CANADIAN TRANSPORTATION RESEARCH FORUM
LE GROUPE DE RECHERCHES SUR LES TRANSPORTS AU CANADA

PROCEEDINGS OF

SEVENTEENTH ANNUAL MEETING

CANADIAN TRANSPORTATION RESEARCH FORUM

Volume 1

MONTREAL, QUEBEC

MAY 26, 27 & 28, 1982

Compiled by: R. Lande
&
K. Tansey

Potential Impacts of Crow's Nest Rate Rationalization on Midwestern United States Grain Flows and Logistics Facilities

by

Jerry E. Fruin
Associate Professor
Department of Agricultural and Applied Economics
University of Minnesota
St. Paul, Minnesota

to be presented at

Canadian Transportation Research
Forum Annual Meeting

May 26-28, 1982

Montreal, Canada

Potential Impacts of Crow's Nest Rate Rationalization
on Midwestern United States Grain Flows and Logistics Facilities

INTRODUCTION

This discussion of the potential impacts of changes in the statutory Crow's Nest Rates attempts to answer three sets of questions. First, why are potential changes in the "Crow's Nest" rate structure of interest to U.S. agriculture? Second, will doing away with the "Crow's Nest" rates actually impact grain flows in and through the U.S. and for what reasons? Finally, since the answer to the second question is positive but the form of the Crow rate rationalization is not yet known, what are some of the possible scenarios that might occur and what are the possible impacts of these scenarios?

The term "Crow's Nest Rates", of course, refers to the statutory rail rates for Canadian grain and grain products. These rates have been fixed since the 1920's, at their 1897 level, and were not deregulated by the 1967 Transportation Act. The rates at about .5¢ per ton mile are without question noncompensatory and have been since the 1950's. For example, Snavely's 1977 study found avoidable costs to be 3.1 times the statutory rates. More recently, the Ministry of Transport put the rates at about 20 percent of actual costs and projected that they would only cover 12 percent of costs in 1985 and 7 percent in 1990.

INTEREST OF U.S. AGRICULTURE

Why are changes in the statutory Crow rates for Canadian grain and grain products of interest to U.S. agriculture? At the national level, the noncompensatory Crow's Nest rates obviously subsidize grain exports. This enables Canadian grains and grain products to compete more favorably in world markets with U.S. grains than if compensatory rates were required in Canada as in the U.S. This has never seemed to be of much concern to U.S. policy makers because first, they didn't know about it or understand it, and second, until recently, the Crow rates probably were not very important in determining export shares when compared to

other factors such as international politics and the two countries' domestic agricultural programs. Finally, the U.S. has its own version of cheap export rates in the government furnished toll-free Mississippi River system. For many years the river was a lower-cost method of getting grain into export than even the Crow Rates.

On the national level, there really is not much concern in the U.S. about the Crow Rates or their rationalization. However, in the Upper Midwest region including the Dakotas, Minnesota and Montana, there are reasons to be concerned. Geographically, this area contains the U.S. part of the hard red spring wheat belt which is approximately the same distance from domestic and foreign markets as is the Canadian part. It also includes the feed grain area in the northern part of the Corn Belt that has a relatively greater location disadvantage from its markets than the wheat area. Historically, this part of the Corn Belt had the lowest corn and feed prices in the United States. Consequently, dairy, poultry and livestock industries developed there and consumed most of the feedstuffs. The high grain prices resulting from the export boom of the 70's caused a significant shift to cash grain farming and away from livestock production in the area. This area now has a substantial feed grain surplus that must be exported. However, because of its extreme distance from the U.S. ports, it is the last region of the U.S. that the exporters turn to for feed grains. The southern and eastern portions of the Midwest are emptied of grain first, causing extreme swings in demand for Upper Midwest feed grains and periodic strains on the logistics system serving the Upper Midwest. Throughout the last decade when export demand has been weak, Upper Midwest grain moved into the marketing and logistics channels slowly. When export demand is strong, grain prices rise at the ports but transportation shortages and logistics snarls are frequent and costly, resulting in lower realized farm prices than expected.

