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GRAIN HANDLING AND TRANSPORTATION: CAPACITY, RATES AND TARIFFS

by John Heads and Arthur G. Wilson*

Handling and transportation charges on prairie grain are substantial in relation to the returns from grain production. Since the end of the rail transport subsidy in the current crop year, the handling and transportation charges on wheat[1] from primary elevator to terminal or transfer elevator are, for example, $49.73/tonne on the westbound movement from Rosetown, SK to Vancouver and $67.01/tonne on the eastbound movement to the St. Lawrence transfer houses. Even in the crop year 1995/96, when wheat prices have been high at $235/tonne handling and transportation charges are substantial relative to what the farmer receives.

During 1995, the University of Manitoba Transport Institute was able to carry out a considerable amount of research on grain handling and transportation. This work was largely funded by the Province of British Columbia and a number of stakeholders in the eastbound grain movement through the Great Lakes/St. Lawrence system. Flowing from this work and other Transport Institute research, we give some indication of likely developments over the next decade relating to capacity in the grain handling and transportation system and factors relevant to railway rates and elevator tariffs. The authors are, of course, solely responsible for any opinions expressed in this paper.

1. SYSTEM CAPACITY

Table 1 shows our projections of exports of major Canadian bulk grains - wheat, durum, barley, canola, oats, flaxseed and rye - by clearance sector. In making projections, we have to make the inevitable assumption that 1999/2000 and 2004/05 will be "average" years not unduly affected by unusual weather conditions or large random variations in market demand.

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Table 1: Projections of Exports of Major Canadian Bulk Grains by Clearance Sector			
	million tonnes		
	Average 1992/1995	Projected 1999/2000	Projected 2004/2005
Pacific Coast	17.6	20.6	21.6
Prairie Elevators	2.3	3.6	4.0
St. Lawrence	5.0	4.7	5.1
Thunder Bay Direct	2.4	1.7	1.9
Churchill	0.3	0.4	0.4
Atlantic	0.1	–	–
Total	27.6	31.0	33.0

Source: John Heads, Arthur G. Wilson, David C. Hackston and Richard W. Lake, Future Changes in Eastbound Grain Traffic, Report to Stakeholders in Eastbound Grain Movement, January 1996, p. 319.

Because of space limitations, only a brief explanation of the lengthy methodology behind Table 1 can be given. Forecasts of Canadian exports of each individual grain were compiled by the Transport Institute on the basis of regression analysis of time series data, modified by grain price expectations over the next decade and the effects of the end of the grain transport subsidy. These were then aggregated for the seven grains to give the total figures in Table 1. Our forecasts are very similar to those produced by the Canadian Wheat Board in its CWB Grain Trade Forecast 2004/05 of August 1995, although the CWB methodology was quite different, relying mainly on an analysis of trends in individual grain importing countries. Agriculture and Agri-Food Canada was less optimistic in its Medium Term Outlook of October 1995 at just under 29 million tonnes for 2004/05.

The methodology used by the Transport Institute to assign grain exports to clearance sector consisted of an examination of the current export destinations of each individual grain; the extent to which these exports would change in the forecast years; and an examination of how these exports were likely to move

by clearance sector. This examination was made for each individual grain and the totals are shown in Table 1.

Some brief comments are offered on the various clearance sectors:

- The Pacific coast now accounts for 64% of Canadian exports of major grains, against a 43% share a decade ago. The reasons for this development are well known: a change in Canada's grain markets to east Asia and increased use of larger ships more easily accommodated at the west coast. However, the Pacific coast share of the movement has not really increased much in the 1990s. Although this has been partly due to capacity constraints, there is not much grain still going through other transportation routes where the economics demand a west coast export. Wheat and canola exports should increase in the future, but the total movement through the west coast will be adversely affected by reduced Canadian exports of feed barley.

- Exports of grain direct to the U.S. from the prairies have increased considerably in recent years, causing much concern south of the border and the establishment of a Canada-United States Joint Commission on Grains, whose report was released early this year. Some may consider our projections of this movement optimistic, but it should be noted that these include U.S. exports routed in the past through Thunder Bay to benefit from the rail transportation subsidy.

