

**AN EVALUATION OF NORTH  
DAKOTA GRAIN MOVEMENTS**

**By**

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### Highlights

The transportation and marketing of North Dakota grain facilitates the generation of new wealth in North Dakota. Efficient and orderly marketing allows North Dakota producers to participate in domestic and distant international markets. In essence, production, agriculture, and agribusiness sectors in North Dakota are totally dependent on the existence of an efficient and orderly marketing system. Because transportation is such an integral and necessary part of grain marketing it is important to have an historical perspective of the transportation of grain from North Dakota to the major terminals which serve as outlets for its grain.

The purpose of this report is to provide a historical perspective of North Dakota grain movements. Grain movements were analyzed using cross tabulation by commodity, crop reporting district, mode, and by destination. It does appear that the marketing system serving North Dakota producers has apparently been actively striving to alleviate potential or existing problems. New markets, such as the West Coast ports of the Columbia River and Puget Sound are being explored and increasingly utilized to move grain. Shippers are using different modes shifting between truck and rail reflecting mode availability and rates.

However, potential problems are apparent. The growth in production and movement of grains will continue to exert demand on existing of future marketing capacity and the advent of new bulky commodities such as sunflowers exasperates the potential problem.

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## AN OVERVIEW

### North Dakota Grain Handling, Transportation, and Merchandising Study

North Dakota's railroad branch line system was developed in the late 1800's and early 1900's primarily for the purpose of moving farm commodities to markets outside the state and to bring freight such as farm inputs and other needed goods to the state's communities. The only other form of surface transportation available for moving bulk freight when the rail network was being developed (excluding some minor river transportation) was the horse-drawn freight wagon. The limited distance that a team of horses and wagon could travel influenced the design of the early branch line railroad network. This development pattern resulted in branch lines that were no farther apart than 10 to 20 miles, and even the most remote producing areas were accessible to rail transportation.

Development of the country grain merchandising system was also influenced by the limited distance a team of horses and wagon could travel, the relative density of the branch line network, and available technology at that time. This resulted in a large number of country elevators spaced only a few miles apart on grain gathering rail lines. Although much of what existed in the past still exists today in the form of branch line network, economic and technological forces that influenced its development have changed since the turn of the century. Other factors are currently at work that may influence rationalization of the railroad network and the country grain merchandising system.

Factors which will influence the future grain handling transportation and merchandising system include branch line abandonment, implementation of multiple car and unit train grain rates, and capital replacement decisions. Other factors include differing rates of cost increases in the two modes, thereby shifting their competitive relationship. Competition between producing regions will also influence the future system. Efficiencies gained as a result of changes in marketing systems by competing producing regions will possibly influence a move to obtain those same efficiencies by other producing regions. The changing technology of farm trucks and the improved quality of our highway system makes it possible for producers to move grain in the state's traditional grain merchandising system. Government policies such as railroad deregulation may have some impact on the system.

As a result of these impending changes that could alter a rather traditional grain handling, transportation, and merchandising system, many private and public decisions will have to be made. These include decisions regarding location, economic viability, size of plant, investment in grain facilities, investment in transportation equipment and infrastructure, efficiencies of merchandising, purchases of farm production equipment, and storage capacity. If such decisions are to be made on an informed basis, it is important that basic information about the industry be developed and published. It was for this reason that the Upper Great Plains Transportation Institute and the Department of Agricultural Economics of North Dakota State University have undertaken the "North Dakota Grain Handling, Transportation, and Merchandising Study". Cooperators in the study include: Burlington Northern Railroad, Farm Bureau, Farmers Union, Grain Terminal Association, North Dakota Agricultural Experiment Station, North Dakota Department of Agriculture, North Dakota State Highway Department, North Dakota Public Service Commission, St. Paul Bank for Cooperatives, and the Soo Line Railroad Company. The purpose of this study is to provide relevant information to decision makers meeting the challenge of a changing business environment in handling, transportation, and merchandising grain in North Dakota.

The study is composed of a number of research projects that will result in 13 separate publications of which this is one. The publications planned for release at varied time intervals are:

- Description of the Existing Country Elevator System
- Cost Analysis of Existing Country and Farm Storage System
- Cost Analysis of Subterminal Elevators
- Existing and Past Patterns of North Dakota Grain Movements
- Description of Rail Rate Structure, Multiple Car Movements, and Rates and Analysis of Shipper Owned Equipment
- Description and Analysis of Exempt Carrier Industry
- Economics of Branch Line Operation
- Farm Truck Costs
- Seasonal Behavior of Marketing Patterns for Grain from North Dakota
- Grain Merchandising
- Marketing Using Delayed Pricing Controls
- Analytical Model for Analyzing Economic Efficiencies of Sub-terminals
- North Dakota Grain Handling, Transportation, and Merchandising Study: Summary, Conclusions, and Policy Implications

These reports, as they are completed, will be available upon request from the Department of Agricultural Economics or the Upper Great Plains Transportation Institute, North Dakota State University.

# AN EVALUATION OF NORTH DAKOTA GRAIN MOVEMENTS

by

Gene C. Griffin and Ken L. Casavant\*

## Introduction

The state of North Dakota is blessed with and dependent on an extremely productive agricultural sector. Agriculture contributes about 70 percent of the new wealth created in the state, roughly \$2 billion each year. A dominant part of this agricultural sector is the production and marketing of grains and oilseeds. During the 1974-75 crop year North Dakota farmers shipped over 291 million bushels of grain (including oilseeds) to markets. This volume has since grown to 456 million bushels during the 1978-79 crop years.

The transportation and marketing of this increasing volume of grains facilitates the generation of new wealth in North Dakota. Efficient and orderly marketing allows North Dakota producers to participate in domestic and distant international markets which allows increased volume to be merchandised without continuously depressed prices. In essence, the production agriculture and agribusiness sectors in North Dakota are totally dependent on the existence of an efficient and orderly marketing system.

The marketing system for grain in North Dakota is broad, balanced, and complex. On-farm facilities provide much of the initial storage capacity needed to handle the crops as they move from the field to first storage. The elevator system provides some storage in addition to its transshipment, merchandising, and pricing functions. Railroad and truck modes are both used in North Dakota to move these commodities in both near and distant markets, aided by barge shipments on inland waterways and ocean shipping from the Great Lakes, Gulf Coast, and Pacific Northwest ports. Indeed, a complex, balanced, and interactive marketing system serves to add economic value to physical production of North Dakota grains.

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This system is dynamic in addition to being complex. Many changes have evolved which require appropriate reaction by participants in the marketing system. Costs of constructing farm storage have been increasing. Railroads, beset by capital availability problems and alternative investment options, have been reluctant or unable to invest capital in rolling stock or branch line maintenance. This results in lines not being capable of carrying the large volume, 100 ton heavy weight covered hopper cars and a continuing shortage equipment during peak movements. The trucking system is affected by increasing fuel costs, port strikes, rural road conditions, etc. as they strive to move agricultural products to market. Country elevators are faced with capital investment needs in rail cars as well as in old, new, or merged grain handling facilities. New commodities and markets are being produced and used as marketers attempt to increase the economies and cost savings available from large volume or "batch" movements.

As these changes occur, adequate information on costs of assembly, elevating, merchandising, and distribution is necessary if informed decisions are to be made. A first step in providing this information is to identify the specific characteristics of North Dakota grain movements such as: where does grain originate from in North Dakota? What markets have traditionally served the North Dakota grain industry? How has grain been moved to these markets? And, even more critically, what changes are occurring in these movements? What new markets, commodities, or modes are being used and what problems (congestion, dependency, etc.) are now emerging or have emerged in the physical distribution system?

Answers to these questions will be useful to elevator managers as they merchandise and move grain, transportation agencies as they provide and plan for service, elevator terminals as they evaluate loading and unloading rates and capacities, etc. A base line description of North Dakota grain flows should provide a foundation for these and other more complex analyses.

### Objectives

The overall purpose of this report is to evaluate, in a descriptive fashion, the movements of grains from North Dakota. Specific objectives are to evaluate past and present grain movements with particular emphasis



on grain origin, destination, mode of shipment, and commodities shipped. Particular attention will be paid to changes over time.

### Data Source and Report Approach

The data used in the study were obtained from "Grain Movement Reports" from the North Dakota Public Service Commission for the five crop years from 1974-75 to 1978-79. State statute requires every public grain warehouse in North Dakota to report information on destination, commodity, and mode of shipment on a monthly basis. Seventeen commodities are summarized in these PSC reports, but only the top five in volume (wheat, durum, barley, oats, and sunflowers) are analyzed in this report. The commodities constitute about 95 percent of total movement.

Destinations utilized in the study were: 1) Duluth/Superior, 2) Minneapolis/St. Paul/other Minnesota, 3) Sioux City/Omaha/Kansas City, 4) Western states, and 5) Eastern/Southern/Midland/Southwestern/Miscellaneous. Origins are the nine traditional Crop Reporting Districts (CRD) in North Dakota.

Total movements out of North Dakota, by commodity and month, are analyzed in the first section. Individual commodities are evaluated as to origin, destination, and mode of shipment in the following section. The destinations for North Dakota grain are analyzed by commodity, origin, and mode of shipment. Similar evaluation is presented for each origin. A summary and conclusions drawn from this descriptive evaluation concludes the report. (For a summary of the 1979-80 crop year, see Appendix A.)

### Total Movement

The total grain shipments out of North Dakota for the crop years 1974-75 to 1978-79 are presented in Table 1 and Figure B-1 in Appendix B. The volume of grain moved out of North Dakota has increased steadily during this period of time from 291,582,000 bushels in 1974-75 to 456,235,000 bushels in 1978-79 with an average over the period of slightly over 346.5 million bushels per year. Only in 1976-77 did a slight decrease in volume occur, which was due primarily to a decrease in wheat and durum movements of almost 25 million bushels. Oats and other movements were also slightly down in that year.

TABLE 1. TOTAL GRAIN SHIPMENTS OUT OF NORTH DAKOTA, BY COMMODITY AND MODE, 1974-75 TO 1978-79 CROP YEARS

Commodities	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
(000 bushels)																				
Wheat	24,450	97,485	122,935		37,552	102,842	139,394		41,705	82,644	124,429		41,444	86,509	127,953		76,114	108,809	184,923	
Percent			42	79			44	73			41	66			36	66		41	59	
Durum	6,408	62,372	68,780		11,962	62,870	74,832		10,480	55,200	65,680		12,947	75,419	88,366		17,621	71,038	88,659	
Percent			24	91			23	84			21	84			25	83		19	80	
Barley	7,406	49,271	56,677		8,918	47,436	56,354		25,145	46,169	71,314		21,353	41,106	62,459		17,324	52,324	69,648	
Percent			19	87			18	84			24	66			10	63		15	75	
Oats	9,126	10,156	19,282		7,007	11,393	18,400		7,681	5,931	13,612		5,113	5,300	10,413		6,260	5,828	12,088	
Percent			7	53			6	62			5	41			3	51		3	48	
Sunflowers	4,674	4,339	9,013		7,663	6,891	14,554		7,102	8,520	15,622		32,706	16,571	49,277		57,761	21,492	79,253	
Percent			3	48			5	47			5	55			14	36		17	27	
Other	8,866	6,029	14,895		10,689	6,060	16,749		8,392	4,665	13,057		9,261	6,130	15,391		10,086	11,578	21,664	
Percent			5	40			5	36			4	36			5	47		5	53	
Total	61,930	229,652	291,582	79	83,791	236,492	320,283	74	100,765	205,129	305,914	67	123,426	235,177	358,603	66	185,166	271,069	456,235	59

The proportion of movements via rail and truck has changed over the time span of this study. The modal share of grains going by rail has decreased from 79 percent in 1974-75 to 59 percent in 1978-79, even though the absolute amount moving by rail has increased from almost 230 million bushels in 1974-75 to over 270 million bushels in 1978-79, indicating that truck has captured a strong share of the increased movement out of the state, tripling its absolute volume during the period. Every commodity (especially barley) shared in this increase except for oats which decreased in volume that particular year.

Wheat and durum volume is relatively steady, averaging about 60-65 percent of total movements over the years. The volume of movements have increased absolutely from about 193 million bushels in 1974-75 to 274 million bushels in 1978-79, an increase of 42 percent. However, since the total movements increased by 57 percent during this period, other commodities have become more important to North Dakota shippers. Barley volume increased slightly in an absolute sense but declined relative to other commodities. Oats declined both relatively and absolutely over the time period.

The growth commodity in the transportation picture for North Dakota has been sunflower, growing from about 9 million bushels in 1974-75 to 79 million bushels in 1978-79, an increase of 779 percent. This growth has caused sunflowers to go from 3 percent to 17 percent of total movements out of North Dakota during this period.

The importance of the emerging sunflower industry to North Dakota transportation is further supported when examining changes in mode usage by commodities. The previously mentioned increase in truck share of total movements arises partially from the increase in sunflower truck movements from less than 5 million bushels in 1974-75 to almost 58 million bushels in 1978-79, an increase in truck movements of sunflowers of over 1,000 percent. As could be expected, truck has significantly increased its share of the sunflower shipments, from 52 percent in 1974-75 to 73 percent in 1978-79.

The total shipments out of North Dakota by month and by mode are indicated in Table 2 and Figure B-2. A significant degree of seasonality in movement is evident in all five years, and it appears to be slightly increasing over time. The months of July, August, September, and October are commonly the largest volume months with May and June becoming more

TABLE 2. GRAIN SHIPMENTS FROM NORTH DAKOTA, BY MONTH, BY MODE 1974-75 TO 1978-79

Month	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
(000 bushels)																				
January	3,235	12,512	15,747	79	4,433	12,193	16,625	73	4,954	8,491	13,446	63	7,118	11,019	18,137	61	12,767	10,504	23,271	55
February	3,444	12,641	16,085	79	6,117	13,938	20,055	69	11,527	19,045	30,571	62	8,003	10,831	18,834	57	9,976	8,503	18,479	46
March	3,540	14,264	17,804	80	7,353	18,729	26,082	72	7,728	15,578	23,306	67	9,023	14,212	23,235	61	13,004	11,223	24,227	45
April	4,661	19,145	23,806	80	5,779	10,994	16,773	66	7,466	14,308	21,774	66	8,779	12,043	20,822	59	14,193	13,008	27,201	48
May	5,071	14,023	19,094	73	7,146	14,165	21,312	66	7,626	9,927	17,553	57	11,590	19,000	30,590	63	21,264	21,231	42,495	50
June	5,640	14,072	19,713	71	8,237	19,600	27,837	70	9,915	16,400	26,315	62	13,433	24,185	37,618	64	12,920	23,545	36,465	70
July	6,625	19,841	26,465	75	7,080	16,283	23,363	77	7,439	20,036	27,475	73	9,387	20,811	30,198	69	12,200	24,002	36,202	67
August	5,911	21,176	27,087	78	8,391	27,882	36,274	77	10,156	35,801	45,957	78	10,975	27,483	38,458	71	14,307	31,040	45,347	68
September	4,834	28,831	33,665	86	8,876	45,069	53,945	84	10,260	29,711	39,971	74	9,507	21,490	31,004	69	14,122	33,304	47,426	70
October	7,915	32,318	40,233	80	8,287	26,737	35,023	76	10,050	15,584	25,634	61	10,094	29,280	39,374	65	23,717	33,933	57,650	59
November	6,796	27,212	34,007	80	6,726	16,906	23,632	72	8,073	11,462	19,535	59	10,003	25,040	35,043	71	19,738	27,102	46,840	58
December	4,255	13,618	17,873	76	5,368	13,990	19,358	72	5,589	8,787	14,376	61	8,834	18,745	27,579	65	12,390	20,944	33,334	58

important in recent years. Some seasonality also occurs in usage of modes throughout the year, although it is extremely variable from year to year. In early years, railroad share varied from about 85 percent in September to 68 percent in May. In recent years the variation is similar but at a different magnitude, ranging from about 70 percent in September to a low of 45-55 percent in March. The variation appears to be independent of volume of movement, because in some large volume months, in some years, rail captured an increased share while in other times the rail share did not increase the response to increased movement. This characteristic reflects the erratic nature of the total movements, the variation in availability of truck or rail transportation, and the variation in commodity flows.

#### Commodity Movements

The movement of North Dakota commodities varies by origin in the state, destination of the shipment, and mode chosen by the shipper. The following discussion describes the five principal commodity movements out of North Dakota.

The origins utilized are the Crop Reporting Districts of the state, identified in Figure 1 by county and district. The wheat shipments out of North Dakota, by mode, are shown in Table 3 and Figure B-3 for the five study years. The relative production in each area has remained quite stable over the five year period with the eastern part of the state, CRD's 3, 6, and 9, producing about 50 percent of the wheat. Crop Reporting District 2 in the north central portion of the state is generally the smallest mover of Hard Red Spring wheat, primarily due to its heavy production of other commodities (discussed later in this report).

Wheat movements have been quite stable over the five-year period with an average of about 140 million bushels per year, with the exception of 1978-79. During this year all areas of the state significantly shared in the increase.

Rail shipments of wheat out of North Dakota have been decreasing quite steadily over the past five years, both relatively and absolutely (except for the large shipment year of 1978-79). Rail shipments in 1978-79 dropped below a 60 percent share for the first time even though rail shipments increased to 108 million bushels, the largest movement in any of the five years.

