available at export positions when required. To this extent, sporadic problems – evidenced by significant fluctuations in the average stock-to-shipment and stock-to-vessel-requirement ratios – continue to affect the reliability of the GHTS as a whole.

Perhaps most indicative of this, was the 39.4% increase in the average amount of time spent by vessels in port during the 2000-01 crop year – either loading or waiting to load. Undoubtedly, such additional time contributed to the higher demurrage costs, and reduced dispatch earnings, recorded in comparison to the base year.

It should be noted that a single year of data is an insufficient foundation upon which to lay a full and proper analysis. Nor does it necessarily indicate the presence of systemic trends as volumes can drive many apparent changes in efficiency. The Monitor will continue to review the performance of the GHTS within the fuller context of an overall supply chain throughout the course of the GMP.

Appendix 1: 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.

Agricore Cooperative Ltd.
Agricultural Producers Association of Saskatchewan
Agriculture and Agri-Food Canada
Alberta Agriculture, Food and Rural Development
Alberta Transportation
Alberta RailNet
British Columbia Railways
Canadian Canola Growers Association
Canadian Grain Commission
Canadian Maritime Chamber of Commerce
Canadian National Railway
Canadian Pacific Railway
Canadian Ports Clearance Association
Canadian Ship Owners Association
Canadian Special Crops Association
Canadian Transportation Agency
Canadian Wheat Board
Cando Contracting Ltd.
Cargill Limited
CMI Terminal
ConAgra Grain, Canada
Gardiner Dam Terminal
Government of BC
Grain Growers of Canada
Great Sandhills Terminal
Great Western Rail
Inland Terminal Association of Canada
James Richardson International Ltd. (Pioneer Grain)
Keystone Agricultural Producers
Louis Dreyfus Canada Ltd.
Mainline Terminal Ltd.
Manitoba Agriculture
Manitoba Transportation and Government Services
Mid-Sask Terminal Ltd.
Mission Terminal Inc.
National Farmers Union
North East Terminal Ltd.
North West Terminal Ltd.
OmniTRAX Canada, Inc.
Parrish & Heimbecker Ltd.
N.M. Paterson & Sons Limited
Port of Churchill
Port of Prince Rupert
Port of Thunder Bay
Port of Vancouver
Prairie West Terminal
Prince Rupert Grain Ltd.
Rail America
Red Coat Road and Rail
Saskatchewan Agriculture and Food
Saskatchewan Highways and Transportation
Saskatchewan Association of Rural Municipalities
Saskatchewan Wheat Pool
South West Terminal
Statistics Canada
Terminal 22 Inc
Transport Canada
United Grain Growers Ltd.
Vancouver Wharves Ltd. (BCR Marine)
Western Barley Growers Association
Western Canadian Wheat Growers Association
Western Grain By-Products Storage Ltd.
Western Grain Elevator Association
Weyburn Inland Terminal Ltd.
Wild Rose Agricultural Producers
Winnipeg Commodity Exchange

Appendix 2: Supplementary Work Program

In developing the GMP, the Government officials identified six areas requiring further study and consideration. The terms of reference issued by the Government direct that these studies are undertaken as soon as possible during the first year of the Monitor's mandate. The status of each of these supplementary work items is summarized in the table below:

Program Item	Current Status
Sample Location Selection Methodology Using accepted statistical techniques, develop a methodology for the selection of the number and location of grain delivery points that are to be included in a representative sample for monitoring rail and service charges (also part of the producer netback calculations and measures)	Presently under development in conjunction with the University of Alberta, Faculty of Business.
Commercial Truck Rates Methodology Develop a methodology to track commercial trucking rates for grain on a monthly basis.	Study is completed and the methodology in place
Other Impacts on Producers Identifying ways to assess the impact on producers over and above the impacts included in the producer netback methodology	The Study was conducted in conjunction with the development of the Producer netback methodology. Both reports have been submitted to government officials.
Base Year Establishment Preparing applicable performance indicators for the base period, i.e. crop year 1999-2000, in accordance with the monitoring design	The preparations of the base year statistics were completed through the implementation of the base program.
Tendered Movements Measures Methodology Developing detailed plans for monitoring tendered vs. non-tendered CWB movements.	A proposal will be submitted to government officials in Spring of 2002.
Sales Based Tracking of Reliability Developing a sales based methodology for tracking system reliability	A proposal was submitted to the government officials in February of 2002 and the study is expected to commence in Spring 2002.

Appendix 3: Data Tables

Preface

The material presented in the accompanying tables is drawn from data supplied by the various stakeholders in Canada's Grain Handling and Transportation System. These include the Canadian Wheat Board, the Canadian Grain Commission, the Canadian Ports Clearance Association, Statistics Canada, individual grain companies and railway companies. The majority of this data is of a secondary nature and reflects the internal data collection practices as well as informational needs of the individual stakeholders. Moreover, the data also comes in a variety of mediums, structures and levels of detail that require considerable transformation and manipulation in order to be rendered usable.

With this in mind, the reader is cautioned regarding the limitations that must be taken into account when considering the material presented. Firstly, although every reasonable effort has been made to ensure that the data used accurately reflects the activity being reported upon, it is largely drawn from un-audited sources. To this extent, errors potentially contained within the data collected – whether by way of inclusion or omission – will also be reflected in the statistics presented.

Secondly, the point in time at which individual stakeholders collect data often differs. By way of example, the railways consider the waybill date the chief determinant of the month, quarter and crop year in which a particular grain shipment actually moved when assembling their traffic statistics. Conversely, the Canadian Grain Commission compiles statistics using the date upon which the shipment was actually received and unloaded at the destination terminal. Such structural differences make exact matches impossible in any direct comparison. These differences, however, do not detract from the relative comparisons and general observations that may be drawn from the statistics.

Thirdly, data made available to the Monitor for certain measures in respect to aggregate grain movements in Western Canada are not always comprehensive. For example, grain production data from Statistics Canada includes all grains, oilseeds and special crops, while data on carry forward stocks reported by the Canadian Grain Commission and Statistics Canada is for only the seven "traditional" major grains. Although it is the intent of the Monitor to provide for more detailed reporting on the movement of "special" crops, such as peas, under the Grain Monitoring Program, the limited availability of relatable data results in their selective inclusion within the measures presented at this time.

Finally, inconsistent or incomplete reporting makes some estimation necessary. By way of illustration, data on measures pertaining to vessel movements at Western Canadian ports over the two years covered by this report was largely incomplete. As a result, it was necessary to blend information compiled from both the Canadian Ports Clearance Association and the Canadian Grain Commission in order to obtain a more accurate depiction of vessel movements throughout this period.

Special mention must also be made of the fact that not all of the data requested of stakeholders has been made available to the Monitor. As a result, the Monitor is unable to calculate a number of the measures contemplated under the Grain Monitoring Program. Accordingly, these measures cannot be presented at this time. Nevertheless, the Monitor continues to work with the stakeholders to overcome the underlying obstacles that will ultimately permit these measures to be produced for future reports.

Table Index

MEASUREMENT TABLES INDEX

Note: 1.) Data on grain volumes in these tables is presented in Net Tonnes

2.) Totals may not always add nor percentages match, due to rounding