EVALUATION OF PROBLEMS ASSOCIATED WITH TRANSPORTING NORTH DAKOTA POTATOES

By

Daniel Kuntz

UGPTI Publication No. 32

October 1978

EVALUATION OF PROBLEMS ASSOCIATED WITH TRANSPORTING NORTH DAKOTA POTATOES

BY

DANIEL KUNTZ
RESEARCH FELLOW

Upper Great Plains Transportation Institute
North Dakota State University
P. O. Box 5074
Fargo, North Dakota 58105

in cooperation with

North Dakota State Highway Department
Bismarck, North Dakota

This study was made possible through a research grant from the North Dakota State Highway Department, Walter Hjelle, Commissioner.

OCTOBER 1978

Table of Contents

List of Tables

List of Tables - Cont.

List of Figures

CHAPTER I

THE NORTH DAKOTA POTATO INDUSTRY

A. INTRODUCTION[1]

Potatoes are grown in every state of the Union. North Dakota currently ranks sixth in the production of potatoes with the leading producer states being Idaho, Washington, Oregon, Maine, and California, in that order. By far, the states of Idaho and Washington are the most important of the United States production areas. In 1976 these two states produced 134,410,000 hundred weight of potatoes or 37.5 percent of this nation's potato crop. In contrast the remaining eight of the ten leading production states combined produced only slightly over 42 percent of the entire crop.

North Dakota's production of 16,940,000 hundredweight of potatoes constituted about five percent of the 1976 national potato crop. If North Dakota production is combined with that of the Minnesota counties in the Red River Valley, the area ranks third in national production, producing approximately 7.5 percent of the potatoes grown in this country. Thus, as a result of the high number of states producing potatoes and the large volume of potatoes grown by the two leading states, while North Dakota ranks high nationally in the production of potatoes it is not in the position of being a producer which the remainder of the country is substantially dependent upon. This is particularly important to the North Dakota producer in view of the facts that per acreage yield in the industry as a whole, and overall production in the leading producer states, have both increased dramatically in recent years. Potato yields per acre in the United States increased over ten percent between the years 1972 and 1976. And in the states of Idaho and Washington potato production increased 13.2 and 77.9 percent respectively over the same years. As a result, unless the North Dakota grower is able to remain competitive in all phases of potato production, including cost and

---

1. Sources: (1,2,3,4,5)

availability of transportation, the North Dakota producer could easily lose his traditional markets to other production areas.

Potato production is separated into seasonal groups corresponding to when the crops are harvested, i.e., spring, summer, fall, and winter. The major portion of United States' potato production is produced by fall producing states, accounting in 1976 for about 86 percent of total national production.

While production of the spring, summer and winter crops increased 7.1 percent between 1972 and 1976, the total number of acres devoted to their production decreased 11.4 percent over the same time period. In comparison production in the fall states increased 20.8 percent and the total number of acres planted increased 12.8 percent between 1972 and 1976.

Traditionally, the spring, summer, and winter crops have not been placed into long term storage. Rather, potatoes grown during these three seasons have been used to fill immediate markets for processed, ship stock, and more importantly, fresh table stock potatoes.

Because the major part of the national potato crop is fall produced and too large to fill only immediate market needs, a large proportion of the fall produced potatoes must be placed into storage. Their use is then spread out from the time of their harvest, usually the first part of August, until about the first of June when the summer crop harvest begins. Improved methods of storage have enabled fall producers to hold their crops until the harvest of the summer crops begins when previously the movement of fall produced potatoes had to be completed months earlier. These improved storage practices have resulted in a noticeable relative decline in winter, spring, and summer production and an increase in fall states' production. Lower costs associated with fall produced potatoes, improved storage practices, and the greater number of regions capable of growing fall potatoes have enabled these producers to capture nearly the entire processed potato market, relegating the winter, spring, and summer crops to filling

primarily fresh market demands.

Shifts in production have also occurred within the fall producing states. Production in the New England states such as Maine and New York have decreased substantially while the more western states have greatly increased their production. Production costs and location of market seem to be the key factors in determining each state's growth or decline.

North Dakota currently ranks fifth in the production of fall potatoes, producing 5.5 percent of the nation's 1976 fall crop. That figure represents a decline in North Dakota's share of fall production as the state produced 7.0, 7.5, 7.9, and 6.4 percent of the national fall crop during the years 1972, 1973, 1974 and 1975 respectively.

Although potatoes can be grown throughout the state of North Dakota, commercial production is concentrated in the counties of the northeastern part of the state which contain part of the fertile Red River Valley. Figure 1 illustrates the five leading counties, their overall production, and their percentage share of North Dakota's total production. The Red River Valley counties (Walsh, Grand Forks, Pembina, and Traill) accounted for over 94.5 percent of total potato production in North Dakota for the year 1976.

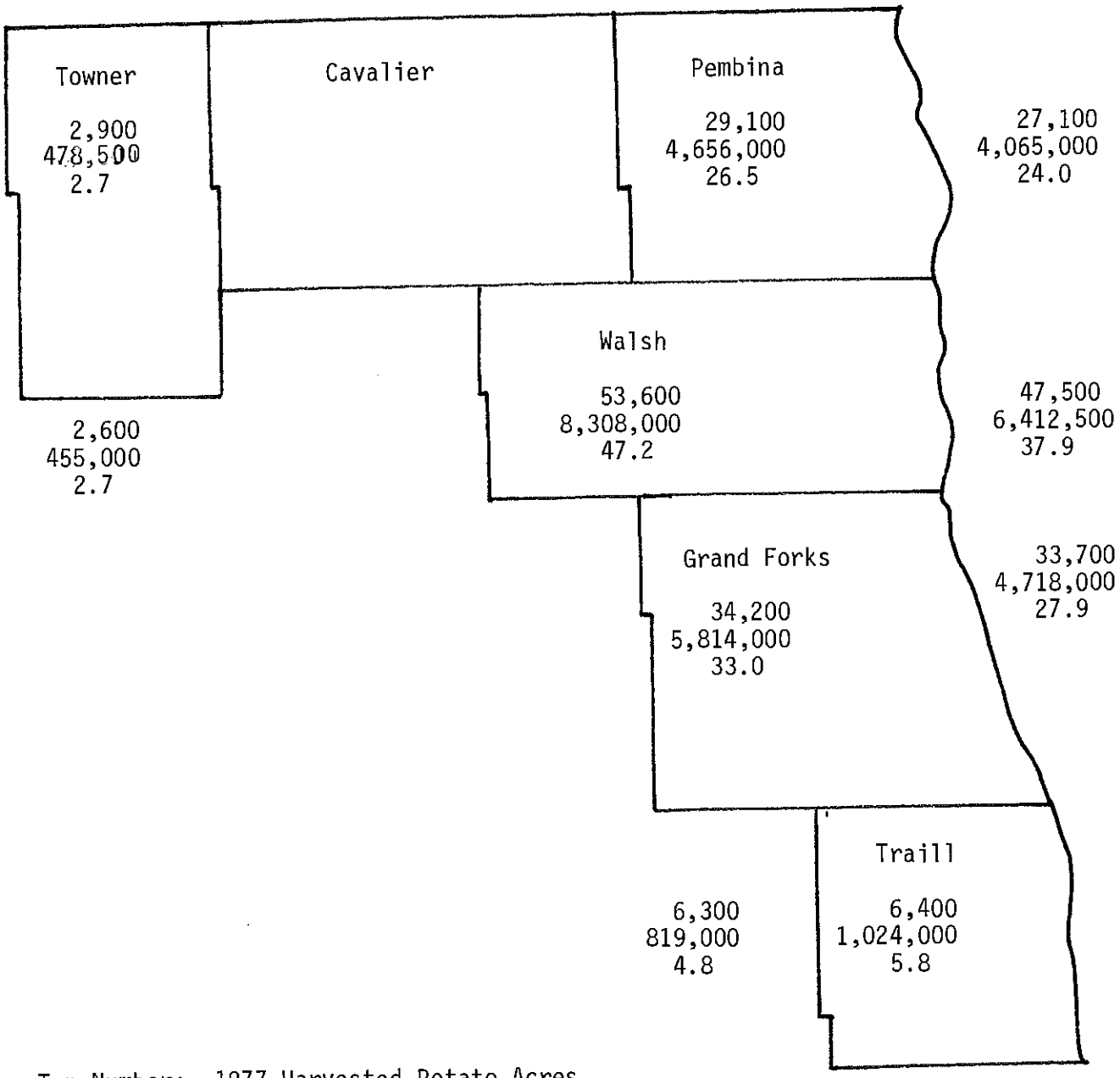
B. Potato Uses [2]

Potatoes are marketed in this nation for five general uses. Those uses are table stock, chip stock, processed, seed, and export. The export market is currently quite small but has been steadily expanding in recent years as countries in Europe and the Orient are relaxing their import restrictions on potatoes. Usually between two and three percent of this nations' crop is destined for foreign markets. This figure is however, influenced greatly by supplies in other countries. For instance, as a result of the 1975 drought in Europe, the United States exported about five percent of its crop produced that year. These

---

2. Sources (1,2,4,6,7,8,)

PRODUCTION OF NORTH DAKOTA POTATOES WITHIN THE FIVE LEADING COUNTIES FOR 1976 AND 1977.



Top Number: 1977 Harvested Potato Acres
Middle Number: 1977 Production in Hundred Weight
Bottom Number: 1977 Percent of Total Production in the State
Numbers outside the Counties are those for 1976.

Source: (2)

FIGURE 1

foreign sales are particularly important for the impact they have on domestic prices because of the impact they have on domestic supplies. It is estimated that a one percent change in quantity is associated with an opposite price change of three percent. Canada is the largest export market for this country, consuming approximately 90 percent of the fresh potatoes exported from the United States, while Far East counties such as Japan have been importing steadily increasing quantities of processed potatoes, reflecting a change in consumer tastes for those products.

The amount of the nation's potato crop used for seed remains relatively constant from year to year. Typically about eight percent of annual national production is used as seed. Generally most of the nation's seed potatoes are grown in the northern states. There are several reasons for this. Diseases spread slowly in these areas, the soil is productive, volunteer plants are usually not a problem, and the potatoes can be stored economically. Most of the seed potatoes marketed commerically are sold as "certified seed potatoes". To qualify for such a designation, acreage on which certified seed potatoes are grown are inspected and certified by the respective states.

The production of seed potatoes is of importance to the North Dakota grower in that it is estimated that 17 percent of the potatoes grown in the Red River Valley are marketed for seed use. In 1975 nearly 25 percent of the total acres of potatoes planted in this state had been certified for use as seed. This acreage total ranked North Dakota as the third largest producer of seed potatoes, with over 19 percent of the nation's total seed potato acreage passing certification being within the state. If the Minnesota and North Dakota acreage totals are combined, this region had the largest percentage of the nation's seed acreage having passed certification, with slightly over 30 percent.

Potatoes produced for the potato chip and shoestring industries, appropriately referred to as "chip stock", have comprised about 10 percent of the nation's total production in recent years. There were 224 chip plants in operation in 1976 located in virtually every state in the Union with the largest concentration occurring in the eastern United States. Potato chippers are generally located near major consuming areas as most chippers have established distribution routes covering a radius of about 200 miles to wholesale and retail outlets. It is estimated that about 30 percent of the potatoes produced in North Dakota are marketed as chipstock while about 10 percent of the national crop is marketed for this use.

Closely related to the chipstock market is the rapidly expanding processed potato market. As a result of a change in consumer tastes and the growth of the fast food industry, this market has been the main contributor to the recent rise in the per capita consumption of potatoes. The most important product category within this market group are frozen products which include french fries, hash browns, patties, and extruded products. On a fresh weight equivalent basis, potatoes produced for the frozen food market increased their share of total consumption from 6 percent in 1960 to about 26 percent in 1976. Frozen french fries alone utilized about 22 percent of the nation's total potato production. Other product uses within the processed category include dehydrated products, canned products, starch, and flour. The marketing of potatoes for dehydrated use has also experienced dramatic growth in recent years. Wide acceptance by the institutional market for such dehydrated products as granules, flakes, flakelets, and sliced and diced potatoes have resulted in an increase in the volume of potatoes used for dehydrated products from 4 percent in 1960 to about 11 percent of total U.S. production in 1976. This increased demand in recent years for processed potato products has resulted in almost 37 percent of the nation's

potato crop in 1975 being dedicated to this market. It is approximated that 13 percent of the Red River Valley potato crop is used for frozen products and seven percent for dehydrated products.

Dehydrator and freezer plants are largely located in the major fall crop production areas of Maine, the Red River Valley, and the western states of Idaho, Washington, and Oregon. This is a result not only of the high volume of production in these areas but also the corresponding high percentage rate of potatoes from these areas that go into storage. Processors must plan on continuous soperation of their plant facilities over at least 6 months to reduce overhead costs. Adeuqate storage facilities are essential to maintain availability of the raw product and its orderly flow through the production plant. It has been estimated that there are 33 dehydrator plants and 33 freezer plants in the United States. Twenty-one of the dehydrator plants and 18 of the freezer plants are located in the western tri-state production area. Four dehydrator plants and 3 freezer plants are located within the Red River Valley production area.

The final potato product use is table stock. Traditionally, the use of the fresh, unprocessed potato constituted the largest single potato market outlet. However, use in this form has steadily declined in recent years. Volume of usage in this category declined over 17 percent between the years 1960 and 1976. Despite this decline, the use of potatoes as table stock still leads all others with slightly over 35 percent of the total 1975 production being used in this manner. This figure corresponds closely to production in the Red River Valley area as it is estimated that about one-third of the potatoes produced in this region are marketed as table stock. Table 1 provides a summary of the production and disposition of both the national and North Dakota potato crops.

TABLE 1: ESTIMATED UTILIZATION OF 1975 POTATO CROP

UNITED STATES AND NORTH DAKOTA

Product Use	U.S. Crop (000 cwt)	%[1]	N.D. Crop (000 cwt)	%[2]	%[3]
Tablestock	112,512	35.1	5,309	30.2	4.7
Chipstock and Shoestrings	34,162	10.7	4,778	27.2	14.0
Seed & on the Farm Household Use	26,624	8.3	2,708	15.4	10.2
Feed[5]	5,083	1.6	0	0	0
Processed	119,450	37.3	3,186	18.0	2.7
(Frozen)	(79,740)	(24.9)	(2,071)	(11.8)	(2.6)
(Dehydrated)	(33,562)	(10.4)	(1,115)	(6.3)	(3.3)
(other)	(6,148)	(1.9)	0	0	0
Shrinkage/Loss	21,998	6.9	1,672	9.5	7.6
Total Production	319,834	99.9	17,600	100.3	5.5
Export[4]	9,324	2.9	N/A		

1. Percentage of U.S. total production.
2. Percentage of N.D. total production.
3. Percentage of national product use supplied by N.D.
4. Export totals included within individual use categories also.
5. N.D. feed use included with seed and on the farm use.

Sources: (2,4,6)

TABLE 2: THE NORTH DAKOTA POTATO CROP IN COMPARISON WITH NORTH DAKOTA'S TOTAL CROP SUMMARY

FOR YEARS 1972 - 1977

TABLE 2.

Year	Total Acreage of Harvested N.D. Principal Crops	Total Acreage of all N.D. Harvested Crops	Acreage of N.D. Harvested Potatoes	Potatoes % Acreage of N.D. Principal Crops	Potatoes % Acreage of all N.D. Crops	Total Potato Production (000 cwt.)	Average Yield/ Acre	Price cwt. Potato $	Value of Production of Principal N.D. Crops[1] (000$)	Value of Production of N.D. Potatoes (000$)	% Value of Productio
1972	13,488,900	17,800,000	120,000	0.89	0.67	17,400	145	2.75	706,643	47,850	6.8
1973	14,988,300	19,600,000	132,000	0.88	0.67	19,140	145	4.60	1,696,666	88,044	5.2
1974	15,270,900	19,700,000	133,000	0.87	0.68	22,950	170	3.15	1,505,796	72,293	4.8
1975	15,093,900	19,600,000	110,000	0.73	0.56	17,600	160	4.20	1,621,437	73,920	4.6
1976	16,146,000	20,700,000	121,000	0.75	0.58	16,940	140	3.45	1,154,921	58,443	5.2
1977	14,927,200	19,961,200	130,000	0.87	0.65	17,600	160	2.80	N/A	58,240	N/A

1. Figures do not include Millet, Hay, Alfalfa seed, corn grown for silage, dry edible beans or sunflowers.

Source: (2)

C. Effect on North Dakota Economy[3]

Although the North Dakota potato crop traditionally comprises less than one percent of the total acreage of the principal crops harvested within the state it has a more significant effect on the North Dakota economy. Table 2 shows a summary of the relative size of the potato crop in comparison with other crops grown within the state as well as production figures, value of production, yields per acre and other comparisons for recent years. As can be seen the annual potato crop contributes about five percent of the value of principal crops harvested within North Dakota. In comparison, spring wheat, the largest North Dakota farm commodity both in terms of acreage planted and value of production, made up about 41 percent of the acres of principal crops harvested in 1975 and contributed about 39 percent to the total production value of harvested principal crops.

D. Marketing Practices[4]

The marketing of potatoes does not submit itself to an easy general description. Marketing practices within the potato industry vary greatly, influenced by factors such as the area of production, the intended use of potato, and acreage size of the grower. Probably the most important factor in determining marketing practices of the North Dakota potato grower is the intended use of the potato, although marketing alternatives within these categories also exist. In general North Dakota potatoes are marketed either on contract or on the open market. Although a futures market for potatoes exists for some types of potatoes produced in certain areas, its use in the Red River Valley is almost nonexistant.

The marketing of potatoes on contract is simply an agreement between the grower to sell and the buyer to purchase a stated quantity of the product based upon the agreed upon terms in the contract. Although the use of contracts in

---

3. Source: (2)

4. Source: (3,4)

the marketing of particularly processed potatoes has gained increasing importance during recent years, the use of contracts in any given year will vary depending upon supply and demand conditions. The principal benefit of the contracts is that it assures the grower of an outlet and the buyer a supply, both at a stated price. During a year of anticipated short supply, the grower will be more willing to gamble on receiving a favorable price on the open market, while the buyer will want to contract for a large percentage of his known next years needs at a stated price rather than risk the chance of prices skyrocketing on the open market. During years in which supplies are anticipated to be abundant, the desire to contract is vice versa. Thus, while it is the wide fluctuations found on the open market that gives contracting its greatest advantage, it is the anticipation of those same fluctuations which influences the amount and size of contracts entered into during any one given year.

In addition to the price and quantity, the terms of the contract may also specify the point and time of delivery, storage agreements, and specifications of quality, among other conditions. The specification of the type and quality of potato contracted for makes it posssible for the buyer to assure himself of receiving the type of raw product he needs to obtain for his finished product, thus providing him with a certain degree of control over the production practices he must follow to obtain the desired price.

Not all contracts contain storage agreements. Under the terms of what is commonly known as the "harvest contract" the grower is required to deliver the potatoes to either the processing plant itself or to a storage location which is controlled by the buyer. A grower under this type of contract has no responsibilities. His potatoes are graded and sold directly as they come off the field. Under what is referred to as the "storage contract," the seller is under an obligation to provide storage for the product for a specified period of time. The

largest percentage of contracts entered into by North Dakota growers are of this type. The grower is compensated for the additional expense and risk under the storage contract by receiving an agreed upon premium over and above the specified base price, the amount of such premium being determined the length of time the potatoes must be stored.

In a number of the larger production areas of the country, bargaining associations have grown up to assist in the negotiation of potato contracts between growers and buyers. In this area the Red River Valley Potato Growers Association is such a bargaining association. The Association functions as a bargaining representative between a particular processor and a number of growers for that processor which have asked the Association to represent them. Although the number of growers the Association will represent and the number of processors it will bargain with varies from year to year, generally it is the growers for the larger processors which will request the Association to represent them during negotiations. The contracts negotiated by the Association are then often looked to by other individual growers in their contract negotiations with their particular buyer as a type of base from which they can negotiate from.

As stated previously the marketing practices of the various North Dakota potato growers are distinctly different depending on the intended use of the potato. A high percentage of the processed and chip stock potatoes are sold under contract. It is estimated that generally between 50 and 85 percent of the potatoes grown in the Red River Valley for these two purposes are grown under contract. In many instances, growers of these types of potatoes will contract to sell a quantity of potatoes equal to what they feel is the lower end of their estimated yield. When yields exceed those estimates the additional potatoes not contracted for will be sold on the open market.

Those potatoes raised for processed or chip stock purposes are typically

transfered directly between the grower and the processor in accordance with the terms of the contract. Or a grower may sell his product to a broker who has a contract with a buyer. In some instances the larger potato growers will buy and sell potatoes in which case they are acting as a broker in addition to being a grower. A grower or broker may also sell potatoes on the open market. In that case a grower or broker will get in contact with or will have been contracted by a potato processor. The two parties will come to an agreement on terms of price, quality and delivery date and the potatoes will be shipped accordingly.

The marketing of table stock and seed potatoes operates on a somewhat different basis. Very few of the potatoes grown for these purposes in the Red River Valley are sold under contract. In the marketing of table stock potatoes the grower will deliver his potatoes at the time he wished to sell them to a wash plant. The grower may be the owner of his own wash plant, own it cooperatively with a number of other growers, or have an arrangement with the owner of the plant for its use. From the wash plant the potatoes may then be marketed through a broker or a grower will arrive at the arrangements for sale directly with the buyer. Buyers of table stock potatoes are generally wholesalers or retailers. Seed potatoes are used by other potato farmers. Thus the seed potato grower has the option of either selling his product to a broker or directly to another farmer. If the potatoes are sold to a broker, the broker will in turn sell them directly to a farmer or another broker in a different production area who will sell them to local farmers.

Table 3 shows average prices received by North Dakota farmers for potatoes, by months, for the years 1961 - 1978. As can be seen the prices for the commodity fluctuate a great deal from year to year. There is also considerable price fluctuation between the beginning of the marketing season and its end. It should be noted here that these prices are averages received by farmers

TABLE 3: AVERAGE PRICES RECEIVED BY NORTH DAKOTA FARMERS FOR POTATOES, BY MONTHS, PER HUNDREDWEIGHT, 1961-1978[a]

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Season Average
						dollars per cwt.							
1961	1.30	1.20	1.15	1.40	1.25	--	--	--	1.10	1.15	1.05	1.05	.99
1962	.90	.85	.90	1.00	1.10	--	--	--	1.15	.95	.95	.90	.98
1963	1.00	1.05	1.05	.90	.75	--	--	--	1.15	.90	1.00	.90	1.08
1964	.90	.95	1.20	1.30	1.60	--	--	--	1.75	1.40	2.85	3.75	3.55
1965	4.65	4.70	4.45	4.50	5.50	--	--	--	1.55	1.45	1.40	1.35	1.40
1966	1.40	1.35	1.45	1.40	1.30	--	--	--	1.65	1.10	1.45	1.45	1.60
1967	2.00	2.00	1.80	1.60	.90	--	--	--	1.60	1.25	1.35	1.15	1.34
1968	1.25	1.35	1.15	1.55	2.40	--	--	--	1.30	1.15	1.30	1.25	1.34
1969	1.25	1.40	1.60	1.55	.90	--	--	--	1.30	1.15	1.45	1.50	1.61
1970	1.55	1.75	1.95	1.95	2.55	--	--	--	1.35	1.50	1.60	1.80	1.67
1971	1.50	1.90	1.85	1.60	1.65	--	--	--	1.25	1.20	1.20	1.40	1.23
1972	1.20	1.30	1.25	1.20	.85	.85	--	1.85	1.85	1.70	2.25	2.50	2.75
1973	3.00	3.15	3.30	3.35	3.90	4.50	--	--	2.10	2.20	3.10	4.00	4.60
1974	4.25	5.85	6.95	6.75	5.85	6.80	--	3.40	3.35	3.15	3.25	3.15	3.15
1975	3.35	3.35	3.80	2.45	1.80	2.00	--	--	2.75	3.25	3.85	3.95	4.20
1976	4.00	4.80	5.15	4.80	4.45	--	--	--	2.60	2.60	2.60	2.65	3.45
1977	2.80	3.70	4.00	4.40	5.00				2.70	2.50	2.60	2.60	2.80
1978	2.65	2.75	2.75	2.85									

[a]No prices are reported during summer months.

SOURCE: (2)

and there is no set open market quotation as there is for other commondities. Rather, on a given market day, there may be price differences between different farmers, different types of potatoes and between the open and contract price. As stated earlier the contract price for potatoes tends to be based strongly on anticipated supply and demand. The open market price on the other hand is based more upon actual supply and demand, since at the time these prices are arrived at the crop has been harvested and the supply of the product can be fairly well estimated. If these estimates show a larger supply than actually exists, prices during the latter months of the marketing season may rise dramatically. On the other hand if supplies are larger than estiamted, season end prices may be lower than prices received during the early months of the marketing season.

The primary factors in determining when potatoes are shipped from this state on a month to month basis is the time they are in demand by outside processors or buyers and the availability of transportation. Such demand is determined by the availability or rather the unavailability of more local supplies of the potato buyer. It is only after the exhaustion of such local supplies has been completed does the bulk of the North Dakota potato movement begin. Potatoes, unlike grain for instance, must all be disposed of within one marketing year since year to year storage is impossible. Thus while the month to month movement of grain from this state is influenced a great deal by the market price of the commodity during that month, price is not the all important factor in the movement of potatoes as the proportion of a crop years' potatoes mvoed per month remains fairly constant from year to year. Although exceptionally high or low prices during an early marketing month may advance or delay the movement of potatoes a month or more, month to month potato movements are more influenced by processor demands and the availability of transportation.

Except in influencing production through planting decision, price is a negligible factor in determining year to year movements. Potato producers, unlike grain producers, are simply unable to hold over a portion of a year's crop in hope of better prices next year. If the North Dakota producer attempts to lengthen the marketing season for even a month or two, he encounters problems with storage and competition from the summer potato crop.

E. Storage Practices[5]

Since very little of the North Dakota potato crop is marketed at harvest, potato storage is an important part of potato production and marketing. It is estimated that 85 to 90 percent of the North Dakota potato crop goes into storage for some period of time. The role of storage in the marketing of potatoes has become even more important in recent years as a result of the increasing demand for chipstock and processed potatoes. These two potato uses not only require mroe difficult storage practices but also require the processor to operate his plant and consequently spread his demand for potatoes over as much of the year as possible to reduce per unit overhead costs. The change in storage practices has been particularly apparent in North Dakota where a large percentage of the crop is marketed for chipstock and processed purposes. Most of the processing plants for these types of potatoes are located in regions other than the Red River Valley. These plants will fill their early fall potato demands with potatoes grown in areas nearest to their plants. During the winter months as these local supplies diminish the plants rely on supplies from more distant production areas such as the Red River Valley. Because of this the shipment of the bulk of the North Dakota potato crop is generally delayed until after the smaller local crops have been marketed. As a result a large number of potatoes are being shipped from North Dakota as late as April and May, seven and eight full months after harvest.

---

5. Source: (4,9,5,6)

While in storage, the potato is a living product; it generates heat, needs oxygen for respiration, and gives off carbon dioxide and water. This respiration results in potato weight loss during storage. Therefore ideal storage conditions of temperature, humidity, and air movement are necessary to minimize loss due to disease and shrinkage.

To reduce moisture loss from potatoes, high relative humidities are necessary. The potato is composed of approximately 78 percent water and thus has, for practical purposes, a relative humidity of 100 percent. Any time the air around the potato is below 100 percent relative humidity moisture will attempt to leave the product through transpiration. Because of the extended storage season in North Dakota, producers generally try to maintain a level of 90 - 95 percent relative humidity in their storage facilities in order to minimize weight loss through respiration.

The desired storage temperature of potatoes varies with the intended use of the product. General recommended storage temperatures for the different uses are as follows: 38 - 42 degrees fahrenheit for seed and table stock; 43 - 50 degrees fahrenheit for processed potatoes; and 50 - 55 degrees fahrenheit for chipstock. The lower temperatures reduce instances of sprouting and disease. Also the lower the temperature the lower the rate of respiration and potential weight loss. For these reasons the storage of table stock and seed potatoes is recommended at the lower temperatures. Storage below those recommended temperatures, however, can result in discoloration and a change in form which results in a sweet flavor which is undesireable to consumers.

Although the lower storage temperature ranges are desirable to prevent rot and shrinkage, reducing sugars begin to form in the potatoes at these lower temperatures. The lower the storage temperature the higher the level of these sugars in the product. While reducing sugars seldom reach the point of appreciably affecting the taste of table stock potatoes, they are extremely important in the

quality of chipstock and processed potatoes. The reducing sugars cause the processed and chip potato to retain more oil during drying resulting in a darkened color. Although the color level is not as important in the processed potato, it is extremely important in the making of high quality potato chips where a light colored product is desired by the consumer. High storage temperatures prevent the formation of these reducing sugars. This explains the two different levels of relatively high temperatures of recommended storage for processed and chipstock potatoes. Maintaining the stored potato at both the higher temperature levels and the recommended humidity level to reach a desired optimum is an extremely delicate procedure. Unless good storage practices are employed and the stored product monitored, undesired consequences such as rot, sprouting, severe weight loss, or high sugar content are realized.

Potatoes which have been stored below temperatures of 50 degrees Fahrenheit can be reconditioned by holding them for a period of time at a temperature of about 60 degrees fahrenheit. Although the reducing sugars will reconvert to starches during this reconditioning period, the quality of the reconditioned potato is seldom that of the product which had been stored continually at a temperature of 50 degrees Fahrenheit. The time needed to recondition the potato varies with the breed of the potato and the temperature it was previously stored at, although generally the reconditioning period will extend from one to four weeks. This period of reconditioning generally occurs at the processor's warehouse after the product is received, at the shipper's warehouse before it is shipped, or even during transportation. Often however the role of transportation rather than being an asset in the reconditioning process has a negative effect on that process. In these instances potatoes which had been stored at the recommended temperatures are billed to a processor. The product is shipped by rail or truck equipped with refrigeration equipment to maintain the desired temperature until destination is reached. However if the refrigeration equipment fails while the

product is in transit it is necessary to recondition those potatoes at the processors plant. Not only does this result in a lower quality product but if the processor has limited warehouse capacity, he might not want or be able to store the shipment for the necessary time to recondition it, in which case the load would be rejected. The same result occurs if the reconditioning process is to take place during transit and refrigeration equipment breaks down while en route. Starting the reconditioning process over would result in a lower quality product plus the need for additional time and warehouse space which the processor may not be willing to expend.

In a survey conducted in January, 1978 it was estimated there was storage capacity for about 21,464,380 hundredweight of potatoes within North Dakota. Table 4 shows the potato storage capacity by county for the state. As can be seen, over 75 percent of the storage capacity within the state is located in the counties of Grand Forks and Walsh. The percentage of the state's storage capacity by county corresponds quite closely to the percentage of the total state production by county as shown in Figure 1. Also to be noted from Table 4, is that 46 percent of the state's storage capacity is located near or within the four communities of Grand Forks, Grafton, Hoople, and Park River.

In a recently completed study by Erlandson, Scott, and Shephard, the following was observed concerning the potato storage situation in the Red River Valley:[6]

> The trend in storage in the Valley has been toward large centralized units with capacities ranging up to 400,000 hundredweight of potatoes. All of the new storage units are built above ground, and about 95 percent have capacities from 15,000 to 200,000 hundredweight. About 95 percent of the new units are loaced off the farm and near a railroad. This type of centralized storage may be owned individually by one large producer or cooperatively by several, and is often managed by one individual. The large storage capacity and consolidated management reduces the number of sources that a packing or processing plant must use to secure a lont-term supply, and helps to reduce the variability of the raw product received from each source. This is important as buyers become more concerned about the need for uniform quality of the raw product.

---

6. Source: (4)

TABLE 4: NORTH DAKOTA POTATO STORAGE CAPACITY - BY COUNTY AND COMMUNITY

January 1978

County	cwt. Capacity Community	County Total	% of Total
Grand Forks		5,439,500	25.3
Grand Forks	2,658,000		
Gilby	740,000		
Reynolds	803,000		
Others	1,238,500		
Pembina		3,473,000	16.2
Crystal	969,000		
St. Thomas	898,000		
Walhalla	1,150,000		
Others	456,000		
Traill		661,000	3.1
Towner		581,000	2.7
Walsh		11,006,180	51.3
Auburn	867,000		
Grafton	2,944,500		
Hoople	2,558,000		
Minto	750,000		
Nash	893,000		
Park River	1,777,180		
Others	1,216,500		
Others (Golden Valley, Cass, Dickey, Burleigh)		303,700	1.4
Total North Dakota Potato Storage Capacity		21,464,380	100.0

Source: (10)

The location of storage facilities along railroads can be explained by the role the railroads have traditionally played in the transportation of potatoes. Until relatively recent times the railroad was the prime mode of transportation for potatoes out of the Valley. Even in the most recent of years the railroads have continued to carry a substantial portion of the potato crop leaving the Valley. A great number of the potato growers in North Dakota are located within ten miles of a railroad station. By locating their storage facilities along a railroad track the producer reduces the number of times the potato is handled before it reaches its final destination, thereby minimizing sources of potential damage to the product, at least as to those potatoes shipped by rail. Although locating the storage facility on the farm would often be more convenient during the harvest, the possibility of excessive damage due to extra handling during the shipping season is too strong of a factor to ignore. Transportation of the crop from the field to storage facilities located on a railroad will often result in additional transportation miles at harvest time. However, since railroad stations located in the area are within relatively short distances from the farm, very little additional equipment is required of the producer to move the crop the few extra miles. However, if it became necessary to locate storage facilities a greater distance from the farm, additional farm transportation during the harvest season may be required.

A large number of the storage facilities in the Red River Valley have been remodeled in the past few years because of the increased use of potatoes for chipstock and processing. As stated previously, the use of potatoes for chipstock and processing requires higher storage temperatures and increases the problems in storage demand and management. Unless the storage facility is able to meet the problems associated with the higher quality standards required of chipstock and processed potatoes, the producer is forced to sell his potatoes for lower grade uses usually with a resulting price cut or he may not be able to dispose of them

at all. The cost of construction and equipping a facility maintaining an environment for longer storage periods and high quality potatoes is not inexpensive. In a survey conducted in 1971 it was estimated the average present value of capital investment for storage facilities per grower was $56,052 for buildings and $7,225 for equipment such as fans, heaters, elevators, etc. That figure came to an average investment of $169.78 per acre of potatoes or a $.89 per hundredweight investment. Naturally those figures have increased considerably since the date of the study as a result of inflation.

F. Transportation Practices - Introduction

In the early years of potato production most potatoes shipped to terminal areas arrived by rail. More recently motor carriers have been moving the bulk of potato shipments to most markets. The last few years has also seen the development and growth of piggyback transportation where truck trailers are loaded with potatoes and transported by truck to a rail loading dock area. The trailers are then loaded on rail flat cars where they are transported to a market terminal area, unloaded and finally moved from the terminal area to a processor's plant by truck. This latter method of transportation however transports only a very small portion of the nation's total potato production.

Potatoes ship best at temperatures of 50 to 60 degrees Fahrenheit. Temperatures above that temperature may lead to decay while lower temperatures can result in the development of high concentrations of reducing sugars in the product or even freezing. With the increased demand for chipstock and processed potatoes the maintenance of a particular transportation temperature is even more important, especially where the potatoes originate in areas such as North Dakota where outside temperature changes can be dramatic and length of transit time to a destination point can be quite long. For this reason nearly all of the potatoes shipped from North Dakota, either because of their intended use or because of the time of the year in which they are shipped, require the use

of insulated rail cars or trucks, both needing equipment for heating during cold weather and refrigeration during hot weather.

In years past when railroads were the principal carrier of potatoes, ice bunker rail cars were used for the transportation of the commodity. These cars were cooled with ice during the summer and were heated during the winter in the early years with charcoal and more recently with alcohol fuel heaters which are thermostatically regulated. With the discontinuance of ice for refrigeration purposes these cars lsot half of their usefulness and were relegated to strictly hauling potatoes during the winter months. The partial use of this equipment was found to be uneconomical and as these cars came into bad order, they were taken out of service. At the present time there remains only about 1,200 of these cars and in a couple of years there will be none.

Truck trailers and rail cars which are temperatrue controlled are referred to as "reefers." There cars or trailers make use of automatic mechanical refrigeration equipment which reduce labor needs in transit and make possible more exact maintenance of temperatures enroute. The railroads serving North Dakota have about 3,000 such reefers to serve their extensive transportation systems throughout the United States. These railroads have purchased no new reefer equipment since the 1950's. The Burlington Northern Railroad, the principal rail carrier in North Dakota, has stated the it does not intend to purchase and new reefer equipment in the future. It would appear that the days of transportating North Dakota potatoes in railroad owned cars is limited to the remaining life of the cars already in existance; a time period of about ten to twenty years at the most. A large part of the problem for the railroad, and consequently for the shipper, is the cost of new equipment. A new mechanical reefer rail car now sells for about $65,000. As the potato is a relatively low valued commodity for its weight and volume it is possible that a

---

7. Source: (11)
8. Source: (6,5,17)

transportation rate can be set at such a prohibitively high level relative to the market value of the commodity that it will prevent its movement. Consequently, because of the relatively low market value of potatoes in relation to its weight, the level at which transportation rates can be set is severly restricted. The problem is further complicated by very slow turn around times for rail equipment. Studies have shown that transit for a mechanical rail car from Grand Forks to Chicago is about 8.4 days.[9] This means that it would take such a car nearly 17 days to make the round trip between Grand Forks and Chicago excluding loading and unloading times, thus less than tow such trips could be made per month. When it is considered that the bulk of the potato movement, (thus the demand for the rail cars) occurs over an eight month period, it becomes apparent that the possibility of the railroads covering expenses plus making a resonable return on investment in the transportation of potatoes is less likely than in the transportation of other commodities.

In comparing truck and rail costs, trucks are generally considered to be the most efficient mode of transportation for most commodities for shorter hauls. However, in more recent years, this generalization has not necessarily been true, for the transportation of potatoes from North Dakota in that increasing volumes of potatoes shipped from this state are being shipped by motor carrier. A number of factors account for this. First of all investment costs for a motor carrier are generally lower. It is estimated that the cost of a refrigerated truck trailer is $27,000, in comparison to $65,000 for a refrigerated rail car. Also in the shipment of commodities that must move in a temperature controlled environment, speed or length of time in transit is of prime importance. Although transit time is important in the potato industry, it is crucial to many other

---

9. Source: (5)

commodities which are more perishable such as fresh fruits and vegetables. Also such temperature controlled commodities tend to move in smaller shipments than do most commodities that move by rail, particulary where the destination of such commodities are areas such as North Dakota where the consumer population is quite small. The net effect of all these factors is that nearly all of the commodities which are shipped in a temperature controlled environment into this state move by truck. The transportation of potatoes out of North Dakota then provides a convenient back haul for the motor carrier transporting other commodities by reefers into the state. In comparison the same factors prevent the movement of temperature controlled commodities by rail into the state. The result is that potatoes become the sole commodity of a one way movement by rail, i.e., the rail cars return empty, whereas potatoes are the secondary commodity of a two way movement by motor carriers. The rail carrier must recover his entire costs of the round trip from the transportation costs between transportation of two commodities; one moving into the state and the other moving out. Often times the motor carrier will set rates at such a level as to recover from the movement of the primary commodity into the state the largest part of the round trip costs of such a movement. He is able to do this because the value of those commodities are sufficiently high enough, in comparison to a commodity such as potatoes, to permit higher transportation rates without prohibiting its movement. This means that if the motor carrier is able to locate a back haul commodity, such as potatoes out of the state, the revenue he recovers from that back haul need only cover his additional costs directly associated with that commodity such as added distances moved to load and unload the commodity, costs of loading and unloading, and additional fuel used for moving loaded versus empty. Any revenues recovered over that level are profits. The trucker is then able to offer the potato shipper a rate for relatively long distances

that is competitive with the rail rate, something he ordinarily would not be able to do.