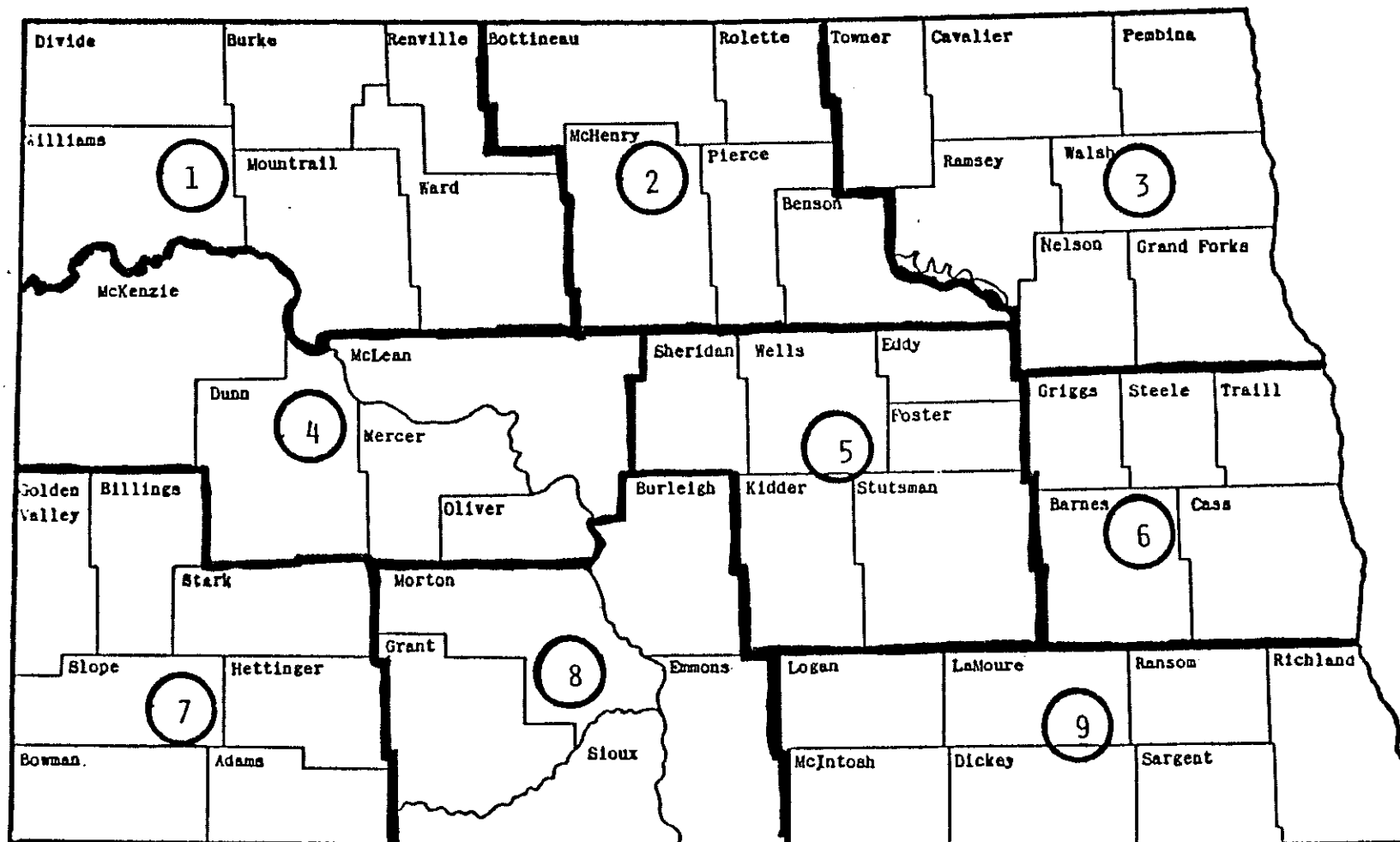


Figure 1. Crop Reporting Districts in North Dakota and Counties in Each District

TABLE 3. WHEAT SHIPMENTS FROM NORTH DAKOTA, BY ORIGIN, BY MODE, 1974-75 TO 1978-79 CROP YEARS

CRO	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
1	3,168	11,304	14,472		3,010	10,170	13,179		3,850	8,880	12,730		3,453	11,557	15,009		4,229	15,411	19,640	
Percent			12	78		10	77			10	70			12	77			11	78	
2	977	5,302	6,279		1,727	6,145	7,872		1,921	4,910	6,831		1,450	5,920	7,370		1,853	8,176	10,029	
Percent			5	84		6	78			5	72			8	80			5	82	
3	4,757	18,136	22,893		8,454	19,244	27,698		7,567	16,597	24,164		8,033	19,296	27,329		20,400	18,356	38,757	
Percent			19	79		20	66			19	69			21	71			21	47	
4	1,145	5,810	6,955		1,375	7,476	8,851		2,169	6,057	8,226		2,235	6,242	8,477		2,905	8,211	11,116	
Percent			6	84		6	84			7	74			7	74			6	74	
5	1,767	9,706	11,473		3,325	12,369	15,695		3,445	11,862	15,307		2,633	9,889	12,521		4,545	14,000	18,546	
Percent			9	85		11	79			12	77			10	79			10	75	
6	5,561	15,833	21,393		8,482	14,479	22,962		8,737	13,324	22,061		10,359	14,854	25,213		20,783	14,642	35,425	
Percent			17	74		17	63			18	60			20	54			19	41	
7	4,822	11,315	16,138		6,894	9,530	16,424		9,019	5,232	14,251		7,408	4,155	11,563		11,411	8,705	20,117	
Percent			13	70		12	58			11	37			9	36			11	43	
8	1,479	5,131	6,609		2,128	7,865	9,993		2,817	4,971	7,788		2,578	2,909	5,487		4,482	5,835	10,317	
Percent			5	78		7	79			8	64			4	54			6	57	
9	1,774	14,947	16,721		2,156	14,564	16,720		2,259	10,810	13,069		3,290	11,607	15,103		5,505	15,472	20,977	
Percent			14	89		12	87			11	83			12	78			11	74	
Total	25,450	97,484	122,934		37,551	101,835	139,386		43,784	82,843	124,427		41,455	86,511	127,966		76,113	108,608	184,721	
Percent	21	79	100		27	73	100		34	66	100		32	68	100		41	59	100	

The use of a particular mode varies with the different areas of the state. Crop Reporting District 7, the southwest corner of the state, utilizes truck heavily and is generally increasing its use of truck, from 30 percent in 1974-75 to 57 percent in 1978-79 and a high of 64 percent in 1977-78. The movement away from rail to truck has been less pronounced in the northern and the southeastern areas of the state during this period. In most areas both truck and rail absolute volumes continued to grow slightly.

Durum shipments out of the state (Table 4 and Figure B-4) have increased slightly in total volume. Durum production and movement is heavily concentrated in the northern area of the state, with the three CRD's in the north shipping an average of almost 75 percent during the period. The lowest share by these districts was 70 percent in 1975-76 and the highest was 78 percent in 1977-78.

Durum shipments continue to move heavily by rail from all producing areas, even though decreasing from 91 percent in 1974-75 to 80 percent in 1978-79. The heaviest user of rail in the three highest durum producing districts is the northwest region, CRD 1, which moved 87 percent of its 27.5 million bushels by rail in the last data year.

Barley shipments out of North Dakota have been on a slight increase, ranging from a low of 56 million bushels in 1975-76 to a high of a little over 73 million in 1976-77 (Table 5 and Figure B-5). The average annual shipment volume was about 64 million over the period. Most of this production and shipment volume comes from the eastern third of the state and has been increasing in relative importance. Shipments from CRD's 3, 6, and 9 have comprised an average of 76 percent of all North Dakota barley shipments over the five year period. The low share was 70 percent in 1974-75 and the high was 81 percent in 1977-78.

Barley shipments are predominately by rail. During the last three years the rail share has been around 70 percent, down from a high in 1974-75 of 87 percent. Most of the rail movement of barley comes from the eastern part of the state in rough proportion to total barley movements.

North Dakota oats shipments have decreased over the study period from a high of 19 million bushels in 1974-75 to a low of 10.5 million bushels three years later (Table 6 and Figure B-6). Oats shipments are broader based throughout the state than were barley shipments although



TABLE 4. DURUM SHIPMENTS FROM NORTH DAKOTA BY ORIGIN, BY MODE, 1974-75 TO 1978-79 CRUP YEARS

CRO	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
	(000 bushels)																			
1	1,875	21,098	22,973	92	2,728	18,845	21,573	87	2,637	16,762	19,399	86	2,464	24,349	26,813	91	3,457	24,037	27,494	87
Percent			33				29								30				31	
2	1,568	11,117	12,685	88	2,365	9,038	11,404	79	2,223	9,143	11,367	80	2,864	13,514	16,378	83	3,773	12,463	16,236	77
Percent			18				15								19				18	
3	1,268	16,057	17,325	93	3,379	15,893	19,272	82	2,596	15,832	18,427	86	3,668	22,036	25,704	88	5,317	17,585	22,902	77
Percent			25				26								29				26	
4	254	2,463	2,717	91	273	3,424	3,698	93	255	3,498	3,752	93	452	3,997	4,448	90	547	4,261	4,808	89
Percent			4				5								5				3	
5	540	4,927	5,467	90	918	6,352	7,270	87	797	4,202	4,999	84	1,271	4,674	5,945	79	2,569	5,760	7,409	79
Percent			8				10								7				8	
6	430	2,124	2,555	83	1,232	2,326	3,558	65	550	2,041	2,591	79	858	2,411	3,269	74	1,263	1,967	3,261	61
Percent			4				5								4				4	
7	239	1,632	1,872	87	385	2,458	2,844	86	543	1,495	2,038	73	749	1,322	2,071	64	734	2,021	2,755	73
Percent			3				4								2				3	
8	48	496	544	91	180	1,165	1,344	87	241	519	760	68	135	334	469	71	250	436	726	60
Percent			1				2								1				1	
9	185	2,457	2,642	93	502	3,369	3,870	87	438	1,709	2,148	80	486	2,779	3,265	85	740	2,487	3,197	78
Percent			4				5								4				4	
Total	6,407	62,371	68,778	100	11,962	62,870	74,833	100	10,480	55,201	65,681	100	12,947	75,418	88,365	100	27,620	71,039	98,659	100
Percent	9		100		16	84	100		16	84	100		15	85	100		20	80	100	

TABLE 5. BARLEY SHIPMENTS FROM NORTH DAKOTA BY ORIGIN, BY MODE, 1974-75 TO 1978-79 CROP YEARS

CRO	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
	(000 bushels)																			
1	462	3,351	3,813		264	1,920	2,183		200	3,022	3,229		364	2,138	2,502		655	2,861	3,515	
Percent			7	88			4	88			4	94			4	85			5	81
2	766	5,257	6,023		356	4,265	4,621		1,179	6,582	7,761		1,280	3,941	5,220		1,463	5,467	6,931	
Percent			11	87			8	92			11	85			8	75			10	79
3	3,478	16,469	19,948		4,350	19,340	23,690		10,169	20,550	30,727		9,637	15,780	25,417		4,157	19,292	23,449	
Percent			35	83			43	82			42	67			40	62			34	82
4	68	394	462		87	252	339		130	215	345		50	126	175		55	109	164	
Percent			1	85			1	74			0	62			0	72			0	66
5	402	4,918	5,321		471	3,967	4,439		1,962	2,811	4,773		1,106	2,576	3,682		1,628	3,795	5,423	
Percent			9	92			8	89			7	59			6	70			8	70
6	1,378	13,225	14,602		2,001	13,619	15,619		9,578	12,862	22,440		7,754	12,504	20,258		8,094	14,645	22,739	
Percent			26	91			28	87			31	57			32	62			33	64
7	524	552	1,076		225	162	386		169	131	300		85	9	94		92	28	120	
Percent			2	51			1	42			0	44			0	10			0	23
8	36	101	137		162	180	342		199	38	237		20	0	20		49	73	122	
Percent			0	73			1	53			0	16			0	0			0	60
9	291	5,003	5,294		1,004	3,723	4,728		1,552	1,949	3,501		1,658	4,089	5,747		1,130	6,055	7,186	
Percent			9	95			8	79			5	56			9	71			10	84
Total	7,405	49,270	56,676		8,920	47,436	56,355		25,146	46,168	73,313		21,954	41,163	63,115		17,323	52,325	69,649	
Percent	13	87	100	--	16	84	100	--	34	66	100	--	35	65	100	--	25	75	100	--

TABLE 6. OATS SHIPMENTS FROM NORTH DAKOTA BY ORIGIN, BY MODE, 1974-75 TO 1978-79 CROP YEAR

CRO	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
	(000 bushels)																			
1	2,439	664	3,103	21	1,171	442	1,613	26	1,818	491	2,309	21	1,614	155	1,769	9	1,797	404	2,200	18
Percent			16				9				17				17				18	
2	1,739	482	2,221	22	1,274	532	1,806	29	1,488	592	2,081	28	849	124	974	13	760	423	1,184	36
Percent			12				10				15				9				10	
3	4,302	1,851	3,153	59	924	2,709	3,633	75	1,439	1,296	2,735	47	531	954	1,485	64	525	607	1,131	54
Percent			16				20				20				14				9	
4	275	9	284	3	429	166	596	28	397	39	436	9	105	31	137	23	304	121	425	28
Percent			1				3				3				1				4	
5	891	1,204	2,095	67	470	1,870	2,340	80	1,029	607	1,536	33	276	290	566	65	572	444	1,016	44
Percent			11				13				11				5				8	
6	1,357	2,069	3,426	60	1,222	2,286	3,509	65	600	1,299	1,900	68	943	1,133	2,077	55	938	821	1,760	47
Percent			18				19				14				20				15	
7	249	18	266	7	153	10	163	6	218	7	225	3	47	0	47	0	68	0	68	0
Percent			1				1				2				0				1	
8	37	28	65	43	259	314	573	55	168	68	236	26	2	6	7	66	171	129	301	43
Percent			0				3				2				0				2	
9	838	3,830	4,668	82	1,104	3,064	4,168	74	723	1,643	2,366	69	745	2,745	3,490	79	1,124	2,878	4,003	72
Percent			24				23				17				33				33	
Total	9,127	10,155	19,281	--	7,006	11,393	18,401	--	7,880	5,932	13,814	--	5,112	5,378	10,494	--	6,259	5,827	12,088	--
Percent	47	53	100		38	62	100		57	43	100		49	51	100		52	48	100	

in recent years a third of the shipments come from CRD 9 in the southeastern portion of the state. The eastern third of the state originates over 55 percent of the oats shipments. Since the northern three districts account for over 40 percent of the movements, it is evident that oats shipments are predominately in the north and east portions of the state. The southwest-south section of the state, CRD's 4, 7, and 8, account for only 1 to 3 percent of the total movement. Little change in location pattern can be discerned over this time period.

The modal pattern of oats shipments varies slightly over the years. Rail share has averaged over 51 percent over the years but with a slight decrease, from a high of 62 percent in 1975-76 to 48 percent in 1978-79. Rail is far more heavily utilized by origins in the eastern portion of the state than in the northern or western portions, and this dependence has continued in this region even as other areas have moved more to truck transportation. The western three CRD's move very little by rail relative to other areas now or in the past.

The sunflower movement volume out of North Dakota (Table 7 and Figure B-7) has dramatically and continuously increased over time, from a low of 9 million bushels in 1974-75. When the sunflower shipments first started (in this study period), CRD 6 in the Red River Valley produced 50 to 60 percent of the total shipments and CRD's 6 and 9, in the Valley, produced almost 80 percent. Since that time sunflower shipments have increased throughout the state, although CRD's 6 and 9 still produce over half of the movements. New areas are the central and northeastern portions of the state, CRD's 5 and 3.

Truck movement of sunflower has always been strong and has increased tremendously, both relatively and absolutely, in recent years. Seventy-three percent of the 1978-79 movements of sunflowers went by truck compared to 45 percent in 1976-77. Volume moved by truck during those three years increased from 7 million bushels to almost 58 million bushels. The only significant movers by rail were CRD's 1 and 4, but they moved a relatively small portion of sunflowers in the last year.

#### Destinations

North Dakota moves its grain into international and domestic markets via many alternative ports or destinations. The principal alternative

TABLE 7. SUNFLOWER SHIPMENTS FROM NORTH DAKOTA BY ORIGIN, BY MODE, 1974-75 TO 1978-79 CROP YEAR

CNO	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
	(000 bushels)																			
1	15	0	15	0	0	0	0	0	5	2	7	29	415	350	771	40	929	1,304	2,233	58
Percent			0				0				0				2				3	
2	0	2	2	100	55	16	71	23	20	6	26	23	997	270	1,267	21	2,521	318	2,839	11
Percent			0				0				0				2				4	
3	646	245	791	31	1,023	831	1,853	45	1,040	1,144	2,184	52	6,657	5,012	10,470	30	11,410	3,393	14,803	23
Percent			9				13				14				20				19	
4	4	0	4	0	1	0	9	89	2	10	20	90	107	72	179	40	137	198	336	59
Percent			0				0				0				0				0	
5	124	346	470	74	1,077	695	1,772	39	1,036	752	1,788	42	5,333	5,734	11,067	41	10,474	5,086	15,560	33
Percent			5				12				11				10				20	
6	2,957	2,507	5,464	46	3,769	3,671	7,441	49	3,100	4,673	7,773	59	14,700	5,930	20,630	29	24,070	5,980	30,050	20
Percent			61				51				50				40				38	
7	0	0	0	0	2	0	2	0	23	3	25	12	101	124	225	25	352	133	485	27
Percent			0				0				0				0				1	
8	0	0	0	0	3	4	7	55	0	0	0	0	41	80	121	60	145	79	225	35
Percent			0				0				0				0				0	
9	1,027	1,240	2,267	55	1,734	1,666	3,399	49	1,789	1,922	3,711	52	4,257	4,100	8,357	50	7,722	5,000	12,722	39
Percent			25				23				24				10				16	
Total	4,673	4,340	9,013	--	7,664	6,891	14,554	--	7,103	8,520	15,622	--	32,708	10,572	51,280	--	57,760	21,491	79,253	--
Percent	52	48	100		53	47	100		45	55	100		64	30	100		73	27	100	

areas can be grouped into: Duluth/Superior; Minneapolis/St. Paul; Omaha and Kansas City; Western states; and others.

The shipment of wheat out of North Dakota by destinations and mode is indicated in Table 8 and Figure B-8 for the five year study period. Duluth/Superior and Minneapolis/St. Paul are the two principal destinations of North Dakota wheat, consistently receiving a combined total of about 80 percent of the movements over the five year period. In recent years the Duluth market has received greater attention from North Dakota wheat shippers, receiving 59 percent or almost 109 million bushels in 1978-79 compared to 44 percent or 54.4 million bushels in 1974-75. Minneapolis/St. Paul has decreased in importance, both absolutely and relatively. In 1974-75, 36 percent of North Dakota wheat, 44.3 million bushels, went to this market compared to 20 percent or 36 million bushels in 1978-79. The markets increasing in volume were Duluth/Superior and the Western states (probably the Puget Sound and Columbia River ports). The Western market has increased both absolutely and relatively in importance to North Dakota shippers, from a low of 13 percent (17 million bushels) in 1976-77 to the high of 19 percent (35 million bushels) in 1978-79. This was an increase of 109 percent over the time period, contrasted to slightly less than a 49 percent increase in total wheat shipments out of North Dakota during that period.

The rail share of North Dakota wheat movements has been declining while the truck share has been increasing. This phenomenon holds for each of the destinations. However, in absolute terms significant variation is evident between those destinations. Even as rail share to Duluth/Superior has decreased from 81 percent to 59 percent, the physical amount moved to the port has increased over 100 percent from about 54 million bushels to 109 million bushels over the five years. Minneapolis/St. Paul, on the other hand, has decreased almost 19 percent, from 44 million to 36 million bushels. The Western destination increased both relatively and absolutely, from 14 percent rail share (18 million bushels) to 19 percent rail share (35 million bushels) four years later.

Durum shipments from North Dakota (Table 9 and Figure B-9) also go primarily to Duluth/Superior and Minneapolis/St. Paul. These two markets have consistently, over the five year period, received over 90 percent of the North Dakota movements with Duluth/Superior receiving 2 to 3 times as

TABLE 8. WHEAT SHIPMENTS FROM NORTH DAKOTA, BY DESTINATION AND MODE, 1974-75 TO 1978-79 CROP YEAR

	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
	(000 bushels)																			
Duluth/ Superior	10,203	44,217	54,419		20,170	54,327	74,497		16,304	37,418	53,722		19,548	46,432	65,980		44,487	64,230	108,716	
Percent			44	81			53	73			43	70			52	70			59	59
Mpls./St. Paul & other Minn.	11,096	32,435	44,330		12,024	28,667	40,691		17,218	28,556	45,774		13,198	21,088	34,286		18,700	17,328	36,028	
Percent			36	73			29	70			37	82			27	64			20	48
S.C./Omaha/K.C.	88	570	658		69	385	454		131	106	237		42	18	60		49	58	107	
Percent			1	87			0	85			0	45			0	30			0	54
Western States	2,147	15,566	17,713		3,527	14,263	17,790		8,047	10,647	18,694		8,873	14,810	23,683		10,429	24,389	34,818	
Percent			14	87			13	80			13	64			17	68			19	70
East/South/Mid/ Misc.	1,116	4,697	5,813		1,761	4,201	5,962		2,085	5,927	8,012		1,782	4,343	6,125		2,448	2,805	5,253	
Percent			5	80			4	70			6	74			5	71			2	53
Total	25,450	95,485	122,933	77	37,551	101,843	139,394	73	41,785	82,644	124,429	66	41,443	88,509	129,952	66	76,113	108,810	184,923	59

TABLE 9. DURUM SHIPMENTS FROM NORTH DAKOTA, BY DESTINATION, AND MODE, 1974-75 TO 1978-79 CROP YEARS

	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
									(000 bushels)											
Duluth/ Superior	4,957	35,771	40,728		8,933	42,632	51,564		5,810	30,068	35,878		9,446	52,354	61,800		13,023	47,950	60,973	
Percent			58	88			69	83			54	84			70	85			69	77
Mpls./St. Paul & other Minn.	1,095	22,623	23,718		2,642	16,524	19,167		3,314	19,077	22,214		2,414	17,577	19,991		3,584	18,748	22,333	
Percent			33	95			26	86			33	86			23	88			25	81
S.C./Omaha/K.C.	--	8	8		--	--	--		--	--	--		6	3	10		--	10	10	
Percent			0	100			0				0				0	30			0	100
Western States	239	607	847		171	264	436		1,155	461	1,636		468	671	1,339		203	1,341	1,545	
Percent			1	72			1	61			3	29			1	83			2	86
East/South/Mid/ Misc.	117	3,363	3,480		215	3,450	3,665		380	5,573	5,953		621	4,415	5,036		810	2,988	3,798	
Percent			5	97			5	94			9	94			6	88			4	77
Total	6,408	62,372	68,781	91	11,961	62,870	74,832	84	10,479	55,204	65,679	84	12,947	75,418	88,365	85	17,620	71,037	88,659	80



much as Minneapolis/St. Paul. No change in this trend is identifiable, even in the years when total shipments increased by 29 percent over the 1974-75 years. Durum still moves heavily by railroad, although to a smaller degree in later years. Minneapolis/St. Paul has relied slightly more on rail for its inbound movement than the Duluth/Superior port in all five crop years.