- The eastward movement through the St. Lawrence and the Québec transfer elevators has fallen very substantially over the last decade. We see more stability in the future, with continued high exports of durum to the major markets in North Africa and western Europe. The direct movement of grain from Thunder Bay to the U.S. is already suffering substantially from the end of the transport subsidy, but the overseas movement in "salties" has been much less affected.

- The Churchill projections reflect marketing plans accepted by the CWB, but the future of this port depends largely on how governments apply the Transport Canada policy of insisting on the financial viability of local and regional ports. Grain shipments through the Atlantic Seaboard are already negligible and could disappear.

The discussion now turns to the ability of the Canadian transportation routes to accommodate the projected grain flows.

1.1 Pacific Coast

Table 1 projected an increase in the exports of major Canadian grains through the Pacific coast to 21.6 million tonnes in 2004/05. The question is whether elevator and railway capacity are adequate to deal with this projected volume of exports, recognizing that this forecast for 2004/05 assumes an average year and that exports in a heavy volume year would exceed this figure by as much as 3 million tonnes.

The B.C. grain terminals had a capacity of 1,139,000 tonnes as of August 1, 1995 - 929,000 at Vancouver and 210,000 tonnes at Prince Rupert. The record grain throughputs were in the crop year 1991/92 - 14.7 million tonnes at Vancouver and 5.3 million tonnes at Prince Rupert for a total of 20.0 million tonnes. In addition to these licensed elevators, Neptune Terminals at Vancouver also has the capability of transferring grain directly from railway cars to ocean vessels. It was announced in late December 1995 that Cargill Limited and the Saskatchewan Wheat Pool had formed a consortium to build a new facility at Roberts Bank capable of a throughput of 3-4 million tonnes per annum and expected to commence operations in 1999.

In recent years, there has been considerable debate as to what was the maximum bulk grain throughput that could be achieved in Vancouver. Various bottlenecks have been alleged, including limited hours of work at the grain terminals, railway delays, port labour disruption, and the failure of ocean ships to arrive on schedule to load grain. A recent study concluded that, with only minor logistical improvements, the existing elevators at Vancouver could handle 16 million tonnes a year and Prince Rupert could handle 6 million tonnes, for a total of 22 million tonnes.[2] With the announcement since that time of the construction of a new facility at Roberts Bank, it is rather academic to debate the adequacy of the elevator capacity on the Pacific coast. This is obviously satisfactory in the context of current projections of grain exports, even in the event that some of this capacity were used to accommodate U.S. grain.

Turning to railway services to the west coast, these do not cause any major capacity difficulties, apart from the ongoing problem of periodic shortages of rail cars.[3] Railway programs to increase main line capacity to the west coast include the extension of sidings, expansion of yard facilities, tunnel and bridge improvements, more effective motive power, and track gradient and alignment changes. Both CN and CP now have enough capacity to deal with the flows of the various commodities exported through the west coast. An additional flow of, say, 3 million tonnes of grain to Vancouver would add less than 6% to the annual exports of all bulk commodities through the port.

Railway operations are rarely a problem within the Port of Prince Rupert and shipments to the facility to be constructed at Roberts Bank will avoid much of the congestion of Vancouver. As far as the existing Vancouver elevators are concerned, there are places of potential railway congestion - Lynn Creek Yard in North Vancouver, Sapperton and occasionally other interchange facilities, and the Fraser River Bridge. However, the railways have managed these problem areas in the past with considerable efficiency and it is not envisaged that railway facilities will limit the future potential grain export through the west coast.

1.2 Great Lakes/St. Lawrence

The reduction in grain exports through the Great Lakes/St. Lawrence has already been documented and the problem in this part of the system is surplus capacity. As of August 1, 1995, the capacity of the terminal elevators at Thunder Bay was 1,487,000 tonnes. Bulk grain shipments from Thunder Bay for export and domestic use amounted to 10.1 million tonnes in 1994/95, implying a turnover ratio of only 6.8. Thunder Bay also has the capacity to load grain directly from rail to vessel at the facilities of Valley Camp and Thunder Bay Terminals, which are not included in these figures. There is considerable over-capacity at Thunder Bay.

Turning to the Québec transfer elevators on the St. Lawrence, capacity is currently 1,477,000 tonnes or much the same as the terminal capacity at Thunder Bay. Throughput of Canadian and U.S. grain for export and domestic use in Canada is little more than 8 million tonnes, implying a throughput ratio of about 5.5. Again, there is considerable over-capacity in the transfer elevator system.