A problem exists however, in that because of North Dakota's small population there are relatively few commodities moving into this state in comparison to the large volume of agricultural commodities which must be shipped out. Consequently the demand for low cost transportation in the form of back hauls from other commodities far exceeds the supply. This problem is further amplified in the movement of potatoes which requires special handling and equipment. Since only a percentage of the trucks coming into the state have refrigeration capability, not all potential motor carrier back hauls are available to the potato shipper. In the past the back haul movement has provided an excellent means of transporting a portion of the state's potato crop; especially during the months when the bulk of the potato movement occurs and when rail cars are unable to meet the total demand for transportation. More recently, however, with the number of motor carrier refrigerated back hauls and the production of potatoes remaining relatively constant and the supply of rail cars steadily decreasing a gap has begun to grow between the demand and supply for transportation. The result is a critical transportation shortage during those months of the year when the bulk of the potato crop is moved.

It should be noted at this point that not all of the potatoes that are shipped out of North Dakota by truck do so as the back haul for another commodity. In fact a large percentage of the North Dakota potato crop moves by motor carrier where potatoes are the primary haul. A few of the larger producers and processors own their own trucks to make such hauls and a few exempt agricultural carriers also offer such service. These carriers will often seek a return back haul of a different commodity coming into the state or simply return empty. The existance of transportation by this private or exempt type carriage is largely an

outgrowth of a need for a guaranteed availability of transportation.

G. North Dakota Potato Markets[10]

In studying problems in the transportation of North Dakota potatoes, particular importance must naturally be given to the location of markets for the product. Only in this manner can key movements and associated costs and problems be identified. After such identification, concentration can then be given to the development of alternative solutions to meeting those transportation needs and problems.

In calendar year 1977 there were 6,760 rail car loads of potatoes shipped out of North Dakota. Based upon an estimated average car loading of 70,000 pounds, 4,732,000 hundredweight of potatoes were shipped out of North Dakota by rail in 1977. In that same calendar year an estimated 7,562,200 hundredweight of potatoes moved from the state by truck. This means that of the nearly 12.3 million hundredweight of potatoes that were shipped out of North Dakota in 1977 about 60 percent were shipped by truck. Table 5 shows shipments of potatoes by month and by mode for 1976, 1977, and 1978 from North Dakota. As can be seen from Table 5, as the shipping season progresses to the later months of March, April and May, the percentage of potato movement by rail decreases. This probably is the result of more cars being held up at different destinations, or spending longer times in transit, or simply undergoing maintenance during the latter part of the shipping season, or more likely it represents a preference on the part of shippers to move their commodity by truck when both modes are available. In comparing North Dakota potato movements by mode with those of the nation, it should be noted that in 1976 less than 25 percent of the nation's potato shipments were made by rail. This is explained partially by the greater availability of trucks for potato shipments in the other more heavily populated areas of the country and the relatively shorter

10. Sources: (12, 13, 15, 16, 4)

TABLE 5: Movement of North Dakota Potatoes
By Month and Mode
For Years 1976-1978
(oo cwt)

Year and Mode	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1976													
Shipments by Rail									2800	4830	6048	5873	55076
Shipments by Truck									3790	7091	10953	9549	
Total N.D. Shipments									6590	11921	16991	15422	
% by Rail									42.5	40.5	35.6	38.1	
% by Truck									57.5	59.5	64.5	61.9	
1977*													
Shpmnts by Rail	6874	7609	7280	4508	665	0	7	119	2471	5565	6265	5957	47320
Shpmnts by Truck	9490	9503	12402	10758	2087	0	0	0	1677	5460	9523	7150	68050
Total Shipments	16364	17112	19682	15266	2752	0	7	119	4148	11025	15788	13107	115370
% by Rail	42.0	44.5	37.0	29.5	24.2	0	100.0	100.0	59.6	50.5	39.7	45.4	41.0
% by Truck	58.0	53.5	63.0	70.5	75.8	0	0.0	0.0	40.4	49.5	60.3	54.6	59.0
1978*													
Shpmnts by Rail	5854	5436	6745	4908									
Shpmnts by Truck	7924	8383	10965	13000									
Total Shipments	13778	13819	17710	17908									
% by Rail	42.5	39.3	38.1	27.4									
% by Truck	57.5	60.7	61.9	72.6									

* Preliminory

Sources: (12,13)

distances to markets from those areas, making truck movement a more attractive mode. However, these statistics also reflect the North Dakota producer's greater dependency on rail transportation when compared with the country as a whole. This dependency is demonstrated further in Table 6. Those statistics indicate that while the use of rail to ship potatoes declined over 60 percent between the years 1967 and 1976 nationally; North Dakota's use of rail for the transportation of potatoes declined slightly over 37 percent during the same period. Thus in a certain sense, North Dakota has been fortunate in comparison with the rest of the country regarding its ability to retain rail transportation. It appears however, that North Dakota's fortune was merely a postponement of the inevitable. For instance, between the years 1973 and 1976, North Dakota's use of rail declined about 40 percent while that of the nation as a whole declined about 28 percent. Thus, the trend in the decreased use of rail transportation seems to have hit North Dakota in recent years on a very serious scale. While the rest of the country has made the gradual transition from rail to truck in the transportation of potatoes, it appears North Dakota is still heavily dependent on the refrigerated rail car; the future of which looks doomed. Like the rest of the country, North Dakota will need to develop alternatives to rail for the transportation of its product to reduce that dependency. And from the indication of recent trends, those alternatives must be developed soon if North Dakota wishes to remain a significant producer in the potato industry.

The location of markets for North Dakota potatoes is important not only to identify means and costs of transporting its products to those markets, but also to analyze its competitive position in those markets. Although there is no data available to determine the destination of all North Dakota potato shipments, data is available identifying the origins of potato shipments received in selected cities throughout the United States. In 1976 these selected cities received over

TABLE 6: SHIPMENTS OF POTATOES BY RAIL

United States and North Dakota

For Years 1967 - 1976

in carlots

Year	Shipments United States	Shipments North Dakota
1967	123,974	12,559
1968	115,102	11,508
1969	113,234	14,924
1970	99,146	13,379
1971	87,037	12,251
1972	75,628	12,852
1973	68,019	13,294
1974	54,879	11,259
1975	40,757	7,277
1976	48,959	7,870
1977	N/A	6,760

Source: (14)

44 percent of the total rail shipments and nearly 60 percent of the total truck shipments of potatoes made in the United States. Thus, while the shipments received by these cities will not provide a completely accurate description of the destination of all North Dakota potato shipments, they do provide a fair representation of the major markets for those potatoes.

For purposes of this study the selected cities have been broken into marketing regions. A list of the regions and the selected cities contained within each is shown in Table 7. As can be seen from Table 8, North Dakota's primary markets are in Regions V, VI, VII, and IX. The cities in these regions accounted for over 95 percent of North Dakota shipments received by the selected cities in 1976. These market statistics are also reporesented graphically in Figure 2. Regions II and III, consisting of the western states, have been both presently and historically relatively smaller markets for North Dakota potatoes. Typically the two regions combined have received only about one percent of the carlots shipped from North Dakota. Correspondingly, North Dakota has supplied generally less than one percent of the demand for potatoes from these two regions. The reason for the relative insignificance of the western states as a market for North Dakota potatoes is that these regions contain some of the largest potato producing states in the country, namely Idaho, Washington, Oregon, and California. As stated previously, processors will generally look to local producers first to fill their demands before they look to more remote production areas. Due to the high concentration of producers in these western states, processors have not had to look to North Dakota for potato supplies except during exceptional circumstances. Because of the transportation advantages the western producers enjoy in relation to North Dakota, the western markets in Regions II and III are likely to remain insignificant markets for North Dakota potatoes during most years. A similar situation exists among the northeast states of Region VIII. These eastern

TABLE 7: Selected Cities Contained in Marketing Regions

Region II	Region III	Region IV
Portland	Los Angelos	Denver
Seattle - Tacoma	Salt Lake City	
	San Francisco-Oakland	
Region V	**Region VI**	**Region VII**
Dallas	Milwaukee	Chicago
Fort Worth	Minneapolis - St. Paul	Cincinnati
Houston		Cleveland
Oklahoma City		Detroit
San Antonio		Indianapolis
		Kansas City
		Louisville
		St. Louis
Region VII	**Region IX**	
Albany	Atlanta	
Baltimore-Washington	Birmingham	
Boston	Columbia	
Buffalo	Memphis	
New York	Miami	
Philadelphia	Nashville	
Pittsburgh	New Orleans	
Providence		

TABLE 8: Carlot Shipments of Potatoes Received by Selected Cities Within Eight Marketing Regions by North Dakota and National Orgins

1977	II	III	IV	V	VI	VII	VIII	IX	
Total shipments received by cities - Rail	58	17	1	1541	333	8262	6946	2706	19864
Total shipments received by cities - Truck *	3694	17,787	2714	12,303	6366	19,433	19,553	9130	90980
Total shipments received by cities	3752	17,804	2715	13,844	6699	27,695	26,499	11,836	110,844
N.D. shipments received by cities - Rail	2	0	0	116	95	2,231	150	413	3007
N.D. shipments received by cities - Truck	10	97	23	919	1610	2,011	170	480	5320
Total N.D. shipments received by cities	12	97	23	1035	1705	4,242	320	893	8327
% of shipments received in region having N.D. orgin	0.3	0.5	0.8	7.5	25.5	15.3	1.2	7.5	7.5
% of N.D. shipments received by cities in region	0.1	1.2	0.3	12.4	20.5	50.9	3.8	10.7	100.0

TABLE 8 (con't): Carlot Shipments of Potatoes Received by Selected Cities Within Eight Marketing Regions by North Dakota and National Orgins

	II	III	IV	V	VI	VII	VIII	IX	Total
1976									
Total shipments received by cities - Rail	89	16	4	1807	430	9370	7628	2487	21831
Total shipments received by cities - Truck*	3891	19387	3194	10552	5723	20214	18805	9500	91266
Total shipments received by cities	3980	19403	3198	12359	6153	29584	26433	11987	113097
N.D. shipments received by cities - Rail	2	0	0	263	112	2584	115	414	3490
N.D. shipments received by cities - Truck	7	72	33	637	1334	2134	123	550	4890
Total N.D. shipments received by cities	9	72	33	900	1446	4718	238	964	8380
% of shipments received in region having N.D. orgin	0.2	0.4	1.0	7.3	23.5	15.9	0.9	8.0	7.4
% of N.D. shipments received by cities in region	0.1	0.9	0.4	10.7	17.3	56.3	2.8	11.5	100.0
1972									
Total shipments received by cities - Rail	439	2533	231	3634	1849	15979	10919	4400	39984
Total shipments received by cities - Truck*	4337	18538	5113	8139	3720	16882	21172	10543	88444
Total shipments received by cities	4776	21071	5344	11773	5569	32861	32091	14943	128428
N.D. shipments received by cities - Rail	3	1	0	404	364	3813	206	1038	5829
N.D. shipments received by cities - Truck	14	94	60	285	398	1153	65	796	2865
Total N.D. shipments received by cities	17	95	60	689	762	4966	261	1834	8694
% of shipments received in region having N.D. orgin	0.4	0.5	1.1	5.9	13.7	15.1	0.8	12.3	6.8
% of N.D. shipments received by cities in region	0.2	1.1	0.7	7.9	8.8	57.1	3.1	21.1	100.0

* Truck totals converted to extimated pound equivlency to arrive at carlot shipment numbers.

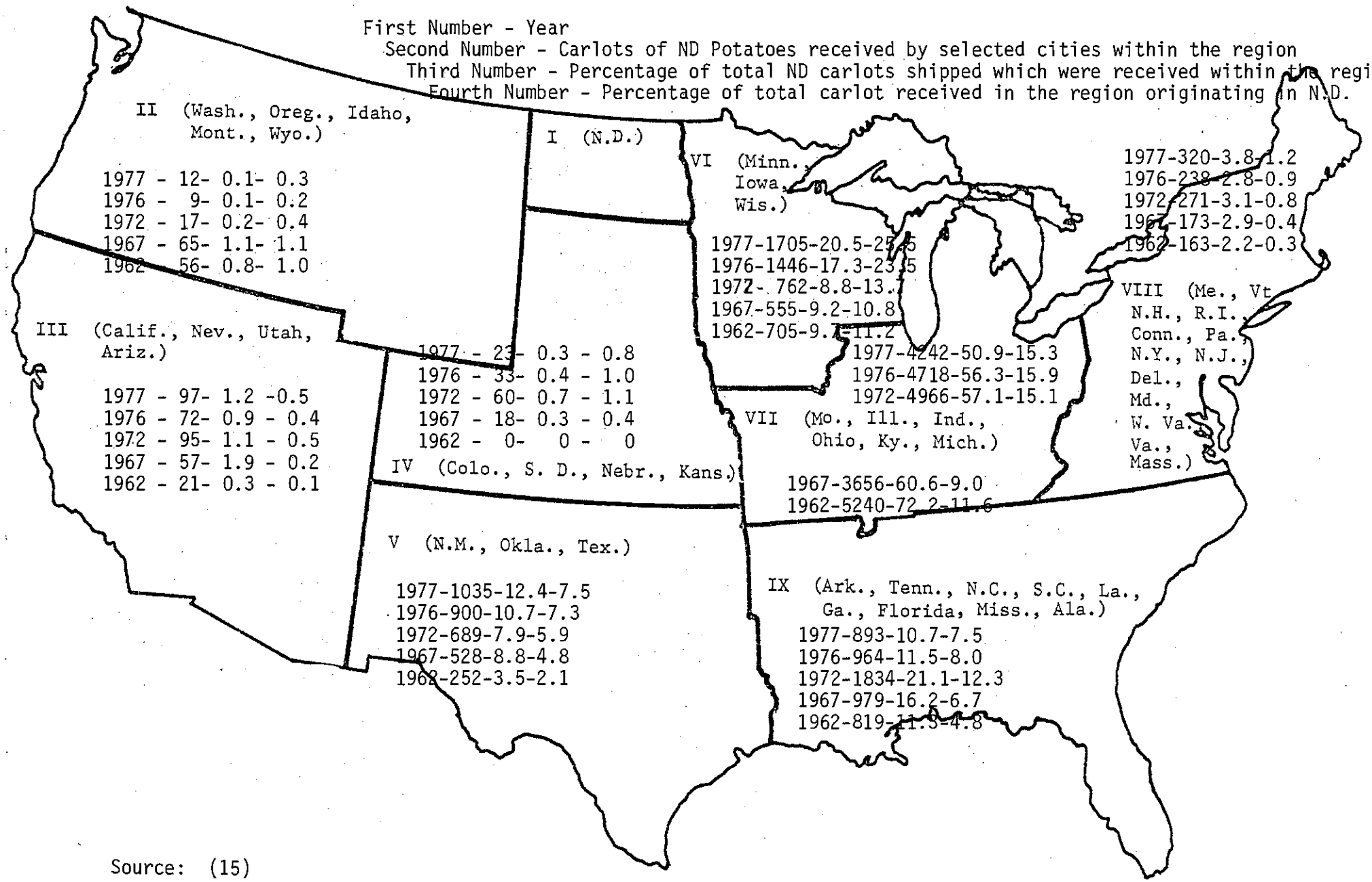
TABLE 8 (con't): Carlot Shipments of Potatoes Received by Selected Cities Within Eight Marketing Regions by North Dakota and National Orgins

	II	III	IV	V**	VI	VII	VIII	IX	Total
1967									
Total shipments received by cities - Rail	2052	5277	585	4869	2424	23826	2210	4942	66185
Total shipments received by cities - Truck*	3832	18682	4388	6049	2724	16602	24226	9700	86203
Total shipments received by cities	5884	23959	4973	10918	5148	40428	46436	14642	152388
N.D. shipments received by cities - Rail	56	7	18	213	211	3396	136	664	4701
N.D. shipments received by cities - Truck	9	50	0	315	344	260	37	315	1330
Total N.D. shipments received by cities	65	57	18	528	555	3656	173	979	6031
% of shipments received in region having N.D. orgin	1.1	0.2	0.4	4.8	10.8	9.0	0.4	6.7	4.0
% of N.D. shipments received by cities in region	1.1	.9	0.3	8.8	9.2	60.6	2.9	16.2	100.0
1962									
Total shipments received by cities - Rail	2385	7754	479	5928	2684	27194	26320	6017	78761
Total shipments received by cities - Truck*	3178	15849	4195	5982	3632	18060	29741	11182	91819
Total shipments received by cities	5563	23603	4674	11910	6316	42254	56061	17199	170580
N.D. shipments received by cities - Rail	54	6	0	171	116	4802	155	552	5856
N.D. shipments received by cities - Truck	2	15	0	81	589	438	8	267	1400
Total N.D. shipments received by cities	56	21	0	252	705	5240	163	819	7256
% of shipments received in region having N.D. orgin	1.0	0.1	0	2.1	11.2	11.6	0.3	4.8	4.3
% of N.D. shipments received by cities in region	0.8	0.3	0	3.5	9.7	72.2	2.2	11.3	100.0

** Data for years 1967 and 1962 does not include unloads for Oklahoma City.

Source: (15)

DESTINATION AREAS FOR POTATOES SHIPPED FROM NORTH DAKOTA



Source: (15)

FIGURE 2

states have been the market for between approximately two and three percent of the potatoes shipped from North Dakota. This can again be explained by the location of the two major potato producing states of Maine and New York within the region. It would appear from the selected cities data that Region III, which includes the states of Colorado, South Dakota, Nebraska, and Kansas, is also not a significant market area for North Dakota potatoes. The information from this region however is probably not accurate as reflecting the importance of this region as a market. The fact that only one of the selected cities, i.e., Denver, was in this region and that community's potato needs are filled largely by producers from that state (Colorado ranks tenth nationally in the production of potatoes) makes the selected cities data for this region unreliable. A large number of relatively smaller communities exist in this region which rely quite heavily on North Dakota to fill its demand for potatoes. In a survey conducted concerning potato shipments from the Red River Valley in 1966-1967, it was estimated that over 20 percent of the potatoes shipped from the study area were destined for Region IV markets. Although the data from that study is somewhat dated at this point it does reflect the fact that Region IV is a much more important market for North Dakota than indicated by the selected cities data. Consequently the states of South Dakota, Nebraska, and Kansas should be considered significant, if not primary markets for North Dakota potatoes.

The southeastern states contained within Region IX are also significant market, typically receiving between ten and twenty percent of the potatoes shipped from this state. This region has histroically been the largest recipient of seed potatoes shipped from the Red River Valley. The southern states of Region V are a similar sized market for North Dakota potatoes. Based upon the selected cities data, Region VII is by far the largest market for North Dakota potatoes, receiving over 50 percent of the potatoes shipped from this state. An interesting note is

that while North Dakota supplies a relatively constant or increasing percentage of the potates shipped into Region VII, the region is becoming a relatively smaller market for the North Dakota producer. This is explained by the fact that while potato production in North Dakota has risen over the years, the number of carlots of potatoes received by Region VII has steadily decreased over the same time period.

One region which has been an increasingly larger market for North Dakota is Region VI. Both the percentage of North Dakota potatoes destined for that region, and the percentage of shipments received by the region originating in North Dakota have about doubled over the last fifteen years. However even with these sizeable increases the region still accounted for less than 20 percent of potato shipments made from North Dakota in 1976.

Some interesting comparisons in the mode of transportation between North Dakota and other regions can also be made from Table 8. Not only have the railroads been carrying a decreasing percentage of the potato shipments, but in many instances the absolute number of shipments made by rail has decreased. This seems to confirm the previous statement that the use of rail cars as a mode of transportation for potatoes appears to be limited. It should also be noted that the switch from rail to truck has been slower to some regions than to others. Also, looking at the raw unload data from the selected cities, in many instances a disproportionate percentage of shipments from a particular origin to a particular destination were made by rail when comparing shipments from other origins to that destination. This would seem to indicate that if the trend from rail to motor transportation continues, those producing areas which have in the past relied on rail transportation will have to find available motor carriers or lose the markets to other producing regions which can. In looking at the significant markets for North Dakota potatoes, the following

indicates the percentage of potatoes received from all origins by rail versus the percentage of potatoes received from North Dakota by rail.[11]

	% Received by Rail							
	All Orgins	ND Orgin	All Orgins	ND Orgin	All Orgins	ND Orgin	All Orgins	ND Orgin
	1976		1972		1967		1962	
Region V	14.6	29.2	30.9	58.6	44.6	40.3	49.8	67.9
Region VI	7.0	7.7	33.2	47.8	47.1	38.0	42.5	16.5
Region VII	31.7	54.8	48.6	76.8	58.9	92.9	60.1	92.6
Region IX	20.7	42.9	29.4	56.6	33.8	67.8	35.0	67.4

With the exception of Region VI, the above shows that North Dakota has been and is now more dependent on rail transportation to reach its major markets than the markets have been to receive their total demands. This partically is the result of what was stated previously in that in these markets North Dakota is the remote supplier. Thus, the product must move greater distances, giving rail a more favorable advantage when the origin is North Dakota versus the more local producing states. In Region VI, of which Minneapolis is the major selected city, the Red River Valley is the local supplier. Since the distance between North Dakota and Minneapolis is comparatively short relative to other markets, motor carriers enjoy the competitive advantage in moving potatoes between these two points. In addition a good deal of the traffic destined for North Dakota originates in Minneapolis. This provides a number of available back hauls for potatoes which are not as proportionally available to other markets.

Up to this point in time North Dakota producers have been able to shift a great deal of their dependency for the transportation of potatoes from rail to truck. This has been aided primarily through the ability of motor carriers to use potatoes as a back haul or for local potato producers to ship their product privately by truck and look at other goods coming into the state as a back haul.

---

11. Due to the lack of data available for Region IV, no comparison was made for this region.

However recent shortages in the availability of transportation to move potatoes seems to indicate that any increase in the number of goods moving into the state which would provide a back haul for potatoes has not kept pace with the decreasing availability of refrigerated rail cars. In other words a saturation point in the availability of trucks which can use potatoes as a back haul movement may have been reached. If this is indeed true, and if the availability of rail cars to ship potatoes continues to decrease, as it appears they certainly will, then the North Dakota producer will have to: 1) make more efficient use of back hauls which are available, 2) seek another form of transportation, and/or 3) face increased transportation costs as his product becomes the primary or sole movement from North Dakota to the market palce.

In most other cases the obvious answer to this problem would be to make potatoes the primary movement, in which instance the increased transportation costs could be passed along in the form of a higher product price. However, as stated previously, in the situation of potates, the product is capable of being grown in nearly every state of the Union. Production in many of these states as pointed out previously has risen dramatically in recent years. Thus the raising of prices to meet increased transportation costs may not be an available option where competing production areas have a lower cost means of transportation available and are capable of expansion. To determine whether such a situation exists for the North Dakota producer, an examination was made of the ten cities of the previously selected U.S. cities which North Dakota shipped the largest amount of potatoes to. In the case of each city the percentage of that city's potato demands which was filled by selected producing regions was determined. The results are shown in Table 9. From the table it can be seen that the states of Wisconsin and Idaho are the major competitors of the Red River Valley producer. The state of Maine has become a decreasing competitor in all markets to the point

TABLE 9: PERCENTAGE OF SHIPMENTS OF POTATOES RECEIVED BY SELECTED CITIES FROM SELECTED ORGINS

City	Year	Total Carlots	% ND	% MN	% Calif.	% Idaho	% Maine	% Mich.*	% Ore.	% Wash.	% Wisc.
Chicago											
	1976	8413	24.8	11.6	8.6	12.1	0.0	2.9	1.3	1.9	27.1
	1972	8499	24.1	15.0	12.5	15.7	0.0	1.7	0.6	3.6	17.4
	1967	11118	15.1	10.7	17.0	18.0	0.3	1.7	0.9	6.8	14.9
	1962	13454	20.0	5.3	14.0	22.2	0.2	2.8	0.6	6.1	11.8
Kansas City											
	1976	1822	36.7	11.2	5.5	3.0	0.0	0.0	0.8	8.1	0.2
	1972	1814	29.1	23.5	3.4	9.0	0.0	0.2	1.2	5.2	2.0
	1967	2771	18.2	16.7	6.4	9.3	0.0	0.0	1.6	3.6	1.8
	1962	3165	21.1	13.1	9.8	16.1	0.0	0.0	0.8	3.2	3.3
St. Louis											
	1976	2951	22.3	18.0	2.3	14.9	0.0	1.9	0.9	2.0	10.0
	1972	3778	31.8	20.1	5.1	14.2	0.0	0.3	0.8	2.5	10.5
	1967	4151	22.3	16.3	7.0	17.1	0.1	0.4	0.7	3.9	12.1
	1962	5214	25.1	15.0	6.4	19.7	0.0	0.2	0.7	4.2	11.9
Oklahoma											
	1976	2451	20.3	2.4	1.9	5.3	0.0	0.0	0.0	2.7	0.0
	1972	2238	9.2	12.4	4.0	11.7	0.0	0.0	0.4	1.8	0.0
	1967		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	1962		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Minneapolis - St. Paul											
	1976	5293	24.3	44.5	8.9	8.0	0.0	0.0	0.7	1.9	5.6
	1972	4258	15.0	49.4	9.6	12.1	0.0	0.0	1.7	2.7	6.6
	1967	3600	13.4	36.4	21.9	10.8	0.0	0.0	0.1	3.3	3.4
	1962	4173	15.2	40.8	16.6	10.9	0.8	0.0	0.0	4.2	3.4

Source: (15)

TABLE 9 (con't): PERCENTAGE OF SHIPMENTS OF POTATOES RECEIVED BY SELECTED CITIES FROM SELECTED ORGINS

City	Year	Total Carlots	% ND	% MN	% Calif.	% Idaho	% Maine	% Mich.*	% Ore.	% Wash.	% Wisc.
Atlanta											
	1976	4410	5.9	6.0	2.3	9.7	0.8	5.4	1.5	1.8	21.8
	1972	5339	13.1	6.0	1.4	9.3	4.1	4.4	0.5	2.6	19.4
	1967	4597	3.3	3.9	3.4	10.0	6.0	2.1	1.5	3.6	9.7
	1962	5254	1.5	2.0	4.1	9.0	5.0	2.6	0.7	2.0	4.9
Memphis											
	1976	1141	24.9	13.2	1.5	5.9	0.0	4.7	0.9	0.4	17.0
	1972	1940	20.4	29.5	0.3	8.8	0.1	5.4	0.4	2.0	8.2
	1967	1725	19.8	22.1	2.7	6.5	0.2	2.3	2.7	1.4	14.8
	1962	2214	17.3	25.4	2.6	8.3	0.3	1.5	0.1	1.8	9.5
Cincinnati											
	1976	2987	12.9	2.8	4.3	21.1	0.9	5.2	0.9	1.2	11.0
	1972	3156	17.8	6.4	2.2	17.5	2.5	7.7	0.6	2.1	14.5
	1967	2938	8.0	6.7	5.9	15.2	4.8	8.6	0.9	2.2	10.9
	1962	3484	9.1	9.2	6.6	13.3	4.7	4.5	0.3	2.8	8.0
Detroit											
	1976	4762	6.1	1.2	8.9	18.6	0.1	41.4	1.2	0.1	7.7
	1972	6291	2.4	2.7	8.3	15.2	2.3	50.6	1.0	0.6	2.7
	1967	8011	0.3	0.8	12.8	13.3	5.9	40.9	1.1	0.8	0.1
	1962	7650	1.3	0.6	11.4	13.5	6.7	44.6	0.6	1.0	1.7
Louisville											
	1976	3032	11.1	6.8	1.5	10.2	1.1	14.0	1.0	0.5	21.4
	1972	2747	8.7	5.1	1.7	14.2	2.0	7.9	0.7	0.6	28.6
	1967	3298	5.4	6.8	3.5	10.2	7.7	3.2	0.9	0.5	21.7
	1962	3268	1.8	4.6	4.7	12.8	7.7	3.7	0.3	0.5	24.0

* Michigan figures do not include rail unloads for the years 1967 and 1962.

where it is an insignificant supplier to the cities which have been the Valley's strongest markets. The state of Oregon is also an insignificant supplier, as is the state of Washington with the exception of the Kansas City market, where its percentage share of the market has increased over five percent during the past 15 years. California is a somewhat larger competitor for the selected markets, however its influence has also been decreasing over the period of the last 15 years. A good portion of the potatoes which are received from California to these markets are probably winter and summer potatoes used for tablestock, in which case they compete with the Valley potato for only a limited market.

The decline of the above states as competitors for the North Dakota producer's traditional markets can be explained by a couple of reasons. First, the use of potatoes in communities located nearer the various production areas have increased in recent years, meaning these producing states have been able to dispose of a larger portion of their crop closer to home. Second, the increasing dependency on motor carrier transportation has made competing in more distance markets less profitable.

The state of Michigan is a significant producer for a number of the markets in which North Dakota is a major supplier, largely because of its proximity to those markets. Although it appears from Table 9 that the role of Michigan as a supplier in these markets is growing, this is exaggerated somewhat since data for rail carlots originating in Michigan for the years 1967 and 1972 was not available, thus only truck unloads are shown for those years.

The states of Idaho and Wisconsin are primary competitors with the Red River Valley in most of its major potato markets. It is interesting to note at this point that while the Red River Valley has increased its production of potatoes about 67 percent over a period of the last 20 years, Idaho has increased production by 136 percent and Wisconsin by 155 percent. Thus the Red River Valley producer

is competing with two strong producing areas which have proven themselves capable of expansion. Unless the Valley producer is able to remain competitive in the marketing of its product, it appears either or both of these producing states could capture a large share of his traditional markets. Looking at Table 9 this trend may have already started, particularly in the case of Wisconsin in the more southern and eastern markets. Idaho has been able to expand its share of the Cincinnati and Detroit markets while maintaining its marketing position in most of the other cities. Only in the Midwestern markets of Kansas City, Oklahoma City, and Minneapolis-St. Paul has the North Dakota producer been able to make any market gains at the expense of either Wisconsin or Idaho.

Although a number of factors are involved in determining the competitiveness of a certain producing area in a particular market, certainly transportation is a major one of these factors. As the use of rail cars in the transportation of potatoes becomes a matter of history, further changes in the pattern of marketing could occur. We have already witnessed the decreasing importance of the states of Maine and California in their more distant markets. It would appear at this time that those states which have sufficient motor carrier transportation available to them will enjoy a competitive marketing advantage over states which are not so fortunate. In comparing the states of North Dakota, Wisconsin and Idaho in their use of the two modes of transportation for the movement of potatoes we find the following:

Percent of Carlot Shipments made by Rail to Selected Cities

	1977	1976	1972	1967	1962
North Dakota	36.1	42.1	67.0	79.2	80.2
Idaho	60.5	58.9	74.3	88.1	90.8
Wisconsin	0.8	2.4	9.4	18.5	10.5

Source: (15)

As can be seen, although North Dakota and Idaho have increased their use of motor carriers in the transportation of potatoes, both are still highly dependent upon rail. Wisconsin on the other hand has traditionally moved only a small percentage of its potatoes by rail, and as indicated it has used motor carriage almost exclusively in recent years to move its crop. This availability of trucks may explain in large part Wisconsin's ability to expand in recent years its market share in many of its markets. In the future it would appear from the above that in those markets where Idaho is North Dakota's primary competitor, both will be under the handicap of developing new modes of transportation to reach those markets as the use of railroads in the transportation of potatoes declines. However, as will be shown in following chapters, Idaho may have a good chance to retain rail transportation to move the potatoes it ships out of the state. Where Wisconsin is North Dakota's main competitor in a particular market, unless this state is able to develop a means of transportation to replace rail to that market, Wisconsin will enjoy a marketing edge and quite likely capture a portion of North Dakota's share of the market.

Chapter II

NORTH DAKOTA POTATO TRANSPORTATION: THE CURRENT SITUATION

A. RAIL TRANSPORTATION

1. Equipment[12]

The railroad industry, through the development of the specialized refrigerator car, has been the pioneer in the interstate shipment of perishable commodities. For many years rail transportation was the only means by which such commodities could be moved. However, the development of the motor carrier industry, with its improved speed and reliability, soon came to make large inroads in the previously railroad dominated market. At the present time the shipment of potatoes, lettuce, and citrus fruits are the only perishable commodities of which a significant portion are shipped by rial. And the railroads have seen their share of the shipment of these products also decline over recent years. Some authors have stated that if the present trend continues, the shipment of perishable commodities by rialroad will end within a few years. However with current marketing practices and the limited availability of trucks into the area, shippers and carriers alike agree that rail transportation must continue to play a significant role in the shipment of potatoes from the Red River Valley if the potato industry is to continue to survive at its present level of importance.

In order to fully understand the transportation of potatoes from this area and the problems associated with such transportation, it is imperative to examine the types and availability of transportation equipment used. The following briefly describes such equipment.

---

12. Sources: (5, 38, 41).

(a.) R.S. Rail Cars - As classified by the American Association of Railroads, the R.S. car used in the transportation of potatoes from the Red River Valley, is a fully insulated car equipped with a bunker at each end. The railroads were able to provide three types of protective services with this type of car -- refrigeration, by placing ice in the bunkers; ventilation, accomplished by manipulation of the hatch covers; and heater service through the addition of heaters in the bunkers.

Until recently charcoal type heaters were placed in the end bunkers to prtect products from low temperatures during the winter shipping season. While these heaters generally worked well for protection from freezing, they lacked any means for controlling temperature, and before the cars were equipped with air circulating fans, much of the warm air rose to the top of the car, resulting in a great deal of temperature variance between the top and bottom of the load. More recently alcohol-fueled heaters have replaced the charcoal heaters. These heaters can be thermostatically controlled allowing for good temperature control when combined with forced air circulation.

The railroads offer tow types of heater service with the R.S. rail car. The first, Carrier Protective Service (CPS), specifies that the railroad will keep the commodity at a temperature to prevent freezing. This type of service is usually specified in the shipment of tablestock and seed potatoes. Under Rule 580, the second type of heat supplied service, the load is carried at some specified temperature level above freezing. Shippers of chipstock and potatoes generally specify this type of service. When using either of these protective services the shipper is assessed a protective service charge in addition to the transportation rate, the level of which depends on the service specified.

The Burlington Northern Railroad has converted a number of these R.S. cars

to bulk loading for the carriage of bulk potatoes. These converted rail cars are referred to as RSB cars. The conversion to bulk transport is accomplished by the addition of rod-chain conveyors on the floor for unloading purposes and slope boards on the side walls. A lengthwise conveyor extends from the bunker wall in each end of the car to the doorway area. In the doorway a crosswise conveyor removes the potatoes to portable conveying equipment outside of the car for loading into trucks, pallet bins, or directly onto the processing line. Slope boards extending from the edge of the longitudinal conveyor to a few feet up the side wahls assure a flow of potaotes onto the conveyor. Loading of the cars is accomplished through the doorway with portable ocnveyors which are somewhat similar to the bin fillers used in potatoe warehouses.

The R.S. car has a capacity to carry approximately 40,000 to 45,000 pounds of bagged potatoes. The converted RSB car has a loading capacity of between 50,000 and 55,000 pounds of bulk potatoes. The smaller size of the RS car and the availability of the CPS charge, which is lower priced than the other protective services, has made the use of this car particularly popular among the tablestock and seed potato shipper.

In 1971 the railroads of the United States owned 31,000 RS cars of which about 1,000 had been converted by the Burlington Northern to bulk loading. However, even at that point the number of these cars was lower than in prior years, as the number of RS cars in service has been steadily decreasing since 1952 when over 100,000 of the cars were in service. In 1976 it was estimated that only 10,000 of the RS cars were still in operation. In 1974 the Burlington Northern had 1,777 RS cars and 710 RSB cars still in service, yet even the cars currently remaining from this group (estimated at 1,200) are expected to be out of use by 1980.

The largest contributing factor in the declining use of the RS car was the

discontinueance of the use of ice for refrigeration purposes. As the mechanically refrigerated car was developed, the demand for the use of ice for the refrigeration of perishable commodities declined drastically. Shortly thereafter the ICC allowed the railroads to discontinue offering the icing service and the RS car was relegated to hauling commodities requiring heater service, primarily potatoes during the winter season. The railroads found this partial use of equipment to be uneconomical and as these cars went into bad order they were taken out of service.

(b) Mechanically - Refrigerated Rail Cars - The mechanically refrigerated car referred to as a RP car is equipped with a diesel engine to drive an electric generator for operating refrigeration, heating, and air circulating equipment. The thermostatically controlled unit allows for constant temperature maintenance at the level specified by the shipper. The Mechanical Protective Service (MPS) charge assessed against shippers who move perishable commodities in there mechanically refrigerated cars is based upon the distance the commodity is shipped, rather than level of temperature specified by the shipper.

The RP car is generally longer and has a higher ceiling than the older RS car. This allows a loading capacity of about 80,000 pounds of bagged potatoes on 100,000 pounds of bulk potatoes. The increased loading capacity and the higher degree of temperature control would make this car extremely suitable for movement of chipstock and processing potatoes except for the fact that very few of these cars have been converted for bulk loading, which is almost the exclusive means of shipping this type of potato.

Previously an important use of the RP car was the shipment of meat. With the movement of meat being done now almost exclusively by truck, the RP cars equipped for hauling meat were not in demand. The Burlington Northern has 850 of these

older meat cars, 450 of which they converted for the bulk loading of potatoes at a conversion cost of approximately $20,000 per car. The modification of the conventional mechanically-refrigerated rail car for bulk use is essentially the same as that for the RS cars. These cars were well received by shippers of chipping and processing potatoes, and the Burlington Northern has recently indicated it will convert another 100 of the cars for bulk loading. The expected life of these converted cars is about 20 more years. Since there is some doubt that the unloading system in these converted cars is suitable for fresh vegetables other than potatoes, large-scale modification of other RP cars appears unlikely as the railroads favor multi-use cars rather than limited use equipment.

The Burlington Northern also has about 60 of the so-called "conditionaire" cars which is an externally insulated version of the center-flow covered hopper car with added equipment for air circulation, refrigeration, and heating. Each hopper is loaded through a top hatch opening and unloaded by gravity flow through a sliding gate at the bottom of the hopper. These cars are capable of carrying over 160,000 pounds of bulk potatoes although some problems have been experienced in the past with unloading at certain facilities which are not equipped for the bottom unloading car.

In 1960, 3,786 mechanically-refrigerated cars were in service on railroads of the United States. By 1971, this had increased to 23,924. However, since that time the number of cars has decreased as the railroads have been reluctant to purchase new equipment. An estimated 20,000 RP cars were in use in 1976. Reasons for the railroads reluctance to purchase new mechanically refrigerated cars is the relatively low rate of income these cars have generated along with their hgih purchase price. A new refrigerated rail car would cost about $65,000. The railroads serving this area have approximately 3,000 mechanically-refrigerated cars. During occasions of extreme shortage however, the Burlington Northern Rail-

road has leased such mechanical cars from companies such as Fruit Growers Express of Washington, D.C.

The railroad primarily referred to in this subsection and the remaining subsections of this section concerning rail transportation of potatoes is the Burlington Northern Railroad as that company carriers the bulk of the potatoes shipped from the Red River Valley by rail car. Although the Soo Line Railroad ships a significant number of potatoes, its overall volume is overshadowed by that of the Burlington Northern. During the past season the Soo Line carried about 300 carloads of bagged potatoes in RS cars, 40-50 carlots of bulk potatoes in conditionaire cars, and had access to between 100 and 150 RP cars which they used for the shipment of potatoes. The Soo Line will not have access to the conditionaire cars this coming season. In addition, the status of about 50 of the RP cars is also uncertain. As neither the Soo Line RS or RP cars are equipped to carry bulk potatoes, the loss of the conditionaire cars will end the capability of that company to transport bulk potatoes other than on piggyback.

2. Rates and Charges[13]

Table 10 shows the rates and charges for the transportation of potatoes by rail from Grand Forks to selected locations. Rates and charges are shown for each of the types of equipment as well as the different protective services. These rates and charges reflect a recent four percent increase in rail rates and an expected fifteen percent increase in protective service charges over those of the past shipping season.