The dominant destination for North Dakota barley (Table 10 and Figure B-10) continues to be Minneapolis/St. Paul, although the East, South, and mid United States are becoming increasingly important. In 1978-79, Minneapolis/St. Paul received 45 percent of barley movements and the "other United States" category increased its share to 35 percent from 8 percent in 1976-77. Rail share decreased over time from 87 percent to 75 percent although Minneapolis/St. Paul continued to rely on rail for over 90 percent of their receipts. The increasingly important markets of "other United States" relies less on rail than the total movement.

Although oats shipments are decreasing in volume, Duluth/Superior and Minneapolis/St. Paul have maintained a consistent share of the market, about 75 percent over the five year period (Table 11 and Figure B-11). Minneapolis/St. Paul is the dominant destination, taking over 55 percent of shipments in most years. The rest of the movement is spread out fairly evenly throughout the U.S., except for the rarely used Omaha market. The overall rail share of the oats movements is an average of 49 percent. Minneapolis/St. Paul still received 68 percent of its oats shipments by rail in 1978-79.

Sunflowers (Table 12 and Figure B-12) are moving more and more heavily to Duluth/Superior, 80 percent of total movements in 1978-79. These movements are becoming increasingly more dependent on truck for transportation from farm to market.

#### Mode of Shipment

The relative modal share for the five commodities included in this analysis are indicated in Tables 13-17. Wheat movements by truck are becoming increasingly important even though rail still moved 59 percent of wheat shipments in 1978-79 (Table 13). Hopper car movements are steadily increasing both absolutely and relatively, moving 58 percent of rail shipments, 62.6 million bushels in 1978-79. Durum shipments

TABLE 10. BARLEY SHIPMENTS FROM NORTH DAKOTA, BY DESTINATION, AND MODE, 1974-75 TO 1978-79 CROP YEARS

	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
	(000 bushels)																			
Duluth/ Superior	2,970	6,235	9,204		6,016	6,331	12,346		20,080	5,792	26,672		16,249	6,145	22,394		5,209	7,578	12,767	
Percent			16	68			22	51			36	22			35	27			18	59
Mpls./St. Paul & other Minn.	847	37,885	38,732		1,212	38,086	39,298		1,614	39,115	40,929		2,155	24,775	26,930		3,295	28,147	31,441	
Percent			68	98			69	97			56	96			42	92			45	90
S.C./Omaha/K.C.	12	2	14		--	32	32		--	4	4		13	18	31		--	89	89	
Percent			0	14			0	100			0	100			0	58			0	100
Western States	1,006	646	1,652		765	128	893		52	73	126		469	323	792		527	677	1,204	
Percent			3	39			2	14			0	58			1	41			2	56
East/South/Mid/ Misc.	2,572	4,503	7,075		926	2,859	3,785		2,399	3,184	5,583		3,067	9,902	12,969		8,294	15,834	24,128	
Percent			12	64			7	76			8	57			20	76			35	66
Total	7,407	49,271	56,677	87	8,919	47,436	56,354	84	25,145	48,168	73,314	66	21,953	41,163	64,116	64	17,325	52,325	69,649	75

TABLE 11. OATS SHIPMENTS FROM NORTH DAKOTA, BY DESTINATION, AND MODE, 1974-75 TO 1978-79 CROP YEARS

	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
	(000 bushels)																			
Duluth/ Superior	2,199	1,373	3,572		2,095	1,460	3,556		1,178	761	1,940		1,310	669	2,000		1,455	623	2,078	
Percent			19	38			19	41			14	39			23	36			17	30
Mpls./St. Paul & other Minn.	2,401	8,253	10,654		2,086	8,189	10,476		3,222	4,870	8,092		1,740	4,450	6,190		2,283	4,826	7,109	
Percent			55	77			57	78			59	60			34	71			59	68
S.C./Omaha/K.C.	1	3	4		22	3	25		14	2	16		3	--	3		45	5	50	
Percent			0	75			0	12			0	13			0	0			0	10
Western States	3,126	319	3,446		1,366	97	1,463		1,464	121	1,584		839	12	847		1,016	185	1,201	
Percent			18	9			8	7			11	8			0	1			10	15
East/South/Mid/ Misc.	1,399	208	1,607		1,238	1,644	2,882		2,003	177	2,180		1,007	144	1,150		1,461	188	1,649	
Percent			8	13			16	57			16	8			11	13			14	8
Total	9,126	10,152	19,283	53	6,807	11,393	18,402	62	7,881	5,931	13,812	43	5,113	5,379	10,492	31	6,260	5,872	12,087	49

TABLE 12. SUNFLOWER SHIPMENTS FROM NORTH DAKOTA, BY DESTINATION, AND MODE 1974-75 TO 1978-79 CROP YEARS

	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
	(000 bushels)																			
Duluth/ Superior	1,661	2,271	3,932		4,155	3,928	8,083		3,095	5,598	8,693		23,199	14,620	38,019		44,348	18,830	63,178	
Percent			44	58			56	49			45	64			74	89			80	30
Mpls./St. Paul & other Mjns.	1,054	422	1,476		789	1,515	2,304		1,276	950	2,232		5,070	1,137	6,213		9,444	954	10,399	
Percent			16	29			16	66			11	43			12	18			13	9
S.C./Omaha/K.C.	24	25	49		18	20	38		3,800	--	3,800		100	4	100		20	--	20	
Percent			1	51			0	53			20	0			0	4			0	0
Western States	114	253	368		187	23	211		195	110	304		600	152	752		484	546	1,029	
Percent			4	69			1	11			2	30			2	19			1	53
East/South/Mid/ Misc.	1,820	1,368	3,188		2,014	1,904	3,918		2,533	1,857	4,390		3,067	2,459	5,526		3,465	1,162	4,627	
Percent			35	43			27	49			23	42			12	40			6	25
Total	4,673	4,339	9,013	48	7,163	7,390	14,554	51	10,899	8,521	19,418	44	32,700	16,572	51,279	30	57,761	21,492	79,253	27

TABLE 13. TOTAL WHEAT SHIPMENTS, BY MODE AND TYPE OF FREIGHT CAR,  
1974-75 TO 1978-79 CROP YEARS

	1974-75	1975-76	1976-77	1977-78	1978-79
	(000 bushels)				
Truck					
Number	25,450	37,552	41,785	41,444	76,114
Percent	21	27	34	32	41
Rail					
Number	97,485	101,842	82,644	86,509	108,809
Percent	79	73	66	68	59
Hopper Car					
Number	40,878	45,796	41,371	53,088	62,673
Percent	42	45	50	61	58
Boxcar					
Number	56,606	56,046	41,273	33,421	46,137
Percent	58	55	50	39	92
Total	122,935	139,364	124,429	127,954	184,923

also are increasingly dependent on truck but to a far less degree than wheat (Table 14). In 1978-79, 80 percent of the durum movements were still by rail. Hopper cars are providing a great share of the rail capacity, increasing from 40 percent in 1974-75 to 59 percent in 1978-79.

TABLE 14. TOTAL DURUM SHIPMENTS BY MODE AND TYPE OF FREIGHT CAR,  
1974-75 TO 1978-79 CROP YEARS

	1974-75	1975-76	1976-77	1977-78	1978-79
	(000 bushels)				
Truck					
Number	6,408	11,962	10,480	12,947	17,621
Percent	9	27	16	15	20
Rail					
Number	62,372	62,870	55,202	75,419	71,038
Percent	91	73	84	85	80
Hopper Car					
Number	24,795	26,409	27,529	45,052	41,895
Percent	40	42	50	60	59
Boxcar					
Number	37,578	36,460	27,671	30,364	29,142
Percent	60	58	50	40	41
Total	68,780	74,832	65,680	88,366	88,659

Barley and oats are moving slightly more by truck each year (Tables 15 and 16). Barley, whose total production is only slightly increasing, relies on rail for 75 percent of its shipments, down from 87 percent in 1974-75, although the absolute amount moved by rail increased over those years. Hopper cars are now used for 68 percent of barley rail movements with box cars moving the other 32 percent. Oats moves slightly less by

TABLE 15. TOTAL BARLEY SHIPMENTS, BY MODE AND TYPE OF FREIGHT CAR, 1974-75 TO 1978-79 CROP YEARS

	1974-75	1975-76	1976-77	1977-78	1978-79
	(000 bushels)				
Truck					
Number	7,406	8,918	25,144	21,953	17,324
Percent	13	16	34	35	25
Rail					
Number	49,271	47,436	48,169	41,162	52,324
Percent	87	84	66	65	75
Hopper Car					
Number	16,434	15,565	21,941	25,912	35,362
Percent	33	33	46	63	68
Boxcar					
Number	32,836	31,871	26,228	15,251	16,963
Percent	67	67	34	37	32
Total	56,676	56,355	73,313	63,115	69,649

TABLE 16. TOTAL OAT SHIPMENTS, BY MODE AND TYPE OF FREIGHT CAR, 1974-75 TO 1978-79 CROP YEARS

	1974-75	1975-76	1976-77	1977-78	1978-79
	(000 bushels)				
Truck					
Number	9,126	7,007	7,881	5,113	6,260
Percent	47	38	57	49	52
Rail					
Number	10,156	11,393	5,931	5,380	5,828
Percent	53	62	43	51	48
Hopper Car					
Number	3,871	4,425	2,476	2,945	3,104
Percent	38	39	42	55	53
Boxcar					
Number	6,285	6,968	3,445	2,435	2,724
Percent	62	61	58	45	47
Total	19,282	18,401	13,812	10,492	12,088

rail relative to truck than it did in earlier years. Total movement in the 1978-79 crop year has decreased for both modes compared to the 1974-75 crop year. Hopper car usage has increased in recent years, reaching 55 percent of rail movements in 1977-78.

Sunflower increased its usage of truck, both relatively and absolutely, over the time period, reaching 73 percent of movements of truck in 1978-79. For the rail shipments, which have tremendously increased in absolute figures, hopper car usage is also high and increasing, reaching 64 percent in both the last two years (Table 17).

TABLE 17. SUNFLOWER SHIPMENTS, BY MODE AND TYPE OF FREIGHT CAR, 1974-75 TO 1978-79 CROP YEARS

	1974-75	1975-76	1976-77	1977-78	1978-79
	(000 bushels)				
Truck					
Number	4,674	7,663	7,102	32,708	57,761
Percent	51	53	45	64	73
Rail					
Number	4,339	6,891	8,520	18,571	21,492
Percent	49	47	55	36	27
Hopper Car					
Number	2,098	3,581	4,712	11,884	13,677
Percent	48	52	55	64	64
Boxcar					
Number	2,241	3,310	3,808	6,687	7,815
Percent	52	48	45	36	36
Total	9,013	14,554	15,622	51,278	79,253

For all five commodities rail still carried 60 percent in 1978-79, down from a relative 81 percent in 1974-75. But during this time the absolute amount moved by rail increased from 223 million bushels to 259 million bushels, a 16 percent increase.

#### Destinations

The destination or markets for North Dakota grain are spread throughout the United States and world. These destinations can vary as to the commodity handled, the mode of shipment used, and origin of those shipments from North Dakota. This section evaluates destinations as to differences in these variables.

### Commodity

The commodities and modes of shipment for each commodity into Duluth/Superior are indicated in Table 18. Wheat is the most important commodity handled at this destination, maintaining an average of 43 percent of total receipts from North Dakota. Durum is the second most important commodity movement, although in 1978-79 sunflower slightly surpassed durum 25 to 24 percent respectively. Duluth/Superior still receives most of its movements by rail, 56 percent in 1978-79, but this is down significantly from the 80 percent in 1974-75. Durum continues to move heavily by rail, 79 percent in 1978-79, but the strong increase in truck movement share and absolute volume of sunflowers has decreased the overall rail share.

Minneapolis/St. Paul also is receiving less of its movements by rail, 62 percent in 1978-79 compared to 82 percent in 1974-75 (Table 19), although durum and barley still move heavily by rail, 84 percent and 90 percent respectively in 1978-79. This rail movement, combined with a small absolute amount of sunflower moving to this destination, has made Minneapolis/St. Paul an even stronger user of rail service than the Duluth/Superior market. Minneapolis/St. Paul relies on all commodities to some degree for receipts, but wheat and durum comprise about 50 percent or more in most years. This distribution has remained quite steady over the time span of this study.

Shipments to the Kansas City market area are quite small but are variable from year to year (Table 20). Shipments are predominated by rail. This volume increasingly arrives by truck, 17 percent in 1974-75 and 40 percent in 1978-79.

The East/South market area consistently receives 60 percent or more by rail (Table 21). Again, all commodities move to some balanced degree to these markets. Although the distribution varies, barley movements do comprise the strongest commodity receipts.

The receipts in the Western states are increasing in recent years (Table 22). The dominant commodity moving west is wheat, with about 75 percent of total receipts. Receipts in the Western states from North Dakota are principally by rail, about an average of 70 percent over the five year period. Wheat has decreased slightly, down to 70 percent in 1978-79, in rail use but still is only moved about 30 percent by truck.



TABLE 18. DULUTH/SUPERIOR RECEIPTS, BY COMMODITY AND MODE, 1974-75 TO 1978-79 CROP YEARS

Commodity	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
(000 bushels)																				
Wheat	10,203	44,217	54,420		20,170	54,327	74,497		16,304	37,418	53,722		19,348	40,432	59,780		44,487	64,210	108,717	
Percent			47	81			49	73			42	70			34	70			43	59
Durum	4,957	35,771	40,728		8,933	42,632	51,565		5,810	30,068	35,878		9,438	52,552	61,990		13,023	47,950	60,973	
Percent			36	88			34	83			28	84			32	85			24	79
Barley	2,969	6,235	9,204		6,016	6,331	12,347		20,800	5,792	26,592		10,249	6,145	22,394		5,209	7,578	12,787	
Percent			8	68			8	51			21	22			12	27			5	59
Oats	2,199	1,373	3,572		2,095	1,460	3,555		1,178	781	1,959		1,518	889	2,407		1,455	623	2,078	
Percent			3	38			2	41			2	39			1	38			1	30
Sunflowers	1,661	2,271	3,932		3,928	4,155	8,083		3,095	5,598	8,693		23,199	14,820	38,019		44,348	18,830	63,178	
Percent			3	58			5	51			7	84			20	39			25	38
Other	1,197	1,550	2,747		1,361	1,107	2,468		570	570	1,140		1,075	1,001	2,076		2,019	902	2,921	
Percent			2	56			2	45			1	50			1	50			1	31
Total	23,186	91,417	114,603	80	42,503	110,012	152,515	72	47,837	40,207	128,044	63	71,025	121,699	192,724	63	110,541	140,113	250,654	56

TABLE 19. MINNEAPOLIS/ST. PAUL AND OTHER MINNESOTA RECEIPTS, BY COMMODITY AND MODE, 1974-75 TO 1978-79 CROP YEARS

Commodity	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
(000 bushels)																				
Wheat	11,896	32,435	44,331		12,024	28,667	40,691		17,218	28,556	45,774		13,198	21,008	34,206		18,700	17,328	36,028	
Percent			35	73			33	70			36	62			34	62			31	48
Durum	1,095	22,623	23,718		2,642	16,524	19,167		3,134	19,077	22,212		2,414	17,577	19,991		3,584	18,748	22,333	
Percent			19	95			16	86			17	86			20	88			19	84
Barley	847	27,885	28,732		1,212	38,086	39,298		1,814	39,115	40,929		2,155	24,775	26,930		3,295	28,147	31,441	
Percent			30	98			32	97			32	90			27	92			27	90
Oats	2,401	8,253	10,654		2,286	8,189	10,476		3,222	4,870	8,092		1,748	4,350	6,098		2,283	4,826	7,109	
Percent			8	77			9	78			6	60			6	71			6	68
Sunflowers	1,054	422	1,476		1,515	789	2,304		1,276	956	2,232		5,076	1,137	6,213		9,444	954	10,399	
Percent			1	29			2	34			2	43			6	16			9	9
Other	5,663	2,488	8,151		6,990	2,882	9,872		5,642	2,573	8,215		5,833	1,998	7,831		6,511	2,009	8,520	
Percent			6	31			8	29			6	31			8	25			7	24
Total	22,956	104,106	127,062	82	26,669	95,137	121,806	78	32,306	95,147	127,454	75	30,424	70,915	101,339	70	43,817	72,012	115,830	62

TABLE 20. SIOUX CITY/OMAHA/KANSAS CITY RECEIPTS BY COMMODITY AND MODE, 1974-75 TO 1978-79 CROP YEARS

Commodity	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
	(000 bushels)																			
Wheat Percent	88	570	658	87	69	385	454	85	131	106	238	45	42	18	61	30	49	58	107	54
			90				82				71				27				37	
Durum Percent	--	8	8	100	--	--	--	0	--	--	--	0	6	3	10	35	--	10	10	100
			1				0				0				4				3	
Barley Percent	12	2	14	14	--	32	32	100	--	4	4	100	13	18	31	57	--	89	89	100
			2				6				1				14				31	
Oats Percent	1	3	4	75	22	3	25	12	14	2	16	15	3	--	3	0	45	5	50	10
			1				5				2				1				17	
Sunflowers Percent	24	25	49	51	18	20	38	53	4	--	4	0	106	4	110	4	20	--	20	--
			7				7				1				48				7	
Other Percent	2	--	2	--	--	3	3	100	59	15	74	21	--	13	13	100	3	14	13	82
			0				1				22				0				6	
Total	127	608	735	83	109	443	551	80	206	127	336	38	170	56	228	25	117	176	293	60

TABLE 21. EAST/SOUTH/MIDWEST/MISC. RECEIPTS, BY COMMODITY AND MODE, 1974-75 TO 1978-79 CROP YEARS

Commodity	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
	(000 bushels)																			
Wheat Percent	1,116	4,697	5,813 25	81	1,761	4,201	5,962 26	70	2,005	5,927	8,012 27	74	1,782	4,343	6,125 18	71	2,448	2,805	5,254 12	53
Burn Percent	117	3,363	3,480 15	97	215	3,450	3,665 16	94	380	5,573	5,953 20	94	621	4,415	5,036 14	80	810	2,988	3,798 9	79
Barley Percent	2,572	4,503	7,075 30	64	926	2,859	3,785 16	76	2,399	3,184	5,583 19	57	3,067	9,902	12,969 37	76	8,294	15,834	24,128 56	61
Oats Percent	1,399	208	1,607 7	13	1,238	1,644	2,882 12	57	2,003	177	2,180 7	8	1,007	148	1,155 3	13	1,461	188	1,649 4	11
Sunflowers Percent	1,820	1,368	3,188 13	41	2,014	1,905	3,918 17	49	2,533	1,857	4,389 15	42	3,667	2,459	6,125 18	41	3,465	1,162	4,627 11	25
Other Percent	1,516	1,071	2,587 11	39	1,703	1,465	3,169 14	46	1,912	1,227	3,139 11	39	2,018	1,656	3,674 10	45	1,259	2,329	3,588 8	65
Total	8,540	15,210	23,750	64	7,857	15,524	23,381	66	11,312	17,945	29,256	61	12,162	22,923	35,084	65	17,737	25,306	43,044	59

TABLE 22. WESTERN STATES RECEIPTS BY COMMODITY AND MODE, 1974-75 TO 1978-79 CROP YEARS

Commodity	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
(000 bushels)																				
Wheat	2,147	15,566	17,713		3,527	14,263	17,790		6,047	10,637	16,683		6,073	14,630	21,503		10,429	24,389	34,818	
Percent			70	88			81	80			80	64			74	68			75	70
Durum	239	607	847		171	264	436		1,155	481	1,636		468	871	1,339		203	1,341	1,545	
Percent			3	72			2	61			8	29			5	65			3	87
Barley	1,006	646	1,652		765	128	893		52	74	126		469	323	792		527	677	1,204	
Percent			6	39			4	14			1	58			3	41			3	56
Oats	3,126	319	3,445		1,366	97	1,463		1,464	121	1,584		839	12	851		1,016	185	1,201	
Percent			14	9			7	7			8	8			3	1			3	15
Sunflowers	114	253	368		187	23	211		195	110	304		660	152	813		484	546	1,030	
Percent			1	69			1	11			1	36			3	19			2	53
Other	490	919	1,409		637	601	1,238		207	281	489		336	3,398	3,734		294	6,323	6,617	
Percent			6	65			6	49			2	57			13	91			14	96
Total	7,122	18,310	25,435	72	6,653	15,376	22,031	70	9,120	11,704	20,822	56	9,645	19,386	29,032	67	12,953	33,461	46,414	72

### Origin

Duluth/Superior and Minneapolis/St. Paul do not vary much in relative importance of origin areas in North Dakota (Tables 23 and 24; and Figures 8-13 and 8-14). The relative importance of eastern North Dakota, CRD's 3, 6, and 9, has increased slightly over the time period for both destinations. Both areas do draw to a lesser degree from the western area of the state, caused probably by increased movement to the West of wheat out of this area and the increased importance of the eastern grown sunflowers. Duluth/Superior uses rail transportation less than Minneapolis/St. Paul because of the size of these sunflower shipments, which move heavily by truck. However, the western CRD's use rail more than the eastern part of North Dakota, especially when shipping to Duluth/Superior.