With the reduced grain flow through the eastbound route and frequent railway complaints about excess capacity in eastern Canada, there are no problems of rail capacity. While it is quite likely that a merger of the eastern Canadian operations of CN and CP will occur over the next decade, this would not have repercussions on railway capacity to deal with the eastbound grain movement.

1.3 U.S. Transportation Routes

Although the Canadian transportation routes have adequate capacity to accommodate the projected level of grain exports over the next decade, there is also the possibility of accessing U.S. transportation routes. At the current exchange rate of C$1=US74¢, the U.S. routes to the west coast are not competitive for Canadian grain, but this could change with strengthening of the

Canadian dollar.[4] However, routes from the prairies to the U.S. Gulf ports are almost competitive with the eastern Canadian movement by rail and laker at current exchange rates and become much more competitive with any strengthening of the Canadian dollar. It is also worth noting that, within Canada, the direct movement of grain from the prairies to the transfer elevator at Québec City, where cleaning facilities are available, is already competitive with the Great Lakes/St. Lawrence route.[5]

2. RAILWAY RATES

On January 1, 1984, the *Western Grain Transportation Act (WGTA)* took effect. Railway rates on grain, paid partly by government and partly by shippers, were to cover railway costs. Railway costs were defined as the infrastructure costs of grain-dependent branchlines, the long-run variable costs of moving grain from the originating primary elevators to the terminal elevators at Thunder Bay, Vancouver, Prince Rupert and Churchill, plus a 20% addition to these long-run variable costs to make a contribution to railway fixed costs. These costs were indexed each year to allow for price increases on railway inputs and reviewed every four years to return the benefit of productivity gains to the shipper and to government.

The government started the new legislation with no increase in rates paid by shippers and a government subsidy met the shortfall between these rates and the costs incurred by the railways. The *WGTA* provided that in future the shippers would be faced with the full costs incurred in any additional movement of grain over and beyond the tonnage moved at the time of the legislation and that the shippers would meet a substantial share of any increase in freight rates attributable to inflation.

Table 2 shows the total freight rate applicable to grain for the average length of haul of 1026-1050 miles, together with the shares paid by government and by the shipper.

Table 2: Annual Rate Scale - $/tonne for a 1026-1050 mile haul			
Crop Year	Government Share	Shipper Share	Total
1986/87	27.03	6.47	33.50
1987/88	23.97	9.00	32.97
1988/89	23.69	9.07	32.76
1989/90	23.06	9.75	32.81
1990/91	21.72	11.04	32.76
1991/92	21.77	11.41	33.18
1992/93	20.77	12.36	33.13
1993/94	18.92	14.16	33.08
1994/95	15.63	14.72	30.35
1995/96	nil	31.82	31.82

Source: National Transportation Agency.

The total freight rate for moving grain over an average distance of 1026-1050 miles has actually fallen during the last decade. Inflation has been low and total factor productivity in the railway industry has shown impressive improvement. The large fall in the freight rate in 1994/95 was the result of incorporating railway productivity gains into the freight rates.

Since 1986/87, the producer has had to bear all the costs for the movement of any incremental grain in excess of the volume guaranteed in the *WGTA* and to meet the modest levels of inflation experienced since that year. The government commitment to subsidize the movement of western grain was effectively frozen at $720 million per annum. This continued until 1993/94, when the government introduced a 10% reduction in transportation subsidies over a wide range of programs, thus reducing the *WGTA* subsidy to about $648 million. In 1994/95, a further reduction in the government subsidy was made to $560 million and by that crop year the producer was paying almost half the total freight rate.

In the February 1995 budget, the federal government announced the complete abolition of the *WGTA* and the subsidy on the movement of grain by rail. As compensation, there was a $1.6 billion one-time payment to prairie grain

landowners and a $300 million adjustment program. Effective August 1, 1995, farmers are now paying the full cost of the freight rate for moving grain.