As the transportation of agricultural commodities by rail is regulated by the Interstate Commerce Commission, the rates shown in Table B-1 have been set by the railroads under the approval of the ICC. The setting of railroad rates is generally a process of railroad proposal and ICC approval or rejection. In the initial rate setting proposal, a rate on a commodity such as potatoes

---

13. Sources: (5, 41).

TABLE 10. RAIL FREIGHT RATES FROM GRAND FORKS TO SELECTED LOCATIONS

Grand Forks to:	Rail Rate	CPS Charge	Rail Rate plus CPS	Rule 580	Rail Rate plus Rule 580	MPS Charge	Rail Rate plus MPS
	(¢/cwt)	(¢/cwt)	(¢/cwt)	(¢/cwt)	(¢/cwt)	(¢/cwt)	(¢/cwt)
Minneapolis, Mn	77.	9.3	86.3	15.7	92.7	29.0	106.0
Chicago, Il	136.	13.3	149.3	21.5	157.5	29.0	165.0
Cleveland, Oh	253.	17.5	270.5	26.3	279.3	29.0	282.0
Kansas City, Mo	146.	13.3	159.3	21.5	167.5	29.0	175.0
Oklahoma City, Ok	203.	17.5	220.5	28.5	231.5	29.0	232.0
Atlanta, Ga	291.	15.1	306.1	31.1	322.1	29.0	320.0
New York, NY	300.	19.8	319.8	28.8	328.8	29.0	329.0
St. Louis, Mo	146.	13.3	159.3	21.5	167.5	29.0	175.0
Washington, DC	300.	22.1	322.1	31.1	331.1	29.0	329.0
Memphis, Tn	236.	15.1	251.1	28.5	264.5	29.0	265.0
New Orleans, La	288.	15.1	303.1	28.5	316.5	29.0	317.0
Dallas, Tx	228	17.5	245.5	28.5	256.5	29.0	257.0
Houston, Tx	254	17.5	271.5	28.5	282.5	29.0	283.0

will be proposed by the railroads, usually through the use of a railroad rate bureau. These proposals will be published at which time interested parties have the right to file comments or objections to the proposed rate with the ICC. If the ICC finds it necessary, it may on its own motion or the motion of an interested party investigate the proposed rate. If these rates are found to be just and reasonable in that they are set at a reasonable level, and there is no preference or pre judice between both competing production areas and competing marketing locations, the rates will be approved. Upon such approval the rates are instituted by the railroads. Rail rates on potatoes, and rail rates on potatoes from the Red River Valley in particular, have been investigated a number of times, most frequently during the 1930's and 1940's, although an extensive investigation was also undertaken in 1974. The existing rail rates are largely the result of those investigations. In addition to the base rail rate, the railroads have periodically initiated what are referred to as "general rate increases." These proposals consist of requests to increase usually all the rail rates in the country by a certain percentage, generally between two and ten percent. These requests are based upon the need for a higher level of revenue to offset increased costs or decreasing profitability. If the ICC finds these added revenue needs to be justified it grants the percentage increase. In recent years the railroads have instituted a number of these general rate increases which have had the result of raising the original base rates to their present levels. For instance, during the past year, the railroads have requested and received approval of two separate four percent increases.

In addition to the above described procedure for setting rates, the railroads have on occasion requested and received approval for the establishment of so-called incentive rates. These rates are generally in existence for varying lengths of time from a month or more to several years. The incentive rates are

reductions in the previously set rates as an effort by the railroads to generate a greater amount of traffic of a commodity to certain destinations or from certain orgins. The objective of the lower rate is usually to either recapture the transportation of a commodity, the movement of which may have gradually have gone to a competing mode, or to make better utilization of railroad equipment during periods of low demand.

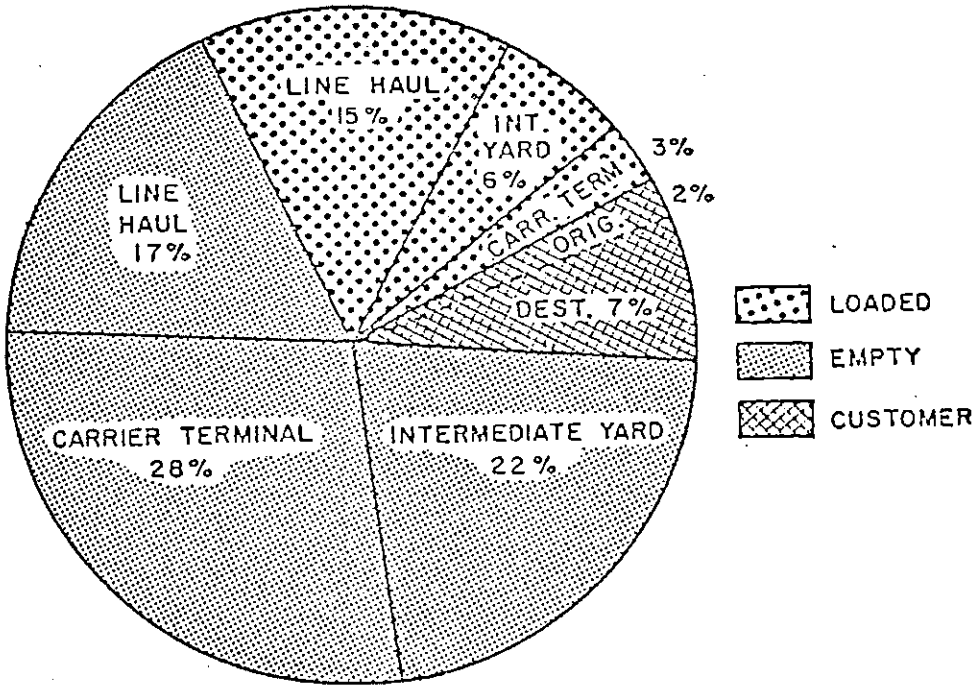
3. Advantages and Disadvantages[14]

In most cases the greatest advantage of rail transportation to a shipper of a particular commodity is a lower freight rate than for most other modes of transportation. In the transportation of potatoes from the Red River Valley however, rail rates and truck rates have been set at relatively comparable levels to most destinations in recent years. The current level of rates thus fail to give the shipper an advantage in using rail transportation. The railroads justify the present rate levels on what they see as the relatively unprofitable nature of potato carriage. Two prime causes of the unprofitable nature of not only potato transportation but produce transportation by rail in general, are poor equipment utilization and high claims payouts. The low level of equipment utilization is demonstrated by the fact the equipment is often used only about half of the year. In recent years with the preference of potato shippers for truck transportation, rail cars are usually only requested when sufficient truck transportation isn't available to meet the total demand for potato transportation. This means there exists a demand for rail cars for the shipment of potatoes only during the peak period of the shipping season, or the five month period from December through April. Due to the time required for a rail car to make a complete round trip, the rail car can generally only expect to make between seven and eight trips during that

14. Sources: (5, 41, 26).

five month period. Consequently all revenue that is derived from these cars comes from those seven or eight trips even though the railroad has an investment in equipment it holds for an entire year.

The second factor reflecting poor equipment utilization involves equipment turn around times and the percentage of time the equipment is empty from the time the car is loaded at an origin until the time it returns empty ready for another load. In a 1975 sample of refrigerated cars moving from California to New York or Boston it was found that such cars were empty 67 percent of their load-to-load time. The actual time spent hauling the commodity on the other hand accounted for only 15 percent of the load-to-load time. The following is a graphic breakdown of the time utilization of the refrigerated rail cars during their load-to-load times.



Closely related to the above graphical representation are the high turnaround times of rail cars. Although the load-to-load time breakdown of rail cars

used by local railroads in the transportation of potatoes may not be exactly as represented above, many of the problems demonstrated by the above graph are problems experienced by local shippers and carriers in the transportation of potatoes. Excessively long transit times, many times caused by switching delays in intermediate yards, are a constant concern of both shipper and carrier. After the car reaches the destination further unnecessary delays result while the car is held for unloading. The extreme delays however, in most instances are experienced after the car is unloaded and billed to return to its origin. These cars seem to receive very low priority in being switched and added to outgoing trains -- the reason naturally being that the car is producing no revenue when moving empty.

With respect to the shipment of potatoes from the Red River Valley, it appears that if the car is billed to a destination that allows the haul to be performed on the local carriers' line, the transit times and turnaround times, although not exceptionally fast, are fairly reasonable and consistent. With the exception of a few lines, when the load must move over a connecting line, the transit times become excessively long and vary considerably from load to load. Since these connecting lines will receive approximately the same amount of revenue whether the load is delivered promptly or delayed a few days and since the shipper is not one of their direct customers, these lines have very little incentive to move the car with any degree of speed if they have loaded cars of their own to ship. The problem is magnified even more after the car is unloaded and billed to return to the origin empty.

Another problem experienced when rail cars are billed to destinations on connecting lines, is that these lines will often use the cars for shipment of other commodities rather than returning them directly to the local line. Often

the revenue derived by the connecting carrier by loading the car to another destination will be greater than the per diem charge assessed against the railroad a destination that allows the haul to be performed on the local carrier's line, are fairly reasonable and consistent. With the exception of a few lines, when the load must move over a connecting line, the transit times become excessively long and vary considerably from load to load. Since these connecting lines will receive approximately the same amount of revenue whether the load is delivered promptly or delayed a few days and since the shipper is not one of their customers, these lines have very little incentive to move the car with any degree of speed if they have loaded cars of their own to ship. The problem is magnified even more after the car is unloaded and billed to return to the origin empty.

Another problem experienced when rail cars are billed to destinations on connecting lines, is that these lines will often use the cars for shipment of other commodities rather than returning them directly to the local line. Often the revenue derived by the connecting carrier by loading the car to another destination will be greater than the per diem charge assessed against the railroad for using the car. During periods of a nationwide boxcar shortage such as experienced this past year, shippers and carriers are often more than willing to use the refrigerated rail car in the transportation of commodities other than perishable produce. Although this may result in a more overall efficient use of the rail car it also means the car is unavailable to move the product it was intended to ship. On the basis of the above graph it appears that if some of these inefficiencies and delays could be eliminated or lessened rail car turnaround times could be cut in half resulting in a potential doubling of revenue producing and hauling capacity.

The level of loss and damage claims as they affect the profitability of transportation by rail has been a constant problem in the movement of perishable produce. The nation's railroads paid out over two million dollars in 1975 on loss and damage claims on potatoes. These figures represent a continuous increase over previous years despite the railroads hauling a declining amount of the commodity. Although the greater degree of temperature control allowable through the use of mechanically refrigerated rail cars has greatly decreased the potential for damage to the commodity, the increasing age of both the RS and RP cars makes the possibility of mechanical failure of heater units more likely. The age factor plus the larger loads carried by the RP cars (and the corresponding higher loss and damage claim when a load is damaged) have been two of the main contributors to the loss and damage problem experienced by rail carriers and shippers.

One of the biggest factors that places rail transportation at a significant disadvantage with motor carriers in the transportation of potatoes, is that the refrigerated rail car will generally be empty on its return movement. In contrast, truck transportation is much more flexible in terms of locating various shipment of commodities to different locations, the railroads have been relatively unsuccessful in making efficient use of its equipment through back hauls. It seems that only during periods of severe transportation shortages does sufficient demand exist for the rail car to justify the added time and expense involved in switching the rail car through a number of connecting lines necessary to obtain a back haul. Consequently the railroad is producing revenue in only one direction in the movement of its cars while the motor carrier will often be deriving revenue from both directions of its movement. This is the primary reason long distance efficiencies generally associated with rail trans-

portation over truck are not reflected in the rail rate level when compared to the motor carrier rate.

From the shipper's standpoint, one of the most important advantages of rail transportation is the flexibility it allows in loading. When a shipper receives a rail car, he is given a certain period of time to load that car before he is subject to paying a penalty. That free time generally allows the shipper to load the car during a period when it fits his labor schedule. Thus the shipper is able to load the car when it is relatively convenient and avoid such costs as overtime wages. Also the rail car can be loaded heavier than a semitrailer, and in the case of a RP car over twice as heavy. This factor is not only a welcome relief to a shipper during a transportation shortage, especially to the chipstock or process potato shipper who is generally able to sell his product in the largest shipment size available, but the larger cars also result in less switching, less time spent in loading and unloading, fewer trains and less railroad yard congestion, making the movement more profitable for both the carrier and the shipper.

4. Carrier and Shipper Complaints and Comments

A feeling of many of the North Dakota potato shippers is that the future availability of some form of rail transportation is an absolute necessity if area potato growers are to be able to continue marketing and moving their product at relatively the same level they have in the past. The feeling is that with the present state population and number of goods moving into the state to provide truck back hauls, there will simply never be enough trucks available to move the state's entire potato production. With knowledge of this dependency on the railroads, shippers are more than concerned with the future plans of the rail companies as they affect the transportation of potatoes. Many of the shippers are well aware

of the problems and difficulties the railroads have experienced in the past in moving potatoes and are sympathetic to those problems, but at the same time feel many of the problems are a direct result of the carrier's own actions.

The shippers are particularly concerned about indications from the railroads that they have no plans for additional investment in new equipment for the transportation of potatoes. It is felt that as a common carrier the railroads have a duty to furnish the potato shipper with sufficient quantities of quality equipment to move his crop. Section 1(11) of the Interstate Commerce Act specifically provides that "it shall be the duty of every carrier by railroad . . . to furnish safe and adequate car service." Case law interpreting this section finds that common carriers are required to furnish shippers with cars suitable and proper for transportation of particular commodities including perishable commodities. J.C. Famechon Co. v. Northern Pacific R. Co., 23 F. 2d 307 (1927). However this section of the Act has also been interpreted to mean that the railroads can only be required to furnish sufficient facilities; they cannot be forced, to acquire such equipment. The decision as to investment of capital has always been held to be a managerial function of the railroads in which the Commission shouldn't interfere. What may be seen as a slight shift of this position is the case of United States v. Chesapeake and O. Ry. Co. 96 S. Ct. 2318 (1976) where the United States Supreme Court upheld an Interstate Commerce Commission order which required railroads to spend increased revenues from a general increase in rates on deferred capital improvements and deferred maintenance, where the request for the general increase was justified on the need for additional revenue for such investment and maintenance purpose. However, this case is still a long way from giving the Commission power to order a railroad to invest in particular pieces of equipment. The Burlington Northern Railroad points to the unprofitable nature of the potato shipments as justification

for their intent not to invest any more money in equipment to move the commodity when such money could be invested for greater benefit in other operations.

However, even the limited availability of railroad funds and the demand for the investment of those funds is not a satisfactory justification should the railroads refuse to furnish equipment for the transportation of potatoes. In cost studies done by the western railroads (which includes the Burlington Northern) on the transportation of fresh potatoes, the railroads have shown that although the revenues received generally covers the variable cost of such transportation, the level of profitability of the traffic is below that of many other commodities which the railroads carry. The western railroads have indicated that in calendar year 1977, the ratio of gross revenue received from the transportation of fresh potatoes, and the variable costs with imbedded cost of capital associated with such transportation, was about 120 percent.[15] This figure indicates that at current rates the revenue received from such transportation is covering variable costs plus contributing to the overhead costs of the railroad. In this sense the traffic is profitable. On the other hand, when compared with some other commodities shipped by the railroads, the profitability of potato transportation is not that good. For example it is estimated the Burlington Northern's revenue in the transportation of wheat from North Dakota to Duluth exceeds the variable costs associated with such traffic by 222 percent.[16] With the current shortage of railroad equipment in gneeral, and the limited availability of railroad investment capital, it is quite understandable why the Burlington Northern would rather invest in equipment for traffic yielding a revenue/variable cost ratio of 222 percent versus traffic with a revenue/variable cost ratio of 116 percent.

---

15. Source: (44).

16. Source: (45).

A recent court case has found that a railroad cannot justify refusal to provide service solely on the grounds that to continue to provide service would be inconvenient or less profitable. Ethan Allan, Inc. v. Maine Cent. R. Co., 431 F. Supp. 740 (1977). It should be remembered however that the duty of the railroads is to furnish equipment; not that they must necessarily purchase it. In the past the railroads have generally been able to acquire sufficient quantities of mechanically refrigerated cars from private car companies. However recently even the private companies have almost quit purchasing these cars as indicated by the general decline in the total number of refrigerated cars in use. If this decline continues it is foreseeable that the local carriers in a few years will be unable to furnish even these privately owned cars. The real problem in so far as the North Dakota shipper is concerned exists in the fact that the ordinary mechanically refrigerated rail car is unsuitable for the transportation of bulk potatoes unless converted with unloading equipment. Since the amount of cars equipped for bulk movement is rapidly declining each year as the old RS cars are phased out, the real shortage exists in sufficient equipment to transport bulk potatoes.

As of this date it does not appear that anyone has legally challenged the railroads with failure to furnish adequate transportation for the movement of bulk potatoes. Should such a challenge to be made the railroads are likely to contend that as the demand for rail cars in the shipment of potatoes exists only over a part of the year, such a demand is not to be considered a reasonable request for equipment. Such a reasonable request is a necessary requirement of forcing the railroads to furnish transportation. The railroads would also likely raise the defense that converted equipment for the transportation of bulk potatoes is specialized equipment which also relieves the carrier of its duty to furnish

equipment. Whether a court of the Commission would agree with the railroads is a question which has not been answered. However the Burlington Northern's recent announcement that it does not intend to invest in new potato transportation equipment does not relieve that company of its duty as a common carrier to furnish a suitable means for the transportation of potatoes.

The railroads also counter criticisms on them for failing to invest in sufficient quantities of equipment by contending that they can't be expected to invest large amounts of capital into equipment if shippers use railroads for the most part as a standby carriers. The railroads point out that in the usual situation shippers move their commodity by truck and only request rail cars when sufficient truck transportation is not available. The rail companies feel lowering rail rates would not make them the primary carrier. They feel that during those parts of the shipping season when both modes of transportation are available in sufficient quantities, truckers would drop their rates to a level below the rail rate no matter what level the rail rate was set at simply to obtain a back haul to help cut operating expenses. The shippers could then be expected to use the lower priced trucks to transport their commodity, while railroad property stands idle. The railroads feel they cannot be expected to invest in equipment if the shippers fail to provide them with a steady flow of the commodity to transport during the entir shipping season.

The shippers answer to this argument is the railroad has been placed in the position of a standby carrier through its own actions and inefficiencies. Time spent in transit is one of the foremost considerations of a potato buyer when he specifies what mode the product is to be moved by. In most instances the buyer wants delivery the second or third day following loading. Yet it is not an uncommon occurrence for rail cars to arrive at their destination ten to fourteen days after being loaded. In addition there is no consistency in transit

times to certain locations. Transit times may vary a matter of days to certain locations, making it extremely difficult for the buyer to schedule his operation around the arrival of a rail car. The shippers point out that the railroads have failed to improve considerably their transportation practices while watching competing motor carriers capture the potato transportation market.

The shippers feel if the railroads cannot, or will not, improve their transit times they must offer their service at a rate sufficiently below the truck rate to compensate for the delay if they want to be other than a standby carrier. The shippers point to incentive rates offered by the Union Pacific Railroad on frozen and fresh potatoes grown in Idaho and the large percentage of the potato transportation that this railroad moves as a result thereof. The fresh potatoes shipped from Idaho by rail are for tablestock however and more exclusively in bags or boxes. Most of the potatoes produced in Idaho which are moved in bulk are processed in the state, with the movement of such potatoes to processing plants accomplished by truck. A certain number of potatoes are shipped out of state for chipping purposes, however these shipments are made by truck when they occur. The shipment of bagged potatoes by rail occurs in the mechanically refrigerated rail car with the average carlot size of these shipments over the past shipping season being 81,000 pounds. The Burlington Northern points out that they have access to sufficient numbers of these mechanical cars and that there have been occasions where that railroad has leased such mechanical cars for the shipment of bagged potatoes and they have gone substantially unused. A number of North Dakota shippers refuse to accept the larger mechanical cars preferring to wait for an available truck, contending they cannot market tablestock potatoes in large enough carlot sizes to meet the minimum carlot size required in the use of the mechanically refrigerated car.

The railroads also point out that in many instances the receivers of the potato shipment are as much or more at fault in slow rail car turn-around times as the railroads. Rail cars often will sit on the receivers side track for days before the car is unloaded and returned to the carrier. This complaint relates closely to one cited by some receivers as a reason they feel it is disadvantagous to ship by rail. After a rail car arrives at its destination the receiver is given a certain number of hours to unload that car. If the car is not unloaded within the specified time period the receiver is assessed a demurrage charge for the additional time he holds the car. Some buyers cite this demurrage charge as a detriment to shipment by rail. This buyer argument seems unfair in the fact that quite often had the shipment arrived by truck, that carrier would insist the shipment be unloaded as soon as possible. Thus in most instances the receiver actually receives more time to unload a rail car than he would have to unload a truck. In essence this additional unloading time is probably a positive factor in favor of transportation by rail. On the same note, based on the percentage of time cars spent unloading as shown in the graph earlier in this section, the argument of the railroads that the receivers are as guilty as the railroads for excessive turn-around times appears exaggerated.

Another well-versed complaint of the potato shippers concerns the protective services offered by the railroads and the mechanical charges levied for those services. Shippers feel that inadequate supervision of mechanical equipment occurs in terms of checking whether the equipment is operating properly and has an adequate amount of fuel. This lack of supervision combined with the long rail transit times can result in damage to the product from inadequate temperature control. Some claim the railroads failure to maintain its equipment is one of the prime causes of the problem. Rail cars which arrive at the shippers location with

inoperative mechanical equipment which must be repaired before the car can be used are not uncommon occurrences. Although the mechanically refrigerated rail car has reduced damage problems considerably, these cars must still be periodically inspected while en route to ensure that the equipment is operating and properly fueled. Many feel that as long as the rail car stays on the track of the local carrier and one or two particular connecting carriers, such inspection is generally done on a fairly conscientious level. However if the car must travel over one of the other connecting lines the inspections are not likely to be done or not done on as thorough a level. Potatoes that must be shipped by rail car over these connecting lines consequently run a much higher chance of suffering damage than those that can be kept on the local lines.

Related to the shippers complaint of the sometimes poor protective services offered by the railroads is the level of mechanical charges assessed for those services. Many of the shippers feel these mechanical charges are simply not justified on the basis of the services offered. For example, the mechanical charges on the mechanically refrigerated cars shipped to Chicago this past year were nearly 20 percent of the rail rate to that destination. These charges are now scheduled to be increased an additional 15 percent for the coming shipping season. The combined rail rate and mechanical charges often mean a total freight bill equal to or larger than the truck rate to many destinations without the degree of protective services or the speed of delivery offered by truck transportation.

Some shippers also feel the mechanical charges should be adjusted to reflect the level of protective services needed to transport a particular load. Currently the same mechanical charges are levied regardless of the temperature level desired or if heater service is needed at all. Thus during the early and latter parts of the shipping season when only ventilation is needed as a protective

service, the shipper is billed for the same mechanical charge he would pay during the coldest parts of the winter. Also there is no adjustment for various temperature levels that are required to be made, so the tablestock or seed potato shipper that wants a 40 degree temperature maintenance pays the same mechanical charge as a chip or processed potato shipper who desires a 55 to 60 degree temperature maintenance. Nor is there an adjustment if the mechanical equipment fails to operate such as provide the level of protective service desired although the damage to the product is not such as to prevent its use. Many instances occur where a rail car will arrive at its destination and the mechanical equipment is not working because of a malfunction or it has simply run out of fuel. Although the temperature on such a load may not be what was specified the shipper will receive no adjustment in mechanical charges unless a sizeable portion of the load is damaged as to make it unsuitable for its intended use. Thus the railroad is often collecting a fuel charge for a protective service which is not being provided at the level it should be.

Another related complaint is the difficulty and time involved in collection of loss and damage claims from the railroads. Since the cause and responsibility of damages suffered to potatoes when transported by truck is usually quite apparent, claims for damages suffered by that mode of transportation are generally settled quite quickly. A rail car, on the other hand, often passes over more than one rail line so the carrier which received the car is quite often not the one delivering it. Consequently when the car is delivered damaged there is often a question of who caused the damage. The carrier may contend that the product was in a damaged or semi-damaged condition when they received it or was damaged by forces beyond their control. The shipper on the other hand will contend the damage was the result of negligence on the part of the carrier. Since

more than one carrier handled the product and receiving carrier personnel are not present when the car is loaded, a question of proof exists as to the real cause of damage exists the claim is often settled within a matter of weeks. If a question exists however the shipper may not receive compensation for months or even years with the usual result being the shipper accepting a settlement for less than his original claim.

The cumulation of the above problems related to rail transportation of potatoes along with the recent attitude of the Burlington Northern not to invest in new potato transportation equipment, has led many of the area potato shippers to believe the Burlington Northern has become at best a reluctant carrier of potatoes. If this description of the railroad's attitude is correct and continues into the future, the problems associated with rail transportation are quite likely to worsen, causing increased dissatisfaction by carrier and shipper alike.

B. TRUCK TRANSPORTATION

1. Availability[17]

In recent years trucks have become the predominant carrier of not only potatoes but nearly all perishable fruits and vegetables. In fact, some of teh studies have indicated that if the present trend continues, by the mid-1980's railroads will have essentially no share of the produce market.[18] Although this trend has also been evident in the carriage of Red River Valley potatoes, it has not occured at the same pace nor on the same level as it has in most other areas of the country.

The only factor that has prevented trucks from becoming all but the exclusive carrier of potatoes from the Valley is the lack of a sufficient number of trucks coming into the area to move the entire crop. The operational costs of motor carrier transportation are such that in order to provide service at a competitive rate a trucker must be carrying a payload over the greatest part of both directions of his trip. It is nearly economically impossible for a truck to operate profitably on long distance one-way movements at a competitively set rate level. This is especially so when the commodity to be moved is a relatively low valued commodity, the movement of which is extremely sensitive to transportation costs. Thus in most instances the availability of motor carriers to move commodities from an area is dependent upon the volume of products flowing into an area to allow a two-way movement of goods by the carrier. No

---

17. Sources: (27, 5, 28, 29, 30, 31, 32, 33, 34, 35, 36, and 37).

18. Source: (26).

other section of the country is probably as handicapped by this fact in the movement of its commodities by motor carrier than the northern Great Plains. The area is characterized by its high production volumes of agricultural commodities and its sparse population. Consequently, it has a large volume of a relatively low value product to move from the area, with only a small volume of products coming in to satisfy its population's consumtion demands. The relationship between truck availability and population is evident when looking at other potato production areas. Major producing states such as Wisconsin, California, Maine, and Washington have major population centers relatively near which generate the movement of products into the area. Consequently, the availability of trucks coming into the area looking for back hauls has enabled producers in those states to move nearly their entire crop by motor carrier. Idaho, on the other hand, a state such as North Dakota with a realtively small population has few products moving into the state, making Idaho producers, like those in North Dakota, still heavily dependent upon rail for the movement of potatoes from the state.

Although the low level of truck availability in the state has a serious effect on the movement of all agricultural commodities the problem is particularly acute in the transportation of potatoes for a couple of reasons. The first of these is the distance the North Dakota potato grower finds himself from his major markets. As stated previously, the greater the distance between origin and destination, the more unprofitable it becomes for a trucker to move commodities only one way. This is a direct result of the fact that truck transportation is a more efficient mode of transportation over shorter distances than it is over longer distances in terms of cost relative to other modes of transportation. Whereas the North Dakota grain shipper is generally within 600 miles of his major markets,

the potato shipper is generally well over one thousand miles away from his. This means that while it may be possible for a motor carrier moving grain to do so on a profitable basis with few or no back hauls, it is nearly impossible for a trucker moving potatoes to do so.

The second reason is the perishable nature of the commodity. Since the entire year's crop is moved over a period of a few months, the demand for transportation is correspondingly seasonal. Thus there is no steady flow of the product from the state which would allow a trucker to depend upon it as year-round transport commodity. As a result exempt agricultural carriers cannot exist by strictly making a business of hauling potatoes. Also, since the product is perishable, time is of the essence in its movement. Long delays in transit can result in deterioration of the commodity. Whereas transit times associated with rail transportation are not a serious problem to the grain shipper, they are of primary concern to the potato shipper. In some instances rail transportation is simply not a suitable transportation alternative in the movement of potatoes, where it is nearly always so in the movement of grain. Thus the preference for trucks because of the shortened transit times is a primary factor in why the demand for, and dependence on motor carriers is so much more acute in the movement of potatoes than it is in the movement of grain.

In trying to improve the availability of trucks for the transportation of potatoes it is important to examine the characteristics and problems of the carriers currently hauling the commodity from the state. Only in that manner will it be possible to identify barriers which prevent truckers from coming into the area which might otherwise do so.

Generally there are three types of carriers which move the bulk of the potatoes shipped from the Valley by truck. The first of these are local exempt carriers which haul potatoes and grain from the Valley and seek back hauls of

other exempt commodities from the destination point whenever possible. The second major type of carrier is the regulated carrier having authority to haul a particular commodity, for instance beer, paper, burlap bags, steel, oil, etc., into the area and who uses potatoes as a back haul. The third type is an exempt carrier other than local. These truckers are generally bringing produce into the vicinity from such production areas as California, Texas, Florida, etc. and seek potatoes as a back haul for at least part of their trip back to destination. Other types of carriers include local farmers who own their own trucks, private carriers of other commodities who use potatoes as a back haul, and local common carriers who will at times ship potatoes. These last three types of carriers probably move less than ten percent of the potatoes shipped from the Valley by truck.

Of the nonlocal truckers bringing products into the Upper Midwest and using potatoes as a back haul, the destinations for most of those products are locations relatively close to the Valley. Truckers hauling goods to Winnipeg, Manitoba are one of the primary sources of trucks using potatoes for a back haul. Also a certain number of trucks bringing goods into Minneapolis will deadhead from that city into the Valley to pick up a load of potatoes for a back haul. Some truckers will also deadhead from such points as Omaha, however their numbers are quite small. It is generally felt that the maximum distance a trucker will deadhead into the Valley for a back haul of potatoes, at the current level of rates is 600 miles. The extra time and expense of deadheading a further distance is simply not justified. Quite often the combination of delay and expense will prevent a trucker from deadheading a distance of even 200 to 300 miles.

Although truckers willing to deadhead into the Valley for a back haul of potatoes increases the total availability of trucks; dependency on such trucks creates a problem to the North Dakota shipper particularly those located in the

northern part of the Red River Valley. In most instances if a trucker deadheads into the Valley, he does so from points south and east of North Dakota. This means that he generally deadheads through Minnesota. If such a trucker is able to secure a shipment of potatoes from the Minnesota side of the border, he will generally do so rather than incur the extra expense and time involved in securing permits to operate in North Dakota. Also such a trucker, even if he does enter the state will usually want to secure a load as far south in the Valley as possible to lessen the distance he has to deadhead. During periods of a transportation shortage such as experienced this past winter, the trucker will seldom have to go very far north or west into the Valley to obtain a shipment. Thus the transportation shortage in the more outlying producing areas of Walhalla and Cando is even more exaggerated as shippers find it virtually impossible at times to obtain a truck to move their product.

When a potato buyer purchases a shipment of potatoes he will usually, if not always, specify the type of transportation to be used in moving the product. It will generally be the responsibility of the shipper however to locate such transportation. If truck transportation is specified a shipper will locate such transportation generally in one of two ways -- either through a truck broker or direct contact with a trucker. If the trucker comes into the area on a regular basis, he is generally acquainted with one or more shippers and will contact those shippers directly to see if they have any potatoes to move. In most instances however the contact is made through the services of a truck broker. If the shipper is unable to secure the type of transportation requested, the buyer may have transportation available which he will provide to carry the commodity. Buyer supplied transportation has in some instances allowed the buyer to use such transportation as leverage in bargaining for a lower price for the sale of the commodity

when the shipper has been unable to secure transportation.

If neither the buyer or the shipper is able to secure transportation, the sale is lost. Nearly all North Dakota potato shippers lost sales during the past winter because of the lack of transportation. Although most of these shippers were eventually able to secure transportation and market their product to other buyers, the loss of these sales can have a severe impact. The shipper is usually forced to move his potatoes later in the season when product demand and quality may have lessened, consequently the shipper may receive a lower market price. And, in the case of seed potatoes, the market may have disappeared entirely. Far more serious however, is the long term impact of possible loss of markets. Potato buyers tend to secure their needed quantity of the product from the same shippers, year after year. When a shipper is unable to meet those demands because of a lack of transportation, the buyer will secure his product from an area where transportation is available. If the lack of transportation persists and the shipper is consistently unable to meet demands, the buyer will soon stop looking to that shipper as his primary supplier. The second shipper with available transportation will become the primary supplier and the first shipper will have a lost market.

Shippers and brokers find that as a general rule truckers looking for back hauls to the midwestern and western sections of the country are generally in greater supply than those looking for back hauls to other areas of the country. Carriers looking for back hauls to the east, especially the New England states, the Carolinas, and Virginias are extremely difficult to locate. The greater availability of trucks going south and west is probably explained by the fact that most of the states between North Dakota and those states have enacted the 80,000 pound weight limitation on interstate highways. This allows truckers to carry larger payloads than truckers going east who must cross a corridor of states

which still retain the 73,280 pound limitation. The larger payload allows a more profitable return to the motor carrier while encourgaing him to deadhaul a greater distance to obtain a back haul. In addition much of the produce consumed in this area of the country is produced in western and southern states such as Washington, California, and Texas. Potatoes provide an excellent back haul for truckers carrying produce from those locations.

Truckers looking for back hauls of potatoes to Illinois and Michigan appear to be slightly more prevalent than to other eastern locations, probably because those states are major distribution centers for products coming into this area. However there seems to be a particular shortage of trucks looking for hauls into Ohio and Pennsylvania. Although markets in these two states seem willing to increase their use of Red River Valley potatoes, a lack of transportation into those areas has prevented a dramatic expansion.

The availability of trucks into the Valley is also influenced a great deal by the time of the year. Reduced truck availability is noticed during two periods of the shipping season. The first of these two periods is the latter part of the month of December and the entire months of January and February. The main factor for the reduced number of trucks during this period is the extreme weather conditions experienced in this part of the country. Some estimate the number of trucks coming into the Valley decreases by 30 percent simply because of the harsh weather conditions. Not only is driving during cold and icy conditions more difficult but operational and maintenance costs also increase as a result of such conditions. In addition truckers don't like to deadhead into the Valley and take the chance of getting caught in a winter storm which might hold them up for two or more days. This was especially apparent this past winter when a pair of early blizzards caused considerable delay and expense for a number of unsuspecting truckers. Most shippers noted a definite decline in the

availability of trucks following those storms.

A contributing factor to the reduced number of trucks available during the latter part of December and the first part of January is the holiday season. Truckers will generally try to stay closer to home and their families during this period of time rather than look for loads which may be more distant. The reduced availability of trucks during the first few weeks of January has caused particular problems to the fresh market shipper. That period of time is usually one of a strong market because buyers tend to reduce supplies during latter December which they restock in early January following year-end inventories. However because of the reduced availability of transportation during this time the North Dakota shipper has quite often been unable to take advantage of the strong market.

The second period of the shipper season when there is a noticeable decline of trucks coming into North Dakota is during that period of the year when the North Dakota Highway Department's spring load restrictions are in effect. The reduced payloads many of the truckers would have to carry because of the restrictions makes it unprofitable for many of the truckers to secure a back haul, especially where the trucker must deadhead into the state from a distance. It has been estimated that truck availability during this period of time decreases from ten to twenty-five percent because of the reduced weight limitations.

2. The Role of the Truck Broker[19]

The majority of potato shippers and motor carriers hauling potatoes from the Red River Valley use the services provided by a truck broker. The truck broker essentially acts as an agent of the trucker and a clearinghouse for the shipper. A shipper needing truck transportation to a certain location will contact the broker and request the same. A trucker seeking a back haul to

---

19.Sources: (27, 30).

a certain location will also contact the broker. The truck broker then matches up shipments destined for certain locations with trucks going to those locations. In recent years however brokers have been unable to secure the necessary trucks to meet the total demand. Brokers stated that during the past shipping season, approximately 60 percent of the requests they received for transportation went unfilled.

Acting as an agent for a motor carrier, the services the truck broker provides are much broader than simply matching loads with trucks. For instance the freight bill which is usually paid for by the buyer is billed through the broker. If the trucker needs operational funds to make a particular haul, the broker may provide him with cash for that purpose which will be later deducted from his payment. The broker will also usually set the rates which will be charged for the transportation, allowing a degree of uniformity plus a set rate schedule that both shipper and carrier can rely on despite the demand or lack thereof for transportation during a particular time. Some brokers also provide information concerning state taxes and regulations for an out-of-state carrier considering coming into the state for a load. In addition the broker provides a form of insurance to the buyer or shipper. Since many of the truckers are totally unknown to a buyer or shipper, they want someone they can turn to in the event the shipment is damaged or stolen. The truck broker as an agent of the trucker serves as that person. For their services most truck brokers charge a fee of eight percent of the gross freight bill.

3. Equipment and Operation Costs[20]

During the early fall months, before temperatures have dropped severly, potatoes can be hauled in almost any type of trailer as the potatoes will require only ventilation rather than both ventilation and heat. During the winter and

---

20. Sources: (38, 29, 27, 30, 36).

early spring months, the period when the bulk of the Red River Valley potato crop moves, heat is required in the trailer to prevent the commodity from reaching unsuitably low temperatures.

The most commonly used trailer for the transportation of potatoes is the mechanically refrigerated trailer or "reefer" as it is called. Such trailers are able to maintain a thermostatically controlled temperature provided by mechanical refrigeration equipment and a heating unit. Such equipment is usually driven by its own engine, often with an auxiliary electric motor for standby operation on plug-in power. Some units are mounted on the nose of the trailer while others extend over the roof of the tractor and some are mounted beneath the trailer. The power source and condensing unit are on the outside of the insulated body, while the evaporator is on the inside. The two sections are separated by an insulated plug which is attached to the vehicle wall and which supports the various parts of the cooling unit.

The cost of a new mechanically refrigerated trailer is about $25,000. This equipment can also be leased on either a short or long term basis. Such a unit leased for a four year period would incur monthly lease payments of approximately $450 per month. If such trailers were leased over a longer period of time or in volume, the monthly lease amount lessens appreciably. Trailers leased for a period of shorter than one year will generally incur monthly payments over the lease period equal to the price of a full years lease. The service life of the trailer itself is about ten years, while the refrigeration unit would probably have to be replaced after six years at a cost of about $8,000.

The second most common type of motor carrier equipment used to transport potatoes is the combination of an insulated trailer van and a portable propane heater. Although such a unit provides only heat, this is generally all that is needed to move potatoes from the Valley. The cost of an insulated trailer is

about $17,000. The additional cost of a portable heater is approximately $800. This equipment can also be leased on much the same basis as the reefer unit.

In addition to the cost of a trailer, a truck operator's other primary expenditures are the cost of a tractor, drivers wages, insurance, and various registration and fuel taxes. A new tractor can be purchased for around $50,000, while insurance costs will run between $5,000 and $6,000 per year. Drivers wages can be paid on a flat rate or as a percentage of gross revenue from the trips he makes, with most experienced truckers grossing in the neighborhood of $20,000 per year. Registration and fuel tax costs will be discussed in detail later.

Break-even cost estimates for a truck operator range from $.68 to $.73 per running mile depending on the type of operation and the length of the run. Generally the longer the trip the smaller the amount of revenue needed to break-even per running mile. For instance, break-even costs between Grand Forks and Chicago have been estimated at $.75 per running mile while break-even costs between Grand Forks and Minneapolis have been estimated at about $.83 per running mile. Some agreement exists that a truck operator must receive revenue averaging about $.85 per running mile to operate on a profitable basis.

The relationship between the per mile revenue a trucker needs to operate on a profitable basis and the amount of payload he can carry will generally determine the rate set between certain locations. The amount of payload a trucker can carry is dependent upon the design and weight of the trailer and the highway weight limitations of the various states he operates in. As a general rule, trucks going to locations in the west can be loaded with a net product weight of between 42,000 and 46,000 pounds. Trailers destined for eastern

locations can generally be loaded to net weights of between 40,000 and 42,000 pounds. Truckers to the eastern markets of Minneapolis and Chicago can sometimes legally load their trailers with net weights of up to 42,000 and 45,000 pounds respectively.

4. Truck Rates[21]

As stated previously, the level of rates set between certain locations are primarily based upon distance, revenue per mile needed by the trucker, and the net amount of payload which can be carried by the trucker. However other factors such as demand and degree of competition also enter into determining the rates set between two locations for a particular commodity.