Movements from the various origins to the Kansas City area are highly variable with little readily discernable pattern (Table 25 and Figure 8-15). The same can be said concerning the East/South area of destination (Table 26 and Figure 8-16). The eastern portion of the state provides 50 to 60 percent of movements into both areas. The west and northwest are quite unimportant for the Kansas City destinations while the southwest is a small origin area for the East/South destination. Both destination areas have basically similar modal use patterns from the alternative origin points in North Dakota, although Kansas City, in the earlier years, was more dependent on rail.

Market destinations in the Western states arise heavily from the western part of North Dakota with little change over time (Table 27 and Figure 8-17). Over the time period an average of almost 63 percent of grain shipments to the Western states came from CRD's 1, 4, and 7 in western North Dakota. Origins in western North Dakota still rely heavily on rail, 78 percent, except for CRD 7 in the southwestern part of North Dakota which utilizes truck for about 60 percent of its movements to the West, especially in 1976-77 and 1977-78.

### Mode of Shipment

The use of alternative modes by different destinations is detailed in Tables 28-32. Duluth has consistently increased its relative use of truck over time from 20 percent in 1974-75 to 44 percent in 1978-79 (Table 28).

TABLE 23. DULUTH/SUPERIOR RECEIPTS, BY ORIGIN AND MODE, 1974-75 TO 1978-79 CROP YEARS

CRO	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
	(000 bushels)																			
1	2,584	17,804	20,388		3,027	18,410	21,437		2,589	14,630	17,219		2,399	21,978	24,377		3,525	25,553	29,078	
Percent			18	87			14	86			13	85			13	90			12	88
2	2,638	10,886	13,524		4,701	10,966	15,667		4,371	8,686	13,057		5,875	14,790	20,665		8,403	16,131	24,523	
Percent			12	81			10	70			10	65			11	72			10	66
3	7,587	20,779	28,366		14,582	24,176	38,758		18,475	18,732	37,207		24,763	35,731	60,494		37,507	32,918	70,425	
Percent			25	73			25	62			29	50			31	59			28	47
4	755	3,775	4,530		743	5,664	6,407		510	3,785	4,295		561	4,460	5,021		822	4,409	5,231	
Percent			4	83			4	88			3	88			3	89			2	84
5	1,622	7,872	9,494		4,179	13,268	17,447		3,716	8,804	12,520		5,931	12,370	18,301		11,437	19,004	30,441	
Percent			8	83			11	76			10	70			9	68			12	62
6	5,822	12,946	18,768		10,542	15,314	25,856		14,071	13,817	27,888		24,139	18,035	42,174		37,583	20,856	58,439	
Percent			16	69			17	59			22	50			22	43			23	36
7	644	3,853	4,497		1,085	4,323	5,408		725	2,020	2,745		726	1,123	1,849		765	2,153	2,918	
Percent			4	86			4	80			2	74			1	61			1	74
8	407	2,794	3,201		878	4,838	5,716		557	2,157	2,714		390	1,542	1,932		992	3,374	4,366	
Percent			3	87			4	85			2	79			1	80			2	77
9	1,127	10,709	11,836		2,765	13,052	15,817		2,823	7,578	10,401		6,242	11,870	18,112		9,508	15,714	25,222	
Percent			10	91			10	83			8	73			9	66			10	62
Total	23,186	91,418	114,604	80	42,502	110,011	152,513	72	47,837	80,209	128,046	63	71,026	121,899	192,925	63	110,542	140,112	250,654	56

TABLE 24. MINNEAPOLIS/ST. PAUL/OTHER MINNESOTA RECEIPTS, BY ORIGIN AND MODE, 1974-75 TO 1978-79 CROP YEARS

CRO	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
	(000 bushels)																			
1	2,800	12,901	15,701		3,114	7,918	11,032		4,020	9,553	13,573		3,734	9,633	13,367		4,737	9,185	13,922	
Percent			12	82			9	72			11	70			13	72			12	66
2	1,776	9,386	11,162		1,794	8,082	9,876		2,497	10,864	13,361		1,841	6,274	8,115		1,676	6,749	8,425	
Percent			9	84			8	82			10	81			8	77			7	80
3	2,477	25,849	28,326		2,906	28,413	31,319		3,139	30,738	33,877		2,538	18,813	21,351		3,526	19,109	22,635	
Percent			22	91			26	91			27	91			21	88			20	84
4	696	2,665	3,361		988	3,081	4,069		1,725	3,507	5,232		1,379	3,059	4,438		1,981	3,934	5,915	
Percent			3	79			3	76			4	67			4	69			5	67
5	1,748	9,905	11,653		2,065	9,566	11,631		3,119	9,779	12,898		3,253	4,759	8,012		5,094	5,450	10,544	
Percent			9	85			10	82			10	76			8	59			9	52
6	5,294	18,887	24,181		5,680	17,225	22,905		7,166	16,823	23,989		8,648	12,620	21,268		12,693	11,585	24,278	
Percent			19	78			19	75			19	70			21	59			21	48
7	3,077	4,691	7,768		3,949	3,833	7,782		4,626	2,548	7,174		2,903	1,816	4,719		4,828	2,827	7,655	
Percent			6	60			6	49			6	36			5	38			7	37
8	1,281	2,197	3,478		1,754	3,188	4,942		2,129	1,660	3,789		1,751	860	2,611		2,950	1,020	3,970	
Percent			3	63			4	64			3	44			3	33			3	26
9	3,807	17,625	21,432		4,419	13,833	18,252		3,888	9,676	13,564		4,376	13,081	17,457		6,332	12,154	18,486	
Percent			17	82			15	76			11	71			17	75			16	66
Total	22,956	104,106	127,062	82	26,669	95,139	121,808	78	32,309	95,148	127,457	75	30,423	70,915	101,338	70	43,817	72,013	115,830	62



TABLE 25. SIOUX CITY/OMAHA/KANSAS CITY RECEIPTS, BY ORIGIN AND MODE, 1974-75 TO 1978-79 CROP YEARS

CRO	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
	(000 bushels)																			
1	1	6	8		1	--	1		4	--	4		3	--	3		8	10	18	
Percent			1	81			0	0			1	0			1	0			6	56
2	1	51	52		--	--	--		2	7	9		1	--	1		--	4	4	
Percent			7	98			0	--			3	78			0	0			1	100
3	12	9	21		--	50	50		--	17	17		99	7	106		--	32	32	
Percent			3	43			9	100			5	100			47	7			11	100
4	5	32	37		4	--	4		2	7	9		10	--	10		6	--	6	
Percent			5	86			1	0			3	78			4	0			2	0
5	10	69	79		1	40	41		15	9	24		8	3	11		8	3	12	
Percent			11	87			7	98			7	38			5	27			4	29
6	--	58	58		43	33	76		3	29	32		15	18	33		18	92	110	
Percent			8	100			14	43			9	91			15	55			38	84
7	18	195	213		24	264	288		23	26	49		13	--	13		18	6	24	
Percent			29	92			52	92			15	53			6	0			0	25
8	48	26	74		26	23	49		77	2	79		13	--	13		18	--	18	
Percent			10	35			9	47			23	3			6	0			6	0
9	34	163	197		11	33	44		81	33	114		10	27	37		40	28	68	
Percent			27	83			8	85			34	29			16	73			23	41
Total	129	609	739	83	110	443	553	80	207	130	337	39	172	55	227	24	116	175	291	60

TABLE 26. EAST/SOUTH/MIDLAND/SOUTHWESTERN/MISC. RECEIPTS, BY ORIGIN AND MODE, 1974-75 TO 1978-79 CROP YEARS

CRO	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
	(000 bushels)																			
1	741	1,459	2,200		341	1,195	1,536		448	2,053	2,501		735	1,680	2,415		1,170	2,038	3,208	
Percent			9	66			7	78			9	82			7	70		7		64
2	439	1,404	1,843		290	974	1,183		567	1,844	2,411		289	2,053	2,342		1,088	2,347	3,435	
Percent			8	76			5	82			8	76			7	88		8		68
3	1,577	1,217	4,794		1,182	5,092	6,274		1,757	7,066	8,823		2,022	7,994	10,016		1,771	7,612	9,383	
Percent			20	67			27	81			30	80			29	80		22		81
4	176	516	692		298	439	737		281	560	841		817	366	1,183		331	249	582	
Percent			3	75			3	60			3	67			3	31		1		44
5	766	2,920	3,686		784	1,902	2,686		1,759	1,167	2,926		1,428	2,509	3,937		2,421	2,097	4,518	
Percent			16	79			11	71			10	40			11	64		11		46
6	2,615	2,963	5,578		2,320	3,927	6,247		2,843	3,747	6,590		3,611	6,274	9,885		6,956	5,871	12,827	
Percent			23	53			27	63			23	57			28	63		30		45
7	434	813	1,247		245	418	663		560	256	816		444	339	783		544	212	756	
Percent			5	65			3	63			3	31			2	43		2		28
8	30	325	355		155	365	520		217	162	379		67	50	117		255	170	425	
Percent			1	92			2	70			1	43			0	43		1		40
9	1,762	1,594	3,356		2,323	1,212	3,535		2,879	1,089	3,968		2,749	1,659	4,408		3,219	4,710	7,929	
Percent			14	47			15	34			14	27			13	38		18		59
Total	8,540	15,211	23,751	64	7,857	15,524	23,381	66	11,311	17,944	29,255	61	12,162	22,924	35,086	65	17,737	25,306	43,043	55

TABLE 27. WESTERN STATES RECEIPTS, BY ORIGIN AND MODE, 1974-75 TO 1978-79 CROP YEARS

CRO	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
	(000 bushels)																			
1	2,315	4,361	6,676		1,284	3,965	5,249		2,201	3,131	5,332		2,100	5,618	7,718		2,238	7,337	9,575	
Percent			26	65			24	76			26	59			27	73			21	77
2	995	566	1,561		436	200	636		423	159	582		464	966	1,430		424	1,844	2,268	
Percent			6	36			3	31			3	27			5	68			5	81
3	305	3,586	3,891		273	1,519	1,792		21	141	162		120	520	640		34	885	919	
Percent			15	92			8	85			1	87			2	81			2	96
4	386	1,846	2,232		500	2,225	2,725		796	2,142	2,938		697	2,975	3,672		1,225	4,455	5,680	
Percent			9	83			12	82			14	73			13	81			12	78
5	382	704	1,086		134	1,093	1,227		392	1,004	1,396		662	1,654	2,316		664	2,955	3,619	
Percent			4	65			6	89			7	72			8	71			8	82
6	499	1,600	2,099		362	427	789		181	244	425		278	786	1,064		249	1,818	2,067	
Percent			8	76			4	54			2	57			4	74			4	88
7	1,819	3,991	5,810		2,564	3,340	5,904		4,212	2,048	6,260		4,417	2,370	6,787		6,587	5,835	12,422	
Percent			23	69			27	57			30	33			23	35			27	47
8	62	527	589		265	1,343	1,608		765	1,728	2,493		669	1,032	1,701		1,212	2,108	3,320	
Percent			2	90			7	84			12	69			6	61			7	63
9	361	1,130	1,491		837	1,264	2,101		127	1,107	1,234		240	3,466	3,706		320	6,223	6,543	
Percent				76			10	60			6	90			13	94			14	95
Total	7,124	18,311	25,435	72	6,655	15,376	22,031	70	9,118	11,704	20,822	56	9,647	19,387	29,034	67	12,953	33,460	46,413	72

TABLE 28. GRAIN MOVED TO DULUTH/SUPERIOR BY MODES

	1974-75	1975-76	1976-77	1977-78	1978-79
	(000 bushels)				
Truck					
Number	23,185	42,502	47,837	71,025	110,541
Percent	20	28	37	37	44
Rail					
Number	91,417	110,012	80,207	121,899	140,112
Percent	80	72	63	63	56
Hopper Car					
Number	35,788	46,419	39,275	76,593	88,390
Percent	39	42	49	63	63
Boxcar					
Number	55,629	63,593	40,932	45,307	51,722
Percent	61	58	51	37	37
Total	114,603	152,514	128,044	192,925	250,653

Both truck and rail receipts were increased absolutely during this time. Hopper cars have increased from 39 percent of the rail shipments in 1974-75 to 63 percent in 1978-79. This phenomenon has occurred at Minneapolis/St. Paul as well, increasing from 36 percent to 60 percent of rail movements (Table 29). Truck has also increased its share of the receipts at Minneapolis/St. Paul but to a lesser degree, 38 percent in 1978-79, than Duluth/Superior.

TABLE 29. GRAIN MOVED TO MINNEAPOLIS/ST. PAUL AND OTHER MINNESOTA

	1974-75	1975-76	1976-77	1977-78	1978-79
	(000 bushels)				
Truck					
Number	22,954	26,670	32,308	30,424	43,817
Percent	18	22	25	30	38
Rail					
Number	104,106	95,138	95,146	70,914	72,013
Percent	82	78	75	70	62
Hopper Car					
Number	37,398	35,347	44,908	41,752	43,028
Percent	36	37	47	59	60
Boxcar					
Number	66,708	59,791	50,238	29,162	28,985
Percent	63	63	53	41	40
Total	127,060	121,808	127,454	101,338	115,831

The Kansas City area and the Eastern/South area also increased their dependence on truck carriage and increased use of hopper cars relative to boxcars for rail movements (Tables 30-31). Hopper cars are used relatively less in the movement to the Western states, although absolute movement has increased quite remarkably in recent years (Table 32). Presently, in 1978-79, boxcars and hopper cars are used about equally to the West Coast. Rail movement continues to be over two and one half times the truck volume, a phenomenon not seen in other movements.

TABLE 30. GRAIN MOVED TO SIOUX CITY/OMAHA/KANSAS

	1974-75	1975-76	1976-77	1-77-78	1978-79
	(000 bushels)				
Truck					
Number	127	109	207	170	117
Percent	17	20	62	75	40
Rail					
Number	608	443	128	56	177
Percent	83	80	38	25	60
Hopper Car					
Number	235	183	71	43	114
Percent	39	41	55	77	64
Boxcar					
Number	373	259	57	13	63
Percent	61	59	45	23	36
Total	735	551	335	225	293

TABLE 31. GRAIN MOVEMENT BY DESTINATION TO EASTERN/SOUTHERN STATES/  
MIDLAND/SOUTHWESTERN/MISCELLANEOUS

	1974-75	1975-76	1976-77	1977-78	1978-79
	(000 bushels)				
Truck					
Number	8,539	7,858	11,311	12,161	17,738
Percent	36	34	39	35	41
Rail					
Number	15,211	15,524	17,524	22,923	25,306
Percent	64	66	61	65	59
Hopper Car					
Number	7,713	8,313	10,136	15,238	17,100
Percent	51	54	57	67	68
Boxcar					
Number	7,498	7,210	7,808	7,686	8,206
Percent	49	46	43	33	32
Total	23,751	23,381	29,256	35,085	43,044

TABLE 32. GRAIN MOVEMENT BY DESTINATION TO WESTERN STATES

	1974-75	1975-76	1976-77	1977-78	1978-79
	(000 bushels)				
Truck					
Number	7,122	6,654	9,120	9,645	12,952
Percent	28	30	44	33	28
Rail					
Number	18,311	15,376	11,703	19,386	33,461
Percent	72	70	56	67	72
Hopper Car					
Number	9,868	8,612	6,063	11,054	16,553
Percent	54	56	52	57	50
Boxcar					
Number	8,443	6,764	5,640	8,332	16,908
Percent	46	44	48	43	50
Total	25,433	22,031	20,823	29,031	46,413

Origins

Destinations

Total shipments out of CRD 1 have increased over time but have been quite variable with a low of about 39 million bushels in 1976-77 and a high of almost 56 million bushels in 1978-79 (Table 33). Duluth/Superior and Minneapolis/St. Paul consistently receive about 80 percent of the shipments from this origin. The only noticeable change has been an absolute and relative increase in the amount going to Western states, 18 percent in 1978-79. CRD 1 still moves most of its grain to market by rail, 79 percent for all destinations and 88 percent for shipments to Duluth/Superior. In recent years rail share has increased for shipments to the West.

CRD 2 in the north central portion of North Dakota increased its shipments 37 percent over the five year period in a fairly consistent manner (Table 34). Duluth/Superior and Minneapolis/St. Paul are by far the most important destinations. Duluth/Superior has increased to 64 percent of total shipments while Minneapolis/St. Paul has decreased to 22 percent. Shipments to Duluth/Superior are generally more often by rail from CRD 2 than other destinations, except for the Western states in the early years. The use of rail from this origin area has decreased, relatively but not absolutely, over time.

TABLE 32. TOTAL SHIPMENTS FROM CROP REPORTING DISTRICT 1, BY DESTINATION AND MODE, 1974-75 TO 1978-79 CROP YEAR

Destination	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
(000 bushels)																				
Duluth/Superior Percent	2,584	17,804	20,387	87	3,027	18,410	21,437	86	2,589	14,630	17,219	85	2,399	21,978	24,377	90	3,525	25,553	29,078	88
Mpls./St. Paul & other Minn. Percent	2,800	12,901	15,700		3,114	7,918	11,032		4,019	9,553	13,573		3,734	9,633	13,368		4,737	9,185	13,921	
			35	82			29	72			35	70			27	72			25	66
S. C./Omaha/ Kansas City Percent	1	6	8		1	--	1		4	--	4		3	--	3		8	10	19	
			0	81			0	--			0	0			0	0			0	55
Western States Percent	2,315	4,361	6,676		1,284	3,965	5,248		2,201	3,131	5,332		2,100	5,618	7,718		2,238	7,337	9,575	
			15	65			14	76			14	59			16	73			18	77
East/South/MO/ Misc. Percent	741	1,459	2,200		341	1,195	1,536		448	2,053	2,501		735	1,680	2,414		1,170	2,038	3,209	
			5	66			4	77			7	82			5	70			6	64
Total	8,441	36,531	44,971	82	7,767	31,488	39,254	81	9,261	29,367	38,629	76	8,971	38,909	47,881	81	11,678	44,123	55,802	79

TABLE 34. TOTAL SHIPMENTS FROM CROP REPORTING DISTRICT 2, BY DESTINATION AND MODE, 1974-75 TO 1978-79 CROP YEAR

Destination	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
(000 bushels)																				
Duluth/Superior Percent	2,638	10,886	13,524	80	4,701	10,966	15,667	70	4,371	8,686	13,057	67	5,875	14,790	20,664	72	8,403	16,131	24,534	66
			48				58				45				64				64	
Mpls./St. Paul & other Minn. Percent	1,776	9,386	11,162	84	1,794	8,082	9,876	82	2,497	10,864	13,361	81	1,841	6,274	8,116	77	1,676	6,749	8,426	80
			40				36				46				25				22	
S. C./Omaha/ Kansas City Percent	1	51	52	99	--	--	--	0	2	7	9	73	1	--	1	0	--	4	4	100
			0				0				0				0				0	
Western States Percent	995	566	1,561	36	436	200	636	31	423	159	583	27	464	966	1,430	68	425	1,844	2,268	81
			6				3				2				5				6	
East/South/MO/ Misc. Percent	439	1,404	1,843	76	209	974	1,183	82	567	1,844	2,411	76	289	2,053	2,341	88	1,088	2,347	3,436	68
			7				5				9				8				9	
Total	5,849	22,293	28,142	80	7,140	20,222	27,362	74	7,860	21,560	29,421	74	8,470	24,083	32,552	74	11,592	27,075	38,668	70



Duluth/Superior has greatly increased its share of shipments out of CRD 3 from 44 percent in 1974-75 to 74 percent in 1978-79 (Table 35). The amount going to Minneapolis/St. Paul has decreased relatively and absolutely from 44 percent, or 28 million bushels, to 22 percent, or 23 million bushels, over this period. This district has increased its usage of truck from 18 percent to 41 percent over the period, due primarily to the heavy truck movements into Duluth/Superior. The other destinations are still serviced heavily by rail out of CRD 3.