A number of other major changes were made to the Canadian grain handling and transportation system in 1995. We discuss rate regulation under the new *Canada Transportation Act* later in this section and note the other changes as follows;

- Canadian Wheat Board basing points have been changed from Vancouver/Thunder Bay to Vancouver/St. Lawrence. Farmers shipping feed barley are now assessed the lower of the freight rate to Vancouver or the freight rate to Thunder Bay plus onward water transportation through the Great Lakes/Seaway and the St. Lawrence terminal elevators of $23.75/tonne. For wheat, the alternatives are rail freight to Vancouver or rail freight to Thunder Bay plus $12.67/tonne for onward transportation to the St. Lawrence, with this figure scheduled to increase by 1998/99 to the full water costs of $19.38/tonne for wheat. Durum wheat and malting barley have only been marginally affected by the change in basing points, as there are still good markets for these grains through the eastern transportation routes.

- The Feed Freight Assistance program was terminated at the end of 1995. This subsidized the freight charges on feed grains moving from the prairies to the Atlantic Region, eastern Québec, British Columbia, Yukon and NWT. Approximately one million tonnes were moving from the prairies under this program, over half to B.C. with the balance to Québec and the Atlantic Region. This feed grain movement is expected to fall significantly.

- Route parity on grain freight rates from Edmonton and Calgary to Vancouver has been abolished. The Edmonton rate is now $3.03/tonne higher than the Calgary rate, reflecting the extra mileage.

- Port parity between Vancouver and Prince Rupert has also been abolished. The rate from Edmonton to Prince Rupert is now $4.22/tonne higher than the rate from Edmonton to Vancouver to reflect the additional distance. This extra amount has not been imposed in its entirety on Prince Rupert - CN has absorbed more than half the additional freight rate and the remaining $2/tonne is being absorbed on an equal basis by the CWB and the elevator.

- The government has announced its intention to abolish the Western Transportation Office (formerly the Grain Transportation Agency) and to end government ownership of grain hopper cars. The various levels of government provide 19,000 hopper cars for the transportation of grain - 13,000 cars owned by the federal government, 2,000 owned by the CWB, 2,000 cars leased by the CWB and 1,000 cars each owned by the Provinces of Alberta and Saskatchewan. Future ownership provisions for these government cars is currently the subject of considerable controversy; as the issue will presumably be resolved before the CTRF meets, this is not considered further in the present paper.

The discussion now turns to railway costs and rates. Under the *WGTA*, a distance related rate scale was calculated by the National Transportation Agency. For any given distance, a railway was not allowed to charge a rate higher than this scale. Every four years, there was a Costing Review to determine the extent to which railway costs had changed. In the years between the Costing Reviews, the rate scale was indexed for changes in the costs of the inputs used by the railways - labour, fuel, materials and cost of capital - and any grain-dependent branchlines which had been abandoned were removed from the costing base.

After each Costing Review, the costing base was revised to remove the effect of railway productivity gains made in the previous four years. Although Canadian railways are often compared adversely with U.S. railroads, their productivity gains have still been impressive, averaging nearly 3% per annum for over three decades. The Costing Review of 1992 established a rate of productivity increase even higher than this between 1988 and 1992. This saving was shared between government and the shippers.

The federal government is implementing further deregulation of transportation and Bill C-101, to be known as the *Canada Transportation Act*. Although this legislation was delayed when Parliament was prorogued early this year, it is expected to be law by the time the CTRF meets in May. Unless changes take place, the key features are :

- A Maximum Rate Scale for the transportation of grain in the crop year 1995-96, with the producer paying the entire freight rate. Freight rates will continue to be indexed each year for changes in the prices of inputs used by the railways and the cost base will be reduced by $10,000 for each mile of grain-dependent branchline which is abandoned. There will be no further Costing Reviews and no more reductions in the cost base for railway productivity gains.

- Grain shippers become eligible to use confidential contracts and the competitive access provisions presently available in the *National Transportation Act, 1987.*

The main issue to note in respect of the Maximum Rate Scale is that there are no longer any provisions for a sharing with shippers of the results of railway productivity gains.[6] As the railways continue to be compensated for changes in the price level of the inputs they use, they will retain the value of all productivity increases in the Maximum Rate Scale. Even if railway productivity gains were to be low as against past experience, say only 2.5% per annum, the Maximum Rate Scale would increase railway revenues on grain transportation by 10% in the year 1999/2000 and this over current revenues which already cover fully-allocated costs. In the real world, this 10% increase in revenues may not materialize, as the railways would increasingly offer incentive rates at high throughput points. However, these incentive rates would also lead to further reductions in railway costs.