Truck brokers operating in this area will usually set up rate schedules for the transportation of potatoes from different points in the Red River Valley to various locations throughout the country. All truckers which make use of a truck broker in securing a load will charge the rate set by that particular broker. However, these broker set rate schedules are fairly common knowledge and in many instances will be charged by a trucker even if he doesn't go through a broker in locating his load. The following are the rates from Grand Forks to selected key market locations as set by a local truck broker:

Truck freight rates from Grand Forks to:	per cwt.
Minneapolis, Minnesota	$ .85
Chicago, Illinois	1.65
Cleveland, Ohio	2.30
Kansas City, Missouri	1.60
Oklahoma City, Oklahoma	1.95
Atlanta, Georgia	2.75
New York, New York	3.25
St. Louis, Missouri	1.90
Washington, DC	2.95
Memphis, Tennessee	2.35
New Orleans, Louisiana	3.00
Dallas, Texas	2.30
Houston, Texas	2.60

21. Sources: (27, 29, 30, 35, 5).

The above rates would be charged with no difference based upon the temperature at which the load was maintained or whether the potatoes were carried in bag or bulk. The above schedule of rates can be expected to increase approximately ten percent by the beginning of the next season to compensate for inflation over the past year.

Depending upon truck demand and availability, shippers and truckers may individually negotiate rates different from those being charged by the truck brokers. For instance, at the beginning and the end of the shipping season when the availability of trucks is generally good and demand for transportation low, shippers may request, or truckers may offer, a lower rate. Most shippers seem to be turning away from this practice however, since it tends to decrease the total availability of trucks over the long run. A trucker who is forced to accept a lower rate to secure a back haul of potatoes is not as likely to return for a back haul of potatoes if that rate does not allow him to operate profitably. On the other hand when the demand for trucks far exceeds those available, some truckers have been known to charge extremely high rates out of shippers who are forced to move their product. There were reports that during this past season shippers were being charged as much as $.70 per hundredweight over broker set prices for some shipments of potatoes to the east.

In the carriage of some commodities the level of truck rates is often influenced or controlled a great deal by the level of rail rates. This is often necessary for the truck operator to remain on a competitive level with the railroad to secure loads. However, due to the extreme preference for truck transportation, the current level of rail rates, and the general shortage of both modes of transportation, the level of truck rates seems to be relatively uninfluenced by the level of rail rates. Truck rates seem to be set almost exclusively on a per mileage basis rather than on any corresponding rail rate. Although

the rate per mile of truck rates to certain locations may vary significantly depending on the availability of trucks hauling to those locations (for instance, rates to some points in the east may be as high as $1.00 per mile to attract more truckers hauling to those locations) they are still generally based on a per mileage basis. To the extent rail rates influence truck rates at all, they may act as a stabilizing influence during periods of high demand. With an alternative mode of transportation available, truck rates are prevented from skyrocketing during periods of short supply. However, as during the past few years, when both modes of transportation are in short supply, the rail rate may not be much of a stabilizing factor.

5. Advantages and Disadvantages of Truck Transportation[22]

Buyer generally determine what mode of transportation the potatoes are to be shipped by. In recent years when rail and truck rates have been at relatively the same level to most locations, buyers will generally choose truck transportation when both modes are available. Some buyers simply refuse to accept shipments by rail. Although the shipper may be able to influence the buyer's choice of transportation somewhat, especially if one mode is in particularly short supply, it would generally require an incentive rail rate of at least $.25 per hundredweight below the truck rate before most buyers would choose rail transportation over truck if given a free choice.

There are a number of factors which govern this strong preference for truck transportation. Since most of the potatoes shipped in this country are now moved by truck, some buyers have changed their unloading facilities or built their receiving points off track, so they are now physically incapable of accommodating rail cars. In most instances however the primary factors for the selection of truck is the speed of delivery time. A truck leaving Grand Forks

---

22. Sources: (33, 35, 27, 29, 32, 28, 37, 34).

can usually arrive at its destination by the fourth morning or sooner to most locations in the United States. Rail shipments, on the other hand, may take as long as 12 to 14 days to reach some distant locations. The time in transit is extremely important to the buyer. Increased time in transit means increased chance of transit related damage to the commodity such as freezing and other temperature changes. Because of the perishable nature of the product and the nonstatic conditions associated with transportation, the deterioration of the product while in transit is rapid in comparison to when the product is held in a stable environment.

Closely related to speed of delivery as an influencing factor is the dependability of truck transportation. Often a buyer will know within a matter of hours what the arrival time of a truck will be. Arrival time by a rail car may vary by days however. This is an especially important factor to the potato processor or chipper who schedules his purchases and the arrival of those purchases based upon a plants needs. For example, if a plant processes a certain number of hundredweight of potatoes per day, a buyer will arrange his shipments so the current number are coming in to keep his plant in constant operation. If a shipment doesn't arrive when expected it may mean the processor has to shut down his plant for a day or two until it does arrive. If the shipment does arrive by rail car earlier than expected and the processor doesn't have sufficient storage, it means that he has to pay demurrage on the rail car until he can unload it. While the scheduling of truck arrivals can generally be done quite easily, railroads have a tendency to deliver cars on an uneven flow basis, some early, some late, and sometimes a whole group of cars will be delivered together.

Another factor favoring truck transportation is damage claims. As stated earlier, since potatoes shipped in trucks are generally in transit a

shorter period of time, their exposure to transit related damages is less. Also since someone (the truck driver) is supplying near constant supervision of the shipment during its entire journey and whom responsibility can be placed on if damages do occur, damage claims against motor carriers are almost non-existent. When claims do occur, settlement of those claims usually occurs quickly with very few problems.

The shipment size of the truck is also an influencing factor to some buyers. More specifically, some tablestock buyers simply do not have the storage capacity, or sell a sufficient quantity of fresh potatoes to handle the 80,000 to 100,000 pound shipments of a mechanical rail car. Since trucks deliver shipments of roughly one-half that size, the small tablestock buyer often insists on delivery by that mode.

From a shipper's standpoint, most would prefer to ship by rail if given the choice or by a mixture of the two modes. The shipper is given a certain period of time, usually at least 24 hours, within which to load a rail car. This means he can hire sufficient labor or schedule his labor at a time during the day convenient for him within that period. A trucker however will usually want his trailer to be loaded as quickly as possible so he can begin his haul. Although a shipper may know that a truck is expected to arrive a certain day, he will often not know what time of day or night it will arrive. This means the shipper has to pay wages for sufficient labor to load the vehicle for the entire period of time they have to wait for it. And, if the turck arrives after working hours, the shipper will be forced to pay his labor overtime wages to load the truck. Shippers also prefer rail for the size of shipment which can be loaded. Since some rail cars will carry over twice as many hundredweight of potatoes as a truck, they allow shippers to reduce the number of loadings they will have to make and correspondingly cut labor costs.

C. TRUCK REGULATORY PRACTICES

1. State Regulatory Practices[23]

The regulation of the American trucking industry by the individual states has been designed to accomplish a number of objectives. One of the primary motives of regulating all phases of motor transportation has been the need for revenue to finance the construction and maintenace of this country's highway system. The high cost of highway construction and maintenance has led all the states to develop some form of highway user tax structure. The situation in North Dakota is no different as all North Dakota user taxes are expended for the construction and maintenance of highways. The North Dakota Highway Department receives no money from the state's general fund for the construction and maintenance of highways. In addition to user tax systems most states have statutes and public utility commission regulations which serve to establish safety standards, control economic competition, asssure adequate service, and protect both shipper and consignee with adequate insurance.

Although all the states have implemented user taxes and other fees and regulations which have enabled them to accomplish many of the objectives just mentioned, their methods of taxation and regulation have been by no means uniform. The result has been a persistent problem for the interstate trucker who must conform his operations to meet the standards established by each individual state he operates his vehicle in. The following is a general discussion of the dif-

---

23. Sources: (18, 22).

ferent types of regulatory practices instituted by the different states as well as a more detailed description of the regulatory system and practices existing in North Dakota.

(a) Registration taxes[24]

Vehicle registration is the periodic filing by the owner of the equipment he operates. Originally designed as a means of identification, vehicle registration soon became a revenue mechanism as registration was accompanied by registration taxes. As states began to rely heavily on these registration taxes to furnish funds for the construction and maintenance of roads, the question soon arose of whether a vehicle registered in a foreign jurisdiction could operate in the local state without being registered in that state and thus not having contributed proportionately to the construction and maintenance of the state's roads which he was making use of. Disputes on this subject arose among the states with the result being the interruption of the free flow of truck traffic across state borders. For example, many states charged full registration from all vehicles traveling within their borders during the year. Interstate truckers became subject to the multiple liability of registration taxes from several jurisdictions. Some of these disputes were resolved by means of bilateral reciprocity agreements which allowed the mutual exchange of privileges between participating states. These agreements however often resulted in a tax balance in favor of one state to the disadvantage of another. Some states attempted to solve this tax balance problem through the institution of what can be referred to as "third structure" tax systems such as mileage taxes, groos receipt taxes, and fuel surtaxes.[25] A second effort to solve this tax balancing problem arose after World War II with the establishment of multilateral registration agreements. Currently, three major multilateral agreements and a number

---

24. Sources: (18, 22, 23).

25. Registration taxes and fuel taxes are referred to as first and second structure taxes respectively.

of minor bilateral agreements are in existance.

(i) The Multistate Reciprocal Agreement (MRA) was formed in 1949 among ten participating states and later expanded to include 16, namely the states of:

Alabama	Louisiana	North Carolina
Florida	Maryland	South Carolina
Georgia	Michigan	Tennessee
Indiana	Mississippi	Virginia
Kentucky	Missouri	West Virginia
	New Jersey	

Full registration reciprocity is granted among these states to operators who maintain a place of business in one of the 16 states and whose trucks are registered in that state. If an operator maintains his place of business in more than one participating state, the operator is required to allocate a portion of his fleet registrations to each of the states where he maintains a place of business and operates trucks. This is known as the "basing point" prinicple and addresses the question of where a vehicle should be registered and, thus, where registration taxes are paid. The states themselves are responsible for ensuring that vehicles are registered in the proper jurisdiction as defined in the agreement.

While the simplicity of pure reciprocity is appealing, a number of states have refused to support the concept. State size and geographic location favor some states while others would suffer from few registrations and low revenues.

(ii) The Uniform Vehicle Registration Pro Ration and Reciprocity Agreement (UPRA) was approved by the "Western Interstate Committee on Highway Policy Problems" of the Western Conference, Council of State Governments on November 5, 1955. The agreement has been adopted by Wisconsin and all the states west of the Mississippi River. Under the agreement, the operator of a fleet may register the vehicles of the fleet in participating states by prorating registration fees in

accordance with the following formula:

$$\frac{\text{in-state fleet miles}}{\text{total fleet miles}} \times \text{state registration tax}$$

The formula is applied for each particpating state as the basis for proportional registration for the preceding 12-month period ending August 31. Mileage reports must be filed by the fleet operator with each state separately.

The definition of fleet in the UPRA excludes operators of single or combination units from prorated registration. Full registration reciprocity among particpating states is afforded these small operators.

For prorating fleets, the base state -- the state in which the vehicles are most frequently controlled -- issues the required license plates and registration cards for each vehicle. Each participating state in which the fleet operates then issues a special identification for each fleet vehicle which must be displayed according to the laws if individual states.

(iii) The International Registration Plan (IRP) is a recent (1973) approach to vehcile registration uniformity. It combines elements of both the MRA and UPRA in an attempt at providing simple, yet equitable, registration standardization. Registration taxes are "apportioned" (allocated) in a manner similar to that of the Uniform Proration and Receprocity Agreement. However, instead of filing applications with each of the states traveled, one application is filed with the base state, as in the Multistate Reciprocal Agreement. The base state issues a single "apportioned" base plate and cab card to each apportioned vehicle. Both the plate and the card list the states in which the interstate operator has apportioned his registration taxes. The following states are presently participating in the plan:

Arkansas
Colorado
Idaho
Illinois
Iowa
Kentucky
Louisiana
Mississippi
Missouri
Minnesota
Montana
Nebraska
North Carolina
Oklahoma
Oregon
South Dakota
Tennessee
Texas
Utah
Virginia
Wisconsin
Wyoming

Under the UPRA and the IRP, duplicate registration taxation is eliminated as betwen those states which are members of the plan. Both plans accept mileage as an appropriate and proper mechanism for allocating registrations. Finally, both plans provide a framework which accommodates a diversity of state tax structures.

(iv) Bilateral Agreements, agreements between two states affect reciprocity between those states. Due to the large number of both formal and informal agreements which are in existence, a description of the various types has not been attempted.

Registration taxes for tractor - semi-trailer combinations are computed by the states in a variety of ways. A common tax basis calls for the trailer to be licensed according to gross vehicle weight, and the trailer to be licensed at a fixed nominal fee. Other variations however also exist. For those carriers which are not based in a local state and are registered in a state which is not a member of a reciprocity compact with the local state, or if a member the carrier has elected not to prorate with the local state, trip permits are usually sold by the local state which allows the carrier to operate in that state for a limited period of time without having his vehicle registered.

Table II presents various aspects of vehicle registration by state. The tax basis for both tractors and trailers is identified as well as the computed registration tax for a typical fixed-axle diesel tractor-trailer combination with a gross vehicle weight of 72,000 pounds. State participation in multilateral registration agreements is indicated as well as the availability of trip permits in lieu of registration.

As shown in Table II, North Dakota is a member of the Uniform Vehicle Registration Proration and Reciprocity Agreement. This means that a truck owner

TABLE 11

VEHICLE REGISTRATION CHARACTERISTICS FOR TRACTOR-SEMITRAILER COMBINATIONS USED IN MULTI-STATE OPERATIONS *

State	Registration Tax Basis	Full Plate Cost (Typical 5-Axle Combination)	Major Registration Compact Participation	Availability of Trip Permits to Vehicles of Foreign Registration
Alabama	TRC: GVW TRL: Flat fee	$346 private $800 for-hire[a]	Multi-state reciprocity	Yes (where no reciprocity)
Arizona	TRC: Flat fee by GVW of combination TRL: Flat fee + GVW fee	$523	Western states proration	Yes (30, 60, or 90 days, 20%, 35%, or 50% of annual fee; $8 minimum)
Arkansas	TRC: GVW of combination TRL: Flat fee	$802	None	None
California	TRC: Flat fee + weight fee TRL: Flat fee + weight fee	$474	Western states proration	Yes (unloaded or occasional trip 6 days - $5; 90 days - 25% annual reg. fee)
Colorado	TRC: Empty weight fee TRL: Flat fee	$56	Western states proration	Yes ($5 flat fee; or mileage tax if greater)
Connecticut	TRC: GVW of combination TRL: Flat fee	$555	None	None
Delaware	TRC: GVW TRL: GVW	$362.40	None	None
Florida	TRC: GVW of combination TRL: Flat fee	$471.50	Multi-state reciprocity	None
Georgia	TRC: GVW TRL: Flat fee	$385 private $700 for-hire	Multi-state reciprocity	None
Idaho	TRC: GVW of combination TRL: Flat fee	$102	Western states proration	Yes (96 hr)
Illinois	TRC: Flat fee + GVW of bination TRL: No additional fee	$1,492	Western states proration	Yes (72 hr)
Indiana	TRC: GVW of combination TRL: No additional fee	$485.50	Multi-state reciprocity	None
Iowa	TRC: GVW of combination TRL: GVW of combination	$1,220	Western states proration	Yes (72 hr; $10/tractor + $10/trailer)
Kansas	TRC: GVW of combination TRL: GVW	$1,070	Western states proration	Yes (72 hr; $10)
Kentucky	TRC: GVW of combination TRL: Flat fee	$771	Multi-state reciprocity and International Registration Plan	Yes (10 days; $25)
Louisiana	TRC: GW/load-carrying axle TRL: Flat fee	$290 private $570 for-hire[a]	Multi-state reciprocity	None
Maine	TRC: GVW of combination TRL: Flat fee	$605	None	None

Source: (18)
*Characteristics of 1975

TABLE 11 (cont.)

State	Registration Tax Basis	Full Plate Cost (Typical 5-Axle Combination)	Major Registration Compact Participation	Availability of Trip Permits to Vehicles of Foreign Registration
Maryland	TRC: GVW of combination TRL: Chassis weight	$415 contract $455 all other[a/]	Multi-state reciprocity	None
Massachusetts	TRC: GVW of combination TRL: Flat fee	$390	None	None
Michigan	TRC: GVW of combination TRL: Empty weight	$590[a/]	Multi-state reciprocity	Yes (10 days; $20)
Minnesota	TRC: GVW of combination age TRL: Flat fee	$1,062.60	Western states proration	Yes (96 hr; - $10)
Mississippi	TRC: Tag fee + GVW of combination TRL: Tag fee + flat fee	$608.50 private & HHG $831.50 for-hire	Multi-state reciprocity	Yes (1-1/2 mills/1,000 lb/mile ($3 minimum))
Missouri	TRC: GVW of combination TRL: Flat fee	$1,008	Multi-state reciprocity, Western states proration, and International Reg. Plan	Yes (72 hr; $10)
Montana	TRC: Flat fee + GVW TRL: Flat fee + GVW	$771	Western states proration	Yes (72 hr)
Nebraska	TRC: GVW of combination TRL: Flat fee	$812	Western states proration	Yes ($10)
Nevada	TRC: EW TRL: EW	$132	Western states proration	Yes (48 hr)
New Hampshire	TRC: GVW of combination TRL: No additional fee	$432	None	None ($2.50/vehicle + $6 - $30 temporary license)
New Jersey	TRC: GVW of combination TRL: Flat fee	$544.10	Multi-state reciprocity	None
New Mexico	TRC: GVW of combination TRL: Flat fee	$75.50	Western states proration	Yes
New York	TRC: GVW of combination TRL: Flat fee	$519	None	None
North Carolina	TRC: GVW of combination TRL: Flat fee	$724	Multi-state reciprocity	Yes (30 days; 1/10 annual fees)
North Dakota	TRC: GVW of combination TRL: Flat fee	$971	Western states proration	Yes (72 hr; $10
Ohio	TRC: EW TRL: EW	$605.25	None	None
Oklahoma	TRC: GVW and age TRL: Flat fee	$634.30	None	Yes (90, 60, or 30 days; 3/8, 1/4, or 1/8 of annual fees)

TABLE 11 (conc.)

State	Registration Tax Basis	Full Plate Cost (Typical 5-Axle Combination)	Major Registration Compact Participation	Availability of Trip Permits to Vehicles of Foreign Registration
Oregon	TRC: GVW TRL: GVW	$185	Western states proration	Yes (5 or 10 days; $5 or $10)
Pennsylvania	TRC: GVW of combination TRL: Flat fee	$560	None	None
Rhode Island	TRC: GVW of combination TRL: Flat fee	$410	None	None
South Carolina	TRC: Load capacity TRL: Flat fee	$514	Multi-state reciprocity	None
South Dakota	TRC: Chassis wt and age TRL: EW and age	$707	Western states proration	Yes (single trip; 2 mills /ton mile)
Tennessee	TRC: GVW of combination TRL: Flat fee	$878	Multi-state reciprocity and International Registration Plan	Yes (7 days; $20)
Texas	TRC: GVW of combination TRL: Flat fee	$735.60	International Registration Plan	Yes (72 hr; $10)
Utah	TRC: GVW TRL: Flat fee	$465	None	Yes (96 hr; $5/single unit; $10/multiple unit)
Vermont	TRC: GVW of combination TRL: Flat fee	$1,659.30	None	Yes ($20 + $10/round trip)
Virginia	TRC: Flat fee + GVW TRL: Flat fee	$662	Multi-state reciprocity	None
Washington	TRC: Flat fee + GVW TRL: Flat fee	$742	Western states proration	Yes (fees according to trailer weight)
West Virginia	TRC: GVW of combination TRL: Flat fee	$590	Multi-state reciprocity	None
Wisconsin	TRC: GVW of combination TRL: Flat fee	$962	None	Yes (72 hr; $10)
Wyoming	TRC: EW TRL: EW	$60	None	Yes (96 hr; $5/single unit; $10/multiple unit)

a/ Lower registration tax for household goods movers.

Abbreviations: EW - Empty Weight
GVW - Gross Vehicle Weight
HHG - Household goods Movers
NS - Not stated
TRC - Tractor
TRL - Trailer

who wishes to operate within the state has basically three ways he can register his vehicles, -- full registration, proration under the UPRA, or puchase of a trip permit. In addition, a number of exceptions also exist under this registration system.

The North Dakota Motor Vehicle Registration Tax is based on gross weight of the vehicle as well as the age of the vehicle. As an example, the owner of a turck and semitrailer who wished to transport potatoes from North Dakota and who paid the full registration tax would do so according to the following schedule:

Gross Weights	First through Fourth Year	Fifth through Ninth Year	Tenth and Subsequent Years
72,001-74,000	1,016.00	813.00	711.00
74,001-76,000	1,051.00	841.00	736.00
76,001-78,000	1,086.00	689.00	760.00
78,001-80,000	1,121.00	897.00	785.00
80,001-82,000	1,156.00	925.00	809.00

Source: N.D.C.C. 34-04-19 and N.D.C.C. 39-04A-04

In addition, there is a fee for a trailer identification plate. In the instance of a semitrailer engaged in the transportation of property, the trailer identification plate fee is $10. Based upon the above schedule, the owner of a new tractor and semitrailer who paid his full registration fee to this state based upon 82,000 pounds GVW would be subject to annual registration fees of $1,166.00. These fees would be paid on an annual basis to the North Dakota Motor Vehcile Registration Department.

The owner of a truck trailer combination registered in another state is allowed to prorate the North Dakota vehicle registration taxes in accordance with

the relation between the total miles traveled in North Dakota and total miles traveled in all states by the vehicle during the previous year, provided that owner is a resident of a state which is a member of the UPRA. In that case the owner will file and pay the prorate tax to the North Dakota Truck Regulatory Office or to his own state's vehicle registration office which will determine and forward the fee, depending on the state in which he resides. Correspondingly, the North Dakota based trucker who elects to prorate his registration taxes, would pay the pro rata share of fees to the North Dakota Vehicle Registration Department with the remainder being divided between those states which the carrier operates in, are members of the UPRA, and the carrier has elected to file with. Thus, for instance, an Arizona carrier who elected to pro rate his fees in North Dakota and who traveled ten percent of his total annual miles in North Dakota, would pay ten percent of the North Dakota registration taxes.

If a nonresident carrier elects not to prorate his vehicle in North Dakota, or is a resident of a state which is not a member of UPRA or a participant in a bilateral agreement with North Dakota and thus cannot prorate his North Dakota registration taxes, he may purchase a $10 trip permit in lieu of paying the full North Dakota registration tax. This trip permit is good for 72 hours or until such vehicle leaves the state whichever occurs first. Thus an Ohio trucker carrying goods to Winnipeg, Manitoba who traveled through North Dakota would have to purchase two trip permits, one when he entered the state enroute to his destination and another when he entered the state on his way back, even though he completed the trip within 72 hours. These trip permits can be acquired at weigh stations, county sheriff's offices, roving regulatory officers, and Highway patrolman. The regulatory officers will often be located at highway junctions near entrances to the state and the trucker can purchase the permit on site or contact an officer through the use of a phone or CB radio to arrange a

meeting location for the sale of the permit.

As stated previously there are a few exceptions and additions which apply to the above described vehicle registration system. North Dakota Century Code (N.D.C.C.) Section 39-04-18 provides:

> 1. . . .
>
> 2. The following motor vehicles may be operated upon the highways, roads, and streets of this state without being registered, under such limitations as are herein specified, provided, however, that whenever the reciprocity commission determines that it is to the best interest of the State of North Dakota and determines by reciprocal agreement or otherwise that as great or greater privileges are not granted North Dakota residents while traveling in other states or territories, they may cancel or limit the application of any exception to residents or motor vehicles from such other state or territory:
>
> a. . . .
>
> b. . . .
>
> c. Motor vehicles registered in any other state or territory when coming into this state a distance not exceeding twenty miles, provided, however, that such motor vehicles have displayed thereon the current license plates issued by the state or territory in which they are registered . . .

The North Dakota Truck Regulatory Department has interpreted this section to allow carriers registered in approved states, to enter the state a distance of twenty miles parallel to the border of the state without paying any registration taxes provided the carrier enters and leaves the state from a point which allows him to travel the shortest distance possible in North Dakota. For example, a trucker operating in Minnesota wishing to take advantage of this exemption and wanting to reach a point ten miles west of Grand Forks would have to cross the Red River at Grand Forks, go to the destination point and leave the state at Grand Froks rather than crossing into the state at Fargo, traveling up I-29 to Grand Forks and then to his destination. As stated in N.D.C.C. §39-14-18-(2) this exemption applies only to carriers registerd in states approved by the reciprocity commission. Thus far such exemption has been granted only to truckers based in states which have granted North Dakota based truckers a similar privi-

lege, namely Minnesota, South Dakota, and Wisconsin. Also in some instances the North Dakota Truck Regulatory Department has interpreted this section to allow carriers registered in approved states, to enter the state a distance of twenty miles parallel to the border of the state without paying any registration taxes provided the carrier enters and leaves the state from a point which allows him to travel the shortest distance possible in North Dakota. For example, a trucker operating in Minnesota wishing to take advantge of this exemption and wanting to reach a point ten miles west of Grand Forks would have to cross the Red River at Grand Forks, go to the destination point and leave the state at Grand Forks rather than crossing into the state at Fargo, traveling up I-29 to Grand Forks and then to his destination. As stated in N.D.C.C. §39-14-18(2) this exemption applies only to carriers registered in states approved by the reciprocity commission. Thus far such exemption has been granted only to truckers based in states which have granted North Dakota based truckers a similar privilege, namely Minnesota, South Dakota, and Wisconsin. Also in some instances the Truck Regulatory Department has extended the distance beyond twenty miles in order that significant points and roads which are slightly outside the twenty mile limit can still fall within the exemption. In the northeastern portion of the state the following sections of highway fall within the exemption:

Highway No. 32 From Canadian Line to Southerly to Jct. #17
Highway No. 17 From Jct. 32 & 17 to Easterly to Jct. #18
Highway No. 18 From Jct. 17 & 18 to South Dakota State Line

North Dakota also has an agreement with the State of Wisconsin which allows truck operators fully registered in that state to register their vehicles in this state for 20 percent of North Dakota's full registration fee.

Another exemption is that North Dakota does not charge a registration tax to two axle vehicles registered in another state. Although this is a signi-

ficant exemption in allowing the free flow of noncommercial traffic between the states, it has little or no effect on the movement of commodities such as potatoes.

Although not an exemption per se, two exceptions to the previously described vehicle registration system are noteworthy. The first applies to Texas based truckers who are charged $20 rather than the usual $10 for a trip permit when they have not previously filed to have their registration taxes prorated. This extra charge has been levied by North Dakota in response to the Texas definition of a "vehicle" which affects the amount of fees a North Dakota based trucker pays when entering that state. Under the Texas definition, a tractor and a trailer are considered separate vehicles, thus both are subject to payment of the trip permit when a non-Texas based trucker enters that state. North Dakota has correspondingly adjusted its definition of a "vehicle" as it applies to Texas based operators requiring two trip permits be purchased for each entry into the state -- one for the tractor and one for the trailer. The other exception applies to Wisconsin based truckers which requires operators from that state to have applied for their trip permits from the Bismarck Truck Regulatory Office prior to entry into the state. These permits will be forwarded to the entry point indicated by the trucker where they may be picked up by that trucker when he enters the state. If the trucker fails to prefile for his trip permit he is subject to a $30-$50 registration fee which is good for one year's quarter in which it is purchased. This added prefiling requirement is in response to a similar requirement imposed by the state of Wisconsin on all out-of-state truckers.

Both of these exceptions are based upon a concept referred to as "mirror reciprocity" in which another state's truckers are treated on the same basis as North Dakota truckers are treated in that state. Theoretically this differential

treatment should place pressure on the other state to change its regulatory practices by truckers based within its jurisdiction. The North Dakota Regulatory Department justifies this differential treatment on the previously quoted proviso of N.D.C.C. 30-04-19(2) which allows the reciprocity commission to limit exceptions to the vehicle registration system to nonresident truckers when it determines that as great or greater privileges are not granted North Dakota residents in a particular state.

(b) Fuel Taxes[26]

Fuel taxes are the state's single most important source of highway revenue with every state except Vermont assessing some level of fuel tax. Early in the life of fuel taxes a balance problem was recognized. Simply, it was a question of whether the state in which fuel was consumed received tax on that fuel. Drivers could fill their tanks in one state where fuel prices (including state tax) were advantageous, then drive through an adjacent state where prices were higher without pruchasing additional fuel or paying tax to the second state. For example, the modern day trucker can often average 600 miles per tank of fuel which will usually allow him to cross over one or more states without having to purchase fuel, despite the fact that he has used that state's roads which are financed to a large extent by taxes on such fuel.

In 1942, Virginia became the first state to enforce a reporting law which ensured that truck operators either bought enough fuel within the state to support their instate driving or that they paid tax to Virginia on the equivalent gallonage. Today, most states follow Virginia's lead.

For interstate truckers, compliance with state fuel tax laws is complex. It usually requires the annual renewal of a fuel permit, which identifies the

---

26. Sources: (18, 23, 22).

vehicle as belonging to a fleet registered with a state's fuel tax division, as well as the submission (filing) of periodic reports to all states in which the fleet is registered with the fuel tax division. About 60 percent of the states requiring fuel reports have a quarterly filing requirement and the remaining 40 percent require monthly reports. In a few states the prescribed period is at the discretion of the administrator. Typically, fuel reports must include: (a) total fleet miles traveled in all states; (b) total fuel consumption by the fleet in all states; (c) fleet miles traveled in the taxing state; (d) the computation of fuel consumed in the taxing state; (e) total fuel purchases in the taxing state; and (f) the determination of fuel tax liability (credit) in the taxing state. Although these requirements are typical, they are by no means universal.

Detailed records must be kept by the carrier to supply items a, b, c, and e above. These records must reflect an accurate, state-by-state accounting of miles and fuel. They must be maintained, usually for two to three years, and are subject to audit by each state's tax authority.

Usually, carriers try to match fuel purchases with the mileage traveled in each state to avoid the accumulation of large tax liabilities or credits. Some very large carriers, however, purchase their fuel in bulk ex-tax then pay the accrued tax liability to each state traveled, thus avoiding over - or under-payment of fuel taxes.

In many states fuel tax credits are carried on the books for a limited time. When that time limit passes, credits may revert to the state. Some states provide for credit refunds to carriers, but the refund procedure is often too cumbersome or time-consuming to be of much benefit to carriers.

Fuel tax bond requirements are imposed by many states. These requirements guarantee trucker fuel tax obligations to the states. Depending on the state,

bond requirements may be unconditionally required, conditionally required, or not required at all. When conditional, the posting of fuel tax bonds may be required either in cases where the individual carrier cannot prove financial responsibility or when the carrier desires to receive tax credit refunds without an audit by the fuel tax administrator.

Frequently, the bond in each state must be equivalent to several times the periodic fuel tax liability of the carrier. Often a minimum is set -- typically at $500 to $1,000. Carriers often make use of the services of a bonding company to post surety bonds. A few is charged by bonding companies, and the carrier operating in many states, particularly the small carrier, can be financially burdened by the expense of the service.

For the operator who is an occasional traveler into or though a particular state, it may be possible to purchase a temporary fuel permit upon entry, or less commonly, simply to provide proof of sufficient in-state fuel purchases at the point of exit. Temporary fuel permits usually specify a valid time period or number of trips. The permit cost to the trucker often includes an in-lieu or equivalent tax and payment relieves the operator from further reporting requirements. Temporary or trip fuel permits are combined in some states with trip registration permits.

In some states a maximum fuel import limit is established. If an operator enters a state carrying fuel in excess of that state's limit, he usually has the choice of paying the fuel tax on the excess amount directly or of purchasing tax paid fuel at an in-state pump.

Table 12 displays by state the 1975 characteristics of fuel tax requirements which apply to virtually all large diesel trucks. Listed are the amount of and annual permit fee, the tax rate for diesel fuel, minimum bond, report filing

requirements, and trip permit information.

In addition to imposing a fuel tax at the pump, North Dakota also requires that the trucker have a fuel bond or purchase a fuel tax trip permit. Any operator can file a bond with the North Dakota Tax Department which will in turn issue a cab card which entitles the operator to enter the state with his truck without paying the fuel tax trip permit. The amount of the bond which must be filed is twice the amount of the carrier's previous quarter fuel tax liability to the state or a minimum of $200. The operator now must file a quarterly report of the mileage traveled in the state and the fuel purchased in the state. The current rate on diesel fuel is 8¢ per gallon. If the operator has purchased more than the necessary amount of fuel as determined by the miles he traveled, he will receive a tax refund from the Tax Department. If he has not purchased sufficient fuel, he pays the North Dakota fuel tax on the difference between the amount of fuel he should have purchased as represented by the miles he traveled less the amount of fuel actually purchased. If the carrier has not filed a fuel bond he must purchase a $5 fuel tax trip permit each time he enters the state with his truck, provided the truck's fuel tank has a capacity of 35 gallons or more. This permit is good for 72 hours. The only exception to the North Dakota fuel tax applies to Minnesota based truckers who are not required to file a fuel bond or purchase the $5 trip permit.

(c) Third Structure Taxes[27] Highway-user taxes which do not fall into the first two categories of vehicle registration taxes or fuel taxes are referred to as third structure taxes. Generally three specific types of taxes are included: mileage taxes, gross receipts taxes, and fuel surtaxes. Altogether, eleven states incorporate third structure taxes into their highway tax structures affecting interstate commercial trucking. Seven states maintain some form of mileage tax, two states levy gross receipt taxes and two states collect fuel

27. Sources: (18)

TABLE 12

Motor Carrier Fuel Tax Parameters by State

State	Diesel Fuel Tax Rate	Bond Requirement	Filing Requirement	Availability of Trip Permit
Alabama	8¢/gal.	$1,000	Quarterly	Yes (7days;$12)
Arizona	7¢/gal.	$ 500	Monthly	Yes (96 hr)
Arkansas	9½¢/gal.	$ 500	Monthly	Vehicles entering for first time may operate under "Entry Slip"
California	7¢/gal	Yes (amount unspecified)	Monthly	None
Colorado	7¢/gal	$100/vehicle	Monthly	Yes (15 days/$1 + fuel tax)
Connecticut	10¢/gal.	$100/vehicle	Monthly	Yes (15 days/$1 + fuel tax)
Delaware	8¢/gal.	$1,000	Quarterly	Yes ($5/vehicle)
Florida	8¢/gal. at pump	None required	None required	Unknown
Georgia	7½¢/gal	None required	Quarterly	Yes (30 days; $1)
Idaho	8½¢/gal.	$ 500	Quarterly	Yes (96 hr)
Illinois	7½¢/gal.	Bulk users only	Bulk users only	None
Indiana	8¢/gal.	$1,000	Quarterly	Yes (5 days; $5)
Iowa	8¢/gal.	$ 500	Monthly	None
Kansas	8¢/gal.	$1,000 (may be required	Quarterly	Yes ($3)
Kentucky	9¢/gal.	$1,000	Quarterly	Yes (10 days; $10)
Louisiana	8¢/gal.	$ 500	Monthly	Emergency only
Maine	9¢/gal.	None required	Quarterly	None
Maryland	9¢/gal.	None required	Quarterly or Monthly	Yes (25 days)
Massachusetts	7½¢/gal.	None required	Quarterly	Single or occasional trips exempt from required

TABLE 12 - continued

State	Diesel Fuel Tax Rate	Bond Requirement	Filing Requirement	Availability of Trip Permit
Michigan	7¢/gal.	None required	Monthly	None
Minnesota	7¢/gal.	$3,000	Monthly	Yes (5 days)
Mississippi	10¢/gal.	$1,000	Quarterly	None (pay fuel tax at exits)
Missouri	7¢/gal.	$ 500	Monthly	Yes (96 hr; $10)
Montana	9¢/gal.	$ 500	Monthly	Yes (72 hr; $20)
Nebraska	8½¢/gal.	$1,000	Monthly	None
Nevada	6¢/gal.	$ 500	Quarterly	Yes (48 hr; $10)
New Hampshire	9¢/gal.	None required	Quarterly	Yes (single round trip $5)
New Jersey	8¢/gal.	None required	Quarterly	Yes (96 hr; $5)
New Mexico	7¢/gal.	$1,000	Quarterly	Yes (20 days; $5)
New York	10¢/gal.	None required	Quarterly	None
North Carolina	9¢/gal.	$ 200	Quarterly	Emergency provisions only
North Dakota	7¢/gal.	$20,000 required	Monthly	Yes (72 hr)
Ohio	7¢/gal.	None required	None required	N/A
Oklahoma	6½¢/gal.	$ 500	Quarterly	None
Oregon	7½¢/gal.	None required	None required	Yes (30 days)
Pennsylvania	9¢/gal.	None required	Quarterly	Yes (25 days; $5)
Rhode Island	8¢/gal.	None required	None required	N/A
South Carolina	8¢/gal.	None required	Quarterly	Emergency only
South Dakota	7¢/gal.	Discretionary	Monthly	Yes (72 hr; $20)
Tennesse	8¢/gal.	$ 500	Quarterly	Yes (7 days; $10)
Texas	6½¢/ gal.	$ 500	Monthly	Yes (20 days; $5)

TABLE 12 - continued

State	Diesel Fuel Tax Rate	Bond Requirement	Filing Requirement	Availability of Trip Permit
Utah	7¢/gal.	$ 100	Monthly	Yes (1 trip; deposit required)
Vermont	N/A	N/A	N/A	N/A
Virginia	9¢/gal.	None required	Quarterly	Emergency only
Washington	9¢/gal.	$ 500	Monthly	Yes (20 days/$10 + $1/day)
West Virginia	8½¢/gal.	None required	Quarterly	Emergency only
Wisconsin	7¢/gal. at pump	None required	Quarterly	N/A
Wyoming	7¢/gal. at pump	None required	None Required	N/A

surtaxes.

Mileage taxes are formulated in several ways. Currently in use are ton-mile taxes, levied by Colorado and Wyoming; weight-mile taxes, levied by Idaho, New Mexico, New York and Oregon, and axle-mile taxes levied by Ohio. The ton-mile tax imposes a fixed rate on the actual tonnage of the vehicle and cargo moved over the actual in-state mileage. The weight-mile tax is a flat rate per mile which varies depending on the gross weight of the vehicle. The axle-mile tax is similar to the weight-mile tax but is based on the number of axles on the truck or combination. All, of course, are based on mileage but the weight and axle-mile taxes, based on a flat rate, have record keeping and auditing advantages. For example, in complying with the Colorado ton-mile tax (TMT) the operator must record both loaded and empty weight and miles, and the tax is levied at different rates for "loaded" and "empty" miles (although a single rate can be negotiated by the carrier with tax officials of the state). Flat rate taxes are more easily applied since they increase simply as a function of in-state miles. In New York and Ohio, turnpike miles are excluded from taxable mileages.

Gross receipt taxes in two states -- Arizona and Montana -- are based on the concept that revenues derived from in-state operations are a measure of benefits to carriers operating over a state's highway system. Thus, the value of highway use is taxed through the gross receipts tax mechanism. The tax consists of a mill levy on revenues related to business which has its origin or destination within the state. The concept overlooks the fact that private carriers may derive as much benefit, or more, than for-hire carriers from use of a state's highways, but private carriers do not generate reveneus as such for their services and, therefore, are not subject to a gross receipts tax. In

Montana, there is a minimum annual gross receipts tax.

Fuel surtaxes, maintained in Kentucky and Virginia, are additional taxes on highway consumption of gasoline or "special fuels" (fuels other than gasoline including diesel oil). In both states the tax applies to all tractors and all vehicles with more than two axles. The surtax is paid with the fuel tax at the time of quarterly filing of fuel tax returns.

Table 13 displays information regarding the third structure taxes discussed above as well as retaliatory taxes levied by some states on vehicles registered in the state which maintain a third structure tax. As can be seen from Table 13, North Dakota does not maintain any third structure taxes.