Crop Reporting District 4, in the western area of the state, divides its shipments, in recent years, between the three markets of Duluth/Superior, Minneapolis/St. Paul, and the Western states (Table 36). The Western states destination has increased its receipts from CRD 4 155 percent over the five year period, substantially more than the 60 percent increase in total shipments from the area. This district continues to rely heavily on rail even though the trend in rail share is slightly downward. Shipments to both Duluth/Superior and the Western states generally use rail in a greater proportion than the total shipments from the area.

Crop Reporting District 5, in the middle of North Dakota, has a variable destination pattern (Table 37). In 1974-75 Minneapolis/St. Paul received 45 percent of the shipments and Duluth/Superior received only 37 percent. In 1978-79 the division was reversed, with 62 percent going to Duluth/Superior and only 21 percent going to Minneapolis/St. Paul. Rail share has decreased steadily over time, from 83 percent in 1974-75 to 60 percent in 1978-79. In absolute terms, though, rail shipment from this district has increased 37 percent from 21 million bushels to 29 million bushels. Duluth/Superior relies more on rail than Minneapolis/St. Paul but less than the Western states destinations from shipments from CRD 5.

The mid-eastern portion of North Dakota, CRD 6, has also undergone significant changes over the five year time period (Table 38). Volume shipped from the area has increased 93 percent from 51 million bushels to 98 million bushels. Duluth/Superior has become the dominant market, increasing from 37 percent of volume to 60 percent in 1978-79, in absolute terms a 211 percent increase. Minneapolis/St. Paul has remained about the same in absolute tonnage but has decreased to 25 percent from 48 percent of total movement. The Western states and Kansas City continue to be unpopular destinations for shipments from the district. Movements via rail have remained about the same in total volume, 37 million

TABLE 35. TOTAL SHIPMENTS FROM CROP REPORTING DISTRICT 3, BY DESTINATION AND MODE, 1974-75 TO 1978-79 CROP YEAR

Destination	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
(OCO bushels)																				
Duluth/Superior Percent	7,587	20,779	28,366 44	73	14,582	24,176	38,758 50	62	18,475	18,732	37,207 47	50	24,763	35,731	60,494 66	59	37,507	32,918	70,426 74	47
Mpls./St. Paul & other Minn. Percent	2,477	25,849	28,326 44	91	2,906	28,413	31,319 40	91	3,139	30,738	33,876 43	91	2,538	18,813	21,351 23	88	3,526	19,109	22,635 22	84
S. C./Omaha/ Kansas City Percent	12	9	20 0	43	--	50	50 0	100	--	17	17 0	100	99	7	106 0	7	--	32	32 0	100
Western States Percent	305	3,586	3,891 6	92	273	1,519	1,792 3	85	21	141	162 1	87	120	520	639 1	81	34	845	919 1	96
East/South/MO/ Misc. Percent	1,577	3,217	4,794 8	67	1,182	5,092	6,274 8	81	1,757	7,066	8,823 11	80	2,022	7,994	10,017 11	80	1,771	7,612	9,382 9	81
Total	11,958	53,440	65,397 82		18,943	59,250	78,193 76		23,392	56,694	80,085 71		29,542	63,065	92,607 68		42,838	60,556	103,394 59	

TABLE 36. TOTAL SHIPMENTS FROM CROP REPORTING DISTRICT 4, BY DESTINATION AND MODE, 1974-75 TO 1978-79 CROP YEAR

Destination	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Total	Rail	Total	% Rail
(000 bushels)																				
Duluth/Superior Percent	755	3,775	4,530 42	83	743	5,664	6,407 46	88	510	3,785	4,295 32	88	561	4,460	5,020 35	89	822	4,409	5,231 30	84
Mpls./St. Paul & other Minn. Percent	696	2,665	3,361 31	79	988	3,081	4,069 29	76	1,725	3,507	5,232 39	67	1,379	3,059	4,438 31	69	1,981	3,934	5,915 34	67
S. C./Omaha/ Kansas City Percent	5	32	37 0	88	4	--	4 0	0	2	7	9 0	75	10	--	10 0	0	6	--	6 0	0
Western States Percent	386	1,846	2,231 21	83	500	2,225	2,725 20	82	796	2,142	2,938 22	73	697	2,975	3,672 26	81	1,225	4,455	5,680 33	78
East/South/ND/ Misc. Percent	176	516	692 7	75	298	439	737 5	60	281	560	841 6	67	817	366	1,183 8	31	313	249	561 3	44
Total	2,018	8,834	10,851	82	2,533	11,409	13,942	82	3,314	10,001	13,315	75	3,464	10,860	14,323	76	4,347	13,047	17,393	75

TABLE 37. TOTAL SHIPMENTS FROM CROP REPORTING DISTRICT 5, BY DESTINATION AND MODE, 1974-75 TO 1978-79 CROP YEAR

Destination	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
(000 bushels)																				
Duluth/Superior Percent	1,621	7,872	9,494 37	83	4,179	13,268	17,448 52	76	3,716	8,804	12,519 42	70	5,931	12,378	18,301 56	68	11,437	19,004	30,441 62	62
Mpls./St. Paul & other Minn. Percent	1,748	9,905	11,653 45	85	2,065	9,566	11,631 36	82	3,119	9,779	12,898 43	76	3,253	4,759	8,011 25	59	5,094	5,458	10,544 21	52
S. C./Omaha/ Kansas City Percent	10	69	78 0	88	1	40	41 0	97	15	9	24 0	37	8	3	11 0	29	8	3	12 0	29
Western States Percent	382	704	1,086 4	65	134	1,093	1,227 4	89	392	1,004	1,396 5	72	662	1,654	2,316 7	71	664	2,955	3,619 7	82
East/South/MO/ Hisc. Percent	766	2,920	3,686 14	79	784	1,902	2,685 8	71	1,759	1,167	2,926 10	40	1,428	2,509	3,937 12	64	2,421	2,097	4,518 9	46
Total	4,527	21,470	25,997	83	7,163	25,869	33,032	78	9,001	20,763	29,763	70	11,282	21,295	32,576	65	19,624	29,509	49,134	60

TABLE 30. TOTAL SHIPMENTS FROM CROP REPORTING DISTRICT 6, BY DESTINATION AND MODE, 1974-75 TO 1978-79 CROP YEAR

Destination	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
(000 bushels)																				
Duluth/Superior Percent	5,822	12,946	18,768	37 69	10,542	15,314	25,857	46 59	14,071	13,817	27,888	47 50	24,139	18,035	42,175	57 43	37,583	20,856	58,439	60 36
Mpls./St. Paul & other Minn. Percent	5,294	18,887	24,181	48 78	5,680	17,225	22,905	41 75	7,166	16,823	23,988	41 70	8,648	12,620	21,268	29 59	12,693	11,585	24,278	25 48
S. C./Omaha/ Kansas City Percent	--	58	58	0 100	43	33	76	0 44	3	29	31	0 91	15	18	32	0 55	18	92	111	0 83
Western States Percent	499	1,600	2,098	4 76	362	427	790	1 54	181	244	425	1 57	278	786	1,064	1 74	249	1,818	2,066	2 88
East/South/MO/ Misc. Percent	2,615	2,963	5,578	11 53	2,320	3,927	6,248	11 63	2,843	3,747	6,590	11 57	3,611	6,273	9,885	8 63	6,956	5,871	12,827	13 46
Total	14,230	36,454	50,684	72	18,947	36,926	55,876	66	24,264	34,660	58,922	59	36,691	37,732	74,423	51	57,499	40,222	97,721	41

bushels in 1974-75 and 40 million in 1978-79, but has dropped from 72 percent of the movements to 41 percent in the last year. This again occurs because of the heavy truck movement, 64 percent to Duluth/Superior.

Shipments from the southwest CRD 7, have increased only slightly, 22 percent, and have been variable over the study period (Table 39). The Western states destination has always been popular with this origin and has continued to increase, from 30 percent in 1974-75 to 52 percent in 1978-79. This growth came about mainly at the expense of Duluth/Superior which has dropped from 23 percent to 12 percent of total shipments. The Minneapolis/St. Paul one-third share of the market has remained stable over the five year period. Truck movements have increased steadily, from 31 percent or 6 million bushels to 54 percent or 13 million bushels. Duluth/Superior continues to use primarily rail in receiving shipments from the western district. Truck movements are becoming increasingly more important to Western markets, increasing from 31 percent to 53 percent with a high of 67 percent in 1976-77 percent in 1976-77.

Duluth/Superior and Minneapolis/St. Paul are the two main destinations for shipments out of CRD 8 in the southcentral part of North Dakota (Table 40). The Western states destination is increasing in importance, taking 27 percent of shipments in 1978-79. Total shipments out of the area vary greatly from year to year. Movements via truck are becoming more important, increasing from 24 percent to 45 percent. This increase is due mainly to the growth in the Minneapolis/St. Paul market. Duluth/Superior and Western states still receive their shipments from CRD 8 heavily by rail.

The southeastern portion of North Dakota, CRD 9, has experienced a 52 percent increase in total volume of shipments over the five year period (Table 41). In recent years the most important market has been Duluth/Superior whose portion of shipments from CRD 9 has increased from 31 percent to 43 percent. During this five year period shipments from this district have become more dependent on truck, 33 percent in 1978-79, up from 19 percent in 1974-75. Minneapolis/St. Paul is the second largest destination and is also heavily a rail user.

#### Commodity

Durum shipments are the principal commodity being moved from CRD 1 in the extreme northwestern corner of North Dakota, averaging about 52

TABLE 39. TOTAL SHIPMENTS FROM CROP REPORTING DISTRICT 7, BY DESTINATION AND MODE, 1974-75 TO 1978-79 CROP YEAR

Destination	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
(000 bushels)																				
Duluth/Superior Percent	644	3,853	4,496	86	1,085	4,323	5,408	80	725	2,019	2,745	74	726	1,123	1,849	61	765	2,153	2,917	74
			23				27				16				13				12	
Mpls./St. Paul & other Minn. Percent	3,077	4,691	7,768	60	3,949	3,833	7,782	49	4,626	2,548	7,174	36	2,903	1,816	4,719	38	4,828	2,827	7,655	37
			40				39				42				33				32	
S. C./Omaha/ Kansas City Percent	18	195	213	92	24	264	287	92	23	26	48	53	13	--	13	0	18	6	24	25
			1				1				0				0				0	
Western States Percent	1,819	3,991	5,810	69	2,564	3,340	5,904	57	4,212	2,048	6,261	33	4,417	2,370	6,787	35	6,587	5,835	12,422	47
			30				29				37				48				52	
East/South/MO/ Misc. Percent	434	813	1,247	65	245	418	663	63	560	256	816	31	444	339	782	43	544	212	756	28
			6				3				5				5				3	
Total	5,992	13,543	19,534	69	7,867	12,178	20,044	61	10,146	6,897	17,044	41	8,503	5,648	14,150	40	12,742	11,033	23,774	46

TABLE 40. TOTAL SHIPMENTS FROM CROP REPORTING DISTRICT 8, BY DESTINATION AND MODE, 1974-75 TO 1978-79 CROP YEAR

Destination	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
(000 bushels)																				
Duluth/Superior Percent	407	2,794	3,201	42 87	878	4,838	5,716	45 85	557	2,157	2,714	29 79	390	1,542	1,932	30 80	991	3,374	4,366	36 77
Mpls./St. Paul & other Minn. Percent	1,281	2,197	3,478	45 63	1,754	3,188	4,942	39 64	2,129	1,660	3,788	40 44	1,751	860	2,611	41 33	2,950	1,020	3,970	33 26
S. C./Omaha/ Kansas City Percent	48	26	73	1 35	26	23	49	0 47	77	2	79	1 3	13	--	13	0 0	18	--	18	0 0
Western States Percent	62	527	589	8 89	265	1,343	1,608	12 84	765	1,728	2,493	26 69	669	1,032	1,700	27 61	1,212	2,108	3,320	27 63
East/South/MO/ Misc. Percent	30	325	355	5 92	155	365	520	4 70	217	162	379	4 43	67	50	117	2 43	255	170	425	4 40
Total	1,828	5,869	7,696	76	3,078	9,757	12,835	76	3,745	5,709	9,453	60	2,890	3,383	6,273	55	5,426	6,672	12,099	55



TABLE 41. TOTAL SHIPMENTS FROM CROP REPORTING DISTRICT 9, BY DESTINATION AND MODE, 1974-75 TO 1978-79 CROP YEAR

Destination	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
(000 bushels)																				
Duluth/Superior Percent	1,127	10,709	11,836	90	2,765	13,051	15,816	83	2,823	7,578	10,400	73	6,242	11,870	18,112	66	9,508	15,714	25,222	62
Mpls./St. Paul & other Minn. Percent	3,807	17,625	21,432	82	4,419	13,833	18,252	76	3,888	9,676	13,564	71	4,376	13,081	17,457	75	6,332	12,154	18,486	66
S. C./Omaha/ Kansas City Percent	34	163	196	83	11	33	44	75	81	33	114	29	10	27	37	74	40	28	68	42
Western States Percent	361	1,130	1,490	76	837	1,264	2,101	60	127	1,107	1,234	90	240	3,466	3,706	94	320	6,223	6,543	95
East/South/MO/ Misc. Percent	1,762	1,594	3,356	47	2,323	1,212	3,535	34	2,879	1,089	3,968	27	2,749	1,659	4,408	38	3,219	4,710	7,930	59
Total	7,091	31,221	38,310	81	10,355	29,393	39,748	74	9,798	19,483	29,280	67	13,617	30,103	43,720	69	19,419	38,829	58,249	67

TABLE 42. SHIPMENTS FROM CROP REPORTING DISTRICT 1, BY COMMODITY AND MODE, 1974-75 TO 1978-79 CROP YEARS

Commodity	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
(000 bushels)																				
Wheat	3,168	11,304	14,472		3,010	10,170	13,179		3,850	8,880	12,731		3,453	11,557	15,009		4,229	15,411	19,640	
Percent			32	78			34	77			33	70			31	77			35	78
Burns	1,875	21,098	22,973		2,728	18,045	21,573		2,837	16,762	19,599		2,464	24,349	26,813		3,457	24,037	27,494	
Percent			51	92			55	87			51	86			56	91			49	87
Barley	462	3,351	3,813		264	1,920	2,183		208	3,022	3,229		364	2,138	2,502		665	2,861	3,515	
Percent			8	88			6	88			8	94			5	85			6	81
Oats	2,439	664	3,103		1,171	442	1,613		1,818	491	2,309		1,614	155	1,769		1,797	404	2,200	
Percent			7	21			4	27			6	21			4	9			4	18
Sunflowers	15	--	15		--	--	--		5	2	7		415	356	771		929	1,304	2,233	
Percent			0	0			0	0			0	29			2	46			4	58
Other	482	112	595		594	112	705		543	211	754		663	355	1,018		612	108	720	
Percent			1	19			2	16			2	72			2	35			1	15
Total	8,441	36,529	44,970	81	7,766	31,488	39,253	80	9,261	29,368	38,629	76	8,973	38,910	47,882	81	11,679	44,125	55,802	79

percent over the years of this study (Table 42). Increases in durum and wheat movements account for the 24 percent increase in total shipments. Some sunflower, 2 million bushels, was grown in 1978-79. Rail share has remained relatively constant at 80 percent over the years due to the increase in total volume and rail share of sunflowers.

Crop Reporting District 2 has also experienced a steady growth, 37 percent in shipments from 28 million bushels to 39 million bushels (Table 43). Although sunflower has become an important movement in the latter years, both wheat and durum contributed to this growth and are the principal commodities shipped, 26 percent and 42 percent respectively. Barley continues to be a stable third crop. All commodities, except for sunflower and oats, continue to rely heavily on rail for movement to market although to a lesser relative, if not absolute, degree each year.

The largest amount of shipments of any origin occurs out of CRD 3 in northeastern North Dakota (Table 44). Wheat, durum, and barley are the principal commodities with sunflower increasing in importance the last two years. Wheat has decreased significantly in its relative movement by rail, down to 47 percent, while holding its absolute shipment volume fairly steady at around 19 million bushels. Durum and barley shipments continue to rely strongly on rail with a small absolute increase in rail shipments. Sunflowers move principally by truck and are now 14 percent of the total movement from the area.

Even though second from the bottom in volume of shipments relative to the other districts, CRD 4 has increased its shipments dramatically by 60 percent over the five year period (Table 45). Wheat is easily the principal grain movement out of this area, 64 percent in 1978-79 with durum a distant second at 28 percent. This movement travels primarily by rail, which has increased from 9 million bushels to 13 million bushels but has dropped slightly relative to truck movements. Durum still moves almost entirely by rail with wheat, sunflower, and barley not too far behind.

The central area of North Dakota, CRD 5, is about average for all origins in size of shipments but is one that has significantly increased volume over the five year period, an 89 percent increase in shipments (Table 46). Wheat, barley, and durum are the traditional commodities but have decreased to 64 percent of the movements due to the tremendous increase in sunflower production to 32 percent of total movement.