The grain railway rate regulation system envisaged in the *Canada Transportation Act* is to continue until 1999 when the Minister is to conduct a review of the effects "on the efficiency of the grain transportation and handling system and on the sharing of efficiency gains as between shippers and railway companies" (section 155 (1)). The Minister may then decide to repeal the Maximum Rate Scale clauses and grain transportation would fall under the *Canada Transportation Act* like any other commodity.

It has been claimed with some justification that the new *Canada Transportation Act* will lead to more rapid rationalization of the western grain transportation system. The railways will have more scope and financial ability to offer incentive rates on multiple car shipments from high throughput elevators. There will be a wider difference between these rates and those applying on shipments from low density branchlines, which will increase pressures towards more rapid branchline abandonment.

Under the *WGTA*, railway productivity gains were fully reflected in the grain freight rates after each quadrennial Costing Review. There were costs to this process in the form of slower rationalization of the grain transportation system, continued operation of low density branchlines and slow development of multiple car shipments. The new legislation will speed up the rationalization. Some of the new efficiencies will be reflected in the rates charged to shippers, especially for high throughput elevators, for points served by or close to both CN and CP, and for points where U.S. railroads might provide a competitive service. Nevertheless, there is no guarantee that competitive forces will ensure

that shippers benefit substantially from railway productivity gains, as the requirement for this under the *WGTA* has not been carried forward into the new legislation.[7]

3. GRAIN HANDLING TARIFFS

3.1 Primary Elevators

The number of primary elevators in the prairies reached its maximum in the early 1960s at over 5,200 and there has been a continued reduction in numbers for over thirty years. At August 1, 1995, there were 1,340 primary elevators in the prairies, which was 24% less than a decade earlier.

In spite of this rationalization, the average prairie elevator only handles 24,600 tonnes of grain per annum and turns over its capacity only 5.0 times in the course of a year. There is a general agreement among the stakeholders in the grain handling industry that elevator costs would be reduced by higher throughput ratios. A given infrastructure with its semi-fixed labour complement can usually handle additional quantities of grain at very low marginal cost.[8]

A continuation of the trend of the last decade would leave the number of primary elevators at about 1,100 by the year 2000, but many expect the number to be down to about 800 by the turn of the century and a further large reduction by the year 2010. With the end of the WGTA, railways have more ability to offer incentive rates for multiple car shipments from high throughput elevators. The end of the rail subsidy has made truck transportation more competitive in moving grain longer distances to primary elevators. In reaction to these changes, there has been a considerable construction of high throughput elevators over the last year or so, mainly in Saskatchewan. These larger elevators are very efficient if they can attract enough grain, but it is difficult to recoup the substantial investment if throughput ratios are no better than the present industry average of 5.0.

There is also a general expectation that there will be a considerable increase in grain cleaning facilities in the prairies. At present there are eight major elevator companies operating primary elevators in the prairies - the three prairie pools, United Grain Growers, Cargill, Pioneer, Parish and Heimbecker and Paterson. Many commentators expect a reduction in this number within the next few years.

Many prairie points are served by more than one elevator. As of August 1, 1995, the 1,340 primary elevators in the prairies were located at 908 points.

There were 536 elevators at single company points and 372 at multiple company points. The single company points accounted for 59% of all points, but for only 40% of the total number of primary elevators in the prairies. Moreover, while companies at single company points may not have direct competition at the same location, they are facing competition from other elevators located in the same general area.

On the other hand, very few elevator points are served by two railways. Only 27 points are recorded with dual railway service and this amounts to only 3% of total elevator points. Admittedly, this statement underestimates the extent of railway competition. In railway tariffs issued before the WGTA and continued after this legislation became law, the railways would look at a specific point of origin and other points considered as "competitive or contiguous" to it and apply the lowest of the applicable rates to all points considered competitive or contiguous. This had the effect of increasing railway competition, as well as elevator competition. Nevertheless, even allowing for this, there are many grain farmers in the prairies who do not have access to a competitive railway.

3.2 Elevator Tariffs

Table 3 shows elevator charges for wheat at primary and terminal elevators.