(d) North Dakota Overweight Permit - In addition to the previously described taxes or fees, North Dakota also requires truckers to acquire annually an overweight permit. The permit, more commonly referred to as an "approved equipment card" by both truckers and regulatory personnel, is a certificate required to be obtained annually by operators of vehicles having a gross weight of over 64,000 pounds. An approved equipment certificate, valid for one year, is issued to any qualified vehicle following inspection and payment of a $15.00 fee. Although the certificate and inspection are required, the $15.00 fee is not charged to vehicles registered or prorated in North Dakota nor to Minnesota and South Dakota licensed truckers traveling the shortest possible route in the 20 mile free zones.

Although the permit is termed on approved equipment permit, the only real inspection which is carried out before the permit is issued is to determine that the vehicle's axle equializes are in proper working order. Before the permit is issued, regulatory personnel at the weigh station will weigh each axle of a tandem axle tractor or trailer separately to see that such axles are designed and operating so each axle loads equally and oscillates with its companion axle on axles. In other words, each axle must be designed in a manner so that after any axle has been

TABLE 13

THIRD STRUCTURE MOTOR CARRIER TAX PARAMETERS BY STATE *

State	Nature	Application	Tax Rate	Bond Requirement	Filing Requirement	Filing Deadline
Alabama	None	N/A	N/A	N/A	N/A	N/A
Arizona	Gross receipts tax	For-hire carriers	2-1/2% of Arizona gross receipts	$100	Monthly	20th day of month for preceding month
Arkansas	None	N/A	N/A	N/A	N/A	N/A
California	None	N/A	N/A	N/A	N/A	N/A
Colorado	Mileage tax	All carriers	8 mills/empty ton-mile (5.48 mills/m ton km) plus 2 mills/loaded ton-mile (1.37 mills/m ton km)	1-1/2 times ton-mile tax liability	Monthly	25th day of month for preceding month
Connecticut	None	N/A	N/A	N/A	N/A	N/A
Delaware	None	N/A	N/A	N/A	N/A	N/A
Florida	None	N/A	N/A	N/A	N/A	N/A
Georgia	Retaliatory tax	All vehicles registered in: Arizona, Colorado, Idaho, New Mexico, New York, Ohio and Oregon	$10 per round trip per vehicle	None	None	N/A
Idaho	Use fee (mileage tax)	All carriers	50.30 mills/mile (31.255 mills/km)	None	None	N/A
Illinois	None	N/A	N/A	N/A	N/A	N/A
Indiana	None	N/A	N/A	N/A	N/A	N/A
Iowa	None	N/A	N/A	N/A	N/A	N/A
Kansas	None	N/A	N/A	N/A	N/A	N/A
Kentucky	None	N/A	N/A	N/A	N/A	N/A
Louisiana	None	N/A	N/A	N/A	N/A	N/A

Source: (18)

*Information as of 1975

TABLE 13 - cont.

State	Nature	Application	Tax Rate	Bond Requirement	Filing Requirement	Filing Deadline
Maine	None	N/A	N/A	N/A	N/A	N/A
Maryland	None	N/A	N/A	N/A	N/A	N/A
Massachusetts	None	N/A	N/A	N/A	N/A	N/A
Michigan	None	N/A	N/A	N/A	N/A	N/A
Minnesota	None	N/A	N/A	N/A	N/A	N/A
Mississippi	None	N/A	N/A	N/A	N/A	N/A
Missouri	None	N/A	N/A	N/A	N/A	N/A
Montana	Gross operational revenue tax	For-hire carriers	0.575 of 1% on Montana revenues; Annual minimum - $30/vehicle for common carriers; $15/vehicle for contract carriers	Unknown	Quarterly	Unknown
Nebraska	Retaliatory tax	For-hire carriers from states charging Nebraska carriers third structure taxes	Levy similar tax as applied against Nebraska based trucks	None	None	N/A
Nevada	Unladen weight fees	All	Up to $450.50/vehicle/yr (or may opt for mileage tax)	None	None unless mileage option selected	N/A
New Hampshire	None	N/A	N/A	N/A	N/A	N/A
New Jersey	None	N/A	N/A	N/A	N/A	N/A
New Mexico	Use fee (mileage tax)	Vehicles registered in New Mexico (foreign vehicles subject to trip tax in lieu of use fee)	20.07 mills/mile; (12.47 mills/km)	Combined with fuel tax bond	Quarterly (combined with fuel tax report)	25th day of April, July, October and January preceding quarter
New York	Ton-mile tax	All carriers except household goods movers	2 mills/ton-mile; (1.370 mills/m ton km)	None	Quarterly with fuel tax report	20th day of month following end of quarter
North Carolina	None for carriers not registered in N.C.	N/A	N/A	N/A	N/A	N/A

TABLE 13 - cont.

State	Nature	Application	Tax Rate	Bond Requirement	Filing Requirement	Filing Deadline
North Dakota	None for vehicles registered or prorated in N. Dakota	N/A	N/A	N/A	N/A	N/A
Ohio	Mileage tax	All	$2 vehicle permit + 2.5¢/mile (1.553¢/km)	None	Unknown	Unknown
Oklahoma	None	N/A	N/A	N/A	N/A	N/A
Oregon	Mileage tax	All carriers based on weight and fuel cype	55.5 mills/mile (34.486 mills/km)	"May be required"	Unknown	Unknown
Pennsylvania	None	N/A	N/A	N/A	N/A	N/A
Rhode Island	None	N/A	N/A	N/A	N/A	N/A
South Carolina	None	N/A	N/A	N/A	N/A	N/A
South Dakota	None	N/A	N/A	N/A	N/A	N/A
Tennessee	None	N/A	N/A	N/A	N/A	N/A
Texas	None	N/A	N/A	N/A	N/A	N/A
Utah	None	N/A	N/A	N/A	N/A	N/A
Vermont	Retaliatory tax	All vehicles registered in states not granting full tax reciprocity to Vermont vehicles	$10/vehicle + $5/round trip	N/A	N/A	N/A
Virginia	None	N/A	N/A	N/A	N/A	N/A
Washington	None	N/A	N/A	N/A	N/A	N/A
West Virginia	None	N/A	N/A	N/A	N/A	N/A
Wisconsin	Retaliatory tax	Any vehicle registered in state assessing third structure tax against Wisconsin vehicles	Levy similar tax as applied against Wisconsin based trucks	Unknown	Unknown	Unknown
Wyoming	Compensatory tax	All	2.5 mills/mile (1.553 mills/km), or optionally based on unladen weight	$200/vehicle, $1,000 maximum	Monthly	25th day for preceding month

loaded, there is no way for such axle to be unloaded in a manner to cause any other axle to be overloaded.

(e) Insurance Requirements - Insurance requirements are usually part of state public service commission requirements on truckers intended to protect the public. Most states require carriers to file a certificate of liability insurance while some also require proof of cargo insurance. While state insurance requirements of interstate truckers may provide protection where exempt and private carriers are concerned, ICC insurance requirements, which apply to regulated carriers, usually surpass state requirements. The ICC requirements call for $100,000 to $300,000 personal liability and $50,000 property damage insurance while state requirements vary considerably from state to state.

In North Dakota, resident based truckers are required to have $25,000 per person - $100,000 per occurrence personal liability and $2,500 per shipper - $5,000 per occurrence cargo liability. The state does not require non resident trucers to present proof of adequate insurance assuming that it the truck is properly registered in its home state, that state has required him to carry adequate insurance.

(f) Length, Width, Height and Weight Restrictions - Probably the most troublesome of state regulations in terms of difficulty and cost of compliance are the nonuniform width, length, height, and weight restrictions imposed by the different states. Although more uniformity has been seen in recent years, compliance with different state standards concerning physical characteristics of the vehicle such as height, width, length, axle span, etc. can be extremely difficult, and in some instances actually prohibit operation in one or more states. Weight limitations on the other hand, which also vary from state to state, directly affect the size of the payload a trucker can carry, thereby having a resultant effect on either or both the rates a carrier charges or the profits he makes on a

particular load. In recent years a movement toward uniformity has been seen in many of the states to increase the maximum gross vehicle weight on the Interstate Highway system to the 80,000 pound limit allowed by the federal government. However a number of states, and most notably a corridor of states along the Mississippi River, have refused to follow the movement; still restricting trucks to the previous GVW limit of 73,280 pounds. This is a particular problem to the interstate trucker operating over a number of states - one or more of which may still have the lighter weight restrictions. The operator is required to reduce the size of his payload to meet the regulations of a single state in which he must cross into, even though the number of miles traveled in that state may be a small percent of his total trip. For the most part, states to the south and west of North Dakota have increased the Interstate Highway system weight restrictions in their states to the 80,000 pound level. This has allowed truckers leaving the state for destinations in those areas to haul a larger payload, thereby improving the profitably of trucking into those locations in comparison to hauls to destinations east of North Dakota. Shipments going to destinations east of North Dakota are required to cross through the previously mentioned corridor of states along the Mississippi River which still maintain the 73,280 pound weight limitations. Trucks leaving the state for destinations in the east and southeast are thereby required to carry a lighter payload. Thus not only are fewer goods per truck moved from the state to those eastern locations, but also the operating cost/revenue ratio of trucking to those destinations is less than it is to more western points. The resulting effect is a lesser availability of trucks willing to haul to those destinations and/or higher transportation freight rates, both of which are detrimental to the North Dakota shipper.

Table 14 is a list of maximum dimensions and weights of motor vehicles prepared by the American Association of State Highway and Transportation Officials.

The new restrictions were designated as Class A load restrictions and carried the following limits:

Single axle: 450 pounds per inch width of tire plus 2,000 pounds not to exceed 18,000 pounds.
Tandem axles: 450 pounds per inch width of tire not to exceed 16,000 pounds per axle.

The Class A restrictions generally replaced the Class No. 1 restriction on the U.S. highways within the state as well as a few segments of state highways in the eastern section of the state and parts of N.D. Highway #5 in the northern part of the state. Figure 3 shows the designations of spring load restriction classifications during the 1978 spring load restriction period.

With maximum axle loading at 20,000 pounds, the Class A, No. 1, and No. 2 restirctions can result in axle load reductions of up to ten percent, 25 percent, and 40 percent, respectively in certain instances. However the percentage of total load reduction is actually somewhat less since all axles cannot be loaded to the legal limit due to truck design and tire load limitations.

Those highways having sufficient structural strength to carry the maximum legal weights year-round are termed "load free" highways. No spring load restrictions are placed on these highways. Basically, in North Dakota, the load free highways consist of the interstate highway system.

The duration of spring load restrictions varies according to annual ground moisture conditions and seasonal shifts. The following are the approximate dates the spring load restrictions were in effect during the past five years:

1978	Imposed	March 23
	Removed	May 22
1977	Imposed	March 17
	Removed	May 9
1976	Imposed	March 26
	Removed	May 24
1975	Imposed	March 24
	Removed	May 30
1974	Imposed	March 12
	Removed	June 6

(g) North Dakota Spring Load Restrictions[28]- In addition to the legal weight limitations in effect on North Dakota highways at all times, it has been a general practice to further restrict axle loads on most highways during the spring thaw period.

During this period excess surface and ground water lying above the receding frost line causes an increase in subbase mositure content to a point where the subbase loses a large degree of its stability. With this reduced stability, the pavement surface also loses its normal bearing capacity and become suspectible to shear failure under heavy axle loads. Special spring load restrictions are therefore imposed to reduce axle loads and avoid excessive pavement failures during this critical period.

In North Dakota seasonal load restrictions are based on weight per inch width of tire and maximum gross weight per axle. Prior to 1977 the following system of road restrictions were in effect on most highways.

No. 1 Load Restrictions:

Applicable to axle and gross vehicle loads.
Single axle: 400 pounds per inch width of tire plus 2,000 pounds not to exceed 15,000 pounds.
Tandem axles: 400 pounds per inch width of tire not ot exceed 15,000 pounds per each axle.

No. 2 Load Restrictions:

Applicable to axle and gross vehicle loads.
Single axle: 300 pounds per inch width of tire plus 2,000 pounds not to exceed 12,000 pounds.
Tandem axles: 300 pounds per inch width of tire not to exceed 12,000 pounds per each axle.

No. 3 Load Restrictions:

Passenger cars and empty trucks only.

In response to requests from truckers and shippers, the North Dakota Highway Department created a new class of spring load restrictions in 1977.

---

28. Sources: (19, 20).

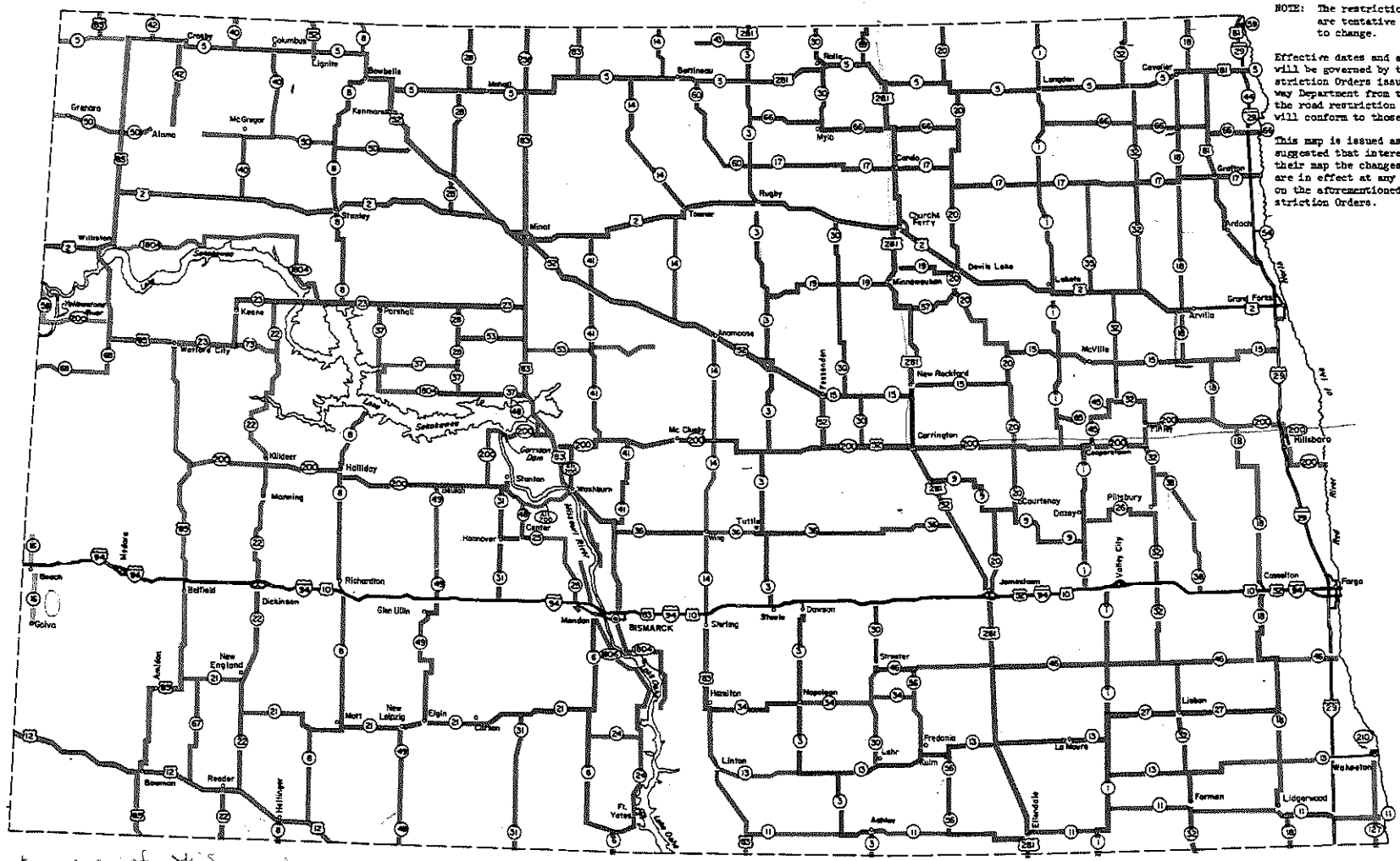
NORTH DAKOTA STATE HIGHWAY DEPARTMENT PROPOSED LOAD RESTRICTIONS FOR 1978

Cl. A Load Restrictions:
Applicable to Axle and Gross Vehicle Loads.
Single Axle: 450 Lbs. per Inch Width of Tire Plus 2,000 Pounds
Not to Exceed 18,000 Pounds

Tandem Axle: 450 Lbs. per Inch Width of Tire
Not to Exceed 16,000 Pounds per Axle

No. 1 Load Restrictions:
Applicable to Axle and Gross Vehicle Loads.
Single Axle: 400 Lbs. per Inch Width of Tire Plus 2,000 Pounds
Not to Exceed 15,000 Pounds
Tandem Axles: 400 Lbs. per Inch Width of Tire
Not to Exceed 15,000 Pounds per Each Axle

No. 2 Load Restrictions:
Applicable to Axle and Gross Vehicle Loads.
Single Axle: 300 Lbs. per Inch Width of Tire Plus 2,000 Pounds
Not to Exceed 12,000 Pounds
Tandem Axles: 300 Lbs. per Inch Width of Tire
Not to Exceed 12,000 Pounds per Each Axle



NOTE: The restrictions listed on this map are tentative only and are subject to change.

Effective dates and actual restrictions will be governed by the Statewide Road Restriction Orders issued by the State Highway Department from time to time during the road restriction season, and postings will conform to those orders.

This map is issued as a guide only. It is suggested that interested parties note on their map the changes or restrictions that are in effect at any one time as indicated on the aforementioned Statewide Road Restriction Orders.

Sufficient copies of this map can be obtained to place in the final copies of the study.

page 114

FIGURE 3

The date shown as the imposition date is the date when the first restrictions were imposed that year, regardless of the area covered. Due to varying weather conditions in most years, the restrictions generally become effective first in the western or central parts of the state with the placement of restrictions in the eastern part of the state coming shortly thereafter. The removal of restrictions is also more or less by area which varies from year to year, although restrictions are generally removed in the western and central sections of the state first. The removal dates shown in the foregoing listing are the dates on which restrictions in the last general area were removed.

(h) North Dakota Truck Regulatory Enforcement Practices[29]- The Truck Regulatory Division of the North Dakota State Highway Deaprtment is the state regulatory agency which has the most personal contact with truckers in the enforcement of the state's truck regulatory practices. This division of the State Highway Department operates 12 ports of entry at the following locations:

Beach	Fargo	Joliette
Bismarck	Grand Forks	Minot
Bowman	Hague	Mooreton
Ellendale	Hettinger	Williston

In addition to serving as weigh stations, these ports of entry all provide information to truckers concerning regulatory practices and fees, sell registration trip permits, fuel tax trip permits, and approved equipment permits, and collect fees from truckers found to be in violation of North Dakota regulatory practices. In addition, the division employs seven district supervisors and 17 portable carmen who operate primarily on a roving basis out of vehicles in enforcing regulatory practices and selling permits. Although highway patrol officers will also make periodic checks for violations of regulatory practices, it is these 12 ports of entry and 24 roving regulatory officers which have the primary burden of

---

29. Sources: (22, 23).

enforcing this state's truck regulatory practices.

As stated previously a truck operator can pay his vehicle registration, fuel and approved equipment taxes at one of three locations. If the vehicle is to be fully registered in the state or the registration prorated, the operator will file for his registration with the Motor Vehicle Registration Office which will issue him a license plate in the case of a full registration or a decal to be placed on his prorate license plate in the case of prorate registration. If a non resident trucker has not elected to fully register or prorate his vehicle he can purchase a trip permit at either a port of entry, a highway patrol officer, or from a roving truck regulatory officer. Fuel taxes can be paid in essentially the same manner, either by prefiling a fuel bond and obtaining a cab card from the State Tax Department or by purchasing a fuel tax trip permit at a port of entry or from a roving regulatory officer. The approved equipment permit will be issued whenever a trucker scales or intends to load his truck to a GVW of over 64,000 pounds while in the state and the vehicle has been properly weighed to determine if the axle equalizers are functioning.

Regulatory officers will make checks of trucks on the road which do not carry North Dakota license plates or a North Dakota prorate decal to determine if the operator has paid the proper registration fees. In addition regulatory personnel will make "spot checks" of about one in every twenty vehicles carrying a prorate order. In most instances if a truck is stopped enroute to a destination within the state and is found to be not properly registered, the regulatory officer will generally give the operator the "benefit of the doubt" so to speak, and simply require the driver to pay the normal trip permit taxes and approved equipment fee on the assumption that the driver intended to pay such fees upon the arrival at his destination. This assumption is a recognition of the fact that weigh stations and

portable carmen are not always located at the most convenient entrance point into the state for each individual trucker, and that truckers entering from such other points may well intend to purchase the required permits upon arriving at their in-state destination by contacting a regulatory officer.

If a truck operator is stopped such that it appears that he is enroute leaving the state and has not acquired the necessary permits he can be assessed the full cost of registering his vehicle in the state plus be convicted of a Class B misdemeanor under N.D.C.C. 39-04-37 and N.D.C.C. 39-04-41. (These same provisions could also be invoked against an operator who is enroute to an in-state destination and has not secured the required permits.) In actuality if it is the first time the regulatory officer has stopped the trucker for failure to acquire the necessary permits and the evasion does not appear blatant, the officer will generally issue the driver a warning and require him to purchase the necessary trip permits. If the same operator is stopped a second time without having acquired the necessary permits it is within the discretion of the regulatory officer to charge the trucker with the full North Dakota registration fee. In most instances, however, the regulatory officer will assess a fee of one-quarter the full registration fee. Despite these regulatory enforcement efforts it is estimated that about ten percent of the trucks leaving the state have not been properly registered.

The enforcement of weight limitations is the second primary responsibility of truck regulatory personnel. In the enforcement of weight restrictions, highway patrol officers and truck regulatory officers will stop any vehicle which appears to be overloaded. N.D.C.C. 39-12-07 provides the following authority and procedure for the weighingof trucks suspected of being overloaded:

> Every police office, including members of the state highway patrol and appointees of the state highway department, having reason to believe that the weight of a vehicle and the load carried thereon is unlawful, may weigh such vehicle and load or have the same weighed either by means of portable or stationary scales, and for that purpose he may require the vehicles to be driven to the nearest scales. Such officer may require the driver of such vehicle immediately to unload such portion of the load as may be necessary to decrease the gross weight to the maximum allowed by the provisions of this chapter.

It should be noted from the above statute that the officer which stops the vehicle has the discretion to weigh the vehicle either on site, through the use of portable or stationary scales, or require the truck to be driven to the nearest scales.

In practice when a truck is suspected of being overweight, the regulatory personnel (if a roving regulatory officer) will generally scale the truck on site through the use of portable scales. If the truck is found to be overweight the driver is given the option of paying the overweight fee or requesting a second weighing at usually the nearest available scales, such nearest scales generally being the closest grain elevator or weigh station. If the trucker requests the second weighing, the amount of overweight fees he has to pay will be based upon the number of pounds he is found to be overweight by the second weighing.

The 80,000 pound GVW limitation on the interstate highway system is an absolute maximum of which no tolerance is allowed. On state highways, however, regulatory personnel have generally been given the right to exercise some discretion before requiring the payment of overweight fees for minor overloads. For this reason, few truckers seldom request the optional second weighing before paying overweight fees, since that weight will generally be heavier than that given by the regulatory officer through the use of a portable scale.

If the vehicle is found to be overloaded, overweight fees can be paid on site in accordance with the schedule set forth in N.D.C.C. 39-12-18 which provides for a charge of:

a. One cent per pound for each pound of weight in excess of the legal limit, up to three thousand pounds of excess weight;

b. Four cents per pound for each pound which exceeds the legal limit by over three thousand but is less than five thousand pounds of excess; and

c. Eight cents per pound for each pound which exceeds the legal limit by over five thousand pounds.

TABLE 14. LEGAL MAXIMUM DIMENSIONS AND WEIGHTS OF MOTOR VEHICLES COMPARED WITH AASHTO STANDARDS

Prepared by the American Association of State Highway and Transportation Officials

December 31, 1977

Line	State or Province	Width Inches	Height ft.-in.	Length-feet [2] Truck Tractor semi-	Single Statutory limit	Single Including statutory enforcement tolerance	Tandem Statutory limit	Tandem Including statutory enforcement tolerance
1	Alabama	96	13-6	55	20,000	[11]22,000	40,000	[11]44,000
2	Alaska	96	13-6	65	20,000		34,000	
3	Arizona	96	13-6	65	20,000		34,000	
4	Arkansas	96	13-6	60	18,000		32,000	
5	California	96	13-6	60	20,000		34,000	
6	Colorado	96	13-6	65	18,000		36,000	
7	Connecticut	102	13-6	55	22,400	22,848	36,000	36,720
8	Delaware	96	13-6	60	20,000		40,000	
9	Florida	96	13-6	55	20,000	22,000	40,000	44,000
10	Georgia	96	13-6	55	18,000	20,340	36,000	40,680
11	Hawaii	[2]108	13-6	[26]55	24,000	25,200	[6]34,000	35,700
12	Idaho	[2]102	14-0	[26]65	[9]20,000	20	[6]37,800	20
13	Illinois	96	13-6	55	[9]18,000		32,000	
14	Indiana	96	13-6	55	18,000	19,000	32,000	33,000
15	Iowa	96	13-6	55	18,000	18,540	32,000	32,960
16	Kansas	96	13-6	60	20,000		34,000	
17	Kentucky	96	[10]13-6	[12]55	20,000	[11]21,000	34,000	[11]35,700
18	Louisiana	96	13-6	65	20,000		34,000	
19	Maine	[2]102	13-6	56½	22,000		[2]38,000	
20	Maryland	96	13-6	55	22,400		[14]40,000	
21	Massachusetts	96	13-6	55	22,400		36,000	
22	Michigan	96	13-6	55	[8]20,000		[17]34,000	
23	Minnesota	96	13-6	60	[17]20,000		[17]34,000	
24	Mississippi	96	13-6	55	18,000		28,650	[8]32,000
25	Missouri	96	13-6	55	[15]18,000		[15]32,000	
26	Montana	[2]102	13-6	60	[15]18,000		[15]32,000	

TABLE 14 - continued

LEGAL MAXIMUM DIMENSIONS AND WEIGHTS OF MOTOR VEHICLES COMPARED WITH AASHTO STANDARDS

Prepared by the American Association of State Highway and Transportation Officials

December 31, 1977

Line	State or Province	Width Inches	Height ft.-in.	Length-feet [2] Truck Tractor semi-	Single Statutory limit	Single Including statutory enforcement tolerance	Tandem Statutory limit	Tandem Including statutory enforcement tolerance
27	Nebraska	96	14-6	60	[2]20,000		[2]34,000	
28	Nevada	96	14-0	70	20,000		34,000	
29	New Hampshire	102	13-6	55	22,400		36,000	
30	New Jersey	96	13-6	55	22,400	23,520	34,000	35,700
31	New Mexico	96	13-6	65	21,600		34,320	
32	New York	96	13-6	55	22,400		36,000	
33	North Carolina	96	13-6	55	19,000	20,000	36,000	38,000
34	North Dakota	[8]102	13-6	65	20,000		[19]34,000	
35	Ohio	96	13-6	60	20,000		34,000	
36	Oklahoma	[2]102	13-6	65	20,000		34,000	
37	Oregon	96	13-6	[8]60	20,000		34,000	
38	Pennsylvania	96	13-6	55	22,400	23,072	36,000	37,080
39	Rhode Island	102	13-6	55	22,400		NS	
40	South Carolina	96	13-6	55	20,000		36,000	
41	South Dakota	96	13-6	70	20,000		34,000	
42	Tennessee	96	13-6	55	18,000		32,000	
43	Texas	96	13-6	65	20,000		34,000	
44	Utah	96	14-0	65	20,000		34,000	
45	Vermont	102	13-6	60	22,400	23,520	36,000	37,800
46	Virginia	96	13-6	55	20,000		34,000	
47	Washington	96	14-0	[8]65	20,000		34,000	
48	West Virginia	96	12-6	[8]55	20,000		34,000	
49	Wisconsin	96	13-6	[25]59	20,000		34,000	
50	Wyoming	96	14-0	85	20,000		36,000	
51	District of Columbia	96	13-6	55	21,000	22,000	37,000	38,000

TABLE 14 - continued

LEGAL MAXIMUM DIMENSIONS AND WEIGHTS OF MOTOR VEHICLES COMPARED WITH AASHTO STANDARDS

Prepared by the American Association of State Highway and Transportation Officials

December 31, 1977

Type of restriction	Gross weight limit: Applicable to: Any group of axles	Gross weight limit: Applicable to: Total wheelbase only	Specified maximum gross weight-pounds 5-axle Truck-tractor semitrailer	Practical maximum gross weight-pounds[1] 5-axle Truck-tractor semitrailer	Line
Table		x	80,000	80,000	1
Formula		x	88,000	76,000	2
Table	Under 18'	Over 18'	[18]	[18]76,000	3
Spec. maximum			73,280	72,000	4
Table	x			76,000	5
Formula-spec. lim.		x	[2]85,000	76,000	6
Spec. lim. -tire			73,000	73,000	7
Table-spec. lim.	x		80,000	80,000	8
Table	x		80,000	80,000	9
Spec. max.[3]	[3]x		[3]80,000	73,280	10
Formula[7,25]	x			79,400	11
Table 20-formula 21	x		[2]85,500	[6]79,000	12
Spec. lim.-tire cap.			73,280	72,000	13
Spec. lim.-tire cap.			73,280	73,280	14
Table	X			73,280	15
Table		x	[2]85,500	76,000	16
Spec. lim.-tire cap. form	x		[23]80,000	76,000	17
Axle lim.-tire cap. 650/lb in.	x		80,000	76,000	18
Tire cap.-axle spacing	x		80,000	80,000	19
Table		x	73,280	73,280	20
Table-spec. lim.		x	80,000	80,000	21
Formula[4,7]				76,000	22
Table Formula	x		[17]80,000	[17] 80,000	23
Table-tire cap.	x			[8] 72,000	24
Table		x	73,280	[8] 72,000	25
Table-formula[7]	Under 18'	Over 18'	[15,7]85,500	73,280	26

TABLE 14 - continued

LEGAL MAXIMUM DIMENSIONS AND WEIGHTS OF MOTOR VEHICLES COMPARED WITH AASHTO STANDARDS

Prepared by the American Association of State Highway and Transprotation Officials

December 31, 1977

Type of restriction	Gross weight limit Applicable to: Any group of axles	Total wheelbase only	Specified maximum gross weight-pounds 5-axle Truck-tractor semitrailer	Practical maximum gross weight-pounds[1] 5-axle Truck-tractor semitrailer	Line
Table-formula[7]	Under 18'	Over 18'	[15,7]85,500	73,280	26
Table	x		85,500	[2]77,500	27
Table	x		80,000	76,000	28
Table-spec. lim.		x	80,000	80,000	29
Axle lim.-tire cap.				79,400	30
Table	Under 18'	Over 18'		76,640	31
Formula		x	80,000	80,000	32
Formula[24]		Over 35'			33
Formula, tire cap.[7]				78,000	34
Formula[22]		x	80,000	76,000	35
Table	x		[2]85,500	76,000	36
Table	x		80,000	76,000	37
Table			73,280	73,280	38
Spec. lim.			73,280	73,280	39
Spec. lim.			73,280	[2]73,280	40
Table	x		[2]85,500	76,000	41
Spec. lim.		x	73,280	72,000	42
Formula[21]	x			76,000	43
Table	x		80,000	80,000	44
Table-tire cap. 600 lb. in.	x		80,000	80,000	45
Table		x	76,000	76,000	46
Table	Under 18'	Over 18'	[8]80,000	[8]78,000	47
Table	x		[8]80,000	[2]76,000	48
Table[16], Formula[7]	x			80,000	49
Table	x			80,000	50
Table-tire cap.			72,280	73,280	51

TABLE 15. ROVING TRUCK, REGULATORY PERSONNEL ACTIVITY REPORT

January 1978 - May 1978

	January		February		March		April		May		Total	
	State Total	Grand Forks District	State Total	Grand Forks District	State Total	Grand Forks District	State Total	Grand Forks District	State Total	Grand Forks District	State Total	Grand Forks District
No. of vehicles checked	2526	579	1540	575	1458	429	1820	619	2493	702	9837	2904
No. of vehicles legal	770	253	682	325	579	244	775	363	785	382	3591	1567
% of vehicles legal	30.5	43.7	44.3	56.5	39.7	56.9	42.6	58.6	31.5	54.4	36.5	54.0
No. of vehicles weighed	149	72	133	67	190	62	318	105	180	63	970	369
No. of vehicles over-loaded	34	25	37	22	42	7	93	17	64	25	270	96
% of vehicles overloaded	22.8	34.7	27.8	32.8	22.1	11.3	29.2	16.2	35.5	39.7	27.8	26.0
No. of trip permits issued	224	121	315	147	223	74	170	70	207	84	1139	496
No. of App. Equipment Permits issued *	55	32	15	37	34	15	19	17	31	16	154	117
No. of Fuel tax Permits Issued	143	68	138	66	130	48	129	54	122	62	662	298
Non Permit Registration Receipts Issued**	936	125	258	60	373	75	439	128	627	172	2633	560

In addition to the fee, the excess poundage must be unloaded on site until the legal limit is reached. If the trucker elects not to pay the fees on site and is later found in a court of law to have violated the state's weight restriction statutes he is subject to the above fees plus court costs. Should the trucker elect to go to trial he must post a cash bond for the amount of what the fees and costs would be or have his vehicle impounded until the date of trial. The above schedule of fees is also used when a truck is found to be in violation of the state's spring load restrictions.

Past experience of the truck regulatory office has shown that of the total number of trucks stopped by roving regulatory officers on suspicion of being overweight, approximately 20 percent are actually overweight. Many of these overloads were slight however, often resulting in the payment of fees between $20 and $30. It has also become apparent in the last couple of years that since weight limitations on the state and interstate highways in the state have been raised, surprisingly the incidence of truck overloads has also increased.

It is interesting to note at this point the number of violations found by roving regulatory personnel. Table 15 gives a breakdown of the number of stops made, and the number of violations found by such personnel for the period from January, 1978 through May, 1978. The activity table is also broken down for the entire state and for the Grand Forks district which includes the area of the state approximately east of Highway 281 and north of Highway 200. It should be pointed out that not all the trip permits and full registration receipts which were issued were done so after the vehicle was found to be in violation of the registration requirements. Some of these permits and receipts were issued on the request of the operator, either before or after he entered the state.

(i) Truck Regulatory Revenue - As road user taxes are justified on the basis of their contibution to the construction and maintenance of the state's highway system, it is imperative that the relationship between the revenue derived

from the various user taxes and the total amount expended by the State Highway Department be compared. Through this process it can be determined how substantial a role these various user fees play in supporting the state's highway system.

Table 16 shows how the various user fees, which were previously discussed, are distributed by the state. While registration taxes and fuel taxes are divided between the state, the counties, and the cities; truck regulatory fees are used totally by the state and are dedicated to the construction and maintenance of the state highway system. Also to be noted from Table 16 is the current special fuel tax rate of $.08 per gallon which became effective in fiscal year 1978. Previously the tax rate was set at $.07 per gallon. Income based on the previous rate is reflected in Tables 17 and 19.

Table 17 lists the amount of revenue collected from each of the previously discussed user taxes,and estimates of how those amounts were allocated during the last six years. Table 18 is a listing of the expenditures made by the State Highway Department during the last six years by program activity. As can be seen, construction and maintenance accounted for the bulk of the expenditures made by the State Highway Department in any one year -- usually combining to make up approximately 75 percent of each years total disbursements. Also noteworthy is the fact that the administration of the Truck Regulatory Division accounted for less than two percent of the Highway Department's total expenditures in any one year.

Table 19 shows the revenue received by the State Highway Department by type over the past six years. The main contributor to the Highway Department's receipts is the federal government; providing over 50 percent of the funds received by that agency. Registration fees and fuel taxes are the biggest contributor of state collected revenue received by the State Highway Depart-

by type over the past six years. The main contributor the the Highway Department's receipts is the federal government; providing over 50 percent of the funds received by that agency. Registration fees and fuel taxes are the biggest contributor of state collected revenue received by the State Highway Department, comprising approximately 30 percent of each year's total revenue. Other state collected fees and taxes provide various degrees of proportionately small amounts of revenue.

TABLE 16. PROVISIONS GOVERNING THE DISPOSITION OF NORTH DAKOTA REVENUES FOR HIGHWAY PURPOSES ACCRUING FROM SELECTED STATE SOURCES, JULY 1, 1977 - JUNE 30, 1979

Collection Agency and Fee and Tax	Disposition of Revenue		
	Fund	Amount of Proportion	Object of Expenditure
Motor Vehicle Department			
Motor Vehicle Registration and related fees	Motor Vehicle Operating Fund	Amount required of $3,248,563 legislative appropriation for biennium ending June 30, 1979.	Collection and administrative costs of the Motor Vehicle Department.
	Highway Tax Distribution Fund	Remainder:	
		63% to State Highway Dept. 37% to counties and cities.	For state highway use. For local road and street purposes
State Tax Commissioner			
Special fuels tax (8¢ per gallon)	Special Fuels Refund Fund	Amount required, approximately 19% of State Tax Commissioner's receipts.	Pay special fuels tax refund claims for non-highway use.
	Highway Tax Distribution Fund	Remainder:	
		63% to State Highway Dept. 37% to counties and cities.	For state highway use. For local road and street purposes.

TABLE 16. PROVISIONS GOVERNING THE DISPOSITION OF NORTH DAKOTA REVENUES FOR HIGHWAY PURPOSES ACCRUING FROM SELECTED STATE SOURCES, JULY 1, 1977 - JUNE 30, 1979 (continued)

Collection Agency and Fee and Tax	Disposition of Revenue		
	Fund	Amount of Proportion	Object of Expenditure
State Highway Department			
Truck Reciprocity Fees: 20% registration fees Prorated truck reg. fees Prorated trailer reg. fees Proration plates and cab card fees Approved truck equipment fees Truck overload fees Trip permit fees	→ State Highway Fund	All.	Construction and maintenance of roads on the state highway system.

TABLE 17. RECEIPTS AND DISTRIBUTION OF SELECTED NORTH DAKOTA FEES AND TAXES LEVIED FOR ROADS AND STREETS, 1972-1977

Fiscal Year	Receipts						Distribution		
	Fuel Tax[1]	Truck Registration[2]	Trip Permits[3]	Reciprocity Registration	Overload Fees	Approved Equipment	Administration[4]	State Highway System	Counties and City
1972	2,965,427	5,313,473	310,087	1,041,494	78,650	51,251	219,672	1,859,433 3,209,094 1,481,482	1,092,048 1,884,707
1973	3,124,534	5,610,508	303,644	1,313,643	67,310	54,405	348,500	1,921,448 3,315,065 1,739,002	1,128,469 1,946,943
1974	3,486,887	6,485,267	395,211	1,549,093	72,384	74,421	342,000	2,308,977 3,870,258 2,091,109	1,356,066 2,273,009
1975	3,444,073	7,166,244	411,644	1,558,867	71,330	76,042	351,500	2,217,220 4,293,289 2,117,883	1,302,177 2,521,455
1976	3,876,031	7,883,557	495,929	1,807,852	133,663	97,680	475,000	2,368,794 4,667,390 2,535,124	1,391,197 2,741,167
1977	4,597,013	8,101,520	606,777	2,130,440	138,539	104,593	388,500	2,718,302 4,859,202 2,980,351	1,596,463 2,853,818

1. Tax on special motor fuels consisting largely of diesel fuels. Amounts shown represent yearly receipts available for distribution.
2. Includes weight fee changes, proportional registration fees, soil conservation trucks, well drillers, farm trucks, and house movers.
3. Includes all mile taxes.
4. Recipts withheld for Motor Vehicle Department operating expenses - estimates.
5. Recipts and distributions do not agree by years because of undistributed balances.

Source: (40).