TABLE 43. SHIPMENTS FROM CROP REPORTING DISTRICT 2, BY COMMODITY AND MODE, 1974-75 TO 1978-79 CROP YEARS

Commodity	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
	(000 bushels)																			
Wheat	977	5,302	6,279		1,727	6,145	7,872		1,921	4,910	6,831		1,450	5,920	7,370		1,053	8,176	10,029	
Percent			22	84			29	78			23	72			23	80			26	82
Burn	1,568	11,117	12,685		2,365	9,038	11,404		2,223	9,143	11,367		2,864	13,514	16,378		3,773	12,483	16,256	
Percent			45	88			42	79			39	80			50	83			42	77
Barley	766	5,257	6,023		356	4,265	4,621		1,179	6,582	7,761		1,280	3,940	5,220		1,463	5,467	6,930	
Percent			21	87			17	92			26	85			16	75			18	79
Oats	1,739	482	2,221		1,274	532	1,806		1,488	592	2,081		849	124	974		760	423	1,184	
Percent			8	22			7	29			7	28			3	13			3	36
Sunflowers	--	2	2		55	16	71		20	6	26		997	270	1,267		2,521	318	2,839	
Percent			0	100			0	23			0	23			4	21			7	11
Other	798	133	930		1,363	226	1,589		1,030	325	1,355		1,029	314	1,343		1,221	208	1,430	
Percent			3	14			6	14			5	24			4	23			4	15
Total	5,848	22,293	28,140	79	7,140	20,222	27,363	74	7,861	21,558	29,421	73	8,469	24,082	32,552	74	11,591	27,075	38,668	70

TABLE 44. SHIPMENTS FROM CROP REPORTING DISTRICT 3, BY COMMODITY AND MODE, 1974-75 TO 1978-79 CROP YEARS

Commodity	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
	(000 bushels)																			
Wheat	4,757	18,136	22,893		8,454	19,244	27,698		7,567	16,597	24,164		8,033	19,298	27,331		20,400	18,356	38,757	
Percent			35	79			35	69			30	69			30	71			37	47
Durum	1,268	16,057	17,326		3,379	15,893	19,272		2,596	15,832	18,427		3,668	22,038	25,707		5,371	17,585	22,902	
Percent			26	93			25	82			23	86			28	86			22	77
Barley	3,478	16,469	19,948		4,350	19,348	23,698		10,169	20,558	30,727		99,637	15,780	25,417		4,157	19,292	23,449	
Percent			31	17			30	82			38	67			27	62			23	82
Oats	1,302	1,851	3,153		924	2,709	3,633		1,439	1,296	2,735		531	954	1,485		525	607	1,131	
Percent			5	59			5	75			3	47			2	64			1	54
Sunflowers	546	245	791		1,023	831	1,853		1,040	1,144	2,184		6,657	3,812	10,469		11,410	3,393	14,803	
Percent			1	31			2	45			3	52			11	36			14	23
Other	606	682	1,288		814	1,224	2,039		580	1,266	1,847		1,015	1,183	2,198		1,028	1,323	2,351	
Percent			2	53			3	60			2	69			2	54			2	56
Total	11,957	53,440	65,402	82	18,944	59,249	78,193	76	23,391	56,693	80,084	71	29,541	63,065	92,607	68	42,837	60,556	103,393	59

TABLE 45. SHIPMENTS FROM CROP REPORTING DISTRICT 4, BY COMMODITY AND MODE, 1974-75 TO 1978-79 CROP YEARS

Commodity	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
(000 bushels)																				
Wheat Percent	1,145	5,010	6,956 64	84	1,375	7,476	8,851 63	84	2,169	6,057	8,226 62	74	2,235	6,241	8,477 59	74	2,905	8,211	11,116 64	74
Durum Percent	254	2,463	2,717 25	91	273	3,424	3,698 27	93	255	3,498	3,752 28	93	452	3,997	4,449 31	90	547	4,261	4,808 28	89
Barley Percent	68	394	462 4	85	87	252	339 2	74	130	215	345 3	62	50	126	176 1	72	55	109	164 1	67
Oats Percent	275	9	284 3	3	429	166	596 4	28	397	39	436 3	9	105	31	137 1	23	304	121	425 2	28
Sunflowers Percent	4	--	4 0	0	1	8	9 0	88	2	18	20 0	92	107	72	179 1	40	137	198	336 2	59
Other Percent	270	159	429 4	37	376	83	449 3	18	362	173	536 4	32	514	392	906 6	43	399	146	544 3	27
Total	2,016	8,835	10,852	81	2,532	11,409	13,942	82	3,315	10,000	13,315	75	3,463	10,859	14,323	76	4,347	13,046	17,393	75

TABLE 46. SHIPMENTS FROM CROP REPORTING DISTRICT 5, BY COMMODITY AND MODE, 1974-75 TO 1978-79 CROP YEARS

Commodity	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
(000 bushels)																				
Wheat	1,768	9,706	11,473		3,325	12,369	15,695		3,445	11,862	15,307		2,633	9,889	12,521		4,545	14,000	18,546	
Percent			44	85			48	79			51	77			38	79			38	75
Durum	540	4,927	5,467		918	6,352	7,270		797	4,202	4,999		1,271	4,674	5,945		1,509	5,760	7,269	
Percent			21	90			22	87			17	84			18	79			15	79
Barley	402	4,918	5,321		471	3,967	4,439		1,962	2,811	4,773		1,106	2,576	3,682		1,628	3,795	5,423	
Percent			20	92			13	89			16	59			11	70			11	70
Oats	891	1,204	2,095		470	1,870	2,340		1,029	507	1,536		276	230	507		572	444	1,016	
Percent			8	57			7	80			5	33			2	45			2	44
Sunflowers	124	346	470		1,077	695	1,772		1,036	752	1,788		5,353	3,734	9,087		10,474	5,086	15,560	
Percent			2	74			5	39			6	42			28	41			32	33
Other	802	369	1,170		902	615	1,517		731	629	1,360		642	191	833		894	424	1,319	
Percent			5	32			5	41			5	46			3	23			1	32
Total	4,527	21,470	25,996	83	7,163	25,868	33,033	78	9,000	20,763	29,763	70	11,281	21,294	32,575	66	19,622	29,509	49,133	60

Sunflowers, in only three years, have increased 770 percent in this district. The portion of these movements shipped via railroad has decreased from 83 percent to 60 percent even though the absolute amount has increased 65 percent over this time. Sunflower is again the heaviest volume user of truck, moving 67 percent or 10.5 million bushels in 1978-79. Wheat and durum still are heavily dependent on rail for movement to the market, 75 and 79 percent respectively.

Crop Reporting District 6 is the second largest shipment origin in the state, second only to CRD 3 (Table 47). Movements in this area have increased 93 percent over the period, due primarily to a steady increase in wheat movements and a dramatic increase in sunflower shipments, increasing 66 percent and 500 percent respectively, over the five year period. Barley remains a steady third commodity in volume of shipment at 23 percent in the 1978-79 crop year. This district uses truck more than any other area in the state, 59 percent in this 1978-79 crop year. This is due to the high truck share of wheat and sunflowers, 59 percent and 80 percent, the two largest movements. The entire area decreased the relative rail share from 72 percent to 41 percent even though absolute rail movements increased 11 percent over the time.

Shipments from CRD 7, in the southwest, have increased 22 percent from 20 million bushels to 24 million bushels, ranking them seventh in the state (Table 48). Wheat dominates the movements out of this area, consistently comprising 85 percent of the movements. Durum is a distant second in importance. This area also uses a surprisingly large amount of truck due to the heavy truck movement of wheat, 57 percent in 1978-79, up from 30 percent four years earlier, although durum still moves 73 percent by rail.

The smallest volume movement occurs out of CRD 8, in the south central part of the state (Table 49). The increase in shipment volume of 57 percent, 8 million to 12 million bushels, was due primarily to the 56 percent increase in wheat shipments which is the dominant commodity moved from the area, comprising 85 percent of total shipments. Little volume or increase in volume is evident for the other commodities. The movements from this district move primarily by rail, although trucks have increased their relative share from 24 percent in 1974-75 to 45 percent in 1978-79. Wheat from this area is increasingly being moved by truck, up from 22 percent or 1.5 million bushels in 1974-75 to 43 percent or 4.5 million bushels in 1978-79.



TABLE 47. SHIPMENTS FROM CROP REPORTING DISTRICT 6, BY COMMODITY AND MODE, 1974-75 TO 1978-79 CROP YEARS

Commodity	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
	(000 bushels)																			
Wheat	5,561	15,833	21,393		8,482	14,479	22,962		8,737	13,324	22,061		10,359	14,654	25,013		20,783	14,642	35,425	
Percent			42	74			41	63			37	60			34	59			36	41
Durum	430	2,124	2,555		1,232	2,326	3,558		550	2,041	2,591		858	2,411	3,269		1,284	1,967	3,251	
Percent			5	83			6	65			4	79			4	74			3	61
Barley	1,378	13,225	14,602		2,001	13,619	15,619		9,578	12,862	22,440		7,754	12,504	20,258		8,094	14,645	22,739	
Percent			29	91			28	87			38	57			27	62			23	64
Oats	1,357	2,069	3,426		1,222	2,286	3,509		600	1,299	1,900		943	1,133	2,077		938	821	1,760	
Percent			7	60			6	65			3	68			3	55			2	47
Sunflowers	2,957	2,507	5,464		3,769	3,671	7,441		3,188	4,673	7,861		14,780	5,930	20,710		24,070	5,980	30,050	
Percent			11	46			13	49			13	59			28	29			31	28
Other	2,547	695	3,242		2,242	545	2,787		1,611	460	2,072		1,996	1,100	3,096		2,330	2,168	4,498	
Percent			6	21			6	20			4	22			4	38			5	48
Total	14,230	36,453	50,682	72	18,948	36,926	55,876	66	24,264	34,659	58,925	59	36,690	37,732	74,423	51	57,499	40,225	97,723	41

TABLE 4B. SHIPMENTS FROM CROP REPORTING DISTRICT 7, BY COMMODITY AND MODE, 1974-75 TO 1978-79 CROP YEARS

Commodity	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
(000 bushels)																				
Wheat	4,822	11,315	16,138		6,894	9,530	16,424		9,019	5,232	14,251		7,408	4,155	11,563		11,411	8,705	20,117	
Percent			83	70			82	58			84	37			82	36			85	43
Durum	239	1,632	1,872		385	2,458	2,844		543	1,495	2,038		749	1,322	2,071		734	2,021	2,755	
Percent			10	87			14	86			12	73			15	64			12	73
Barley	524	552	1,076		225	162	386		169	131	300		85	9	94		92	28	120	
Percent			6	51			2	42			2	44			1	10			1	23
Oats	249	18	266		153	10	163		218	7	225		47	--	47		68	--	68	
Percent			1	7			1	6			1	3			0	0			0	0
Sunflowers	--	--	--		2	--	2		23	3	25		101	124	225		352	133	485	
Percent			0	0			0	0			0	12			2	55			2	27
Other	157	25	182		208	18	226		176	30	205		114	37	151		85	146	231	
Percent			1	14			1	8			1	15			1	25			1	63
Total	5,991	13,542	19,534	69	7,867	12,178	20,045	61	10,148	6,898	17,044	40	8,504	5,647	14,151	40	12,742	11,033	23,776	46

TABLE 49. SHIPMENTS FROM CROP REPORTING DISTRICT 8, BY COMMODITY AND MODE, 1974-75 TO 1978-79 CROP YEARS

Commodity	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
	(000 bushels)																			
Wheat	1,479	5,131	6,609		2,128	7,865	9,993		2,817	4,971	7,788		2,578	2,989	5,567		4,482	5,835	10,317	
Percent			86	78			78	79			82	64			87	54			85	57
Durum	48	496	544		180	1,165	1,344		421	519	760		135	334	469		290	438	728	
Percent			7	91			10	87			8	68			7	71			6	60
Barley	36	101	137		162	180	342		199	38	237		20	--	20		49	73	122	
Percent			2	74			3	53			3	16			0	0			1	60
Oats	37	28	65		259	314	573		168	58	226		2	6	7		171	129	301	
Percent			1	43			4	55			2	26			0	66			2	43
Sunflowers	--	--	--		3	4	7		--	--	--		41	88	129		145	79	225	
Percent			0	0			0	55			0	0			2	68			2	35
Other	227	114	341		346	229	575		321	122	443		113	67	181		290	117	407	
Percent			4	33			4	40			5	26			3	37			3	29
Total	1,827	5,870	7,696	76	3,078	9,757	12,834	76	3,746	5,708	9,454	60	2,889	3,484	6,373	55	5,427	6,671	12,100	55

TABLE 50. SHIPMENTS FROM CROP REPORTING DISTRICT 9, BY COMMODITY AND MODE, 1974-75 TO 1978-79 CROP YEARS

Commodity	1974-75				1975-76				1976-77				1977-78				1978-79			
	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail	Truck	Rail	Total	% Rail
	(000 bushels)																			
Wheat	1,774	14,947	16,721		2,156	14,564	16,720		2,259	10,810	13,069		3,296	11,807	15,103		5,505	15,472	20,977	
Percent			44	89			42	87			45	83			35	79			36	74
Durum	185	2,457	2,642		502	3,369	3,870		438	1,709	2,148		486	2,779	3,266		710	2,487	3,197	
Percent			7	93			10	87			7	80			7	85			5	78
Barley	291	5,003	5,294		1,004	3,723	4,728		1,552	1,949	3,501		1,658	4,089	5,747		1,130	6,055	7,186	
Percent			14	95			12	79			12	56			13	71			12	84
Oats	838	3,830	4,668		1,104	3,064	4,168		723	1,643	2,366		745	2,745	3,490		1,124	2,878	4,003	
Percent			12	82			10	74			8	69			8	79			7	72
Sunflowers	1,027	1,240	2,267		1,734	1,666	3,399		1,789	1,922	3,711		4,257	4,186	8,442		7,722	5,000	12,722	
Percent			6	55			9	49			13	52			19	50			22	39
Other	2,977	3,742	6,719		3,855	3,009	6,863		3,036	1,449	4,485		3,176	4,497	7,673		3,227	6,938	10,165	
Percent			18	56			17	44			15	32			18	59			17	68
Total	7,092	31,219	38,311	81	10,355	29,395	39,748	74	9,797	19,402	29,280	67	13,618	30,103	43,721	69	19,418	38,830	58,250	67

The southeastern origin, CRD 9, is the third largest volume shipper in the state and has increased total shipments 52 percent, from 38 million in 1974-75 to 58 million in 1978-79 (Table 50). Most of this increase came from sunflower which increased from 2.3 million bushels (6 percent of total shipment) to 12.7 million bushels (22 percent of total shipment) over the five-year period. Nevertheless, wheat remains the single most important commodity with 36 percent of the shipments in 1978-79. Although rail use has decreased relatively, from 81 percent to 76 percent, the absolute amount of rail shipments has increased 24 percent or 7.6 million bushels. Sunflower moves predominantly by truck, 61 percent, which increased over time. Wheat, durum, and barley, which comprise over 50 percent of the movements, are still dependent on rail for most of their transportation.

#### Mode of Shipment

Rail continues to have a strong share (all CRD's are shown in Figure B-18), 79 percent of the total shipments from CRD 1, and both modes have increased their total absolute movement during the study period (Table 51).

TABLE 51. TOTAL SHIPMENTS FROM DISTRICT 1, BY MODE AND FREIGHT CAR TYPE, 1974-75 TO 1978-79 CROP YEARS

	1974-75	1975-76	1976-77	1977-78	1978-79
	(000 bushels)				
Truck	8,441	7,766	9,261	8,972	11,678
Percent	19	20	24	19	21
Rail	36,530	31,488	29,367	38,909	44,124
Percent	81	80	76	81	79
Hopper Car	18,159	15,742	15,635	23,982	24,733
Percent	50	50	53	62	56
Boxcar	18,371	15,746	13,732	14,927	19,391
Percent	50	50	47	38	44
Total	44,971	39,254	38,628	47,881	55,802

Hopper cars have increased their relative share of the rail movement, from 50 percent to 56 percent with a high of 62 percent in 1977-78.

Crop Reporting District 2 also continues to rely heavily on rail, 70 percent, for moving its commodities to market (Table 52). Hopper cars have significantly increased their share of rail movement, relatively from 30 percent to 50 percent and absolutely from 6.8 million to 13.6 million bushels.

TABLE 52. TOTAL SHIPMENTS FROM DISTRICT 2, BY MODE AND FREIGHT CAR TYPE, 1974-75 TO 1978-79 CROP YEARS

	1974-75	1975-76	1976-77	1977-78	1978-79
	(000 bushels)				
Truck	5,848	7,140	7,861	8,469	11,592
Percent	21	26	27	26	30
Rail	22,293	20,222	21,560	24,083	27,076
Percent	79	74	73	74	70
Hopper Car	6,789	6,378	9,360	12,889	13,621
Percent	30	32	43	54	50
Boxcar	15,504	13,845	12,199	11,193	13,455
Percent	70	68	57	46	50
Total	28,141	27,362	29,421	32,552	38,668

The northeastern corner of the state (CRD 3) has greatly increased its usage of truck, 18 percent in 1974-75 to 41 percent in 1978-79 (Table 53). For the 60.5 million bushels moved by rail, 69 percent went by hopper cars in 1978-79, a significant increase from 36 percent in 1974-75.

TABLE 53. TOTAL SHIPMENTS FROM DISTRICT 3, BY MODE AND FREIGHT CAR TYPE, 1974-75 TO 1978-79 CROP YEARS

	1974-75	1975-76	1976-77	1977-78	1978-79
	(000 bushels)				
Truck	11,957	18,944	23,392	29,542	42,837
Percent	18	24	29	32	41
Rail	53,441	59,250	56,693	63,065	60,556
Percent	82	76	71	68	59
Hopper Car	19,313	23,087	28,307	40,224	41,567
Percent	36	39	50	64	69
Boxcar	34,127	36,163	28,386	22,841	18,988
Percent	64	61	50	36	31
Total	65,398	78,193	80,085	92,607	103,393

Crop Reporting District 4 continues to rely on rail for most of its shipments, 75 percent in 1978-79, but to a decreasing extent over time (Table 54). Of the rail shipments, 56 percent still move by boxcar with little definite trend over time. This situation does not hold for CRD 5 where 70 percent of the rail shipments move by hopper car (Table 55), dramatic increase over the 44 percent in 1974-75. This district's rail movements have decreased relative to truck and both modes have increased in absolute terms over time. In 1978-79, 60 percent or 29.5 million bushels moved by rail from CRD 5.

TABLE 54. TOTAL SHIPMENTS FROM DISTRICT 4, BY MODE AND FREIGHT CAR TYPE, 1974-75 TO 1978-79 CROP YEARS

	1974-75	1975-76	1976-77	1977-78	1978-79
	(000 bushels)				
Truck	2,016	2,532	3,315	3,463	4,347
Percent	19	18	25	24	25
Rail	8,835	11,409	10,000	10,860	13,047
Percent	81	82	75	76	75
Hopper Car	3,528	5,229	4,638	5,683	5,798
Percent	40	46	46	52	44
Boxcar	5,307	6,180	5,363	5,176	7,249
Percent	60	54	54	48	56
Total	10,852	13,941	13,315	14,323	17,394

TOTAL 55. TOTAL SHIPMENTS FROM DISTRICT 5, BY MODE AND FREIGHT CAR TYPE 1974-75 TO 1978-79 CROP YEARS

	1974-75	1975-76	1976-77	1977-78	1978-79
	(000 bushels)				
Truck	4,527	7,164	9,000	11,281	19,624
Percent	17	22	30	35	40
Rail	21,469	25,868	20,762	21,294	29,509
Percent	83	78	70	65	60
Hopper Car	9,502	11,893	9,953	14,440	20,565
Percent	44	46	48	68	70
Boxcar	11,968	13,975	10,809	6,854	8,944
Percent	56	54	52	32	30
Total	25,997	33,032	29,763	32,575	49,133

In the east central origin area, CRD 6, there has been a heavy movement toward shipping via truck, increasing from 28 percent in 1974-75 to 59 percent in 1978-79 while rail shipments have remained relatively stable in absolute terms (Table 56). A strong shift has occurred in the use of hopper cars where the usage went from 37 percent in 1974-75 to 72 percent in 1978-79.

TABLE 56. TOTAL SHIPMENTS FROM DISTRICT 6, BY MODE AND FREIGHT CAR TYPE, 1974-75 TO 1978-79 CROP YEARS

	1974-75	1975-76	1976-77	1977-78	1978-79
	(000 bushels)				
Truck	14,230	18,948	24,264	36,690	57,500
Percent	28	34	41	49	59
Rail	36,453	39,927	34,660	37,732	40,222
Percent	72	66	59	51	41
Hopper Car	13,582	15,348	17,369	24,650	28,754
Percent	37	38	50	65	72
Boxcar	22,871	21,579	17,290	13,083	11,468
Percent	63	62	50	35	28
Total	50,683	55,875	58,924	74,423	97,722

CRD's 7 and 8 still rely to a strong degree on boxcars in moving their rail shipments, 57 percent and 61 percent respectively (Tables 57 and 58) CRD 7 has, in fact, increased its usage of boxcars over this time for rail shipments. CRD 7 is now using truck for 54 percent of its movements whereas CRD 8 still relies on rail for 55 percent of its movements to market.