Table 3: Elevator Charges for Wheat, $/tonne, 1995/96

	Manitoba Pool Elevators	Saskatchewan Wheat Pool	Alberta Wheat Pool
Primary elevators			
Elevation	9.46	7.78	9.09
Cleaning	3.20	3.20	2.70
Terminal elevators			
Thunder Bay	6.04	6.04	n/a
Vancouver	n/a	6.33	6.33

Source: Canadian Grain Commission.

Note: Elevation at primary elevator is for receiving, elevating and loading out, while cleaning is for removal of dockage at the terminal elevator with the

elevator company retaining the dockage. Terminal elevator charges are for receiving by rail, elevating and loading out by water; additional charges apply for receiving from truck and for loading out in railway cars.

Primary elevation charges are appreciably lower under the tariffs of the Saskatchewan Wheat Pool than those published by the pools in the other two provinces. The two pools are the price leaders in Saskatchewan and Manitoba. Pioneer tariffs are identical to the pools, while Cargill tariffs differ by no more than 2¢. UGG tariffs are slightly higher. Elevation charges levied by Alberta Wheat Pool are generally higher than those of competitors in that province, but this seems to be only to offset the low cleaning rate filed by the pool. While competition between primary elevators exists as to grading, dockage, and moisture determination and other service attributes, there is no open price competition. Each pool acts as the price leader within its province.

The same lack of price competition is evident in the terminal elevators. The rates quoted in Table 3 for Thunder Bay and Vancouver apply to the tariffs of all companies operating in each port. Prince Rupert Grain offers a slightly lower rate than Vancouver at $6.15/tonne and the Churchill tariff is $5.92/tonne.

The transfer elevators on the St. Lawrence are not owned by the prairie elevator companies. The bulk of the grain delivered to these elevators is received from ships and loaded out to ships, but to allow better comparability with Thunder Bay, it is more appropriate to consider the higher rate of $4.17/tonne for receipts in these elevators by rail and loading out by water.[9] It is the view of the trade that the filed rates at the transfer elevators are discounted for competitive reasons to a much greater extent than the rates in terminal elevators. The Thunder Bay terminal elevator tariff is almost $2/tonne higher than the comparable transfer elevator tariff. As this comparison excludes cleaning, it is difficult to see what extra services at Thunder Bay justify this difference.

Elevator charges in Canada are considerably higher than those applying in the United States. While a rigorous analysis of U.S. elevator charges has not been made for this paper, terminal elevator charges appear to be of the order of C$4/tonne. Primary elevator charges in the U.S. would also be about $4/tonne with this charge excluding cleaning.[10] The total of terminal and primary elevator charges in the U.S. therefore amounts to some C$8/tonne against a comparable figure in Canada excluding cleaning ranging from nearly $14/tonne to $15.50/tonne. While it is claimed with some justification that the private grain trade in the U.S. is marketing wheat as well as handling it and therefore able to recover additional revenue from the marketing function, nevertheless

elevation charges are much lower in the U.S. than in Canada. However, in fairness to Canadian elevator companies, it should be noted that there has been considerable U.S. government subsidization of elevator construction.

4. CONCLUSION

The main conclusions that flow from this paper are:

1. In the three crop years ending 1994/95, Canadian bulk exports of major grains averaged 27.6 million tonnes per annum. These are projected to increase to 31.0 million tonnes in 1999/2000 and 33.0 million tonnes in 2004/05. As in all grain trade projections, it is assumed that these future years will be "average" in the sense of not being unduly affected by climate variations and random fluctuations in markets.

2. The increased grain exports are forecast primarily through the Pacific coast at 21.6 million tonnes in 2004/05. Direct shipments from the prairies for consumption in the U.S. are also forecast to increase to 4.0 million tonnes. Exports through other clearance sectors are not expected to show any increase.

3. Grain handling and transportation capacity are sufficient to meet these export projections through all clearance sectors. With a new facility to be built at Roberts Bank to commence operations in 1999, west coast elevator capacity is more than adequate for the volume of grain projected. Although there may continue to be periodic shortages of rail cars, main line rail capacity to the west coast can cope with expected flows of the various commodities exported through the B.C. ports. Railway congestion can occur in moving grain cars through the existing Vancouver elevators, but the railways are managing these problem areas with considerable efficiency. It is not envisaged that railway facilities will limit potential grain exports to the west coast.