Transportation problems of the region during the 1970's included branchline abandonments, power shortages and rail car shortages similar to those north of

the border. The problems were acerbated by the bankruptcy of two major Midwestern railroads. One of these, the Rock Island Railroad, ended up in liquidation, a singular event in U.S. railroad history. The Rock was the only railroad which could provide single line service from the Midwest to the Gulf. As the provider of single line service, the Rock was recognized as the rate-setter on that route. The other bankrupt Midwestern railroad, the Milwaukee, was one of the so-called transcontinental roads, providing the Midwest with single line service to the Pacific Northwest ports. It is currently in reorganization and is now strictly a regional railroad having sold or abandoned its western lines. In the eyes of Midwesterners, the Milwaukee had been the most innovative rate-setter of the transcontinental rails.

Another major problem was and is the bottleneck at Lock and Dam 26 on the Mississippi River. This lock has been at physical capacity since about 1976. After a long and bitter fight between the waterway interests on one side and the railroads and environmentalists on the other, a new dam with a larger capacity lock has been started. However, the new lock will not provide any increase in capacity until about 1988. In addition, the U.S. version of low export rates in the form of the free use of the inland waterway system was compromised with the imposition of user fees in the form of a tax on fuel used for barge movements. At the existing level, the user tax is of little consequence. However, proposed increases in the user tax to a full cost recovery level could add from 10 to 20¢ a bushel ($3.50 to $7.00 a ton) for grain movements from Minneapolis to the Gulf.

Finally, port strikes, such as the one that occurred at Duluth-Superior in 1979 and other types of port embargoes have been a problem. Two additional growing concerns of the Upper Midwest are the physical capacity of the Great Lakes Seaway route, especially the Welland Canal and the Reagan administration's proposals for user charges on Great Lakes ports.

A change to compensatory rates in Canada, therefore, presents a good news - bad news situation to the U.S. Upper Midwest. The good news is that a change to

compensatory rail rates in Canada will increase the landed cost of Canadian grain at export ports and make U.S. grain more competitive in world markets. The bad news is that cost-based rates will provide the incentive for Canadian innovators to search for lower cost routes and methods of moving grain to export destinations. These routes and methods may include increased use of trucks, and adoption of unit-train technology, more use of the Great Lakes and St. Lawrence ports and possible movements by rail, or truck to lake or river points in the U.S., or movements by unit-train directly through the U.S. to Gulf of Mexico ports.

The 1980 deregulation of U.S. rail carriers and the formal legalization of rail contract rates and the current surplus of grain equipment makes one or more of these events very probable.

Some of the possibilities would be undertaken to lower total logistics costs which might be higher or lower than before Crow rate rationalization. Other possibilities would, in addition, include the use of U.S. facilities and the Welland Canal, which have histories of congestion during periods of heavy export demand.

The primary U.S. concern, then, is that there would be increased costs, congestion, and equipment shortages due to an influx of Canadian grain. A second more subtle concern is the use of subsidized U.S. transport facilities (primarily waterways and harbors) by foreign grain that directly competes with U.S. grain in world markets. The third concern is the potential capacity problem at the Welland Canal if Canada were to expand Great Lakes shipments because of higher rail rates to the West Coast.

WILL RATE RATIONALIZATION IMPACT GRAIN FLOWS

The second question is "will doing away with the Crow rates actually impact grain flows in and through the United States?" It is true that there are some institutional and political barriers to Canadian grain flowing out through the U.S. Differences in the grading system and market practices are probably the

most important. Under certain scenarios, the economies of improved logistics may be strong enough to ride roughshod over such institutions--if not in the short-run, at least in the long-run.

Consider the North American continent from an agricultural point of view, ignoring national, state and province borders. In the center of the continent--running virtually from the Gulf of Mexico to the Arctic--is the area with such favorable soil and climate that it is called the "Great North American Granary", or sometimes more simply "The World's Granary". This area annually produces most of the North America's 400 million tons of coarse grains, wheat and oilseeds. In 1979-80, approximately 40 % or 160 million tons of this total production was exported either off the continent or to Mexico. Canada's export percentage is generally higher, approximately 50% of production.