TABLE 57. TOTAL SHIPMENTS FROM DISTRICT 7, BY MODE AND FREIGHT CAR TYPE, 1974-75 TO 1978-79 CROP YEARS

	1974-75	1975-76	1976-77	1977-78	1978-79
	(000 bushels)				
Truck	5,991	7,867	10,147	8,503	12,742
Percent	31	39	60	60	54
Rail	13,542	12,178	6,897	5,647	11,034
Percent	69	61	41	40	46
Hopper Car	6,488	6,833	4,069	2,852	4,688
Percent	48	56	59	51	43
Boxcar	7,054	5,344	2,828	2,795	6,346
Percent	52	44	41	49	57
Total	19,533	20,044	17,044	14,150	23,776



TABLE 58. TOTAL SHIPMENTS FROM DISTRICT 8, BY MODE AND FREIGHT CAR TYPE, 1974-75 TO 1978-79 CROP YEARS

	1974-75	1975-76	1976-77	1977-78	1978-79
	(000 bushels)				
Truck	1,826	3,079	3,745	2,889	5,427
Percent	24	24	40	45	45
Rail	5,869	9,756	5,709	3,484	6,672
Percent	76	76	60	55	55
Hopper Car	1,191	2,347	1,325	1,226	2,608
Percent	20	24	23	35	39
Boxcar	4,678	7,409	4,384	2,258	4,064
Percent	80	76	77	65	61
Total	7,696	12,834	9,454	6,373	12,099

Truck movements in the southeastern origin area, CRD 9, have increased their relative share from 24 percent in 1974-75 to 33 percent in 1978-79 (Table 59). Absolutely, during that period, truck volume increased 174 percent from 7 million in 1974-75 to 19 million in 1978-79. Of the 67 percent rail share, down from 81 percent in 1974-75, 59 percent moved in hopper cars in 1978-79 compared to 40 percent in 1974-75.

TABLE 59. TOTAL SHIPMENTS FROM DISTRICT 9, BY MODE AND FREIGHT CAR TYPE, 1974-75 TO 1978-79 CROP YEARS

	1974-75	1975-76	1976-77	1977-78	1978-79
	(000 bushels)				
Truck	7,091	10,354	9,798	13,617	19,419
Percent	24	26	33	31	33
Rail	31,220	29,394	19,482	30,104	38,830
Percent	81	77	67	69	67
Hopper Car	12,449	12,017	9,798	18,733	22,850
Percent	40	41	50	62	59
Boxcar	18,771	17,377	9,684	11,371	15,980
Percent	60	59	50	38	41
Total	38,311	39,748	29,280	43,721	58,249

### Summary and Conclusions

This descriptive review of grain flows out of North Dakota has emphasized volumes, origins, destinations, mode of shipment, and commodities. The results of the review reinforce the earlier statement in this report that changes are occurring, changes that will affect grain merchandising and marketing efficiencies.

#### Summary

##### Total Movement

The volume of grain moved out of North Dakota has increased steadily from 291,582,000 bushels in 1974-75 to 456,234,000 bushels in 1978-79, an increase of 57 percent. Rail share of this movement has decreased from 79 percent to 59 percent although the absolute amount moving by rail has increased 18 percent. Absolute truck movements have almost tripled over the time period.

Wheat and durum volume still average about 60-65 percent of total movements. The growth commodity has been sunflower, increasing almost 300 percent to 79 million bushels in 1978-79. This increase has also affected truck movement because 73 percent of this commodity moves by truck.

Seasonality is evident throughout the five year period in monthly movement as well as mode of shipment.

##### Commodity

Wheat shipments have been stable, except for 1978-79, and 50 percent of them originate from CRD's 3, 6, and 9. Rail shipments of wheat have been decreasing over the years both absolutely and relatively. Durum shipments have slightly increased and are shipped from the northern part of the state. Durum still moves heavily by rail, 87 percent in CRD 1.

Barley volume has increased slightly and oats had decreased over time. The eastern third of the state originates the greatest volume of both barley and oats. Rail share of barley and oats had decreased slightly, down to 75 percent and 48 percent respectively.

Sunflower volume has increased continuously over time and, while still grown principally in eastern North Dakota, has moved into the middle portion of the state. Sunflower is primarily moved by truck except for CRD's 1 and 4.

Duluth/Superior and Minneapolis/St. Paul are the two principal destinations for North Dakota grains. The Duluth market receives 59 percent of the wheat, up from 44 percent in 1974-75. Minneapolis/St. Paul is decreasing in importance for wheat, down to 20 percent from 35 percent during the same time period. The Western market for wheat has greatly increased, from 13 percent (17 million bushels) in 1976-77 to 19 percent (35 million bushels) in 1978-79. Rail share of wheat dropped for each destination except the West Coast. Total volume to Duluth/Superior has increased 100 percent.

Durum shipments go primarily to Duluth/Superior and heavily by rail, 77 percent in 1978-79. Barley goes to Minneapolis/St. Paul 45 percent of the time, and this market relies on rail for 90 percent of its barley receipts. Oats moves principally to Minneapolis/St. Paul and still moves mostly by rail. Sunflower moves heavily to Duluth/Superior and does so increasingly by truck.

Wheat is moving increasingly by truck and 58 percent of rail car shipments travel in hopper cars. Durum uses hopper cars about the same proportion as wheat, but it still relies on rail more than wheat. Barley and oats shipments have moved more by truck each year but still are strong users of rail, 75 percent and 48 percent respectively.

### Destinations

Duluth/Superior's most important commodity is wheat, 43 percent of total movement, with durum and sunflower about equal at 25 percent each. It presently receives 56 percent of its movements by rail, down significantly from 80 percent in 1974-75. Minneapolis/St. Paul receives 62 percent of its movements by rail, down from 82 percent in 1974-75.

It relies on all commodities, but wheat and barley comprise about 64 percent of the receipts.

The Kansas City area has been decreasing in importance over the five-year period. The receipts in the Western states are predominantly wheat, 70 percent of this by rail.

There has not been significant change in origin of shipments to Duluth/Superior or Minneapolis/St. Paul. Eastern North Dakota, CRD's 3, 6, and 9, has increased slightly over time while Western states are serviced heavily from the western part of the state, 63 percent over the five-year time period.

Duluth/Superior has increased its receipts by truck over time, reaching 44 percent in 1978-79. Minneapolis/St. Paul also increased truck share but only to 38 percent. The movement to the Western states has slightly decreased its relative use of hopper cars although absolute movement has increased quite remarkably in recent years.

The origins in the western section of North Dakota, CRD's 1, 4, and 7, use Western markets more than the other areas. These origins rely heavily on rail movements except for CRD 7 which uses trucks for 53 percent of the movements, especially to the Western markets.

The origins in the eastern section of North Dakota, CRD's 3, 6, and 9, rely more on Duluth/Superior than in earlier years. Additionally, less and less is moving by rail from this area, although, when Minneapolis/St. Paul is the destination, rail continues to be most commonly used.

CRD 2 in the north central part of North Dakota uses truck less than other origins. Duluth/Superior receives 64 percent of the shipments from this area, 62 percent from CRD 5 and 36 percent from CRD 8, the other central origins. Rail share of total shipments has decreased from all three origins.

### Origins

Durum is grown principally in the northern section of North Dakota, CRD's 1, 2, and 3, and is moved predominantly by rail. Wheat, which is increasing in importance in absolute volume in this area, also moves primarily by rail.

CRD 4 relies mostly on wheat with most wheat moved by rail. Durum still moves almost entirely by rail; CRD 5 has greatly increased its movement of sunflower which decreased the relative importance of rail for all grains. Wheat and durum are still moved heavily by rail; CRD 6 also has seen the strong increase in sunflower shipments and attendant truck movement.

CRD 7 moves mainly wheat and principally by truck, 57 percent in 1978-79; CRD 8 moves mainly wheat where 57 percent goes by rail; and CRD 9 has also greatly increased sunflower movements and this is primarily by truck. However, wheat is still the most important commodity and is still primarily dependent on rail.

Rail has a strong share of the North Dakota origins, stronger in the West than East but, is generally decreasing relative to truck. In the eastern origins truck has made significant relative in roads because of the heavy sunflower movement but rail movement of wheat and other commodities has increased in an absolute sense.

Hopper cars have increased in relative importance but not equally. In the west or southwest boxcar movements still dominate the rail movement with 56 percent, 57 percent, and 61 percent of the market in CRD 4 and 8.

### Conclusions

The increasing movement of grains out of North Dakota suggests that potential problems of congestion and capacity availability may arise. Some general tentative conclusions can be drawn. It does appear that the marketing system serving North Dakota producers has been actively striving to alleviate potential or existing problems. New markets, such as the West Coast ports of Columbia River and Puget Sound, are evidently being explored and utilized to move grain. Shippers are using modes in different fashion, shifting between truck and rail in a manner reflecting mode availability and rates. New hopper cars (shipper owned, shipper leased, or carrier owned) are being used to increase the physical capacity of the transportation system.

However, potential problems are apparent. The growth in production and movement of grains will continue to exert demands on existing or future marketing capacity in the industry. The advent of new, bulky commodities such as sunflower also affects the ability of the system to serve the new as well as old commodity flows. The seasonality of movement causes additional strains on the available transportation capacity. Finally, energy considerations will affect truck availability and rates and may cause further emphasis to be placed on large "batch" movements of grain, e.g. unit trains or multiple car shipments.

### Future Research Needs

The discussion in this report has only been descriptive in nature since the general purpose was to provide a base-line document describing how grain transportation was changing for North Dakota shippers. Future research efforts should be directed to the cause of the changes in order

for marketing firms to react to or plan for the changes. Specific attention could be paid to costs of operation for trucks or rail service, economies in elevator or rail car capacity, impact of processing plants on sunflower movements, seasonality of movement in North Dakota, impact of port congestion, revenue/cost ratios on different origin-destination movements for rail and truck, impact of energy on costs of alternative transportation modes, etc. Analytical evaluation of these and similar items will provide both short-term and long-term information for decision-makers in the North Dakota grain industry.

APPENDIX A

## SUMMARY OF 1979-80 CROP YEAR

Data on the 1979-80 crop year have recently become available for analysis but were too late to receive the detailed examination offered in the main body of this report. This summary will examine the main subject areas incorporated in the main report and test for any major shifts in trends during the 1979-80 crop year. For detailed information see North Dakota Grain and Oilseed Transportation Statistics, 1979-80, UGPTI Report #36, by Gene C. Griffin, December 1980.

### Total Grain and Oilseed Movements

Total movements of grain and oilseeds out of North Dakota continued to increase in 1979-80, reaching slightly over 476 million bushels, a new record for the state and an increase of over 4 percent (20 million bushels) (Table A-1). This increase was due primarily to an increase in durum, barley, sunflower, and miscellaneous movements of 7, 13, 21, and 48 percent respectively, a total increase of over 38 million bushels. Hard red spring movements decreased almost 15 million bushels from the previous year's shipments. Hard red spring still comprises 36 percent of the total movement with sunflower and durum each at 20 percent.

Duluth/Superior is still the most important market for North Dakota grain and oilseed production (Table A-2). But, it decreased from 55 percent to 48 percent relatively, and had a 20 million bushel decrease absolutely in shipments from North Dakota for the years 1978-79 to 1979-80. Minneapolis/St. Paul gained 26 million bushels over 1978-79 and increased its relative share to 25 percent. The Western market area remained constant at 10 percent and miscellaneous markets gained 17 percent of the total movements.

Modal shipments had a significant change in trend in the 1979-80 crop year (Table A-3). Rail increased its relative share of total movements to 62 percent, up from a low of 59 percent in 1978-79 and reversing a declining trend that had held over the past five years. Total shipments by rail increased by over 23 million bushels (9 percent) over the previous year and truck shipments declined by 3.4 million bushels (2 percent). Minneapolis/St. Paul, which increased total volume, received 34 percent of its grain by truck, remaining constant from the previous year, but with an absolute increase of 69 million bushels (26 percent). Rail increased 29 percent, about 18 million bushels.



TABLE A-1. NORTH DAKOTA GRAIN AND OILSEED SHIPMENTS<sup>a</sup> 1969-1970 to 1980-1981

	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80
	(thousand bu.)										
Hard Red Spring	120,690 (38%)	105,672 (35%)	126,048 (39%)	191,696 (44%)	183,567 (45%)	122,934 (42%)	139,394 (44%)	124,429 (41%)	127,953 (36%)	184,923 (41%)	169,573 (36%)
Durum	58,549	57,355	71,666	83,351 (19%)	60,758 (15%)	68,781 (24%)	74,843 (23%)	65,680 (22%)	88,366 (25%)	88,659 (19%)	94,581 (20%)
Barley	74,268 (24%)	69,023 (23%)	70,883 (22%)	78,384 (18%)	91,739 (22%)	56,676 (19%)	56,355 (18%)	73,314 (24%)	63,115 (18%)	69,648 (15%)	78,621 (17%)
Sunflowers	N.A.	N.A.	N.A.	9,183 (2%)	9,246 (2%)	9,013 (3%)	14,554 (5%)	15,622 (5%)	51,278 (14%)	79,253 (17%)	95,940 (20%)
Oats	44,519 (14%)	55,087 (18%)	44,537 (14%)	44,222 (10%)	41,338 (10%)	19,282 (7%)	18,401 (6%)	13,812 (5%)	10,492 (3%)	12,087 (3%)	7,959 (2%)
Rye	4,043 (1%)	4,675 (2%)	4,193 (1%)	5,009 (1%)	7,721 (2%)	2,513 (1%)	3,293 (1%)	2,769 (1%)	1,772 (1%)	2,811 (1%)	3,598 (1%)
Flax Seed	13,133 (4%)	13,540 (4%)	9,159 (3%)	11,411 (3%)	6,871 (2%)	5,300 (2%)	6,590 (2%)	4,883 (2%)	6,174 (2%)	4,541 (1%)	4,581 (1%)
Misc.	N.A.	N.A.	N.A.	9,952 (2%)	10,141 (2%)	7,082 (2%)	6,866 (2%)	5,405 (2%)	9,454 (3%)	14,312 (3%)	21,212 (4%)
Total	315,202 (100%)	305,352 (100%)	326,486 (100%)	433,208 (100%)	411,381 (100%)	291,582 (100%)	320,285 (100%)	305,912 (100%)	358,604 (100%)	456,234 (100%)	476,064 (100%)

<sup>a</sup>Includes CCC shipments.

TABLE A-2. NORTH DAKOTA GRAIN AND OILSEED SHIPMENTS BY DESTINATION

Destination	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80
	(thousand bu.)					
Minneapolis-St. Paul	110,118 (38%)	104,900 (33%)	109,620 (36%)	85,231 (24%)	93,353 (20%)	119,711 (25%)
Duluth-Superior	114,603 (39%)	152,514 (48%)	128,044 (42%)	192,925 (54%)	250,653 (55%)	230,544 (48%)
West	25,433 (9%)	22,031 (7%)	20,823 (7%)	29,031 (8%)	46,413 (10%)	46,954 (10%)
Miscellaneous Markets	41,428 (14%)	40,840 (13%)	47,425 (16%)	51,417 (14%)	65,814 (14%)	78,856 (17%)
Total	291,582 (100%)	320,285 (100%)	305,912 (100%)	358,604 (100%)	456,234 (100%)	476,065 (100%)

TABLE A-3. NORTH DAKOTA GRAIN AND OILSEED SHIPMENTS BY RAIL AND TRUCK AND DESTINATION

Destination	1974-75		1975-76		1976-77		1977-78		1978-79		1979-80	
	Rail	Truck	Rail	Truck	Rail	Truck	Rail	Truck	Rail	Truck	Rail	Truck
(thousand bu.)												
Minneapolis-St. Paul	91,477 (83%)	18,641 (17%)	83,290 (79%)	21,610 (21%)	82,764 (76%)	26,856 (24%)	60,859 (71%)	24,372 (29%)	61,186 (66%)	32,168 (34%)	79,040 (66%)	40,072 (34%)
Duluth-Superior	91,417 (80%)	23,185 (20%)	110,012 (72%)	42,502 (28%)	80,207 (63%)	47,837 (37%)	121,899 (63%)	71,025 (37%)	140,112 (56%)	110,541 (44%)	138,319 (60%)	92,225 (40%)
West	18,311 (72%)	7,122 (28%)	15,376 (70%)	6,654 (30%)	11,703 (56%)	9,120 (44%)	19,386 (67%)	9,645 (33%)	33,461 (72%)	12,952 (28%)	31,878 (68%)	15,070 (32%)
Misc. Markets	28,448 (69%)	12,980 (31%)	27,813 (68%)	13,027 (32%)	30,455 (64%)	16,970 (36%)	33,034 (64%)	18,384 (36%)	36,310 (55%)	29,504 (45%)	45,100 (57%)	33,750 (43%)
Total	229,653 (70%)	61,928 (21%)	236,491 (74%)	83,793 (26%)	205,129 (67%)	100,783 (33%)	235,178 (66%)	123,426 (34%)	271,009 (59%)	185,165 (41%)	294,342 (62%)	181,724 (38%)

Duluth/Superior receipts from North Dakota arrived less by truck, 40 percent compared to 44 percent, than in the earlier year. Rail's share of the receipts increased to 60 percent of the total. The West market received about the same volume as the previous year, but truck movements increased to 32 percent of shipments from 28 percent in 1978-79.

The Crop Reporting District shipment pattern did not significantly change in the 1979-80 crop year (Table A-4). CRD's 3, 6, and 9 in the eastern part of the state still originate 58 percent of total shipments. Seasonal patterns of shipment also did not vary significantly from earlier years.

#### Commodity Movements

Hard red spring movements made a significant shift toward Minneapolis/St. Paul (26 percent from 16 percent) from Duluth/Superior (45 percent from 59 percent). Movement to the West decreased 10 percent or 3.4 million bushels from the 1978-79 crop year.

Durum shipments also increased to Minneapolis/St. Paul, from 21 percent of total durum shipments. Duluth decreased shipments to 69 percent of the total amount moved. Durum continues to move heavily by rail, 84 percent of the time, and does so to all destinations. CRD's 1, 2, and 3 across the northern part of the state still are the major origin points, originating 75 percent of shipments in 1979-80.

Barley movements increased by 2 million bushels to Minneapolis/St. Paul but decreased in volume, relative to other markets, from 39 percent to 27 percent over the year. Duluth/Superior shipments increased by 83 percent over the prior year, receiving 29 percent of barley shipments, up from 18 percent in 1978-79. Barley was moved 79 percent by rail in total, and to Minneapolis/St. Paul 96 percent went by rail. Both are slight increases over the 1978-79 crop year.

Sunflower volume continued to set records for shipments, reaching 96 million bushels in 1979-80. Duluth/Superior was again the dominant market with 72 percent of shipments, down from 80 percent in 1978-79 although it increased absolutely by 6 million bushels. Production of sunflower continues to spread throughout the state although the eastern part of the state still ships over 70 percent of all sunflower.

TABLE A-4. NORTH DAKOTA GRAIN AND OILSEED SHIPMENTS BY ORIGIN (CROP REPORTING DISTRICT)<sup>a</sup>

Crop Reporting District	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80
	(thousand bu.)					
1	44,971 (15%)	39,254 (12%)	38,628 (13%)	47,881 (13%)	55,802 (12%)	55,571 (12%)
2	28,141 (10%)	27,362 (9%)	29,421 (10%)	32,552 (9%)	38,668 (8%)	39,278 (8%)
3	65,398 (22%)	78,193 (24%)	80,085 (26%)	92,607 (26%)	103,393 (23%)	116,150 (24%)
4	10,852 (4%)	13,941 (4%)	13,315 (4%)	14,323 (4%)	17,394 (4%)	18,722 (4%)
5	25,997 (9%)	33,031 (10%)	29,763 (10%)	32,575 (9%)	49,133 (11%)	44,364 (9%)
6	50,683 (17%)	55,875 (17%)	58,924 (19%)	74,423 (21%)	97,722 (21%)	97,513 (20%)
7	19,533 (7%)	20,044 (6%)	17,044 (6%)	14,150 (4%)	23,776 (5%)	24,865 (5%)
8	7,696 (3%)	12,834 (4%)	9,454 (3%)	6,373 (2%)	12,099 (3%)	12,761 (3%)
9	38,311 (13%)	39,748 (12%)	29,280 (10%)	43,721 (12%)	58,249 (13%)	66,843 (14%)
Total	291,582 (100%)	320,285 (100%)	305,912 (100%)	358,604 (100%)	456,234 (100%)	476,065 (100%)

<sup>a</sup>Includes hard red spring, durum, sunflowers, barley, oats, rye, flax, and miscellaneous commodities.