4. Turning to the eastbound grain movement, the problem is considerable surplus capacity in the terminal elevators of Thunder Bay and the transfer elevators on the St. Lawrence. The grain flow through the eastbound route has fallen dramatically over the last decade and, with general railway complaints about excess capacity in eastern Canada, the railways can accommodate future grain flows without any difficulties.

5. Railway productivity gains have been very impressive for many years. The average rail rate received by the railways for shipping grain is actually less now than a decade ago in spite of general inflation in the economy. Under the Western Grain Transportation Act, the railways were required to share

productivity gains with the shipper (and at that time the government) every four years. Under the new *Canada Transportation Act*, the maximum rate scale will be regulated to at least the year 1999, but there is no longer a requirement to transfer productivity gains to the shipper every four years. This causes considerable concern, as grain shippers are often captive to one railway.

6. There has been considerable rationalization of the primary elevator system in the prairies over the last 30 years. Yet, the average prairie elevator still turns over its capacity only 5 times in a year. The current number of 1340 primary elevators in the prairies will continue to fall, possibly to about 800 by the turn of the century and continuing to a much lower figure by the year 2010. Currently, there are eight major companies operating primary elevators in the prairies and many consider that this number will be consolidated in the next few years.

7. Tariffs at primary and terminal elevators are much higher in Canada than in the United States. Excluding cleaning charges, primary and terminal elevator charges in Canada are in the range of $14/tonne to $15.50/tonne, with an additional transfer elevator charge of $4/tonne for grain moving through the transfer elevators on the Lower St. Lawrence. Although it is not possible to be precise, U.S. terminal and primary elevator charges amount to about C$8/tonne.

Endnotes

1. These are primary and terminal elevator tariffs, cleaning, the rail rate for grain shipped in single cars, and for the eastbound movement what the CWB currently estimates will ultimately be the full cost of $19.38/tonne for the transport of wheat from Thunder Bay to the St. Lawrence.

2. John Heads, Arthur G. Wilson and James J. Eisler, Potential Changes in Grain Traffic Through British Columbia Ports, University of Manitoba Transport Institute Report for the British Columbia Ministry of Employment and Investment, November 1995, p. 9.

3. ibid., p. 10-24.

4. University of Manitoba Transport Institute, The International Competitiveness of Western Canadian Transportation, Report prepared for Western Economic Diversification Canada, November 1994. This report was prepared by a number of authors, with Dr. Wilson assisted by

Dr. Lorraine Hope responsible for Chapter 5, which examined grain.

5. Future Changes in Eastbound Grain Traffic, referenced as the source of Table 1, p. 281.

6. The costs of abandoned grain-dependent branchlines continue to be removed from the cost base. However, the $10,000 per mile per annum in the new legislation is less than the full railway saving ($13,300 per mile in 1994/95), which was previously all passed to the shippers.

7. On the dangers facing captive shippers in other industries, see John Heads, "Captive Shippers: The Coal and Sulphur Industries", Canadian Transportation Research Forum Proceedings, 1995, pp. 743-58.

8. See, for example, National Transportation Agency, The 1995 Branch Line Review, Report to the Minister of Transport, October 1995, pp. 12-13. This showed that the transfer of 0.67 million tonnes of grain from low density branchlines to alternate branchlines would lead to net elevation cost reductions of about $2 million annually, i.e., $3/tonne.

9. When the movement is from unit trains, the rate is $4.10/tonne at Quebec and $4.24/tonne at Montreal, for an average of $4.17/tonne. This is higher than the water-water rate of $3.87/tonne. Rail-water rates are higher at Sorel and Trois Rivières, but the movements there are much smaller. There are, of course, no rail-water rates for Baie Comeau and Port Cartier.

10. Terminal charges are readily available, but it is not easy to establish primary elevator charges in the U.S. The Upper Great Plains Transportation Institute informs us that their survey in 1994 produced a wide range of figures from US3¢ to US12¢/bushel. After discussion with this Institute, we took on average figures of US8¢/bushel, which is equivalent to C$4/tonne. This estimate is also consistent with data in IBI Group, Grain System Efficiency, July 1994, Table 1.1.