TABLE 18. STATE HIGHWAY DEPARTMENT DISBURSEMENTS, 1972-1977

Item	1972		1973		1974		1975		1976		1977	
	Amount	Percent of Total	Amount	Percent of Total	Amount	Percent of Total	Amount	Percent of Total	Amount	Percent of Total	Amount	Percent of Total
Construction	37,237,020	60.7	41,626,901	65.4	37,380,380	65.7	42,598,366	60.8	54,447,455	62.8	49,666,057	56.0
Maintenance	8,015,387	13.1	7,386,420	11.6	7,730,378	13.6	9,269,562	13.2	12,083,635	13.9	12,175,802	13.7
Administration	2,397,528	3.9	2,697,066	4.2	2,776,447	4.9	3,263,555	4.7	3,509,925	4.0	4,023,443	4.5
Planning and Research	652,185	1.1	645,953	1.0	744,343	1.3	782,377	1.1	923,818	1.1	1,195,475	1.3
Safety Program	451,078	0.7	461,283	0.7	318,162	0.6	338,106	0.5	365,698	0.4	457,565	0.5
Drivers License Division	315,340	0.5	337,597	0.5	348,575	0.6	412,350	0.6	574,838	0.7	781,079	0.9
Tranfers to State Highway Patrol	1,694,468	2.8	833,927	1.3	1,750,000	3.1	1,225,000	1.7	-0-	0.0	-0-	0.0
Truck Regulatory Division	848,460	1.4	847,830	1.3	1,103,286	1.9	1,161,714	1.7	1,197,076	1.4	1,276,466	1.4
Travel Division	276,830	0.5	270,706	0.4	472,546	0.8	533,033	0.8	692,266	0.8	444,487	0.5
Construction of Buildings	-0-	0.0	589,204	0.9	43,558	0.1	674,882	1.0	42,122	0.1	945,473	1.1
Miscellaneous	25,911	0.04	66,366	0.1	79,548	0.1	241,733	0.3	130,138	0.2	105,558	0.1
Total disbursements for state highways	51,914,207	84.6	55,763,253	87.6	52,747,223	92.7	60,500,678	86.3	73,966,971	85.3	71,071,405	80.2
Expended on local streets and roads	9,478,332	15.4	7,914,121	12.4	4,179,857	7.3	9,613,978	13.7	12,368,049	14.5	17,349,018	19.6
Mass transit	-0-	0.0	-0-	0.0	-0-	0.0	-0-	0.0	190,661	0.2	228,141	0.3
TOTAL DISBURSEMENTS	61,392,539		63,677,374		56,927,080		70,114,656		86,725,681		88,648,564	

Source: (40).

TABLE 19. STATE HIGHWAY DEPARTMENT RECEIPTS, FISCAL YEARS 1972-1977

Item	1972		1973		1974		1975		1976		1977	
	Amount	Percent of Total	Amount	Percent of Total	Amount	Percent of Total	Amount	Percent of Total	Amount	Percent of Total	Amount	Percent of Total
Motor Fuel Taxes												
Gasoline tax	12,215,855	19.3	13,287,887	20.0	13,456,335	20.9	12,962,624	18.6	14,080,096	16.6	14,946,750	15.3
Special motor fuel tax	1,859,433	2.9	1,921,448	2.9	2,308,977	3.6	2,217,220	3.2	2,368,794	2.8	2,718,302	2.8
Special fuels excise tax[1]	626,874	1.0	664,533	1.0	972,218	1.5	1,286,902	1.8	1,415,959	1.7	1,597,989	1.6
Motor Vehicle Registration Fees												
Truck	3,209,094	5.1	3,315,065	5.0	3,870,258	6.0	4,293,289	6.2	4,667,390	5.5	4,859,202	5.0
Other	5,147,630	8.1	5,584,283	8.4	5,756,670	8.9	6,172,152	8.9	6,562,662	7.7	6,929,267	7.1
Motor Vehicle Use Tax	217,292	0.3	312,725	0.5	477,775	0.7	477,514	0.7	490,726	0.6	452,320	0.5
Ton Fees[2]	139,282	0.2	137,267	0.2	133,631	0.2	113,131	0.2	126,392	0.1	124,581	0.1
Truck Fees												
Trip permits	310,087	0.5	303,644	0.5	395,211	0.6	411,644	0.6	495,929	0.6	606,777	0.6
Reciprocity reg.	1,041,494	1.6	1,313,643	2.0	1,549,093	2.4	1,558,867	2.2	1,807,852	2.1	2,130,440	2.2
Overload fees	78,650	0.1	67,310	0.1	72,384	0.1	71,330	0.1	133,663	0.2	138,539	0.1
Approved equipment	51,251	0.1	54,405	0.1	74,421	0.1	76,042	0.1	97,680	0.1	104,593	0.1
Other	152,392	0.2	176,059	0.3	236,479	0.4	290,391	0.4	221,850	0.3	253,473	0.3
Miscellaneous fees and taxes	757,638	1.2	1,047,130	1.6	1,266,525	2.0	933,378	1.3	1,297,659	1.5	1,192,169	1.2
Federal funds for state highways	28,117,081	44.3	29,596,332	44.4	27,850,605	43.3	31,201,900	44.8	37,455,474	44.1	43,188,347	44.2
Drivers license fees	76,743	0.1	-0-	0.0	-0-	0.0	-0-	0.0	688,295	0.8	1,340,090	1.4

TABLE 19. STATE HIGHWAY DEPARTMENT RECEIPTS, FISCAL YEARS 1972-1977 (continued)

Item	1972		1973		1974		1975		1976		1977	
	Amount	Percent of Total	Amount	Percent of Total	Amount	Percent of Total	Amount	Percent of Total	Amount	Percent of Total	Amount	Percent of Total
Total receipts for state highways	54,000,796	85.1	57,781,731	86.8	58,420,582	90.8	62,066,384	89.1	71,910,421	84.8	80,582,843	82.5
Cities[3]	432,454	0.7	1,785,107	2.7	923,497	1.4	517,300	0.7	1,233,288	1.5	1,366,387	1.4
Counties[4]	3,257,111	5.1	2,983,533	4.5	1,732,629	2.7	3,574,941	5.1	3,693,611	4.4	4,907,670	5.0
Federal funds for local roads and streets	5,749,157	9.1	4,054,682	6.1	3,297,693	5.1	3,520,954	5.0	8,006,224	9.4	10,677,129	10.9
Federal funds for mass transit	-0-	0.0	-0-	0.0	-0-	0.0	-0-	0.0	4,344	0.0	160,754	0.2
TOTAL RECEIPTS	63,439,518		66,605,053		64,374,401		69,679,579		84,847,888		97,694,783	

1. Two percent excise tax levied on purchase of special funds used for agricultural, railroad, industrial, and heating purposes.
2. Special fees levied on North Dakota licensed commercial trucks having a registered gross weight of 12,000 to 24,000 pounds, inclusive.
3. Consists of city reimbursements to State Highway Department for street construction.
4. Consists of county reimbursement to State Highway Department for county highway construction.

Source: (40).

2. FEDERAL REGULATORY PRACTICES [30]

The Interstate Commerce Commission (ICC) is the federal agency having primary authority over the regulation of interstate motor carriers. For purposes of this study a detailed description of the regulatory practices of the ICC over the motor carrier industry is not necessary. However a brief outline of the various types of carriers and the extent of ICC regulation over each has been included. Such an outline should serve to disclose some of the regulatory difficulties encountered in carriage of various commodities between different points.

(a). Regulated carriers - The regulated sector of the motor carrier industry consists of common and contract carriers. Common carriers must provide their services to anyone, however they are prohibited from entering into contracts with their customers and the ICC regulates the rates the carrier may charge, the commodities it may carry, and the routes over which it may operate. Contract carriers on the other hand, can provide service only by contract and only to a strictly limited number of customers.

Entry by new firms into the regulated section of the industry, especially as common carriers, is extremely limited, as evidenced by the fact that most ICC operating authorities are so-called grandfather rights. These are operating authorities granted to firms already in existence when the motor carrier industry originally came under federal regulation in 1935. Entry is granted in general, only when the ICC determines that the existing carriers cannot provide adequate service for the traffic under consideration. Expansion of existing carriers into new routes often requires the purchase of another carrier's operating authority.

A contract carrier is defined as one transporting under continuing contracts with one person or a limited number of persons either (a) for the furnishing of

---

30. Sources: (24,25).

transportation services through the assignment of motor vehicles for a continuing period of time to the exclusive use of each person served or (b) for the furnishing of transportation services designed to meet the distinct need of each individual customer. The ICC has the power to limit both number and type of shippers served by the contract carrier.

Generally both types of carriers are also regulated in one of two ways: (1) they are closely regulated as to the commodities they may carry, but they are allowed latitude as to the routes over which they may operate, or (2) they are allowed latitude as to which commodities they may carry, but they are closely regulated as to where they may operate.

The first group are generally referred to as "specialized commodity carriers" which haul specified commodities between a number of different points over any particular road. These carriers are generally smaller firms that specialize in truckload shipments which do not require the use of terminals. These carriers will often hire drivers that own their own trucks (owner-operators) to provide the actual transportation of the freight.

The second category, called "general freight carriers" generally carry a wide range of commodities between a limited number of points with the routes between the points explicitly specified. These carriers usually specialize in smaller shipments which require terminal facilities to consolidate the shipments into loads large enough to utilize their trucks efficiently.

(b) Private carriers - Unregulated carriers are those having no ICC opeating authority and therefore may not carry regulated commodities on a for-hire basis. They are essentially two types -- the exempt carrier and the private carrier. Private carriers are companies which carry their own goods in furtherance of their nontransportation business interests. For instance, a manufacturer which uses its own trucks to deliver its product to wholesalers is a private carrier as is a

wholesaler which uses its own trucks to deliver its products to its customers. The test to determine if the carrier is a private carrier is whether the primary business of the operator is the manufacturer or sale of goods and if the transportation is incidental thereto. The private carrier is prohibited from hauling commodities for others (except exempt commodities) and is also prohibited from leasing his truck and driver to regulated carriers for periods shorter than 30 days.

(c) Agricultural products exemption - The Interstate Commerce Act expressly exempts from federal economic regulation unprocessed agricultural goods. This exemption essentially allows any carrier to furnish for-hire transportation of raw agricultural products as long as the vehicle is not used at the same time in carrying any other property, or passengers for compensation. Thus there are two types of carriers hauling agricultural products: (a) regulated and private carriers which haul agricultural commodities as a back haul and incidental to carriage under their regulated authority or of their own goods, and (b) those carriers who haul nothing but exempt agricultural products, appropriagely called "exempt carriers".

(d) Agricultural cooperative exemption - Transportation activities of agricultural cooperatives, as defined under the Agricultural cooperative, the organization must meet the following requirements: (1) its members must be producers of agricultural products; (2) it must be controlled by its members: (3) it must be engaged in marketing farm products of, or furnishing farm business services to its members; (4) it may not deal in farm products, farm supplies, or farm business services for nonmembers in an amount greater than the amount of such business transacted for members. If the cooperative were transporting strictly exempt agricultural commodities, there would be no need for the cooperative exemption, however, such cooperatives often transport farm supplies on return hauls and such supplies are not included in the commodity exemptions. In addition to back hauling nonexempt supplies for its

members, the cooperative is allowed to a limited amount of back haul commodities for nonmembers. Nonmember transportation of nonexempt commodities is limited to that which is incidental to its primary transportation operation and necessary for its effective performance but in no event can it exceed 15 percent of its total interstate transportation services in any fiscal year, measured in terms of tonnage. "Incidental and necessary" has been interpreted to mean that the for-hire transportation for nonmembers must at a minimum be rendered as to equalize or prevent an economic loss which would have resulted from an otherwise empty movement of a vehicle employed on the prior or subsequent trip in member transportation. The nonfarm nonmember traffic must be coordinated with membership shipment in the reverse direction.

Although unregulated and exempt carriers are not directly subject to economic egulation, they are severely restircted by it. For examply, exempt carriers haul unprocessed agricultural products from rural areas to manufacturing and consuming centers, but they are prohibited from competing with regulated carriers for shipments moving in the reverse direction. This can cuase exempt carriers to have excessive empty mileage, increases the cost of transporting agricultural commodities, and has been cited by some writers as a cause of the reduced availability of truck service to haul manufactured goods to rural areas.

3. Carrier and Shipper Complaints and Comments[31]

By far the most common heard complaint concerning the trucking industry is the lack of uniform state standards and regulations and the resulting "red tape" involved in attempting to comply with the standards and regulations of the individual states. Comparatively speaking, North Dakota is generally considered by truckers to be a good state to operate in. Past efforts of the state to make North Dakota regulations fairly liberal, especially in terms of size and weight limitations, moderate

---

31. Sources: (27, 28, 29, 30, 32, 33, 34, 35, 37)

fees, and reciprocal agreements make it one of the easier states to operate in especially for the trucker who runs in the state on a fairly frequent basis so he is acquainted with the state's regulatory practices. Unfortunately, for a trucker to operate through North Dakota to more eastern destinations, he must cross states which are considered some of the most difficult to operate in. Regulatory practices in the states of Iowa, Illinois, Wisconsin, and Missouri, for example, are frequently mentioned as being exceptionally burdensome. The fact that a trucker may have to cross one of those states to reach North Dakota for a load may prevent that trucker from making a trip he might otherwise consider. Efforts to make such states easier to operate in could have a resulting positive effect on the availability of trucks in North Dakota.

Although North Dakota may be viewed as a comparatively liberal state within which to operate in terms of regulatory practices, that does not mean that its regulatory practices do not present a problem to the interstate trucker. Naturally anything less than complete receprocity with free and unrestricted entry in the state by interstate truckers similar to that privilege enjoyed by passenger cars will cause some degree of difficulty in terms of compliance. However, certain regulatory practices in particular seem to bear the brunt of the criticism directed at regulatory practices which may inhibit the availability of trucks in the state.

In terms of taxes, the approved equipment permit is the most complained of regulation. Although implemented to assure that a truck's weight equalizing equipment is in proper working order, the permit is viewed primarily as a revenue gathering mechanism that discriminates against the interstate truckers who travels through the state on an infrequent basis. The degree of the inspection which is performed in connection with the permit is not considered to justify the fee charged. Since the fee is a flat annual amount, it is felt to be extremely discriminatory. As each trucker is charged the same amount to obtain the permit no matter how many

miles or how often he travels on the state's highways, the fee cannot be justified as an equitable road user fee. This is particularly apparent in view of the fact that no fee is charged to obtain the permit for truckers based in North Dakota or who prorate their vehicles in this state.

Another tax that is complained of generally is the fuel tax. The expense and paperwork in filing fuel bonds is usually not justified unless the operator intends to enter the state on a fairly steddy basis. Truckers which enter states on an infrequent basis feel fuel tax permits are unfair in that they are often taxed twice -- once at the pump and again when they have to purchase a fuel tax trip permit.

As previously mentioned, the restriction which probably has its greatest impact on reducing the availability of trucks in North Dakota are the spring load restrictions when they are in effect. The creation of the Class A restriction has allowed commodities to the eastern and southeastern sections of the United States to move relatively unaffected by the imposition of spring load restrictions. Since the Class A restriction is on the same weight basis as the 73,280 pound limit imposed by some of the states which must be crossed in reaching destinations in the east and southeast, loads are not required to be reduced for the entire trip simply to comply with North Dakota spring load restriction. However on loads destined for points in the south and west which can be reached by the interstate highway system, it is often necessary for the trucker to carry the reduced payload dictated by the spring load restriction rather than an 80,000 gross vehicle weight allowable on the interstate highway system. To overcome that problem truckers will try to locate shipments at origins adjacent to the interstate, or when carrying bagged potatoes, "top" the load off by leaving the rear of the trailer empty until reaching an interstate highway system where additional bags of potates carried there by a second vehicle will be added. This latter practice has decreased in recent years because of the added time and labor involved and the reduced use of bags in the shipment of potatoes. Since a large percentage

of potato storage in North Dakota is not located on an interstate highway, the result is a number of trucks leaving North Dakota for points in the south and west which are not loaded to their legal capacity once they reach the interstate highway system. The situation is particulary bothersome to the potato carrier since in most instances he travels less than 30 miles on a restricted highway during a trip which is often over one thousand miles long. Therefore, a similar problem arises in the movement of potatoes to the east and south if all the states along the route to those destinations should eventually increase weight restrictions on the interstate system to the federally allowable 80,000 pound limit.

Another frequently voiced complaint concerns delays caused through excessive stops by truck regulatory personnel. Some have termed the regulatory officer's actions as harassment, however this is an unfortunate use of the work which in itself may have led to some hard feelings. The term "harassment" suggests an intentional persistent tormenting. The problem involved here however appears to be related to difficulties in regulatory enforcement rather than an intent on the part of any regulatory officer to torment truckers. Although isolated instances of personality conflicts arise on occasion between regulatory officers and truckers; for the most part, regulatory personnel enjoy a good reputation in terms of rapport with truck operators. Discontent has arisen among some members of the trucking industry however, over instances where a trucker will be stopped two or more times while en route to his destination in the state by an officer for a regulatory check. The problem is largely confined to those trucks operating in the state under the authority of a trip permit. Trucks which are fully registered or prorated in the state have registration plates on the outside of the vehicle. Since the fact this latter group of truckers have paid their registration fees in the state is readily visible to the regulatory officer by merely glancing at the vehicle, they will seldom be stopped except when suspected of being overloaded or for an occasional spot

check. The truck operating under a trip permit on the other hand has no means of exterior identification to show that he has paid the necessary fees allowing him to operate in the state. As a result these truckers may be stopped each time they come across a regulatory officer. Generally each regulatory officer operates in a certain designated section of the state; if the trucker crosses two or more of these sections while en route to his destination, it is quite possible that he could be stopped in each. If the trucker has paid the necessary fees, the check will usually only take a matter of minutes. However,repeated stops, although not resulting in an extreme delay, serve to operate as an annoyance to the truckers who may view them as just another device to make operating in the state more difficult and frustrating.

A regulation which is also complained of on occasion is the restriction on the 20 mile free zone available to Minnesota, South Dakota, and Wisconsin truckers which directs that they come into the state at the entrance point nearest their destination. Some feel the regulation should be changed to allow the trucker to enter at any convenient point and travel any distance within the state to reach his destination if he at all times stays within the 20 mile limit from the state's border. This would allow truckers operating in the eastern part of the state to enter at any point along the Minnesota border and take advantage of Interstate 29 rather than use Minnesota state highways to the entrance point nearest their North Dakota destination.

Some comments have also questioned the legality of the use of portable scales and split axle weighting in checking the gross weight of trucks. They suggest that any scale which is incapable of weighing the entire truck cannot serve as the basis of a fine for the gross weight of a vehicle being over the legal limit. N.D.C.C. 39-12-07 however makes no restriction on the type of scale which must be used and in fact specifically allows the use of portable scales.

The weight of the argument is lessened even further by the fact that in practice the trucker is given the option of a second weighing at a stationary scale if he is not satisfied with the weight registered by the portable scale. Certainly if an overload fee is based upon a particular wheel or axle being overweight, the use of split axle weighing or portable scales would seem to be without challenge, provided the scale is accurate. If the fee were based upon the gross vehicle weight as being over the legal limit, the use of split axle weighing and portable scales would again seem to be without challenge unless it could be shown that the method of determining gross vehicle weight with such weighing devices may result in a gross vehicle weight in excess of the gross vehicle weight which would be obtained if the entire vehicle were weighted with one instrument and one weighing.

A possible cause of some of the criticism directed at North Dakota truck regulations and regulatory practices may be the degree with which North Dakota regulations are enforced. It is generally felt that North Dakota enforces its truck regulations as well or better than most other states. This can be a problem or a benefit depending on which viewpoint one takes. In terms of minimizing road damages and maximizing safety and user fee revenue it would seem that if a regulation is worth adopting, it is worth enforcing with some degree of stringency. Some feel however that such a degree of enforcement may be overzealous when compared with enforcement in other states if its net effect is to discourage trucks from operating within the state. The determining factor then comes down to what type of trucker is discouraged from entering the state because of fairly strict enforcement practices, if in fact any are discouraged at all. If the enforcement only discourages the trucker attempting to operate illegally through vehicle overloads and the avoidance of paying user taxes, then the enfocement is performing its purpose and is laudable. If, however, stringent enforcement also discourages the trucker who tries to operate legally, then it is counterproductive to improving

the availability of transportation. The latter situation is probably not so much a direct result of the degree of enforcement as it is the burden caused by the particular regulation sought to be enforced. Thus the real question is whether the regulation is a burden to the trucker rather than the enforcement of the regulation.

In a number of instances North Dakota's enforcement practices are actually appreciated by the trucker attempting to operate legally. If enforcement practices accomplish their objective in preventing illegal practices such as overloading and fee avoidances, it allows the operator who tries to operate legally to do so without having to compete with operators who cut expenses through such illegal practices. Practices such as ports of entry which are open on a continuous basis are also appreciated by the trucker who tries to operate legally. Such stations are a convenience in that they allow the operator to obtain the necessary permits with a minimum degree of effort whenever he decides to enter the state whether it be day or night.

The question of whether truck regulations and regulatory practices actually operate to decrease the availability of motor carrier transportation in the state is a difficult one and one which is probably incapable of being answered with any degree of mathematical accuracy. With the exception of spring load restrictions, it does not appear that the burden of any individual North Dakota regulation or regulatory practice operates in itself to reduce the number of trucks entering the state to any significant degree. The combined burden of some of these regulations and regulatory practices has however on occasions in the past prevented truckers from coming into the state. The most noticeable effect is the trucker who is operating in Minnesota and refuses to cross into North Dakota to obtain a load unless he is unable to secure a load in Minnesota so as to avoid the payment of additional fees which are an added operating expense to him. The extent to

which this occurs and its net overall effect of truck transportation availability in the Red River Valley is probably not a significant factor in causing severe transportation shortages to move the North Dakota potato crop.

A more important question is whether the elimination of certain fees and regulations would operate to bring truckers into the state, particularly those deadheading from other locations, who have not previously considered doing so. It is difficult to judge which regulations or fees could be eliminated or reduced to achieve a sizeable increase in the number of trucks entering the state since there is a number of other factors which will certainly influence an operator's decision to make a particular trip. It is probably only after actual experience that an accuarte determination could be made.

A complaint unrelated to state regulatory practices but which affects the transportation of bag potatoes relates to charges made to unload such packaged commodities at some destinations. At some destinations local union rules require the truck to obtain swampers to unload his truck. Swampers usually charge a trucker about $30 to $50 to have his truck unloaded. To avoid such charges truckers prefer to haul bulk potatoes in most instances to the detriment of the bag shipper. It is estimated that 95 percent of the truckers will request bulk potatoes over bagged if both are available.

D. TRAILER-ON-FLAT-CAR TRANSPORTATION[32]

1. Soo Line Plan II½

The trailer-on-flat car (TOFC) service, commonly referred to as "piggyback," is a rather recent, but rapidly growing development. Based on surveys by the Association of American Railroads, fewer than 3,000 mechanically refrigerated trailer-on-flat car units were in service in 1963. By 1970, this had expanded to over 19,500 general purpose TOFC units, of which some 12,000 were railroad owned and the remainder owned by users.

The phenomenal growth of this service in a brief period of seven years is due largely to its convenience and flexibility. Produce can be loaded at the shipper's plant, whether located on a rail siding or not, hauled to a loading ramp, loaded onto a flat car, moved to market via rail, and then rolled off the flat car at a destination ramp and hauled over the road to the buyer's plant.

Many of the TOFC units are owned by the railroads or railway-controlled car lines. Others are owned directly by users, such as product shippers or receivers. Construction, insulation, and refrigeration equipment are essentially similar to that described for over-the-road trailers. Differences, were they exist, largely involve structural strength to resist the longitudinal shocks sometimes encountered in rail hauls, and extra size fuel tanks to keep the diesel engine operating on longer trips

Nationally, rates for this service tend to be somewhat lower than in railway refrigerator cars. This is particularly true when one shipper can load two TOFC units on a flat car to take advantage of the flat car rate. Under the usual tariff the shipper pays a fixed freight and protective service charge for the two trailer loads. Rates for the service do vary however according to the plans offered by the carrier and the one selected by the shipper. These plans usually vary according

---

32. Source: (32,43).

to whether the trailer is railroad owned or shipper owned, whether the railroad provides ramping and deramping services, the liability assumed by the carrier, etc.

Up until now the Soo Line is the only railroad in this area which has offered piggyback service for the transportation of potatoes. The Soo Line began providing TOFC service in 1972. Since that time demand has fluctuated from year to year depending on the availability of the more traditional modes of transportation. For example in 1975 the Soo Line moved almost no potatoes with piggyback. During the last two years use of the service has picked up dramatically. During the past shipping season the carrier shipped 746 trailers carrying an average net product weight of about 42,000 pounds, for a total of about 313,320 hundredweight of potatoes. These potatoes were shipped primarily to destinations in the south and southeast such as points in Virginia, the Carolinas, Georgia, Florida, Tennessee, and Louisiana.

The TOFC service offered by the Soo Line is termed a "Plan II½." Under this plan, the product is shipped in carrier owned trailers, the carrier provides the ramping and deramping service, and assumes liability for the load while in transit. At present the Soo Line operates two loading ramps in this area, one at Thief River Falls, Minnesota and one at Detroit Lakes, Minnesota. During the past season the great bulk of the potatoes shipped under the plan were ramped in Thief River Falls.

The complete TOFC transportation service as it was performed this past year can be described as follows: When the shipper desires to move his product by piggyback he requests the number of trailers he needs from the railroad. The shipper then secures the owner of a tractor to pick up the trailer at the loading ramp and transport it to the shipper's warehouse where the trailer is loaded. After loading the trailer is moved back to the loading ramp by tractor where two of these trailers are loaded on a flat car by the railroad. The flat cars are then shipped from Thief River Falls to Chicago where they were deramped. The trailers are then transported

by tractor to the loading ramp of a connecting carrier from where they were shipped to their final destination. At the destination point the trailers were deramped and transported to the buyers plant where they were unloaded and billed for return.

The trailers were transported by tractor within Chicago to avoid excessive delays to switch the cars to a connecting carrier which can take between one and one-half days to four days while deramping, ramping, while transportation to the connecting carrier by tractor could be accomplished in a matter of hours.

The trailers were shipped from Chicago to the destination on rail lines to the southeast. They were shipped under Plan II½ FAK (Freight All Kinds) on those lines. The rate charged by the Soo Line was $1,103 for 84,000 pounds from Thief River Falls to Chicago plus a $65 drayage charge to move the trailer from the Soo Line ramp in Chicago to the ramp of the connecting line. The connecting lines charged a flat rate for 77,000 pounds to the various destinations plus a per hundredweight charge for the number of hundredweight the net load of the trailers exceeds 77,000 pounds, or in the usual case of potatoes from the Red River Valley, 70 hundredweight. In addition the southeastern lines would also assess a per trailer protective service fee. The shipper would also be responsible for paying the drayage charge from his warehouse to the Soo Line ramp in Thief River Falls. That charge was generally assessed on a per trailer basis from the shipper's warehouse to Thief River Falls. Based upon last season's rates plus the recently approved general rate increase for the railroads, the total TOFC charge from Grand Forks to four selected locations for two trailers loaded with a net product weight of 42,000 pounds per trailer is shown in Table 20.

The trailers were all shipped to southeastern locations because the eastern rail lines did not offer a plan II½ for perishable commodities. With the use of connecting railroads, the Soo Line hopes to achieve an average turnaround time from

TABLE 20.

TRAILER ON FLAT CAR RATE ON SOO LINE PLAN II½ FOR TWO TRAILERS LOADED TO 42,000 POUNDS PER HUNDREDWEIGHT

Grand Forks to:	Drayage to Thief River Falls	Freight Rate to Chicago	Drayage w/in Chicago	Rate from Chicago	Protective Services	Total Charge per Hundredweight
Jacksonville, FL	$.19	1.38	.08	1.67	.14	3.46
Atlanta, GA	$.19	1.38	.08	1.18	.11	2.94
New Orleans, LA	$.19	1.38	.08	1.42	.11	3.18
Memphis, TN	$.19	1.38	.08	.97	.11	2.73

Thief River Falls to all points of 21 days. The Soo Line also feels that if the trailers were destined simply for Chicago the average turnaround time from Thief River Falls would be ten days. An average turnaround time of 21 days would allow the trailers to make approximately eight trips between the first of December and the end of May.

The use of the TOFC service this past season was generally quite well received although some problems were experienced. One of the problems the railroad had was with loss and damage claims although this problem was not overly serious. Of the nearly 750 trailers shipped, approximatley 15 loss and damage claims were filed although the damages usually did not affect the total load of the trailer. It was estimated that approximately 90 percent of the damage claims arose as a result of mechanical failure of the refrigeration units or the diesel engines which ran the refrigeration units on the trailers. In an effort to minimize these claims in the future, the Soo Line undertook a study to determine their causes and make recommendations for their prevention. The study made a number of recommendations which should eliminate or minimize claims for future shipments. The most important of these is that thorough inspections of the loads and the mechanical units of trailers leaving the Red River Valley destined for Chicago will be made at Minneapolis, Minnesota, Stevens Points, Wisconsin, and Chicago, Illinois.

Another problem experienced this past shipping season involved a general lack of equipment and high turnaround times for some of the equipment, the former being influenced somewhat by the latter. Although the Soo Line leases nearly all of the trailers and most of the flat cars used for the service, they simply did not have enough equipment to handle the huge demand for transportation experienced this past season. It is estimated that had the railroad had sufficient equipment, the demand existed this past season to ship three times the number of trailers which were moved. The shortage of flat cars was one of the contributing reasons for unloading the trailers

off the Soo Line cars in Chicago and transporting them to the connecting line cars by tractor. This made more efficient use of the flat cars in two ways. First of all the cars could return immediately with empty trailers back to Thief River Falls. Had the trailer been transported to the connecting line by rail rather than truck the flat cars would have been tied up between two and four days for switching. This switching time would have been doubled if the empty trailers would have also been transported from the connecting line to the Soo Line by locomotive. The practice of deramping the cars in Chicago also allowed the Soo Line to keep its flat cars on its own track. Had the trailers been transported the entire distance to their destination on Soo Line flat cars, those cars would naturally have been tied up the extra transit time involved in moving the trailers from Chicago to the destination point and returning. This would have resulted in each flat car carrying considerably fewer trailers from the Red River Valley to Chicago. Also had the cars been switched to a connecting line, the connecting lines would have quite likely used them after they were unloaded to transport other products to other destinations rather than immediately returning them to the Soo Line at Chicago. This practice of the connecting lines using the TOFC equipment for its own purposes rather than immediately returning it, was a primary cause of the lack of sufficient trailers this past season. With the huge demand for such trailers caused by the severe transportation equipment shortage this past winter, many of the trailers were diverted to haul goods for the connecting line's own shippers rather than immediatly returning them. As a result some of the trailers were able to make as few as one or two trips with loads of potatoes during the entire shipping season.

A relatively recent announcement by the southeastern line that they plan to cancel their protective service tariffs for the upcoming shipping season may quite likely mean the end of transporting the trailers from Chicago by rail. Although

the Soo Line has requested those lines to reconsider their decision, at this time it appears that those lines will no longer accept trailers loaded with perishable commodities. In an effort to deal with the announcement of the southeastern line, the delays caused through the use of a connecting line, and to assess its own profitability in transporting potatoes by piggyback, the Soo Line this summer undertook a study of its TOFC service. One of the alternatives which is strongly being looked at is the possibility of transporting the trailers the entire distance from Chicago to the trailer's destination by tractor. The railroad hopes to locate truckers in Chicago who have authority to carry other commodities from major potato markets into Chicago or who simply have an excess capacity of tractors. These truckers would then transport the Soo Line trailers from the Chicago ramp to the destination and then return them back to the Soo Line in Chicago. If the trucker had authority to carry other commodities from the market destination into Chicago, he would be allowed to use the Soo Line trailer to transport those commodities. If the trucker had no such authority the railroad probably wouldn't allow the trucker to transport another commodity as a back haul, unless that back haul could be picked up en route back to Chicago and be destined for Chicago or to some other point on the Soo Line railroad. To allow the non-authority trucker to transport a back haul destined for some location other than Chicago or another point on the Soo Line would result in excess delays. For instance, this past season the Soo Line trailers returned with back hauls about ten percent of the time, usually loaded with produce destined for Winnipeg. The extra time involved in moving the trailer to Winnipeg and back on the flat cars often resulted in a delay in the turnaround times of the trailers of ten days.

If tractors were used to transport the trailers from Chicago to their destination, the potato shippers freight bill would likely consist of the drayage charges from his warehouse to the Soo Line loading ramp, the TOFC freight rate from the loading ramp

to Chicago, and the truck rate from Chicago to the market destination. In terms of comparing the total transportation charge in this manner with transportation through the use of connecting lines, it is necessary to compare the truck rate from Chicago to selected destinations with that of the rail rate plus protective service charges, plus the Chicago switching fee between the same points. Based upon the charges shown in the previous listing of rates from Chicago to the four market destinations the cost of using the connecting lines was between $.74 and $.82 per mile per trailer. Although the truck rate for transporting the trailers might vary depending on whether the trucker had a back haul for the trailer into Chicago by which he might reduce the operating costs, it is generally felt a sufficient number of truckers would be attracted to undertaking the transportation, even if a back haul were not available, if a rate between $1.10 and $1.20 per loaded mile were offered with such rate including the cost of returning the empty trailers. Although the per mile truck rate is considerably higher than the per mile rail rate, in most instances highway mileage is shorter than the rail mileage, so the disparity is not as great as it may appear. Using the TOFC freight rate of the Soo Line, plus a drayage charge of $80 per trailer, and a $1.20 per loaded truck mile rate, the TOFC total transportation charge of moving potatoes from Grand Forks to selected locations in the above described manner is shown in Table 21. It should be noted that tranpsortation of the potatoes through Chicago to some of the selected locations would result in some inefficient circuitous routing. In an effort to eliminate this the Soo Line is studying the possibility of developing a TOFC rate from the Red River Valley to Minneapolis from where the trailers destinef for the more western locations would be moved by tractor. This would result in less circuitous routing and a resulting lower freight bill. At the present time no TOFC rate has been published for transportation between Thief River Falls and Minneapolis, however a "ball park" estimate of such a rate would be approximately $300 per trailer.

Based upon this estimate a transportation charge using TOFC between Thief River Falls and the selected locations via Minneapolis is also shown in Table 21.

Transportation of the trailers by tractor from both Chicago and Minneapolis would allow the use of the TOFC service to a larger number of markets, particularly those in the midwest and the east, two of the locations where transportation to is the hardest to locate. The use of the tractors to transport the trailers to their destination would also reduce the transit and turnaround times of the trailers. It is estimated that the use of tractors would reduce the expected average turnaround times of the trailers from 21 days to 13 or 15 days. The additional areas which could be served, together with the reduced transit times, have led many people in the potato industry to believe this intermodal method of moving the product may be at least a partial solution to many of their current transportation problems.

In a further effort to reduce the costs of the TOFC service to the potato shipper and make it more convenient, the Soo Line study is also considering the possibility of opening a trailer loading ramp in North Dakota, most likely at either Ardoch or Forest River. Although the rail rate from such a dock to Chicago would be higher than the rate from Thief River Falls to Chicago, the increased rate should be more than offset by the reduced drayage charge the shipper would have to pay, resulting in a net reduction of the total transportation charges.

Probably the most important determination to be made by the Soo Line Study is the assessment of the profitability of the TOFC transportation of potatoes for the railroad. The results of that study will determine both the future rate level from the Red River Valley to Chicago and the future availability of the service. If the study proves the service at its present rate level to be unprofitable, those rates will have to be raised. However if to raise the rates to a level at which the service would be profitable also means the rates would no longer be competitive with the rail and truck rates, the service would likely be discontinued. Regardless

TABLE 21. ESTIMATED FREIGHT COSTS FOR POTATOES FROM GRAND FORKS TO SELECTED LOCATIONS; SOO LINE PLAN II½ FROM THIEF RIVER FALLS, MINNESOTA TO MINNEAPOLIS AND CHICAGO AND TRACTOR BEYOND (dollars per hundredweight)

Grand Forks to:	Drayage to Thief River Falls	TOFC Rate from TRF to Minneapolis	Tractor Minneapolis to Destination	Total Cost per cwt via Minneapolis	TOFC Rate from TRF to Chicago	Tractor Rate from Chicago to Destination ($1.20/mile)	Total Cost per cwt via Chicago
Minneapolis, MN	.19	.71	---	.90	---	---	---
Chicago, IL	.19	.71	.57	1.47	1.38	---	1.57
St. Louis, MO	.19	.71	.79	1.69	1.38	.41	1.98
Kansas City, MO	.19	.71	.64	1.54	1.38	.72	2.29
Cleveland, OH	.19	.71	1.05	1.95	1.38	.48	2.05
New York, NY	.19	.71	1.73	2.63	1.38	1.16	2.73
Washington, DC	.19	.71	1.53	2.43	1.38	.96	2.53
Memphis, TN	.19	.71	1.20	2.10	1.38	.76	2.33
Atlanta, GA	.19	.71	1.56	2.46	1.38	.99	2.56
New Orleans, LA	.19	.71	1.76	2.66	1.38	1.31	2.88
Dallas, TX	.19	.71	1.34	2.24	1.38	1.31	2.88
Oklahoma City, OK	.19	.71	1.14	2.04	1.38	1.13	2.70
Houston, TX	.19	.71	1.68	2.58	1.38	1.54	3.11

of the results of the study it is quite likely that the Soo Line will continue to offer the TOFC Plan II½ for the next two seasons as they have leased the trailers they are presently using for the service for that period of time. Continuation of the TOFC Plan II½ beyond the two year period will likely depend on the extent of the demand for the service and its profitability to the railroad.

2. Burlington Northern Plan III Proposal

Concurrently with its announcement that it did not intend to invest in any new rail equipment for the transportation of potatoes from the Red River Valley, the Burlington Northern Railroad also announced its willingness to develop a TOFC Plan III service if there was sufficient interest and demand by the shippers in using such a service. The Plan III proposal by the Burlington Northern would involve the use of shipper owned or leased trailers. The railroad would assume no liability for the commodity for loss or damages resulting from the failure of the mechanical refrigeration units while the trailers were in transit, nor would the railroad guarantee delivery times of the trailers to their destination, nor would it pay the shippers a per diem charge or give a mileage rate allowable for the use of the shipper owned trailers. The Burlington Northern would however inspect trailers upon request at regular inspection points to determine whether or not the unit was operating satisfactorily at a charge of $28 per trailer. Bills for fuel, oil and other supplies including repairs needed at these inspection points would be rendered against the shipper on the basis of cost. The rate proposed by the Burlington Northern plus the recent general increase would be about $1,085 for two trailers loaded to 42,000 pounds each, moving from Grand Forks to Chicago. The proposed rate also included return of the empty trailer. If two inspections were performed on each trailer's mechanical refrigeration unit between Grand Forks and Chicago, an additional charge of $112 would be incurred. Fuel costs for the two trailer's refrigeration units would add at least an estimated $100 to the cost

of transporting the two trailers. The total cost of transporting the shipper owned trailers from Grand Forks would be about $1,300. This compares with a rate of $1,160 from Thief River Falls offered by the Soo Line's Plan II½ where the carrier owns the trailers and assumes liability for loss and damages. Even with the inclusion of drayage charges from Grand Forks to Thief River Falls the freight bill to the shipper would be approximately the same under the two plans, although the shipper would have to make a considerable investment in equipment and assume a great deal of liability for loss under the Burlington Northern proposal.

Although some interest was shown in the idea of a TOFC plan III, the overall, reception of the Burlington Northern proposal was not enthusiastic. The rates offered were generally felt to be too high for the services the railroad was proposing to offer. The railroads' refusal to grant a per diem charge or mileage allowance for the shipper owned trailers was felt to prevent assurance that the trailers would be delivered and returned promptly. Without such an assurance the shippers were without a means of guaranteeing that the cost of investment in the trailers could be spread out over a number of loads per year. Thus the proposal by the Burlington Northern as it was offered was seen as another indication by that carrier that it was not strongly interested in the transportation of potatoes for the long term future.