Now, consider the North American continent from a logistics point of view. What is the most efficient way to move such vast tonnages from the interior to ocean ports? There are two great waterways available for this. First, the Great Lakes-St. Lawrence Seaway going east is well situated for shipments to the historic markets for food in Europe. The second is the Mississippi River and its major tributaries whose outlet on the Gulf of Mexico is well situated for some of the historic markets of Europe, as well as for Mediterranean and south Atlantic markets. The Panama Canal also contributes to the locational attractiveness of the Mississippi River outlet.

The other rivers of the continent are generally handicapped by their short distance to the fall line or the fact that they flow north and have extremely short navigation seasons. An important exception is the Columbia-Snake outlet to the Pacific which is becoming important as demand for North American grain grows in the Pacific Basin.

The only alternative to water transport of grain for long distances is, of course, rail. The location, use, and profitability of the railroads has been influenced by the two major waterways which dominate export grain movements.

There are a number of major rail systems on the continent that cross the Rockies and connect the Granary with the Pacific Basin. However, considering the volumes, the westward movements of grain was not very important until recently.

On the other hand, because of the seasonal nature of lakes and river traffic and the historic eastward direction of grain flows, railroads have played an important role moving grain to the Eastern Seaboard for processing and export.

Now consider where the Granaries markets are located. Historically, the Great Lakes routes were well situated for these markets. First, of course, are the industrial cities on the Great Lakes and in the east. These have always been major markets, but these are now mature with little growth potential. The next set of markets are the historic markets of Western Europe. These markets are also mature, and in some instances, competing with North America for the world food markets. As an illustration, Table 1 shows that Canadian grain exports to the U.K. and Western Europe declined about 20% from 1971-1980 when measured in tons and from 32.3% to 18.1% as a proportion of total Canadian grain exports. U.S. export tonnage to the U.K. and Western Europe increased significantly but still declined from 44.4% to 25.3% as a proportion of total agricultural exports.

The only large growth markets now that are well situated for the Great Lakes route are the centrally planned economies of Eastern Europe and Russia. However, weather, economic uncertainties and world politics have caused these markets to be quite variable from year-to-year.

Canada's proportion of export tonnage going to Eastern Europe and the USSR increased from 12.1% in 1970 to 27.5% in 1979-80. The United States' proportion of grain exports to the USSR and Eastern Europe increased from 3.4% in 1971 to 10.8% in 1980. The proportion of the total Canadian grain exports going to East and West Europe and the USSR stayed constant during the decade while that of the U.S. declined by over 10%.

The future growth markets of the North American granaries are quite diverse geographically. The growth of Pacific Rim markets has been instrumental in

increasing the quantities of grain and oilseeds being shipped from West Coast ports. The low westbound Crow Rates played a major role in the growing proportion of Canadian grain going west throughout the 1970's. U.S. exports to Pacific Rim countries were probably growing faster than Canada's, but the United States rail rate structure was high enough to preclude significant shift in exports from West Coast ports until about 1978. At that time the combination of increased ocean bunker fuel costs and delays on the Mississippi River at Lock and Dam 26 and at the Panama Canal allowed overland rail movement to the West Coast ports to become competitive with barge movements to the Gulf ports.

Table 1 shows that significant growth in exports to South and Central American countries and Africa occurred during the decade. Many of these markets for grain are ideally served from Gulf of Mexico ports. The greatest growth in grain flows on the continent during the 1970's was to the Gulf. This growth was primarily by barge until about 1976 when the continuing bottleneck at Lock and Dam 26 on the Mississippi River caused an increasing reliance on direct unit-train shipments to Gulf ports.

Looking then at the continent as a whole and considering that the pattern of world demand for food is shifting away from the traditional markets in Europe, the question is "will there be any effects of significant increases in the Crow Rates on grain flows through the U.S.?"

The answer is definitely positive but the extent and speed of response will depend on the amount and form of the increases. In the analysis that follows the assumption is that the shipper will pay a full compensatory or market established rate. This is the extreme case as a subsidy phase-out will undoubtedly occur over a period of years and the grain flow shifts will occur gradually over an extended period of time.

SCENARIOS AND POSSIBLE IMPACTS

This part of the paper discusses some preliminary results including possible rate levels and directional shifts in grain flows. Quantitative estimates of the potential shifts have not been made but are awaiting the form and timing of the rationalization proposals and the inclusion of ocean freight rates in the analysis.