Many of the area's shippers also object to the whole concept of shipper owned equipment under a Plan III. A general feeling is that a potato grower should not have to invest in transportation equipment simply to be assured his product will be moved to market. Growers would rather invest their money in their own business of the production and storage of potatoes than in the railroad's business of transportation. Thus, becuase of the shippers general lack of interest in the Plan III as proposed, and the railroads so far refusal to modify the proposal, the future of the Burlington Northern Plan III proposal is quite uncertain at this time.

CHAPTER III

ALTERNATIVES FOR IMPROVING THE AVAILABILITY OF TRANSPORTATION.

A. INTRODUCTION

There are a number of alternatives available to both shippers and carriers of fresh potatoes from the Red River Valley which would aid in improving the availability of transportation for that product. The alternatives are aimed at either increasing the total number of units available to move the commodity or improving the efficiency of those units presently being used. This chapter attempts to list the more feasible of these alternatives and discuss's the advantages and disadvantages of each as well as the ability of the alternative to contribute to the overall availability of transportation. The sections of the chapter divide the alternatives into the different type modes of transportation they are directed toward.

B. TRUCK TRANSPORTATION ALTERNATIVES

1. Private Operation Alternatives

A means by which the State's producers could assure themselves of an increased number of trucks to carry goods from the state is to increase the number of goods coming into the state to serve as backhauls for the movement of potatoes. It is the movement of these goods into the state which in most cases dictates the number of goods coming into the state which could serve as backhauls for potatoes is going to be dependent on the area's population, it does not appear that there is much that can be done to improve the balance of the flow of products to and from the state. Consequently alternatives directed toward motor carrier transportation which could be undertaken by the private sector are limited to making more efficient use of the carriers which are available, encouraging truckers to dead head into the area from nearby population centers, and development of shipper owned transportation equipment.

(a.) More efficient use of available carriers. This study suggests two main alternatives which may be undertaken to make more efficient use of motor carriers

currently available to haul potatoes. The first of these is the more active solicitation of truckers who are carrying goods into the state and whom could be carrying potatoes as a backhaul but are not currently doing so. The most obvious of these carriers is the common carrier. There are a few carriers having common carrier authority into the state whom could be using potatoes as a backhaul for this authority but who have done so on only a very limited basis in the past. Since these carriers do not generally solicit loads, theyare often simply overlooked by shippers as a potential means of moving their product. Since many of these common carriers operate on a regular schedule basis between their points of authority, the obvious advantage these carriers offer is a fairly constant weekly flow of vehicles from the valley which could be carrying potatoes. The disadvantages these carriers have is that they have authority to operate only between a limited number of points. Most of the common carriers in the Red River Valley have authority between this area and nearby major distribution centers such as Minneapolis, Duluth, Chicago, Milwaukee, etc. Many of these distribution centers however are also significant markets for Red River Valley potatoes.

Disadvantages in the transportation of potatoes from the common carrier's stand point can be the unloading time involved in transporting that commodity. Since the common carrier usually operates on a set schedule, it is necessary that its vehicles be ready and available to meet that schedule. Some common carriers point to instances in the past where they have hauled potatoes but have had their trucks tied up for an unreasonable length of time while the truck was being unloaded, thus preventing that vehicle from being used on its scheduled route. Also most truck drivers for regulated carriers are union members whose contracts entitles them to payment whenever they are with the vehicle, whether actually driving it or not. Time spent in locating a load and having it unloaded can result in high labor expenses without a corresponding amount of revenue if those times become excessive. Efficient use of this carrier in

particular, would require extreme cooperation between the shipper and receiver and the carrier to be effective.

The freight rate for potatoes has also been a problem in the past preventing use of this type of carrier. The carrier has contended that the rate shippers were willing to pay was too low and shippers felt the common carrier rate was not competitive. In recent years however as rates set by other types of motor carriers have risen and become stablized,they are at a level which most common carriers would probably consider attractive.

The increased use of the regulated common carrier is an alternative which could be attractive to both the carrier and the shipper moving potatoes to the less distant markets such as Minneapolis and Chicago. These carriers should be given more consideration by shippers, especially those shippers who are able to move a fairly steady volume of potatoes to markets which are serviced by the local common carrier. Also, during periods of transportation shortages, these carriers should be more actively solicited.

In addition to the regulated common carrier the potato industry should also solicit either local exempt carriers or other regulated carriers with authority into the area who have the capacity to haul potatoes from the Valley but at this time aren't doing so. Encouragement by individual shippers or a shipper association may entice a few carriers to use potatoes as their backhaul, who in the past may have opted for another commodity or no backhaul at all because of inconveniences they envisioned in hauling potatoes but are not doing so, may be small in number they should not be overlooked. These carriers are already operating in the area and may require only a minimum degree of negoiation to attract them to transporting potatoes.

A second means of making more efficient use of currently available motor carriers is to assure that each load is carrying its maximu legal amount. As

pointed out previously, North Dakota spring load restrictions act to hamper this objective during the months they are in effect. Load restrictions on state roads which are stricter than allowable load limits on the interstate system during any part of the year, serve to reduce the total number of potatoes moved per carrier as a result of load restrictions during a very small portion of the carrier's line haul.

One alternative to minimizing the effect of spring load restrictions is to have potatoes stored at warehouses adjacent to the interstate. This would allow trucks to be loaded to the interstate legal load limit and would minimize damage to the state's highways during the spring load restriction period. Although this alternative offers the advantage of more efficient use of available truckers, it also offers a number of disadvantages. The most obvious of these is that huge investments have already been made in potato warehouses at their present locations. The economics of moving or abandoning an existing warehouse and warehouse site for one along an interstate highway to minimize the effect of a regulatory practice in operation six to eight weeks a year, is simply not justified. Consequently, this alternative is feasible only for new or replacement storage. Since the amount of new or replacement potato storage which is built in any one year is quite small, this alternative is certainly no short term solution to minimizing the effect of spring load restrictions. Even for the shipper contemplating new or replacment storage the alternative offers disadvantages. Since only a small number of the potato producers have their operations based along an interstate highway, the construction of storage on such a site necessarily means it will be disjointed from his other operations. This results in increased transportation costs to the producers during harvest when the crop is transprted from the farm to the warehouse. When the warehouse is located separately from the producer's other activities it also lessens the degree of supervision he can maintain over the storage site or

else increases the cost of such supervision. A producer's hired labor is also often used in other farm activities as well as assisting in storage related activities such as loading vehicles. When the sites of these two activities are located at a distance from each other, it necessarily means the use of the producer's hired labor is less efficient. In addition, if a producer were to locate new or replacement storage along the interstate system, it may prevent him from locating that storage along a railroad spur line, if the two modes of transportation are not within relatively close distance to each other. Although the rate of the railroads in the transportation of potatoes has decreased in recent years, it still carries a sizeable portion of this areas potato crop and will continue to do so in at least the near future. By locating his storage facilities off of a railroad line the potato shipper foregoes any opportunity of using that mode of transportation other than TOFC. This could place such a shipper at a significant disadvantage in the movement of his product particularily during periods when the availability of truck transportation is short. Also, since the railroads have indicated they are working on the development of proto type vehicles for the transportation of potatoes and other perishable commidities in the future, it is quite possible rail transportation could again arise to its former position of prominence in the movement of potatoes in which case the shipper whose storage facilities were located off a rail line would again be at a severe disadvantage. The combination of the above factors makes this alternative unfeasible for those shippers located a significant distance from an interstate highway, and unacceptable to all but a few shippers who are located closer to such a highway.

(b.) Attract carriers from other areas. Activities which could be undertaken by the area potato industry to attract motor carriers in deadheading into the valley to pick up potatoes have the potential of a significant impact on increasing the total number of motor carriers available. Since it is not likely that the number

of goods flowing into this area will increase significantly in the future, and if shippers are forced to depend on motor carriers as the primary or exclusive transportation mode, it is imperative that more truckers be attracted into the valley from other locations to pick up potatoes as a backhaul. The two main types of activities which could be undertaken to encourage motor carriers from other areas to deadhead into the Valley to haul potaotes are active solictation of those carriers and improving the profitability of truck transportation of potatoes; the success of the first may be dependent upon the second.

Naturally the most obvious way of improving the profitability of potato transporation for the trucker is to pay them a higher freight rate for such transportation. However, since the freight rate affects directly the amount of revenue the producer receives for his product, the setting of such rates can be a delicate process. If the rates are set too high the producer must sell his product for a higher price to compensate for the rate or else accept a lower amount of net revenue for his product.

Since the Red River Valley producers operate in a nationally competitive market with a nationally competitively set price, any attempt to sell his product above that price will prevent him from marketing his potatoes and continually accepting a lower amount of net profit from his product to compensate for higher transportation cost will place him at a competitive disadvantage, which will eventually force him out of the industry. Thus, while it may be possible to slightly adjust freight rates and still remain competitive, a full scale adjustment of the motor carrier rate structure to attract a large volume of carriers could eventually spell the end of the potato industry in the Red River Valley. On the other hand, it is quite possible the level of rates as they are currently set are already too high in the sense they place the area producer at a competitive disadvantage. Certainly many area producers would agree with this latter contention.

If significant numbers of motor carriers are to be attracted into the area to

to haul potaotes, alternatives improving the profitability of the transportation to the trucker within the existing rate structure may be more feasible than a wholesale increase in that rate structure. The alternatives which accomplish increased profitability must be directed at reducing the truckers costs, either in terms of reducing the direct costs he encounters or reducing delays associated with transportation. One means of reducing both direct costs and delays is to request governmental agencies to take steps in minimizing or eliminating costs and delays associated with various regulatory practices. This alternative will be discussed in detail later. Another alternative is replacement of the private broker with a shipper operated service which would serve as a clearing house for shippers and truckers. The obvious advantage of this alternative is that it could eliminate or reduce the eight percent brokerage fee many of the truckers entering the area must pay to secure a load. In many instances, this brokerage fee, can reduce the total amount received by the trucker for the transportation of the commodity from between $50 and $100. Those additional amounts in the hands of a trucker could often spell whether he makes a profit or not and determine whether he makes a particular run especially when he must dead head from a distance to secure the load. The obvious disadvantage of such an alternative is it could eliminate the private truck brokerage and the services they perform not only for the potato shipper but also the trucking industry and the community in general. These brokerages have served as a valuable part of the potato industry for a number of years and any alternative which could hamper them or spell their elimination must be studied carefully. As discussed in Chapter 2, the truck broker does more than simply act as a clearing house but also provides information, billing, advancing operating funds, assuming liability etc. Any shipper controlled service designed to replace the truck broker should also be prepared to provide most or all of these other services, the provision of which would necessarily increase the cost of such a service. However, it should

not be discounted that one central shipper clearing house could be an advantegeous service especially to the trucker who is known to be financially stable and trust worthy and comes into the area for a load on a fairly regular basis.

Another alternative which could be undertaken to attract truckers into the Valley is the active solicitation of these carriers from nearby population and distribution centers such as Minneapolis, Sioux Falls, or Omaha. There may well be carriers having authority between these centers and other points which are also Red River Valley potato markets, who could be persuaded to deadhead into the Valley and carry a load of potatoes as a backhaul to their other authority point or some other intermediate point. These truckers may be particularily interested in such an arrangement if a favorable preseason freight rate and volume could be negotiated with them. The provision of a shipper controlled clearing house service for truckers solicited in this manner would be particularily appropriate. Shippers would be assured of a set volume of transportation capacity between here and the points the trucker agreed to haul to and could thus schedule shipments and sales to accomodate that volume. The trucker on the other hand could call ahead to make sure a shipment was available before leaving a point such as Minneapolis. With a preseason guaranteed volume and rate and a shipment coordinating service which would eliminate delays and brokerage costs, the trucker could fine sufficient compensation for the added expense and time involved in deadheading into the Valley.

As stated previously, although whole scale restructuring of the existing rate structure might place area producers at a competitive disadvantage, it may be possible to make minor adjustments in the rate schedule which would have the effect of encouraging truckers to deadhead into the area without seriously upsetting the competitive balance. An alternative which addresses this possibly is an upward adjustment of potato freight rates during those months when transportation supplies are traditionally short. Currently, the number of motor carriers available usually decreases during the more severe winter months of latter December through the first

part of March. The added expense and risk involved in operating during these colder months has prevented truckers who might ordinarily do so from deadheading into the Valley. Unfortunately, it is these same months when the demand for transportation is the heaviest in the potato industry. An upward adjustment of rates of between 5 and 10 percent during these months might not only compensate the regular carrier for his added expense of operating in the colder weather but also act as an incentitive for other truckers to deadhead into the Valley. Although the increase will reduce the net revenue the producer receives for his product, it might also encourage a sufficient number of added carriers to assure the shipper of a means of moving his porduct during his prime marketing months. The availability of adequate transportation during these marketing periods might have the effect of offsetting any revenue lost due to higher freight rates. This is possible especially if the shipper can receive a more premium price for his product during these months rather than having to sell it later when transportation is available but the quality of, and the demand for his product may have dropped with a corresponding drop in the price he will receive for it. If this alternative is to be effective however, it is necessary that the amount of the increase and the months during which it will be in effect be determined and publized at the start of the shipping season.

If this alternative has the effect of increasing the total number of trucks available during the heavy demand months, it could actually result in smaller total transportation bill for the areas potato industry. If the number of trucks available rose to the point where the acute transportation shortages experienced in the past would no longer exist, a competitive situation would exist in that truckers which have taken advantage of these shortages in the past by charging excessively high rates would no longer be able to do so.

If truckers are going to be encouraged to take advantage of the increased rate they must be made aware of it prior to its implematation. A willingness to pay an

increased rate only when a transportation shortage develops can only be expected to result in price gouging by the turckers which are available without increasing the total number of truckers, most who might not even be aware that an increased rate is available.

(c.) Shipper owned tractors and trailers. - One means by which shippers could increase the number of trucks available and assure themselves of access to these vehicles is to purchase and operate their own tractors and trailers; in essence become private carriers. The two advantages to this alternative are the increased number of trucks available and the shippers control over those vehicles. However, coupled with these advantages are also a number of disadvantages. The first of these is the investment costs of such an undertaking. The cost of a new tractor and trailer can easily exceed $75,000. Add to this operating costs such as driver wages, fuel, taxes, and insurance, and the costs simply becomes prohibitive for most porducers especially when a shipper has demands for investment capital and operating funds within his own production activities. Even if a producer had the capital and was willing to invest in a tractor - trailer combination such a unit would probably not be able to move his entire crop, especially within the period he may want or be able to market that crop. For example, a single tractor - trailer combination would not be adequate to move a sizeable crop of a seed potato producer who must market that crop primarily during the months of January through March.

Even if a shipper were able to invest in a number of transportation units or if a shipper association were to purchase and operate such units, these units could not be operated profitably on one - way shipment of potatoes from the Red River Valley. Since potatoes move from the Valley only over six or seven months of the year, it would be necessary for these shippers to find other commodities to haul during the remainder of the year to enable them to recoup their investment. In addition, it has been estimated, that a private operator would need to find backhauls.

Thus in the long run the total number of vehicles available to transport commodities would remain relatively the same.

(d.) Formation of an agricultural cooperative. - Closely related to the previous alternative of shipper owned and operated transportation is the creation of an agricultural cooperative consisting of area producers which would own its own transportation system. Generally this alternative offers many of the same advantages and disadvantages of ownership by individual shippers. There are however, a few distinct differences which make this alternative more favorable than the prior one. The most important distinction is that an agricultural cooperative can ship non-agricultural goods for its own members plus a limited amount of such goods for nonmembers. This allows such a carrier to secure non agricultural commodities for backhauls without obtaining ICC authority. This distinction alone could easily spell the difference between profit and loss of a shipper controlled transportation operation. In addition, this alternative would not necessarily require the large capital investment by an individual shipper. Since shippers could pool their funds into such a cooperative, an individual is able to invest in a transportation system over which he has some control, but need do so only to the degree he wants. Since a cooperative system would be centrally controlled more expertise and supervision could be put into the system, making for a more coordinated service. However, a centrally controlled system also removes from the individual shipper control and assurance that the vehicles will be used to move his crop. This alternative also offers the disadvantage that it does not necessarily guarantee an increased number of vehicles if the cooperative hauls non-agricultural goods which an existing carrier is dependent upon to support his total transportation operation, part of which would include the transportation of potatoes. However, if those goods are removed from a carrier which is not hauling potatoes or from a rail carrier, particularily a rail carrier who is not transporting potatoes, then such a cooperative could have a net overall gain toward increasing the total number of units available

to ship potatoes.

As its name suggest this alternative would require a great deal of cooperation and committment of the part of anumber of shippers if it were to be successful. Preseason committments of funds and guaranteed volume of potatoes would be necessary to make this alternative successful.

2. State Regulatory Alternatives.

There are a number of regulatory changes which the state could undertake to make operation easier for the motor carrier. Whether any one or all of these changes would have a net effect on increasing the total number of trucks available in the state is difficult to predict. It is difficult to believe that any 10 or 15 dollar permit or fee is currently preventing truckers from coming into the state who might otherwise do so. However, it is not idfficult to believe that the combined burden of various regulatory permits and practices of not only this state, but every state a trucker travels through, has the effect of interfering with the flow of interstate motor carriers. A trucker who might consider deadheading 600 miles to pick up a load of Red River Valley potatoes will probably elect another option if he had to cross through two or more additional states and pay fees and conform to regulatory practices within each. A trucker can soon see his profit diminish as he pays $25 or more in user taxes to each state he must cross into.

As an agricultural state which is heavily dependent on motor carrier transportation to not only move a significant portion of its products but to also act as a competitive force with other modes of transportation to assure a reasonable level of rates, North Dakota must make a positive effort to attract truckers into the state and make operation herein as easy as practical. North Dakota's dependency on motor carrier transportation will become more acute in the future if the recent trend of railroad branch line abandonment continues. Regulatory practices which are fair and reasonable to both the carrier and the State are necessary if an optimum level of cooperation is to be acheived between the two. Practices which

serve only to hinder rather than promote, either the state's or the carrier's interest, have no place in this state's present or future regulatory system.

On the other hand, the mere fact that regulation exists or a fee is extracted does not make it unreasonable. Most of these fees and practices were enacted to serve a very legitimate purpose, and,in the majority of cases, that purpose still exists and is being served today. For instance, most of the fees and permits were established as a means of supplying revenue for the construction and maintenance of this state's highway system. No one is probably more aware of the need for a good system of roads and the revenue to develop and support that system than the motor carrier. In fact, it is probably quite possible that development of an improved road system could do more to attract motor carriers into the state than the elimination of all regulatory practices. Most motor carriers do not object to their contributing a fair share of the revenue needed to support a good road system. However, the mere fact that a trucker makes a profit from the use of the road system, rather than simply being a casual user, should not be used as an excuse to extract more than a fair share of revenue from him for the support of the state's highways. In fact, some have suggested that because of the contribution the carrier makes to this state's economy, the trucker should be encouraged to enter the state through elimination of all fees and taxes as they pertain to him. These persons feel that the added revenue which the state would receive in the form of added taxes from increased and higher income, would more than compensate for any revenue lost to the state due to the elimination of these fees and taxes. For example, it has been suggested that if sufficient transportation could be guaranteed, potato acreage and, correspondingly, production would be increased in North Dakota in many cases replacing wheat and other lower income producing crops. The added income from this increased production and its multiplier effect on the state's economy, many feel, would more than adequately compensate the states treasury for lost revenue from motor carrier fees and taxes.

The problem, of course, is whether any of this increase in general taxes would go toward the support of the North Dakota highway system or would be diverted toward other government services. At least under the present taxing scheme taxes collected from the highway system are tied to the support of that system.

The following is a discussion of alternatives for changing current regulatory practices and potential resultant effects of these changes on the state and the motor carrier industry.

(a.) Mirror reciprocity. Before examining individual regualtory alternatives, a general discussion of the concept of mirror reciprocity is in order. A definition of this concept, as it applies in the regulatory context, concerns the regulating of resident truckers from another state on the same basis as that state regulates resident truckers of this state. The concept exists as either a retaliatory measure or is intended to place pressure on the other state to change its regulatory practices as they affect this state's truckers. However there seems to be little value to the first objective and the extent to which objective the second is accomplished is questionable. As a retaliatory measure, mirror reciprocity is aimed at the other state. Yet, in effect, the only ones which suffer from the concept are this state and resident truckers of the other state. North Dakota's practice of charging Texas truckers for two trip permits, one for the tractor and one for the trailer, or the practice of requiring Wisconsin truckers to request their trip permits through the Bismarck regulatory office before entering the state, simply because that is the manner in which those states regulate out-of-state truckers, are prime examples. It is known that those practices are burdens on North Dakota truckers when they enter those states and it influences their decision whether to enter those states. When North Dakota engages in the same practice it can be assumed those practices present burdens and influence decisions of truckers from Wisconsin and Texas in entering this state. As a result truckers from those states probably enter North Dakota in fewer numbers than they would if

those practices were eliminated. The practices result in discrimination against truckers from those states,the legality of which is questionable, while serving as a detriment to this state's shippers by possibly reducing the total amount of transportation available. While the practice of charging Texas truckers for two trip permits may yield the state twice the revenue per truck, it may decrease the total number of trucks coming into the state. The practice of requiring Wisconsin truckers to request their trip permits in advance may not only decrease the number of trucks from that state and correspondingly trip permit revenue, but also result in increased administrative costs by funneling the request through Bismarck.

As stated, the second objective of mirror reciprocity appears to be to place pressure on the state to which it is directed to change their regulatory practices. Although this objective may have been accomplished on occasions in the past its rate of success is probably slowing. First of all, the other state's regulatory practice may have been instituted at the request of that state's resident truckers to prevent competition from out of state truckers. If this is the case, one can hardly expect those truckers to now request their state to change the regulatory practice. Also with states such as Wisconsin and Texas which have sizeable population centers with a number of goods flowing into the state and resultingly an abundant availability of truckers looking for back hauls out of the state, they are not as dependent on encouraging out - of - state truckers to deadhead into the state to move their agricultural products. In fact they may actually seek to discourage such out - of - state trucks to competitively protect their resident carriers. North Dakota however cannot afford such a luxury. Rather the state must do whatever is reasonable to attract out - of - state truckers to move its agricultural commodities. Thus this state would probably have better success in getting another state to change its regulatory practices through negotiation between the two states executive and administrative officials than it can hope for by exercising retalitory

practices aimed at placing pressure on another state and its motor carriers.

The North Dakota Highway Department justifies the practice of mirror reciprocity on a section of the North Dakota Century Code which states "whenever the reciprocity commission determines that it is to the best interest of the State of North Dakota and determines by reciprocal agreement or otherwise that as great or greater privileges are not granted North Dakota residents while traveling in other states or territories, they may cancel or limit the application of any exception to residents or motor vehicles from such other state or territory.[32] Although this statute provides state legislative authority to regulatory officials to apply differential treatment to resident carriers of other states on the same basis as the treatment given North Dakota resident carriers, it is not a mandatory provision to do so. Consequently North Dakota should be able to alter its policy of mirror reciprocity without the need for any legislative changes.

(b) Pro-rate registration. - The states formation of reciprocal pro-rate registration pacts has been one of the best efforts on their parts to provide for uniform and fair treatment of non-resident truckers since the advent of motor carrier user fees. Unfortunately not all states are members of these pacts, nor are all the states which are members of the pacts, members of the same pact. Idealy pro-rate registration would be the fairest and simplest to both carriers and states alike if all states had the same registration tax rates, and a resident trucker could file with his resident state or at a central location from where his registration fees would be apportioned among the states he traveled in on the basis of mileage travelled in each. Since it does not appear such a situation will develop in the near future, other alternatives to making the prorating of registration fees simpler and easier should be looked at by the state. One alternative would be for the state to join one or both of the other pro-rate pacts. This would allow resident truckers from those states to pro-rate North Dakota registration fees on the

basis as prescribed by that pact. This alternative could be particularily useful to North Dakota sine it currently does not have any prorate agreements with the more eastern states, some of which are members of the other pro rate pacts. It is also these eastern states which is often most difficult to find transportation to. If joining one or both of the pro rate pacts had the effect of encouraging truckers from the eastern states to operate in North Dakota, this alternative could be extremely helpful to improving the availability of transportation to those areas. Although a dramatic increase in the availability of trucks could not be expected, the fact that the trucker could enter the state without incurring additional expense and delay in purchasing trip permits, might encourage truckers who enter the state from those locations on occasion to do so on a more regular basis.

The state has on occasion looked into the above alternative. On those occasions they have decided aginst joining another pro rate pact. The primary reason for those decisions has been the different formulas those pacts use in determining how the registration taxes due to each state are determined, it was felt joining one of the pacts would result in a lesser amount of revenue to the state from truck registrations. However, if the volume of trucks entering the state increases as a result of joining such a pact, the additional revenue from this added volume may off set this loss of revenue somewhat. It may well be time for the state to again examine the possibility of joining another pro rate pact, keeping in mind that the actual volume of revenue received from such a venture should not be the sole deciding factor.

Another possible alternative to allow truckers from more states to pro rate their registration taxes, is to allow those truckers to file for a proration regardless of whether they are residents of a state belonging to one or the other pro rate pacts. A method by which this might be accomplished would be to allow resident truckers from states which are not members of the "Uniform Registration Proration and Reciprocity Agreement" (UPRA) to file with the state and prorate the state's

registration fees as if their base state were a member of UPRA. The trucker could simply file an application with the state's vehicle registration office stating the percentage of total miles travelled in this state and pro rate the North Dakota registration tax accordingly. Because of the paperwork involved, the trucker from the other state which travels in this state only on occasion, would probably not elect this option. However this alternative would be a great convenience to the operator of a fleet of trucks which travel in this state on a regular basis. Allowing truckers to prorate North Dakota registration fees regardless of whether they are residents of a UPRA state, combined with the availability of a trip permit for the trucker who enters the state only occasionally is probably the most equitable and easiest way registration and other user taxes can be extracted from out - of - state truckers to help finance this state's highway system. Such an effort should be appreciated by both carriers and regulatory personnel alike.

(c.) Trip permits. - This study suggests two alternatives if the use of trip permits is to be continued in the state. The alternatives pertain to both the registration and fuel tax trip permits.

The first of these suggests a change in the time period for which permits are issued. Currently the permits are issued for a period of 72 hours or until the trucker leaves the state, whichever is first. This means that a carrier which enters the state and leaves and then re-enters the state must buy two trip permits even though he may have left the state the second time within 72 hours of when he first entered. If the trip permit is seen as a user tax this practice of charging a second permit when the carrier re-enters the state within a 72 hour period is not justified. Such a carrier may be in the state and use the state's road system only a few hours during the entire 72 hour period if he is simply passing through. However he pays the same user fee as the carrier who does not leave the state but

uses this state's road system the entire 72 hour period. If the trucker's trip permit were good for the set time of the trip permit he might be encouraged to re-enter the state on his return run to pick up a backhaul,rather than return through a different state for a backhaul where he would have to pay that state's user fees. Thus not only is this alternative more equitable than the current method of issuing the permits, but it could conceivably attract more truckers to return through the state to obtain backhauls.

The second alternative concerning trip permits relates to the complaint of truckers that they are stopped an excessive number of times to determine if they have purchased the necessary permits. Any excessive stopping, if in fact it actually occurs, is likely caused by the fact that there is no outside identification on the vehicle for regulatory personnel to determine if the vehicle has paid the proper fees as opposed to a fully licensed or pro rated carrier which displays a plate. This alternative suggests as a solution to this problem that a card be issued to the trucker after he purchases the required permits which could be placed in the corner of his windsheild or taped in a conspicuous place on the outside of his vehicle. This card would identify the time when the trip permits would expire and be large enough for a regulatory office to read from his vehicle. To aid in the usefulness of these cards, it is suggested that the trip permit expiration period be changed from 72 hours to midnight of the second day following issuance. For example, if a carrier purchased a North Dakota trip permit anytime on September 23, that permit would allow him to operate in the state until midnight of September 25. The card which would be issued could then contain three or four digets indicating the month and day on which the carriers permit expires. In the above example the card would contain the numbers 925 indicating that the carriers permit expires the 25th day of the 9th month. In a glance the regulatory office could determine if the trucker had purchased the necessary permits and if those permits had expired.

This alternative could be of benefit to both the trucker and the regulatory officer by reducing the number of unnecessary stops. Regulatory office's would however still have to make periodic spot checks to prevent any tempation to counterfeit or exchange the cards between carriers. If a carrier is caught using a card which he counterfeited or did not have the proper permits, he could be assessed the full or partial cost of annual resident registration fees as a further deterent.

(d) Approved equipment permits. - This alternative suggests the complete removal of a fee for the issuance of the approved equipment permit. This fee is one of the most complained of regulatory fees required by the state, primarily because of the discriminatory manner by which it is administered. Some feel the basis of the permit itself is not justified. The permit and inspection were originally required to assure that when any axle on a truck is loaded there is no way for that axle to be unloaded in a manner to cause any other axle to be overloaded. Although a loudable purpose, single axle weight restrictions should provide enough incentive for the trucker to make sure that his equipment is working properly such that it equally distributes the load of the vehicle over the axles. If such equipment were not operating, one axle could become overloaded subjecting the carrier to an overweight fine in addition to the damage it could do to the overloaded axle.

Even if the inspection is necessary, it is simple and quickly performed and does not in itself justify a $15 fee. If the fee were justified on the basis of actual cost associated with time and labor expended in the inspection, it should be charged to trucks registered or prorated in North Dakota, not just those who must buy trip permits.

Because of the above factors, many feel the inspection fee remains in existance simply as a revenue measure. The inspection, however, cannot be justified as a user

charge either. Since the permit is a one-time annual fee regardless of how often or how long the trucker operates in the state, the fee bears no relation to the carriers use of the states highways. Considering the approved equipment fee generates less than 0.1 percent of the revenue received by the State Highway Department and the amount of discontent caused by the fee, it would appear to be a prime target for elimination. If the highway department feels that both the inspection and revenue derived therefrom are still necessary, the inspection and certificate could still be performed and issued without charge, and the amount of a trip permit raised to compensate for revenue lost through the elimination of the inspection fee.

(e.) 20 mile free zone. - The idea of a free zone along the state's borders which allows truckers to load and unload commodities therein without having to purchase permits is one which serves the state's interest in attracting carriers to move North Dakota commodities. The reason why the free zone was implemented however was as a bilatual agreement between states which would allow truckers from those states to escape user taxes for short trips rather than as a method of enticing truckers to enter the state to transport North Dakota commodities. A number of alternatives have been suggested, which would alter the present 20 mile bilateral free zone concept as an aid to also attracting additional carriers.

One alternative for changing the 20 mile free zone as it currently exists, is to eliminate the requirement that the trucker enter the state from a point which allows him the most direct route to his point of destination. This alternative would allow the carrier to operate anywhere within the 20 mile zone without having to purchase permits. The advantage of this alternative to the trucker is that he uses his choice of roads in reaching his destination. For instance trucks entering the state from the southeast could use Interstate #29 to reach any point in the Valley rather than using Minnesota state highways until they come to entry

point which gave them the most direct route to this destination. The disadvantage of this alternative is that it would allow truckers who are just travelling through the state to do so without ever paying user taxes. Trucks moving to Winnipeg could enter the state anywhere along its southern or eastern border; travel up interstate #29 the entire distance to Winnipeg and return without ever buying a trip permit.

Another alternative is to extend the free zone from 20 miles to 30 or 50 miles. This alternative offers the advantage of allowing the truckers to reach deeper into the state for loads without having to incur the cost of user taxes. The disadvantage is that it would reduce the amount of trip permit revenue the state receives.

Finally, the free zone concept could be expanded from a bilatual type agreement to allowing truckers from all states to use the privlidge. Currently, the exemption from trip permits under th2 20 mile free zone applies only to truckers from the states of Wisconsin, Minnesota and South Dakota. Expanding the priviledge to truckers from all states would probably have the greatest impact of encouraging truckers who have secured trip permits to operate in Minnesota, to cross the border into North Dakota to pick up loads for a backhaul. Although it might improve the total availability of trucks in the Red River Valley only slightly, it would definitely improve the imbalance of available trucks between the Minnesota and North Dakota sides of the Valley; an imbalance which in the past has placed the North Dakota producers at a disadvantage in securing transportation.

(f.) Spring load restrictions. - Due to the lighter payload the trucker is allowed to carry, spring load restrictions have the greatest impact of any other regulatory practice, in reducing the availability of trucks. However, these restrictions play a very important part in preserving the quality of North Dakota roads and reducing maintenance costs. The institution of the Class A load restriction on a number of the state's roads was a great deal of assistance in helping the North Dakota potato producers move his product and represents a recognition of the producers problems

and an attitude of cooperation on the part of the North Dakota Highway Department. However, until the motor carrier is able to move the 80,000 pound legal limit on the interstate system the entire length of this trip and during all seasons of the year, the spring load restrictions are going to be a handicap to the North Dakota potato producer in moving his product.

One of the most frequently mentioned alternatives to the current system of spring load restrictions is the implementation of a load restriction based on speed rather than weight. Such a system of speed restrictions have been in existance in South Dakota and parts of Montana for a number of years with conflicting reports of success both in terms of enforcement and road damage. It is noteworthy however that the state of Montana is moving from spring load restrictions based on speed back to restrictions based on weight for a number of its highways. The spring restriction based on speed is justified on a theory that the lower speeds result in less impact on the road surface. After considerable searching however, engineering studies which supported this theory could not be located. In fact, most authorities on the subject felt the lower speeds may have the opposite effect, since studies have indicated excessive pavement damage when trucks are operated at creep speeds.

Regulatory officals also point to problems of enforcement when the spring load restriction is based on speed. Two years ago the North Dakota Highway Department experimented with speed load restrictions in a section of the Red River Valley and encountered extreme difficulty in enforcing the restrictions. The temptation to climb above the restricted speed was often too great for the truckers to resist especially when they had a number of miles to travel on a restricted road. As one regulatory offical commented "you would have to place a patrol car behind every truck in the state to enforce the speed load restriction." Enforcement problems are complicated by the fact that carriers with empty or partially filled

trucks feel they should not be subject to the lower speeds. To allow an exception for the empty truck however would require a means by which a regulatory officer could identify from the outside whether the truck is loaded. In the case of an enclosed van such as used in hauling potatoes, identification of whether the trailer is loaded or not or the extent to which it is loaded can be difficult without stopping the truck. The combined factors of enforcement problems and no assurance that the speed restrictions actually accomplish their objective had led most highway department officials to sharply oppose suggestions that spring load restrictions be changed from a weight basis to a speed basis.

Another alternative to lessening the impact of spring load restrictions is the construction of more "load free" roads in the state. Currently only the interstate system and a few short sections of concrete state highways are the only roads on which spring load restrictions are not placed. If the trend for a greater dependency on trucks for the movement of agricultural products continues and if railroad branch lines are abandoned in the state, it may be necessary for North Dakota to develop an integrated system of load free highways in the state. For the present time potato industry leaders might encourage highway department officials to develop a plan for the creation of load free segments of state highways from points which contain heavy concentrations of potato storage to points on the interstate system. Such segments of highway might include:

> Highway 17 from the intersection of Highway 32 to the intersection of Interstate 29, Highway 81 from Hamilton to Grand Forks, Highway 18 from Cavalier to the intersection of Highway 17.

Development of these roads into load free highways would provide producers in the communities of Grafton, Cavalier, Hoople, Park River, Crystal, St. Thomas, Auburn and Minto with a means of loading trucks to the interstate legal load limit without interference from spring load restrictions. These communities account for 50 percent of the potato storage capacity in North Dakota. Although this alternative favors producers in certain locations and would not completely eliminate

the burden associated with spring load restrictions, it would go a long way in lessening their impact.

(g) Elimination of nonresident user taxes. - An alternative which enjoys considerable support among shippers is the elimination of user taxes as they apply to non resident truckers. This alternative would allow vehicles registered in other states to operate in this state without pro rating their vehicles, filing fuel bonds and fuel tax statements, or purchasing trip permits. Many shippers feel this is the only way the state can assure itself of a significant increase in the total number of trucks operating in the state. The one difficulty with this alternative is estimating the resultant increase in the number of trucks which would become available if this alternative were implemented. There seems no way of approximating the impact this alternative would have on the total availability of trucks without a fairly lengthy experimention period.

Although having the advantage of possibly yielding a significant increase in the total number of trucks available, this alternative offers a number of significant disadvantages. If registration was still required of resident motor carriers it is quite possible that a number of North Dakota based truckers would move their operations to another state. Since such a carrier is paying user taxes to both states now, a switch of operations to the other state under this alternative would allow such a trucker to continue paying the present level of user taxes to that state while entirely avoiding the payment of North Dakota user taxes. In effect, unless this alternative would eliminate user taxes to both resident and nonresident truckers, this alternative would discriminate harshly against the carrier which based its operations in this state. Such an effect could operate to partially off set any increasing traffic from non resident truckers. Certainly for a state which wants to increase the availability of transportation, an alternative which discriminated against its resident truckers loses some of its appeal.

Under this alternative, whether it eliminates user taxes to either or both resident and non resident truckers, a signigicant impact on the revenue collected by the state highway department can be expected. In 1977 the total elimination of special motor fuel taxes, truck registration fees, trip permits and approved equipment permits, would have meant a $10,419,314 reduction in total receipts received by the North Dakota Highway Department. That revenue amounted to over 10 percent of the receipts received by the Highway Department in 1977. That figure also nearly equals what the state spent in road maintenance during the same year. Considering the fact that over 50 percent of revenue received by the State Highway Department is received from the federal government, motor carriers are a prime source of state collected revenues.

It should be pointed out, however, that the main source of motor carrier use tax revenue is derived from resident truckers, and pro rated vehicles; receipts from trip permits and approved equipment fees account for less than two percent of department receipts. If a method could be devised by which the taxes on the occasional non resident truckers could be eliminated without encouraging resident truckers and pro rated truckers to base their operations elsewhere or change the manner of registering their vehicles, this alternative would be much more attractive.

Some feel that dispite the loss in revenue from the elimination of user taxes the alternative should be implemented. It is felt the loss of revenue to the highway department would be more than made up for by other state collections resulting from increased jobs and personal incomes if sufficient transportation were available to allow producers to maximize their production capacity in higher income commodities. Although no one is sure that the elimination of user fees would guarantee the necessary level of transportation, some feel it would be well worth the state's gamble to find out.

(h) Improved communication. - One alternative which offers a great deal of

promise toward solving a common problem is improved communication between industry representatives and state regulatory personnel. Too often in the past, the shippers have communicated thier problems to the highway department during the middle of the shipping season when transportation availability is at its shortest, tempers are high, and when there is very little the highway department can do to improve the situation. Rather than meetings as an attempt to solve a problem, they become accusatory sessions which often accomplish very little.

If the transportation availability situation is to improve, it is essential that a great deal of cooperation be encouraged between shippers, carriers, and regulators, with each recognizing the problems of the other. Representatives from these different interests could possibly meet prior to each shipping season to discuss the particular time and volume of product movement, projected availability and modes of transportation, and peculiar problems expected to be encountered. In this manner advance planning for means to eliminate or lessen the impact of problems can begin prior to the time they become acute.

3. Federal Regulatory Alternatives. -

The alternatives discussed in this section primarily require action on the part of the federal government or all the states rather than unilateral action which the state of North Dakota could take. The federal government with its power over interstate commerce possesses a great deal of potential to provide uniformity of regulatory practices to improve the free flow of motor carriers in interstate commerce. The alternatives discribed herein are by no means novel. They have been suggested and campaigned for by various interest groups for a number of years. However, up until this time, the federal government has seen itself as unfit to interfere in this area of regulatory power which has traditionally been left to the states. The alternatives are offered here as simply issues which North Dakota interests may want to join with interests from other states in requesting the federal government to change its present regulatory policies or lack thereof.

(a) National system of registration and regulation.

Since it does not appear that the states will arrive at a common agreement for complete user tax reciprocity or a central registration system for interstate motor carriers in the near future, an alternative may be for the federal government to adopt such a registration system or force the states to do so. Such a system could either allow the carrier to register his vehicles with his base state, such registration to be recognized nationwide or file his registration fees with a central office where they could be prorated among the states he operates in. Although such a system would result in added or lost revenue to some states,it would eliminate much of the red tape involved in the trucking industry through easing the burden of compliance with various state registration requirements.