The first part of the analysis was to estimate some possible rates. Rather than attempt to estimate post-Crow rates based on cost data, preliminary rate estimates were constructed from existing U.S. rates. Table 2 gives one set of estimates of wheat rates from six prairie locations to Thunder Bay and Vancouver along with the rail mileage and the Crow Rate. The rate estimates were developed using a regression equation on 18 observations of rate and mileage from Burlington Northern Grain Tariff 4022-A (X003 level) for west-bound grain from the Dakotas and Montana for export. The tariff was in effect on December 1, 1981. The distances ranged from 522 to 1,282 miles from the origin to the West Coast destination. (All R^2's exceeded .97 indicated mileage as the primary determinent of the rate in that tariff.) This set of rate estimates represents the maximum rates that the Canadian railroads could charge because of the potential for competition on the Burlington Northern. Furthermore, there is no taper or cap on the rate function. These rates are undoubtedly fully compensatory as there is no effective grain transportation competition in the Western Dakotas.

These maximum rates run from about 5 times the Crow rates for 54 cars to 10 times the Crow rates for single cars. The main point to be drawn from these maximum rates is that location would make a significant difference in determining whether grain moves east or west. For example, under the Crow rates, it was only 6¢ per hundred or 1.32 per metric ton cheaper to send grain to Vancouver from Calgary than to Thunder Bay. Under the estimated rates the difference would be 1.19 per hundred, 72¢ a bushel, or $26 a metric ton. One effect of such rate differentials would be to clearly develop Vancouver and Thunder Bay grainsheds

and reduce cross hauling. Since more grain is produced east of the equidistant (equi-rate) line between Thunder Bay and Vancouver, more grain would tend to flow east to Thunder Bay and through the Welland Canal reversing the trend of increasing proportions of grain moving west. However, that could be overcome by separate eastward and westward tariff schedules if desired by government or railroad interests.

As explained, Table 2 was based on captive shipper rates and estimates the maximum rate that could be charged. A more competitive rate can be estimated from the Burlington Northern corn and soybean rates from Midwest locations to Pacific Northwest ports. These rates are quite competitive as the Union Pacific and Chicago and Northwestern Railroads compete for parts of this traffic and for the Pacific Northwest Export corn market. These are true unit-train rates requiring fast loading and unloading and a single shipper and consignee. These rates are considered barely compensatory, that is, they just cover variable costs and make little or no contribution to overhead. These are an estimate of the lowest possible compensatory rate for true unit-trains over distances equivalent to that from Winnepeg to Montreal or Vancouver. These rates are group rates and range from $1.23 U.S. for 1,400 miles to $1.31 U.S. for over 2,000 miles and are equivalent to $1.45 to $1.54 Canadian.

Other alternatives include increased trucking and trucking longer distances to terminals and export ports. Table 3 was constructed from the "Prescribed Minimum Rates" for truck and movements of grain in Minnesota. These prescribed minimum rates became effective in December 1981 after public hearings. Deregulated interstate truck rates were 15 to 20% less at that time. However, these rates are still higher than the rail rate estimates in Table 2. It does not appear that there would be any transport cost savings from trucking after rate rationalization. The U.S. experience has been different in that substantial quantities of wheat move by truck from North Dakota to Duluth-Superior elevators for export. Those distances are similar to those from west of Winnepeg to Thunder Bay. Interstate

grain trucking in the U.S., which would include the movements from North Dakota to Duluth, does not have rate regulation and consequently may move on rates lower than those in Table 3. If grain truck traffic to Thunder Bay were to develop as a result of rail rate changes, it should be noted that the area to the south and southwest of Winnepeg is up to 100 miles and two to three hours driving time closer to Duluth than Thunder Bay.

A recent example of the U.S. experience with long distance grain trucking is the large quantities of wheat that were trucked from central North Dakota to the barge terminals in Idaho during the Duluth port strike and severe hopper car shortage of 1979. This represents 1,100 miles and 24 hours of driving time. In contrast, Regina is some 700 miles and 15 to 16 hours driving time from Duluth or the Twin Cities by truck. (During 1979, the Twin Cities had a severe barge shortage so the barging alternative was not available.)