Another alternative would be for the federal government to adopt or force the states to adopt, uniform height, weight and length requirements. The vast difference and complexity of the various state regulations on these subjects is simply not justified. The burden a single or group of states can place on the flow the interstate commerce is unacceptable. The fact that many state highways and all of the interstate highway system have been constructed and are supported primarily through federally collected funds is justification in itself for a uniform system of regulations on those highways.

The adoption by the federal government of these two alternatives would allow the free interstate flow of motor carriers in much the same fashion as is accomplished now with the passenger vehicle. If the states wish to retain their power and keep the federal government out of what has histroically been a state exercised area of regulation, they must begin to act in a more cooperative and unified manner or else the federal government may be required to act. A state's interest in controlling the safety and use of its road system cannot justify the present degree of burden placed on interstate commerce.

(b) Expanded operating authority for exempt carriers.

Another federal regulatory alternative is to deregulate the trucking industry entirely or to at least allow exempt carriers to carry non exempt commodities as backhuals where such backhauls are incidental to their exempt carriage. The theory is that by letting exempt carriers also carry non exempt commodities, the motor carrier industry would be more efficient and at the same time increase the total number of carriers. The theory however has its weak points depending on what degree of deregulation is being discussed. The pros and cons of this alternative has been debated for years and are beyond the scope of this study. Suffice it to say that there have been recent moves towards deregulation of not only motor carriers but the transportation industry as a whole. Area shippers and carriers may well want to study this issue in greater detail to estimate possible effect on the transportation situation in this area before supporting one side of the argument or the other.

C. RAIL TRANSPORTATION ALTERNATIVES

As has been stated a number of times in this study, the future of the Red River Valley potato industry as a major national producer is dependent upon the future availability of rail transportation in one form or another. The alternatives discussed in this section are aimed, if not at increasing the capacity of rail transportation, at least maintaining; its present capacity. It is important that this capacity be maintained for another ten to twenty years during which time either the railroads or other modes may be able to develop new types of equipment for the transportation of perishable commodities. In either event, however, an immediate problem exists which must be dealt with.

The alternatives offered in this section are heavily dependent upon the cooperation and implementation of the Burlington Northern Railroad. As some recent events have indicated that cooperation and action may not be easy to obtain especially without the support and committment of area potato shippers. If the railroads

are expected to take any future courses of action, especially action which requires the expenditure of investment funds, they are going to require some showing that such action will be profitable from their point of view. Such an assurance of profitability can only be made if shippers are willing to commit the transportation of sufficient quantities of their product to the railroad as to make efficient use of equipment. The railroad cannot be treated as a standby carrier and at the same time be expected to provide service and equipment to meet periodic demands. On the other hand, the railroads cannot expect shippers to make committments and make the most efficient use of railroad equipment if they are unwilling to recognize the problems of the potato industry and provide a service to meet these problems.

1. Private Car Ownership -

The first alternative is directed at the private ownership of railcars. There are essentially three ways in which shippers can acquire railcars for transportation of their commodities - purchase of new cars, purchase of used cars, and the leasing of used cars. In recent years there has been a trend towards the ownership of private railcars as railroads with limited investment capital have been unable to meet demands for new equipment. In May of this year for instance, over 32 percent of the covered hopper cars in this country were privately owned.[33] The advantage of private car ownership is that it increases the total number of rail cars in existance and gives the shipper a degree of control over the availability and use of the cars which it owns. The main disadvantages of the alternative are the costs to the shipper and the dependency on the future cooperation of the railroad to recoup those costs.

In the usual case of private car ownership, the shipper acquires the car and it is transported by the railroad at the published freight rate for that commodity. The shipper however receives a rebate for the ownership of the car

---

33. Source (46)

in the sense the railroad pays the owner or lessor of the car what is referred to as a "mileage allowance". The owner or leasor receives a pre-set payment for the use of the car by the railroads based upon the number of miles the car moves. In effect the railroad is leasing the car from the private owner for the transportation of the owner's or leasee's commodities.

As stated the car owner receives an allowance for the ownership of the car based upon the number of miles the car travels. The amount of the allowance is a published amount set with the approval of the ICC rather than privately negoiated between the carrier and shipper. ICC approval of the mileage allowance is required to prevent the railroads and large shippers from negotiating too high a mileage allowance which would in effect cover the cost of car ownership plus operate to give the large shipper a lower freight rate to the detriment and prejudice of the small shipper. As a consequence, these mileage allowances are set relatively low to prevent the possibility of a shipper owning railcars from receiving an illegal rebate as to place him in a favorable position over his competitors in terms of transportation costs.

Another difficulty with the mileage allowance is that the railroad is not required to offer one. Consequently, when there is an abundance of railcars, the railroads can cancel any mileage allowance rates to encourage use of rail owned equipment rather than private cars. The shipper then pays the published freight rate regardless of whether or not he owns the car his commodity is shipped in. This latter factor could be a particular problem to the North Dakota potato shipper. Even if he were successful in having the railroad implement a compensatory mileage allowance for a privately owned car, he stands the likelihood of the railroad paying that allowance only during the time its own cars were all in use. Thus, during the early and latter parts of this shipping season when railroad owned cars were available, he might not be paid an allowance for the use of his equipment from which he could recoup part of his capital investment.

The cost of a new mechanically refrigerated rail car is approximately $65,000. In addition, if the car were to be used for hauling bulk potatoes, it would have to be converted for bulk unloading. Although new mechanical cars are not being converted for bulk unloading, the cost of converting a used rail car is approximatley $20,000. Assuming the cost of converting a new car would be relatively the same, a new mechanically refrigerated car equipped with bulk unloading would cost approximately $85,000.

It is also possible to lease or purchase used mechanically refrigerated cars from some of the private car companies. During the course of this study, Fruit Growers Express Company of Washington, D.C. was contacted for estimates of the cost to lease or purchase such cars. A representative of the company indicated they had approximately 800 of the used RP cars in varying conditions of operating order and that they would be willing to sell or lease. All of the cars would require some degree of upgrading however to make them fit for extensive use. The cost of these cars plus upgrading was estimated to be about $20,000 each. These upgraded cars would have a useable life of 5 to 7 years before they would have to undergo another major rehabilitation which would extend the lifetime of the car an additional fifteen years. In addition, if the cars were to be used for bulk potatoes, they would have to be converted to bulk unloading at a cost of $20,000 per car. Thus a used rail car equipped for bulk unloading could be purchased for $40,000 with an additional expenditure after about a five year period to extend its useful life.

Fruit Growers also indicated it would lease these rail cars under the condition that the cost of upgrading and converting the cars would have to be paid for by the purchaser. The company would then spread purchase price of the car excluding conversion and upgrading costs, over the length of the lease period - generally 3 to 5 years. However, if the car were leased, the company would per-

form the necessary maintenance on the car. If the car, whether purchased new or used, were owned by the shipper he would be responsible for the cost of maintaining the unit.

If a shipper made an investment of $65,000 in the purchase, upgrading, conversion, and maintence of a used car with a useful life of 20 years, he would have to recoup that investment at the rate of $3,250 per year in terms of mileage allowances. If the rail car could make 8 to 10 trips a year at an average of 2,000 miles per round trip, the shipper would need a mileage allowance of between $.16 and $.20 per mile to breakeven without any return on his investment. The shipper might be able to recoup his investment at a lower rate if he were able to lease his car for the carriage of other commodities during that part of the year in which potatoes did not move. However, the fact that very few perishable commodities move by rail anymore and the resulting lack of demand for the refrigerated rail car, indicate the shipper would have a problem in securing this added income.

In addition to the question of whether the railroads would be willing to negotiate a mileage allowance sufficient for the shipper to recoup his investment, a problem exists under this alternative in that the shipper has little control over the rail car in terms of dictating its transit and turn around times. Since the shipper has no assurance of the turn around times of his car after it is released to the railroads, he is at their mercy in having them return the car in a reasonable time so he can move sufficient quanties of his product plus make enough trips to spread out the cost of his investment in the rail car. The combination of the above factors make this alternative unfeasible for most shippers. Although it might be more feasible for a shipper funded association to undertake, it still would require a large investment and a great deal of risk. Considering the cost and risk involved there appears to be more lucrative alternatives available then shipper owned rail cars.

2. Railroad Owned Cars

Assuming the railroads don't invest in new refrigerated rail cars in the near future there are a few alternatives available to make more efficient use of existing equipment. The first of these is to encourage the Burlington Northern to convert the remaining 300 - 350 RP meat cars which it owns to bulk unloading. Since the remaining 700 RSB cars are expected to be out of use within a couple of years, and, as the RP cars are capable of carrying nearly twice the payload as the RSB car, this alternative, although not creating any additional transportation, will give the railroad at least its existing capacity to transport bulk potatoes. These converted cars would have an expected life of about 20 years. Although the alternative would not be a permanent solution, it would solve immediate problems of maintaining existing capacity. This continued level of existing capacity is vitally important in maintaining a balance of transportation modes to prevent even more serious transportation shortages than have been experienced in the past. At a cost of $20,000 per car however, the conversion of 350 additional cars represents a capital investment on the part of the railroad of about seven million dollars. To convince the railroads to make that investment, shippers must make maximum use of not only any newly converted railcars, but also rail cars which have already been converted. What this means primarily is making use of the cars over the entire shipping season, not just during periods of a transportation shortage. It also means using the cars to ship to points which maximize profits to the railroad. To assure themselves of this maximum efficient use over the entire shipping season, there are also steps which the railroad can take which will be discussed later.

Another alternative shippers can undertake to make better use of railcars is the use of the non converted cars for the shipment of bagged potatoes. Since the railroad has access to a large number of these cars, shippers of bagged potatoes could possibly have a means of assuring themselves of the transportation they

need if they indicate to the railroad at the beginning of the season the volume of potatoes expected to be moved and the time of year they are expected to be shipped. In this manner the railroads can arrange in advance for the estimated demand for this transportation. It is vitally important that after those estimates are made to the railroad, the shippers then fill those expectations with the shipment of potatoes on rail cars to the maximum extent possible. This alternative not only provides the bagged potato shipper with some assurance of available transportation but also makes trucks which would be hauling bagged potatoes available for the transportation of bulk potatoes - equipment for which the real transportation shortage exists. This alternative however also requires the cooperation of the railroad in making the use of these cars more attractive in comparison with truck transportation.

The railroad might also be encouraged to consider conversion of RP cars other than meat cars or conversion of cars leased from private car companies. This alternative offers the advantage of being able to create an absolute increase in the capacity of the railroad to carry bulk potatoes. The disadvantage however is the investment costs which the railroads would have to undertake and the possible low return on that investment this alternative might yeild. To have the railroads even consider this alternative the shippers must be in the future demonstrate their sincerity in using rail owned equipment. Through the maximum use of equipment which is currently available. Even with that demonstration, the railroad might be willing to consider this alternative only in terms of a joint venture with the shippers. Such a venture might include the use investment funds from a shipper organization to assist in the cost of rail car conversion, or having the shippers convert the cars on some type of lease arrangement with the railroad. Such an alternative would require a great deal of negotiation and coordination between the railroad and any shipper organization which wanted it implemented.

A fundamental point underlying the success of any of the above alternatives is the profitability of potato transportation to the railroads. Unless the profitability of potato transportation can be improved for the railroads it is unlikely they will make future investments in that endeavor. Increasing the volume of potatoes moved, decreasing transit times, and reducing loss and damage claims are all factors which would contribute to improved profitability. Past experience seems to indicate that one way of acheiving all three objectives is if rail cars can be kept on the line of a local carrier or one or two selected connecting lines. Most of the difficulty in excessive loss and damage claims and excessively long transit times seems to stem from problems associated with a rail car traveling over a number of connecting lines. If rail cars could be kept on the line of the local carrier or those connecting carriers which in the past have demonstrated an ability to move cars effectively, transit times could be reduced considerably. Reduced transit times mean an ability to transport more volume per rail car and reduced possibilities of damage to the commodity. Railroad responsibility can be pinpointed by limiting the number of lines the rail car travels over. Also, by having the cars travel over fewer lines, the number of cars traveling over those lines is consequently increased so that supervisory practices over the cars can be done in a more routine and hopefully better manner. Keeping the cars on the local lines also means that all the revenue the car produces goes to the local carrier. When the local carrier turns the car over to a connecting line, the localy owned car is generating a minimal amount of revenue for its owner. Thus, if the local carrier can keep the car on its own line generating transportation revenue rather than simply per diem revenue, the overall profitability of the transportation should be improved.

A means by which the railroad might be able to accomplish the objective of more efficient use of its equipment is the offering of incentive rates. If rail

cars are to be used by shippers as something other than a standby means of transportation, the railroads must offer some advantage to compensate for the increased time and risk involved in shipping by rail. The most obvious incentive is a reduced rate. The incentive rate alternative could accomplish both the objective of transporting more bagged potatoes in the large mechanically refrigerated car and keeping bulk equipped rail cars on the local carriers own lines.

The establishment of incentive rates for bagged potatoes should be a joint effort on the part of both shipper and carrier. Multicar rates for 5 to 10 cars or single car incentive rates could be established to points which are prime markets for Red River Valley seed and tablestock potatoes. These rates should be negotiated between the railroad and a shipper organization with the shipper organization being able to assure the railroad to a minimal volume of potatoes that would move under the rate provided sufficient equipment is made available. If shippers failed to meet those minimum volumes the shipper organization could possibly reimburse the railroad under some formula based upon the difference in the guaranteed volume and the volume actually shipped. Shipments moved under such an arrangement would probably best be handled with the shipper organization acting as a coordinator and an agent for the individual shippers.

The use of incentive rates for bulk potatoes shipped to points on the line of the local carrier or on one or two connecting carriers, is also a means by which the railroads can keep cars equipped for bulk unloading on their own lines, hopefully resulting in greater profitability to the railroad dispite the reduced rate. The reduced rates plus the resulting improved transit times should provide the incentive for shippers to use rail whenever available for shipments to selected points during the entire shipping season. Rather than being a standby carrier the railroad can become the primary carrier to these markets making more efficient use of its equipment.

As stated previously, all of the alternatives under this section require a great deal of cooperation and coordination between the shippers and the railroad. This can probably only be accomplished if individual shippers delegate a shipper organization a great deal of responsibility and authority to negotiate and carry out arrangements with the railroad, with such organization possibly acting as an agent for all potatoes moved by rail. The committment required and the flexibility and autonomy which would be lost may be sacrifices many shippers are unwilling to undergo. The alternative however may be the loss of rail transportation altogether and severe transportation shortages.

D. TRAILER-ON-FLAT-CAR TRANSPORTATION ALTERNATIVES

Trailer - On - Flat - Car (TOFC) service for the transportation of potatoes from the Red River Valley is probably the most exciting and promising concept offering a solution to future transportation shortages. The development of TOFC service for transporting potatoes is relatively new and limited past experience has indicated some problems that need to be worked out before the service can be expanded to point where it can carry a substantial portion of the commodity to be moved from the Valley. The most promising factor TOFC offers is that it has most of the advantages of rail and truck transportation with few of the disadvantages of either.

In discussing TOFC as an alternative for the transportation of potatoes it is necessary to distinguish between the service as previously offered and a more intermodal concept which has attracted recent attention. Trailers moving on flat cars hauling potatoes from the Valley in the past have moved nearly their entire distance by rail with tractors being used only as a means of switching between connecting rail lines and as a means of cartage from loading and unloading ramps and shipper warehouses and processor plants. The use of primarily rail transportation for the movement of the trailers has resulted in problems with protective

services, long transit times, trailer return, and has also prevented the trailers from being used to carry backhauls from their destination. However these problems are the same problems as experienced in the use of rail cars for the transportation of potatoes and reflect problems associated with rail transportation in general rather than any particular difficulties related to TOFC service. These problems, combined with the fact that many of the Eastern and Southeastern rail lines have cancelled protective services for TOFC trailers, prevent the use of TOFC to move potatoes primarily by rail except in a few selected markets.

The use of rail flat cars to move trailers from the Valley to major distribution points located on the line of the originating carrier and the the use of tractors to transport the trailers from there to the market location, eliminates many of the problems associated with rail and past TOFC service. This type of service, the flexibility and speed of truck transportation plus an opportunity to increase the total availability of transportation.

The types the TOFC service available can generally be broken down into two categories, based upon ownership of the trailers with variations under each type. The first type is where the trailers are owned or leased by the railroad. The main advantage of this plan from the shippers viewpoint is that no investment is required on the part of the shipper in the transportation equipment. In addition the shipper does not have to concern himself with the management of the trailers and finding a use for them during the off season. Also, if the trailers are railroad owned, they are likely to be put to more intensive use as the railroads try to recoup their investment. Being in the transportation industry, the railroads have much better access to alternatives which will keep the trailers in use. Since the railroads ability to recoup their investment is based on the volume of trailers they are able to carry, they are more likely to try and keep the trailers moving. Also they will try to find other uses for trailers during the off season

to make the most efficient use of the trailers. Being in constant contact with other carriers and shippers, it should be much easier for the railroad to locate other uses for the trailers during the off season than it would be for a shipper to find uses for a shipper owned trailer during the off season. The disadvantage of this alternative from the carrier's standpoint is the amount of investment which would be required to purchase the number of trucks needed to carry a substantial portion of the Red River Valley Potato crop. If the railroads feel their funds are better invested in other types of rail equipment, it might be possible for a shipper organization to purchase a pool of trailers and lease them to the railroad on an annual or long term arrangement. This would allow the necessary trailers to be made available without a substantial amount of railroad investment while still allowing railroad management of the trailers and giving the carrier an incentive to make the most efficient use of the equipment. These trailers can also be leased by either shipper or carriers from private companies, although as a general rule the railroads can lease them at a lower rate than can a shipper.

Another question arises of who would be responsible to locate tractor transportation for the trailers from the major distribution point to the market destination. Ideally this should be done by the railroad since they are in a better position to negotiate the necessary arrangements with tractor owners than shippers, especially if the trailers are railroad owned. However if the railroads are unwilling to take the responsibility of locating and negotiating with tractor owners, the burden will be that of the shippers. If such activity is carried on by the shippers it would best be done by representatives of a shipper organization to assure some type of uniformity and coordination.

Questions concerning backhauls for the trailers must also be dealt with. It would be to the advantage of both carrier and shipper if tractor owners were allowed to solict backhauls for the trailers provided such backhauls don't unnecessarily

interfere with trailer turn around times and that the revenue derived from the backhaul be reflected in the tractor rate. The use of backhauls and a correspondingly lower tractor rate will assure that the TOFC service can remain competitive with rail and truck transportation. Backhauls should also provide the owner of the trailer with a better return on his investment through the more efficient use of the trailer. Probably the best trucks to solict to assure a fairly constant flow of backhauls are tractor owners having authority to carry goods from various potato market locations to the major distribution deramping center. The trailers would then be transported from the distribution center to the market location by the truckers after which time he could use them to transport the goods he has authority for back to the distribution point. If a steady flow of potates could be moved between the two points the trucker might be willing to negotiate an arrangement whereby the trailers which he owns could be placed in TOFC service since he would now be transporting rail owned trailers. This would increase the number of trailers available without any investment on the part of either shippers or railroads.

To make the TOFC intermodal alternative successful, a relatively constant flow of potatoes must move under the plan with an estimated amount of potatoes to be moved to various market locations predetermined. For the service to operate in such a coordinated manner, the total transportation rate to various locations must be competitive with truck rates to these same locations. The Plan II½ arrangment of the Soo Line is quite competitive to most locations in the South, East, and Southeast and should lend itself quite readily to an expanded intermodal service provided the necessary equipment and tractor owners can be located. The Burlington Northern Plan III proposal however would require considerable change both in terms of rates and services offered before it could become an attractive alternative. Unfortunately up to this point the Burlington Northern has been unwilling to substantially alter its proposal.

Under either plan, the success of an intermodal service can be more readily assured through shipper cooperation and prior negotiation with the railroad. Such shipper cooperation would probably best be obtained through the vestment of some degree of authority in a shipper organization representative. This representative could be responsible for determining expected shipper demands for transportation to various locations prior to the shipping season and then communicate those demands to the railroad and assist in securing the necessary tractor transportation to meet those needs.

Chapter IV

CONCLUSIONS AND RECOMMENDATIONS

FOR IMPROVING THE AVAILABILITY OF TRANSPORTATION

A. INTRODUCTION

The recommendations contained in this chapter are those of the author after evaluating the various alternatives contained in the previous chapter. None of these recommendations are meant to be cast in stone, but rather are meant to serve as a basis and stimulation for discussion amongst regulator, carrier and shipper representatives. It is through such discussion that implementation of alternatives agreeable to all interests can be attained.

B. TRUCK TRANSPORTATION ALTERNATIVES

The recommendations contained in this section, if implemented, are not expected to result in a large scale increase in the supply of truck transportation, rather these recommendations are aimed more at improving the environment of transportating potatoes in hopes of not only encouraging carriers presently transporting potatoes to continue to do so, but also attracting a limited number of out-of-state truckers into the transportation of the product. These recommendations are as follows:

1. SOLICITATION OF CARRIERS FROM OTHER AREAS.

This recommendation suggests preshipping season solicitation of truckers from other areas. It is recommended that during the spring and summer months an industry representative locate and negotiate with carriers having authority to operate between: (a) a point within 600 miles of the Red River Valley, and (b) a point which is, or is near a significant market distination for North Dakota potatoes. A preseason transportation rate based upon an estimated volume of potatoes would be estimated, a list of markets and negotiated rates would be completed and available transportation capacity to various markets would be estimated and

published prior to the shipping season in a shipping industry newsletter. Individual shippers would then be able to contract for a specific volume of that capacity which would guarantee that shipper the availability of transportation to that market. Shippers who did not contract for transportation prior to the shipping season would be able to request any remaining transportation capacity not contracted for on a demand basis, with all demands being channelled through an industry representative. This would allow the carrier to know before leaving his home base if a load was available thus preventing unnecessary trips or long waiting periods. This would also avoid the cost of a truck broker.

2. ELIMINATION OF RETALITORY MIRROR RECIPROCITY REGULATIONS.

Regulations which are aimed at resident truckers of particular states and are mirrored to reflect burdensome regulatory practices of that state, should be eliminated. As discussed in chapter 3 these practices serve only to reduce the total availability of transportation within this state with very little corresponding benefit.

3. JOIN ONE OR BOTH OF THE OTHER PRO-RATE AGREEMENTS.

The state should reevaluate its earlier decision not to join the other pro rate pacts. The entering of these pacts could encourage truckers from those states to enter North Dakota on a more frequent basis. Although reduced revenue to the State Highway Department can be expected to result if North Dakota joins another pro rate pact, this should not be a sole determining factor. The expected revenue losses should be looked at relative to the total Highway Department budget and then compared with the benefits which can be expected to acrue to the carriers and shippers of the state.

4. ALLOW MOTOR CARRIERS FROM ALL STATES TO PRORATE NORTH DAKOTA REGISTRATION FEES.

This recommendation would allow truckers from all states to pro rate their

registration fees on the same basis as a trucker who is a resident of a state and who is a member of the URPA. Such registration would not only allow complete non-discriminatory registration by truckers from all states but also encourage truckers from the eastern states to enter North Dakota on a more frequent basis.

5. CHANGE THE MANNER OF ISSUING TRIP PERMITS.

Trip permits expiration periods should be midnight of the second day following issuance, regardless of whether or not the trucker leaves the state within the seventy-two hour period. The present expiration period is not justified as an equitable user tax but merely discourages truckers from returning through the state empty - the time at which they would most likely secure a backhaul of North Dakota products.

Also, trip permits should be issued with some means of identifying that a vehicle had purchased the necessary permits and showing the expiration time of those permits. Permits issued in the manner outlined in Chapter 3 should reduce unnecessary stopping of truckers to the advantage of both carrier and regulatory personnel.

6. ELIMINATION OF THE FEE FOR THE IMPROVED EQUIPMENT PERMIT.

This fee can be neither justified as an equitable user tax or as necessary to cover the cost of the inspection. The inspection and permit, if really necessary, can still be made and issued but the fee for such permit should no longer be charged. If the revenue from these fees is vital to the Highway Department, registration fees or the cost of a trip permit should be raised to compensate for the lost revenue. Collected fees should be more equitable to the occasional user of North Dakota roads.

7. CHANGE THE 20 MILE FREE ZONE CONCEPT.

All States should be allowed to operate within the twenty mile free zone.

This should assist in reducing any imbalance of transportation existing between North Dakota and Minnesota.

8. DEVELOPMENT OF LOAD FREE ROADS.

Shipper industry representatives should meet with State Highway Department officials to work out a phased implementation schedule for the development of load free sections of road. These sections of road should be developed in order to prioritize between points on the interstate highway system and concentrated areas of potato storage. This will allow the movement of fully loaded trailers from at least some major warehouse locations without the impeding effect of spring load restrictions. This alternative alone could have a significant impact on improving transportation availability during the months when transportation shortages are often most critical. This recommendation should be looked at as a necessary future improvement to all the state's major highways as railroad branch line abandonment becomes more prevelant.

9. IMPROVED COMMUNICATION.

Implementation of this recommendation is essential if the problems concerning truck regulation are to be worked out. It is suggested that shipper and carrier industry representatives be chosen to meet with State Highway Department personnel on a regular basis to discuss possible implementation of recommendations contained in this study as well as any future problems and suggestions that might arise.

10. LOBBY FOR UNIFORM REGUALTORY PRACTICES.

Members of the potato industry should lobby agressively for the enactment of a uniform national system of motor carrier registration and regulation by the United State Congress. It appears this is the only manner in which such a uniform system of regulations will ever be adopted. A uniform system of regulation is essential to eliminate some of the inequities that exist in the regulation of the motor carrier industry today. It is suggested that area industry representatives take a more active role in the campaign calling for a national system of uniform motor carrier registration and regulation.

C. RAIL TRANSPORTATION ALTERNATIVES

Recommendations contained in this section also cannot be expected to result in exceptionally significant increases in transportation availability. The recommendations are, however, designed in the hopes that the railroads will be able to maintain their present capacity for transporting potatoes. The difficulty with the implementation of the recommendations contained in this section is such implementation is nearly entirely dependent upon the railroads. With the cooperation and encouragement of area shippers however, the railroads are much more likely to seriously consider, if not implement, such recommendations.

1. CONVERSION OF 350 RP CARS TO BULK UNLOADING.

Conversion of the remaining old RP meat cars owned by the Burlington Northern to the transportation of bulk potatoes provides the most important short term solution to maintaining the existing capacity of transportation equipment. The conversion of these cars will provide the equipment necessary to replace the rapidly deteriorating stock of old RS cars. Implementation of this recommendation will require extensive negotiation on the part of the potat industry and the Burlington Northern Railroad. The Railroad will likely require that shipper commit themselves to a certain volume of potatoes that would be moved by these converted cars.

2. INCREASED USE OF RAIL CARS FOR THE SHIPMENT OF BOGGED POTATOES

Increased use of nonconverted mechanically refrigerated cars for the transportation of bagged potatoes is one means by which shippers may increase the capacity of available transportation. This recommendation would be best implemented through pre-shipping season discussions between shippers and the railroad at which time an estimate of the cars that will be needed and used during the season can be arrived at. In this manner shippers will be assured of an adequate supply of railcars and the railroad need only acquire the supply of cars necessary to meet estimated demand.

3. INSTITUTION OF INCENTITIVE RATE TO SELECTED LOCATIONS

Institution of incentive rates is the most significant step the railroads can

undertake to assure efficient use of their equipment. It is recommended that incentive rates on bagged potatoes be established between the Red River Valley and major market locations for tablestock and seed potatoes. Such rates should provide a demand for the use of an increased number of mechanically refrigerated cars through the entire shipping season, not just when other means of transportation are not available.

4. APPOINTMENT OF A TRANSPORTATION COORDINATOR

This recommendation actually pertains to the implementation of all of the other recommendations contained in this chapter. It is recommended that a person be appointed and given the authority to enter into negotiations with carriers on behalf of the potato industry for the implentation of the recommendations contained in this chapter. Such a person should be closely associated with, be a member of, or an employee of, the Red River Valley Potato Growers Association.

D. TRAILER-ON-FLAT CAR RECOMMENDATION

As stated previously in this report, the increased use of TOFC service offers the most potential for elimination of future transportation shortages. Consequently, efforts are necessary on the part of shipper representatives to implement a TOFC service suitable to meet present and future demands. The recommendations in this chapter are designed as suggestions where those efforts can be concentrated to best acheive such a system.

Since completion of chapter two - describing present potato transportation services - the Soo Line railroad has announced its intentions relative to the shipment of potatoes through the use of TOFC service. The plan as announced by the Soo Line is basically as follows:

The Soo Line has announced for the coming season a rate of $1,250 for TOFC service from Thief River Falls to Chicago for two trailers not to exceed 42,000 lbs. per trailer. The shippers will be responsible for cartage from his ware-

house to Theif River Falls and also for arranging motor carrier transportation from the Chicago deramping point to the buyers destination. Trailer turnaround time is expected to average ten days per trailer, the Soo Line's present trailer equipment supply will allow loading of five or six flat cars (10 to 12 trailers) per day at Theif River Falls, on the average, seven days a week. This supply will certainly be exceeded by demand during the coming season.

The Soo Line decided against using Ardoch, N.D. as a ramping point for the TOFC service. The Soo Line will however, provide an allowance to the shipper of $75 per trailer, per trip, if a shipper-owned trailer is used. The railroad will give the shipper the same privledges as a railroad owned trailer, namely, heater protection and free return of the trailer.

Based upon the TOFC rate for a railroad owned trailer moved by tractor from Grand Forks to Theif River Falls and from Chicago to destination, a TOFC rate was computed from Grand Forks to selected locations and compared with estimated rail and truck rates from Grand Forks to the same locations for the coming season. The result is contained in Table 22.

As can be seen in Table 22 the use of TOFC service is a competively advantageous means of transporting potatoes from the Red River Valley to points in the East and Southeast; points to which transportation has been the most difficult to locate in the past. The implementation of an expanded TOFC service to these points offers many of the advantages of both rail and truck transportation without the disadvantages of either. TOFC is not dependent upon backhauls such as truck transportation, consequently supplies of such transportation is not dependent on population. Also, as the rail portion of the TOFC movement is accomplished over one rail line, long delays in transit times are eliminated. Trailers can be used to haul other commodities and thus are more efficient for a higher rate of return on investment than ordinary rail cars.

TOFC service to the East and Southeast is not intended to replace truck transportation to those locations. The speed and flexibility of truck transportation will continue to make that form of transportation competitive. TOFC service to the East and Southeast can be expected to replace rail transportation to those locations, making rail equipment that in the past has been used to move potatoes to those locations available to transport larger volumes of that commodity to the South and Midwest; points where rail transportation is more competitive and efficient.

TABLE 22. ESTIMATED POTATO FREIGHT RATES FROM GRAND FORKS TO SELECTED LOCATIONS BY MODE.

1978 - 1979

Grand Forks To:	Rail Rate Plus MPS[a]	Truck Rates[b]	TOFC Rate[c]
Minneapolis, Mn.	1.06	.94	--
Chicago, Ill.	1.65	1.82	1.62
Cleveland, Ohio	2.82	2.53	2.10
Kansas City, Mo.	1.75	1.76	2.34
Oklahoma City, Okla.	2.32	2.15	2.75
Atlanta, Ga.	3.20	3.03	2.61
New York, N.Y.	3.29	3.58	2.78
St. Louis, Mo.	1.75	2.09	2.03
Washington, D.C.	3.29	3.25	2.58
Memphis, Tenn.	2.65	2.59	2.38
New Orleans, La.	3.17	3.30	2.93
Dallas, Tex.	2.57	2.53	2.93
Houston, Tex.	2.83	2.86	3.16

a. Reflects 15% increase in protective service charges over past shipping season.
b. Reflects 10% in rate over past shipping season.
c. Based upon a cartage charge of $80 per trailer from Grand Forks to Theif River Falls and tractor rate of $1.20 per mile from Chicago to destination.

The following are the recommendations for the implementation of an improved and expanded TOFC service:

1. SOLICITATION OF MOTOR CARRIERS.

The TOFC service recommended for implementation is an intermodal system. Motor carrier transportation must be solicited to move trailers from deramping

points to selected markets for North Dakota potatoes. It is suggested that an employee of a shipping association solicit carriers and negotiate contracts for upcoming shipping season. This person would also coordinate potato movements between shippers, railroads, and motor carriers during the shipping season.

2. ADDITION OF NORTH DAKOTA LOADING RAMP.

Although the Soo Line has announced it will not locate an additional loading ramp in North Daktoa during this shipping season, it is recommended that shippers try to persuade the railroad to reconsider its decision for future shipping seasons. Reduced drayage costs resulting from a North Dakota ramp would make the TOFC service even more conventient and competitive.

3. ACQUISITION OF ADDITIONAL EQUIPMENT .

Acquisition of additional equipment is essential to expand TOFC service to a level sufficient to meet present and future demands for transportation. Needed are improved loading facilities and additional rail cars and flat cars. Flat cars and improved loading facilities will likely be supplied by the railroad if shippers commit sufficient quantities of long term transportation to TOFC. Both railroads and shippers can lease or purchase trailers for the use in TOFC service.

4. IMPLEMENTATION OF TOFC RATE TO MINNEAPOLIS .

Implementation of a TOFC rate from the Red River Valley to Minneapolis will make this service a more competitive mode to points in the South and Midwest. It is suggested that shippers begin negotiations now with the Soo Line on such a rate for the next shipping season.

SOURCES

1. U.S. Department of Agriculture, Statistical Reporting Service, Potatoes and Sweet Potatoes, U.S. Government Printing Office, Washington, D.C., Annual volumes.

2. North Dakota Crop and Livestock Statistics, Annual Summary, Department of Agricultural Economics, North Dakota State University in cooperation with statistical Reporting Service, United States Department of Agriculture, Fargo, North Dakota, Annual Volumes.

3. Erickson, Stan, East Grand Forks, Minnesota, Red River Valley Potato Growers Association, Personal Communication.

4. Erlandson, Gordon W., Donald F. Scott, and Lyle C. Shephard, Potatoes - Production, Prices, Marketing, Consumption, Agricultural Economics Miscellaneous Report No. 31, Department of Agricultural Economics, North Dakota State University, Fargo, North Daktoa, December 1977.

5. Hanson, E.J., Red River Valley Potato Growers Association, East Grand Forks, Minnesota Personal Communication.

6. Smith, Ora, Potatoes: Production, Storing, Processing, Second Edition, The AVI Publishing Company, Inc., Wesport, Connecticut, 1977.

7. Spudlight. Seed Report 1975. United Fruit and Vegetable Association, Washington, D.C.

8. U.S. Department of Agriculture, Agricultural Statistics, U.S. Government Printing Office, Washington, D.C., Annual Volumes.

9. Lundstrom D.R., "Potato Storage", Potato Production in North Dakota, Extension Bulletin 26, North Dakota State University, Fargo, North Dakota, March 1976.

10. Red River Valley Potato Growers Association, East Grand Forks, Minnesota.

11. Bueling, Merrill C., and F. Larry Leistritz, Potato Production Practices and Resource Requirements in the Red River Valley, Agricultural Economics Statistical Series, Issue No. 20, North Dakota State University, Fargo, North Dakota, November, 1973.

12. Edwards, Doug, United States Department of Agriculture, Consumer and Marketing Service, Washington, D.C., Personal Communication.

13. Williams, Ron, United States Department of Agriculture, Minneapolis, Minnesota, Personal Communication.

14. U.S. Department of Agriculture, Agricultural Marketing Service, Fresh Fruit and Vegetable Shipment Totals, FVUS - 7(1976), U.S. Government Printing Office, Washington, D.C., Annual Volumes.

15. U.S. Department of Agriculture, Agricultureal Marketing Service, Fresh Fruit and Vegetable Unload Totals, FVUS-5(1976) U.S. GOvernment Printing Office, Washington, D.C., Annual Volumes

16. Nelson, David C. and Donald E. Walstad, Shipments of Potatoes from the North Dakota - Minnesota Red River Valley, Upper Great Plains Transportation Institute, North Dakota State University, Fargo, North Dakota.

17. The Grand Forks Harald, April 27, 1978; Ranch and Farm Section, page 21.

18. Glovf, W.D., B.M. Hutchinson, and B.A. Sanders, Effects of Current State Licensing, Permit, and Fee Requirements on Motor Trucks Involved in Interstate Commerce, FHWA-RD-75-40,(1975) National Technical Information Service, Springfield, Virginia 22161.

19. Economic and Engineering Analysis of Seasonal Load Restirctions on North Dakota Highways, North Dakota State Highway Department, Bismarck, North Dakota, 1974.

20. Fink, Ray, Engineering and Maintenance Division North Dakota State Highway Department, Bismarck, North Dakota, personal communication.

21. Supervisor and Portable Carmen Activity Reports - January 1978 through May 1978, Truck Regulatory Division, North Dakota State Highway Department, Bismarck, North Dakota.

22. Backstrand, Fred, Truck Regulatory Division, North Dakota State Highway Department, Bismarck, North Dakota, Personal Communication.

23. Schneider, Larry P, Truck Regulatory Division, North Dakota State Highway Department, Bismarck, North Daktoa, Personal Communication.

24. Locklin, D. Philip, Economics of Transportation, 7th Edition, 1972, Richard D. Irwin, Inc., Homewood, Illinois.

25. MacAvag, Paul W., and John W. Snow, Regulation of Entry and Pricing in Truck Transportation, 1977, American Enterprise Institute for Public Policy Research, Washington, D.C.

26. Ainsworth, D.P., and Schrier, A Long Term Study of Produce Transportation, Volume 1, Executive Summary, 1977, National Technical Information Service, Springifeld, Virginia 22161.

27. Carlson, Jim, Red River Dispatch, East Grand Forks, Minnesota, Personal Communication.

28. Hoff, Glenn, Associated Potato Growers, Inc., Grand Forks, North Dakota, personal communication.

29. Britton, Dave, Glacier Transport, Grand Forks, North Dakota, personal communication.

30. Perrin, Betty and Scott, Archie, Scott's Inc., Grand Forks, North Dakota, personal communication.

31. Berg, Charles, Glendenning Motorways, Inc., Grand Forks, North Dakota, personal communication.

32. Newton, George, Frito-Lay Inc., Grand Forks, North Dakota, personal communication.

33. Warner, Stub, L.E. Tiebert and Sons, Voss, North Dakota, personal communication.

34. Marifjeren, Earl, Park River Potato Company, Park River, North Dakota, personal communication.

35. Burbridge, Arden, Park River, North Dakota, personal communication.

36. Larson, Gene and Larson, Neil, Larson and Sons, Park River, North Dakota, personal communication.

37. Anderson, Joel and Johnson, Tom, Hoople Potato Company, Hoople, North Dakota, personal communication.

38. Lipton, Werner J. and A. Lloyd Ryall, Handling, Transportation and Storage of Fruits and Vegetables, Volume 1. Vegetables and Melons, the AVI Publishing Company, Westport, Conneticut, 1972.

39. Bergo, Gordy, Wallworks Leasing, Fargo, North Dakota, personal communication.

40. North Dakota Highway Statistics, 1977, North Dakota State Highway Department, Bismarck, ND

41. Nelson, Kenneth, Area Sales Manager, Burlington Northern Railroad, Grand Forks, North Dakota, personal communication.

42. Idaho Growers and Shippers Association, Idaho Falls, Idaho.

43. Stoffel, Ralph H., District Sales Manger, Soo Line Railroad Company, Theif River Falls, Minnesota, personal communication.

44. Verified statement #6 of the Railroads, Interstate Commerce Commission, Ex Parte 349 proceedings, 1978.

45. Verified statement #4, Gene C. Griffin, Upper Great Plains Transportation Institute, Interstate Commerce Commission, Ex Parte 270 (Sub. No. 9) - Investigation of Railroad Rate Structure - Grain & Grain Products.

46. Transportation Bulletin, U.S. Department of Agriculture, Agricultural Marketing Service, Transportation and Warehouse. Division, Transportation Services Branch, Washington, D.C., July 17, 1978, Vol. 78, No. 18.