In spite of the contradictory evidence from the U.S., our conclusion is that due to the differences in the cost of truck and rail and the distances involved, trucking directly to water terminals such as Thunder Bay or Duluth will not increase much in the short-run unless encouraged by Canadian officials. Trucking longer distances to inland rail subterminals on the other hand, will be a natural development. This could include trucking across the border to rail subterminals in the U.S. if Canadian and U.S. rail rates differed substantially.

The two routes for Canadian grain through the U.S. which probably have the most potential are an all rail route to Gulf ports or a truck or rail movement to the Twin Cities where it would be transshipped to barges. The U.S. Gulf ports are deep-draft, year-round high capacity grain ports. Gulf origins are favorably located with lower shipping rates than lake ports for many of the worlds developing grain markets. The deregulation and increased competitiveness of the U.S. railroads and recent and probable railroad merger activities make unit-train rail movements from Canadian origins through the U.S. quite likely. Table 4 has the mileage from selected Canadian grain origins to U.S. and Canadian lake and ocean

ports. In recent years, substantial quantities of U.S. grain have routinely moved 1,500 to 2,000 miles by unit-train for export. Rail distances from Canadian origins to U.S. Gulf ports are only slightly more than that. In fact, the short line rail mileage from Winnepeg to Mobile is 1,802 and is 1,921 to Galveston. These distances fall in the distance range covered by Burlington Northern's West Coast unit-train rates of $1.45 to $1.54 (Canadian). The routes are over much more favorable terrain.

The Burlington Northern can provide direct service from Winnepeg to a number of Gulf ports including both Galveston and Mobile. Another probable rail route from Canada to the Gulf includes the midwestern portion of the Milwaukee Road. The remaining portion of the Milwaukee is up for sale or merger. The Milwaukee is of interest because it serves Kansas City and other midwestern gateways to the Gulf. The two most likely merger partners are the Grand Truck Western which is controlled by the Canadian National and the Soo Line which is controlled by the Canadian Pacific. Control of the Milwaukee by a Canadian railroad would allow a grain movement over halfway to the Gulf on their subsidiary. A third possibility for direct rail from Canada to the Gulf is the use of the Soo Line as a bridge with one or more U.S. midwestern rail lines.

A final route through the U.S. that may compete cost-wise is via the Mississippi River after an initial truck or unit-train movement to Minneapolis-St. Paul. Barge rates on the Mississippi River are not regulated and can vary considerably over the season depending on supply and demand factors. However, grain barging costs from St. Paul to Gulf of Mexico were estimated at 65¢ a hundred (76¢ Canadian) during the 1981 season. Unit-train rates from Canadian origins to the Twin Cities of 80¢ or less could be competitive with a unit-train movement from Canada to the Gulf ports. This route is less likely to develop in the near future than direct train movements to the Gulf because of capacity problems at Lock and Dam 26. However, the Lock and Dam 26 bottleneck will be eliminated about 1988 and this route may become even more economical at that time.

A CONCLUDING PERSPECTIVE

This preliminary analysis did not look at port handling costs and ocean freight rates. However, potential long-run changes in overland transport costs to some Canadian grain shippers in excess of $20 per ton will impact the direction of Canadian grain flows and override institutional constraints. The growth of Latin American and African markets, along with the declining importance of Western Europe markets and the political uncertainties of Eastern Europe make access to U.S. Gulf ports increasingly desirable for Canadian agriculture. The cost of moving grain by unit-train, over the favorable midwestern terrain to the Gulf, should compare favorably with movements of similar distances in Canada. Given the current deregulatory posture in the U.S., the most likely transport mode in the near future will be by unit-train direct to Gulf ports but competition by rail-barge or truck-barge using the Mississippi River will probably develop when the Lock and Dam 26 bottleneck is eliminated after 1988.

Table 1

Canadian and United States Agricultural Exports by Area[1/]
(Million Metric Tons)

Area	Canada[2/] 1970-71 Quantity	%	1979-80 Quantity	%	United States[3/] 1971 Quantity	%	1980 Quantity	%
United Kingdom and Western Europe	4.8	32.2	3.9	18.1	26.4	44.4	41.2	25.3
Eastern Europe	.4	2.7	2.4	11.2	2.0	3.4	11.4	7.0
USSR	1.4	9.4	3.5	16.3	--	--	6.2[4/]	3.8
China	2.0	13.4	2.5	11.6	--	--	9.0	5.5
Japan	2.1	14.1	3.2	14.9	9.3	15.7	24.9	15.3
Asia - less China and Japan	1.8	12.1	.7	3.2	11.4	19.2	20.7	12.7
Latin America	.8	5.4	2.7	12.6	5.3	8.9	24.1	14.8
Africa	.2	1.3	1.2	5.6	2.3	3.9	8.8	5.4
Other	1.4	9.4	1.4	6.5	2.7	4.5	16.7	10.2
TOTALS	14.9	100.0	21.5	100.0	59.4	100.0	163.0	100.0

1/ Grains and oilseeds and their products.

2/ Crop years.

3/ Calendar years.

4/ 19.5 million metric tons in 1979.

Table 2

Current Rail Rates (Crow) and Estimates[1/] of Maximum Grain Rate
Based on Current U.S. Tariffs
(Cents Per Hundredweight)

From:	Distance	Current[2/] Grain Rate	Single Car	Estimated Rates: 2-6 cars 2-4 Origins	26 Cars One Origin	54 Cars One Origin
To Thunder Bay:						
Winnepeg	420	14	105	87	81	71
Regina	777	20	176	158	151	142
Moose Jaw	819	20	185	166	159	150
Saskatoon	899	22	201	181	176	166
Calgary	1,244	26	269	250	243	234
Edmonton	1,228	26	266	247	240	230
To Vancouver:						
Winnepeg	1,474	--	315	296	289	278
Regina	1,108	26	242	223	216	207
Moose Jaw	1,067	25	234	215	208	199
Saskatoon	1,088	24	238	220	213	202
Calgary	642	20	150	131	124	115
Edmonton	765	20	174	156	149	139

1/ Estimates were developed by regressing rates from Burlington Northern Grain Tariff 4022-A (X003 level) against mileage and converting to Canadian dollars at a $1.17 exchange rate.

2/ Source: Grain Trade of Canada, 1978-1979, Statistics Canada.

Table 3

Selected Minnesota Minimum Grain Rates[1/] in Canadian Cents[2/]

Distance in Miles	Rate per 100 Pounds
100	44
200	78
300	111
400	150
500	181

1/ Minnesota Prescribed Minimum rates applicable on all grain effective December 7, 1981. Minimum truck load weight 40,000 pounds.

2/ Exchange rate of $1.17.

Table 4

Selected Rail Mileages

	Thunder Bay	Duluth	St. Paul	Vancouver
Winnepeg	420	380	445	1,474
Regina	777	737	760	1,108
Moose Jaw	819	751	713	1,067
Saskatoon	899	850	915	1,088
Calgary	1,244	1,204	1,153	642
Edmonton	1,228	1,241	1,188	765

	Montreal	Galveston	Mobile	Baltimore
Winnepeg	1,415	1,921	1,802	1,638
Regina	1,772	2,090	2,177	1,953
Moose Jaw	1,813	2,031	1,935	1,906
Saskatoon	1,894	2,262	2,272	2,108
Calgary	2,239	2,049	2,510	2,437
Edmonton	2,223	2,243	2,704	2,434

Sources: 1980 Commercial Atlas and Marketing Guide and Handy Railroad Atlas of the United States, Rand McNally and Company.

REFERENCES

1. Foodwest Resource Consultants, U.S. Grain Handling and Transportation with Selected Comparisons to the Canadian System, June 1979.

2. Snavely, King and Associates, 1977 Costs and Revenue Incurred by the Railways in the Transportation of Grain Under Statutory Rates, September 1978.

3. Statistics Canada, Agricultural Statistics Division, Grain Trade of Canada, 1978-79.

4. Statistics Canada, Agricultural Statistics Division, Grains and Oilseeds Review, Ottawa, various months.

5. United States Department of Agriculture, ERS, Canada Export Market Development for Agricultural Products, Foreign Agricultural Economic Report #107, May 1975.

6. United States Department of Agriculture, ESCS, U.S. Foreign Agricultural Trade Statistical Report, Washington, D.C., various years.