Oats shipments decreased to all markets in 1979-80 and were moved mostly (54 percent) by truck. Minneapolis/St. Paul was still the most popular destination with Duluth/Superior shipments decreasing significantly. Rye and flaxseed, which are produced in smaller quantities in the state, both slightly increased their shipments in 1979-80. Rye moves mostly by rail (53 percent) while flaxseed moves heavily (86 percent) by truck. Most rye goes to Duluth/Superior while Minneapolis/St. Paul receives 90 percent of flaxseed shipments.

#### Summary

The trends identified in the main analysis section have generally continued through the 1979-80 crop year. The most noticeable change was a recovery by the railroads to 62 percent of total movements. Rail moved over 23 million bushels more in 1979-80 than the previous year while truck shipments declined by over 3 million bushels.

APPENDIX B

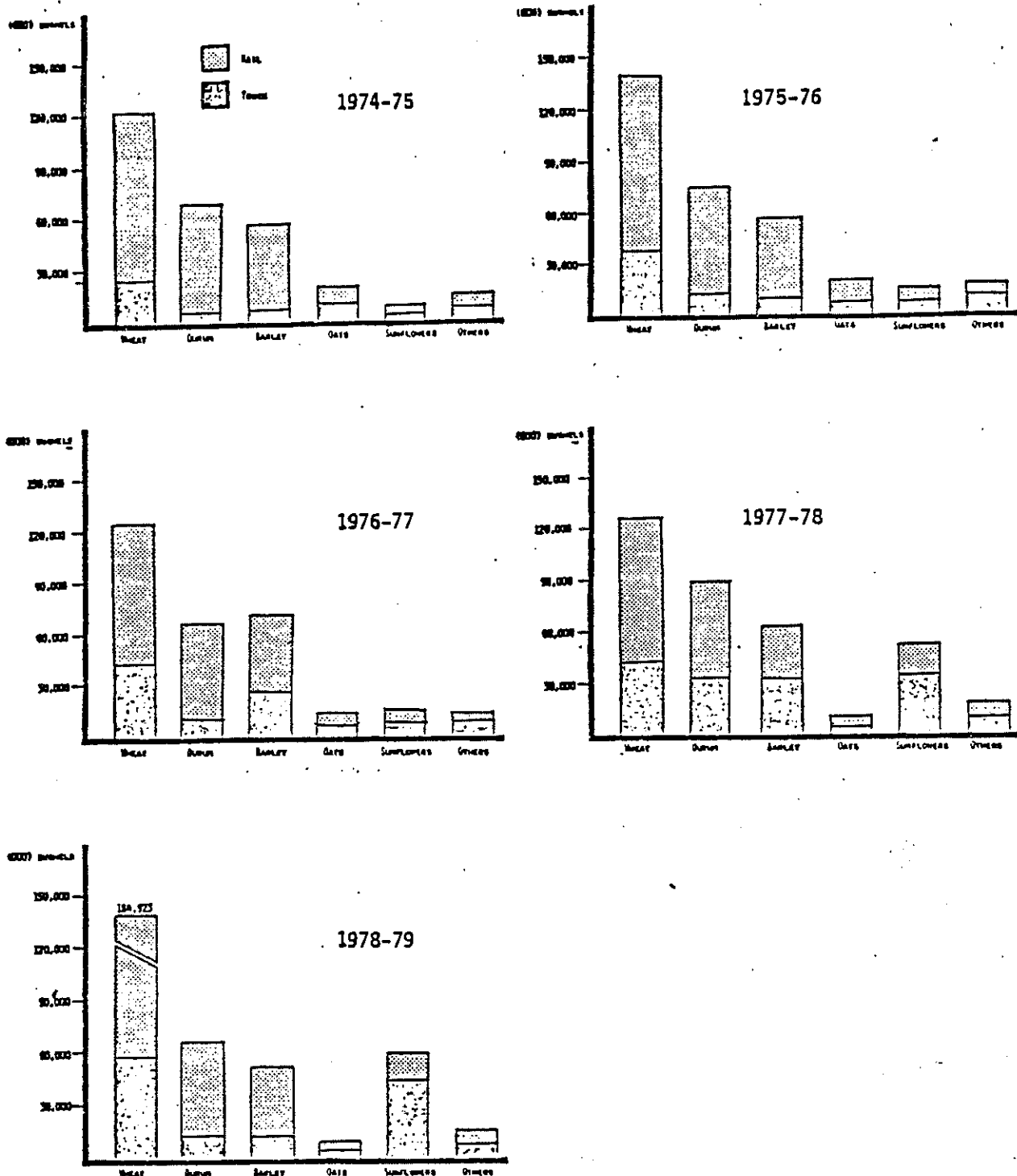


Figure B-1. Total Grain Shipments Out of North Dakota by Commodity and Mode, 1974-75 to 1978-79 Crop Years



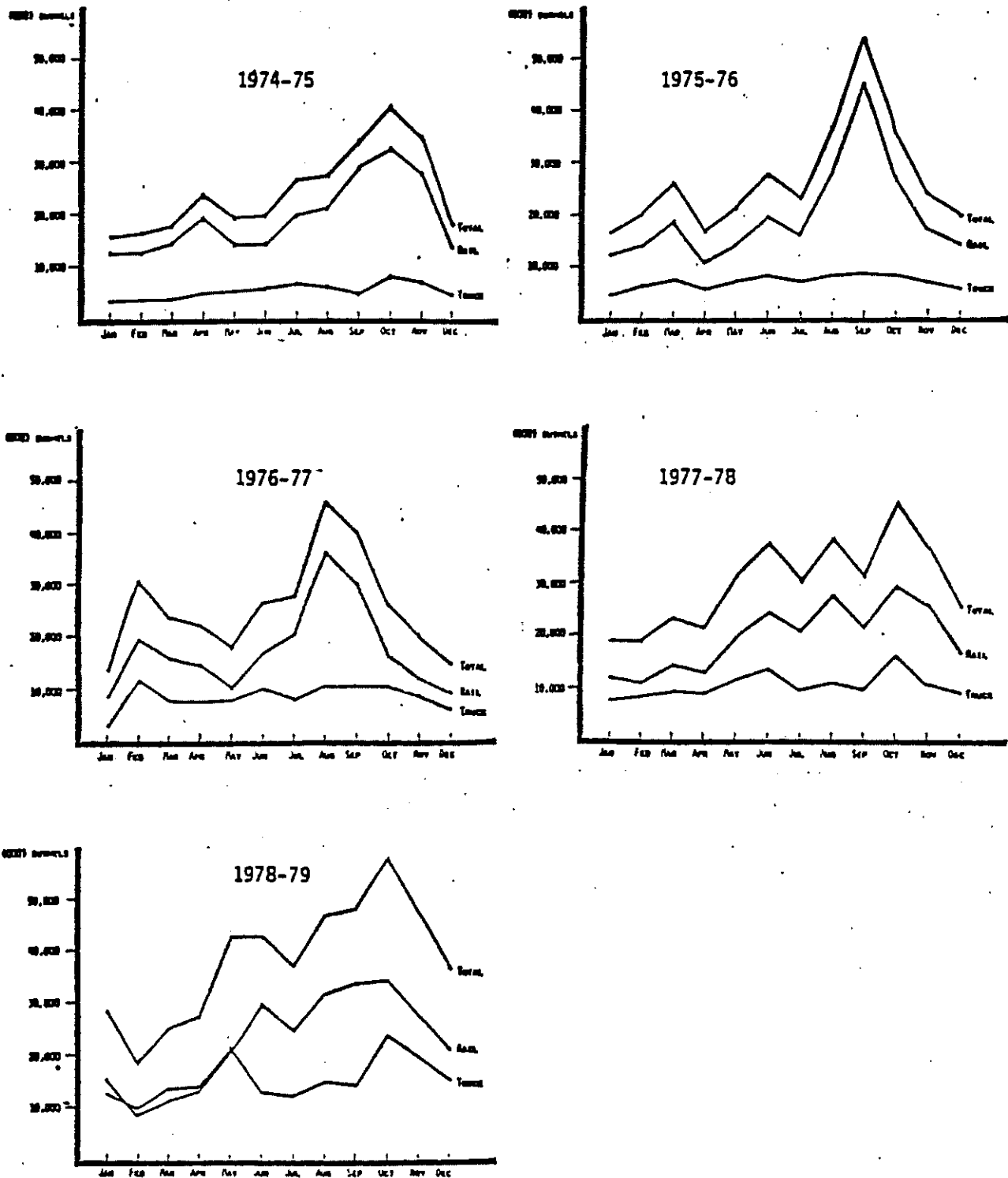


Figure B-2. Grain Shipments from North Dakota, by Month, by Mode, 1974-75 to 1978-79 Crop Years

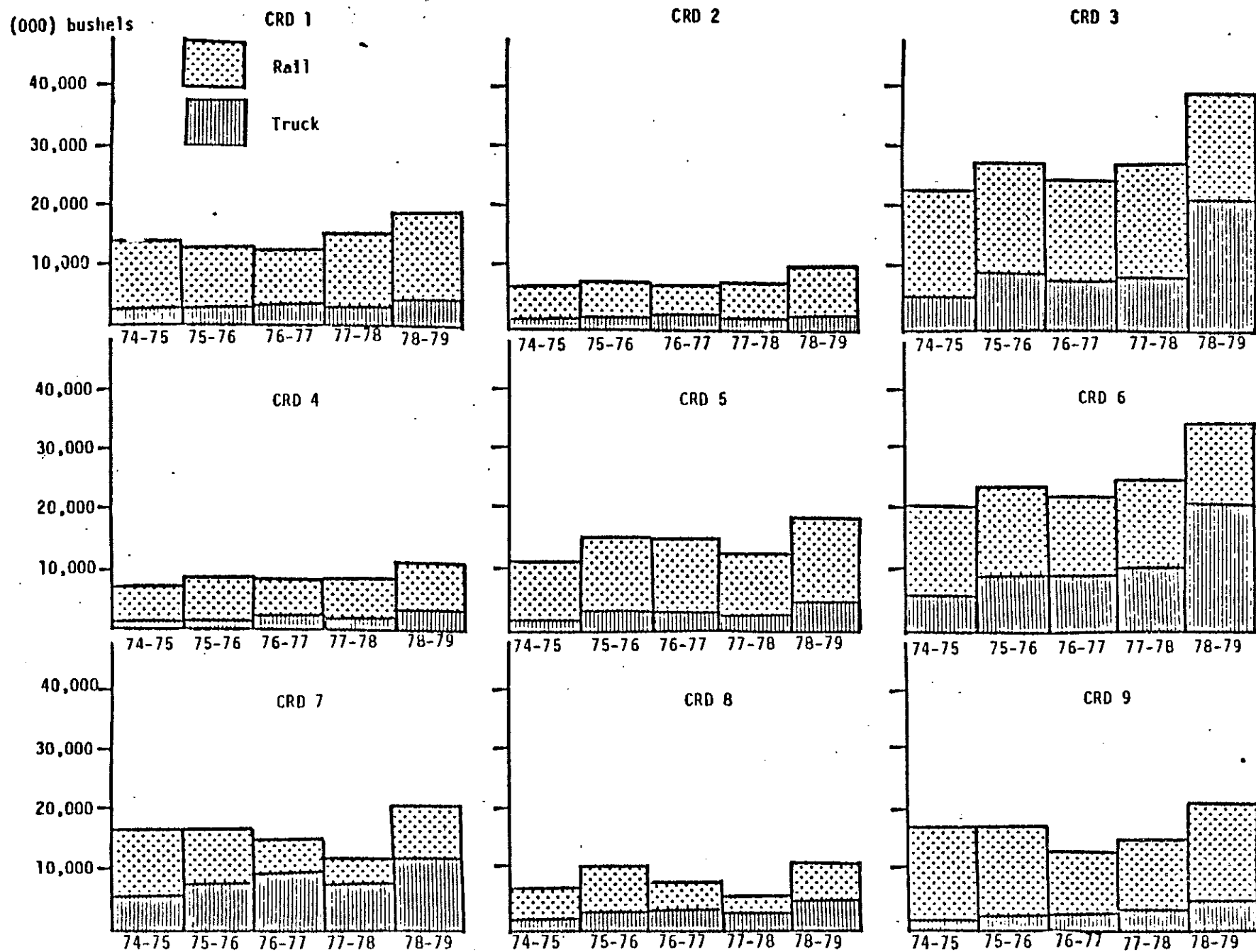


Figure B-3. Wheat Shipments from North Dakota by Origin, by Mode, 1974-75 to 1978-79 Crop Years

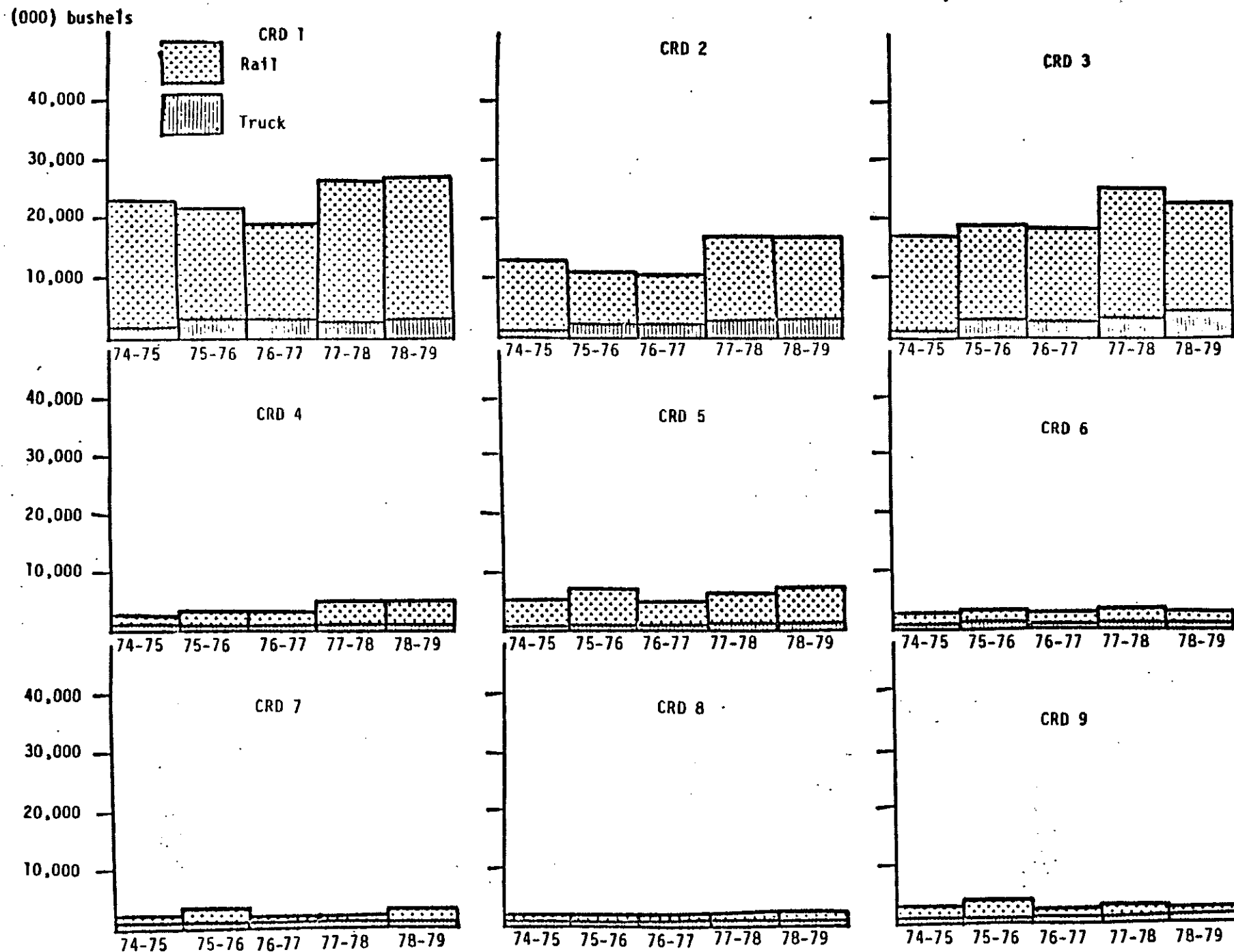


Figure B-4. Durum Shipments from North Dakota by Origin, by Mode, 1974-75 to 1978-79 Crop Years

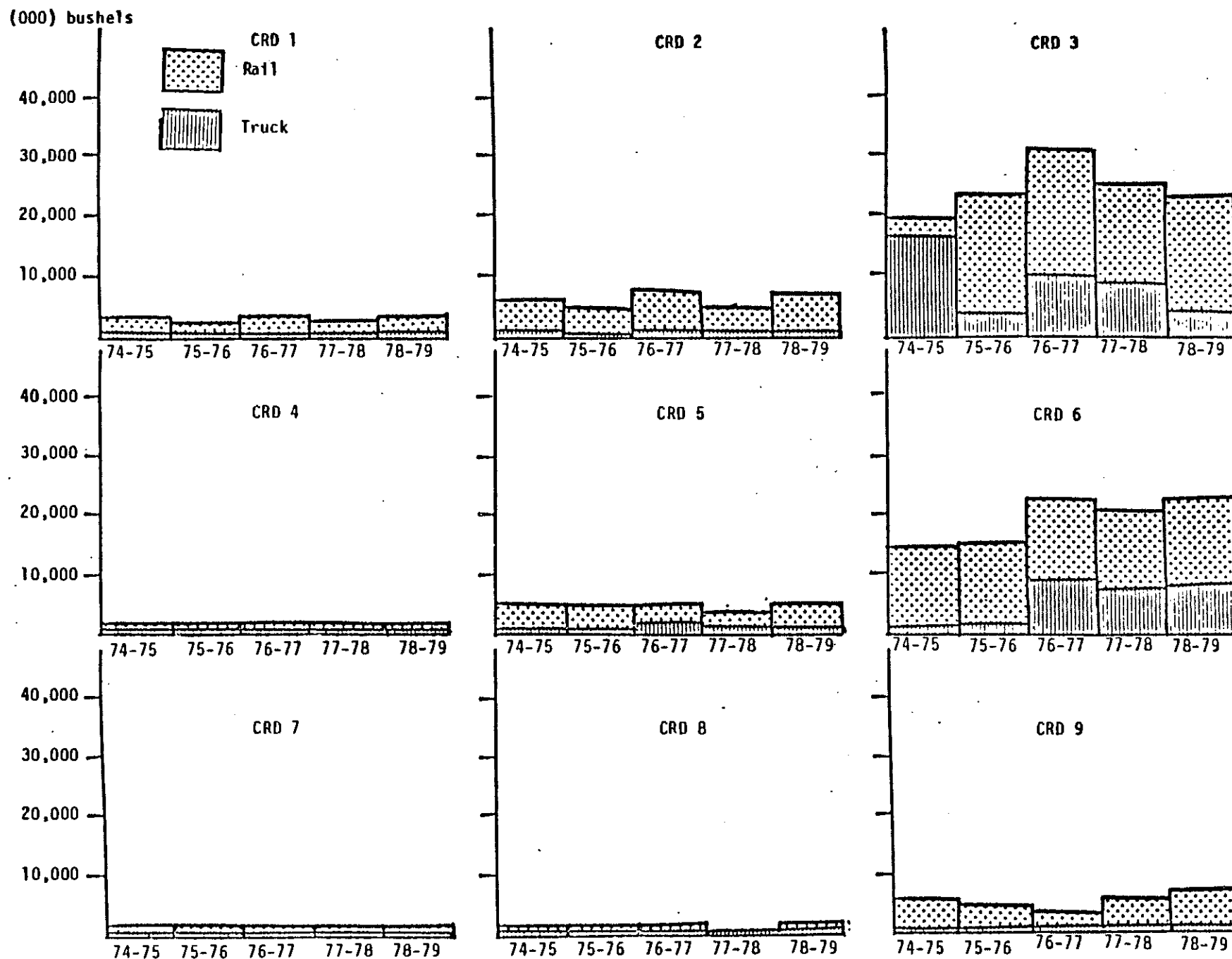


Figure B-5. Barley Shipments from North Dakota by Origin, by Mode, 1974-75 to 1978-79 Crop Years

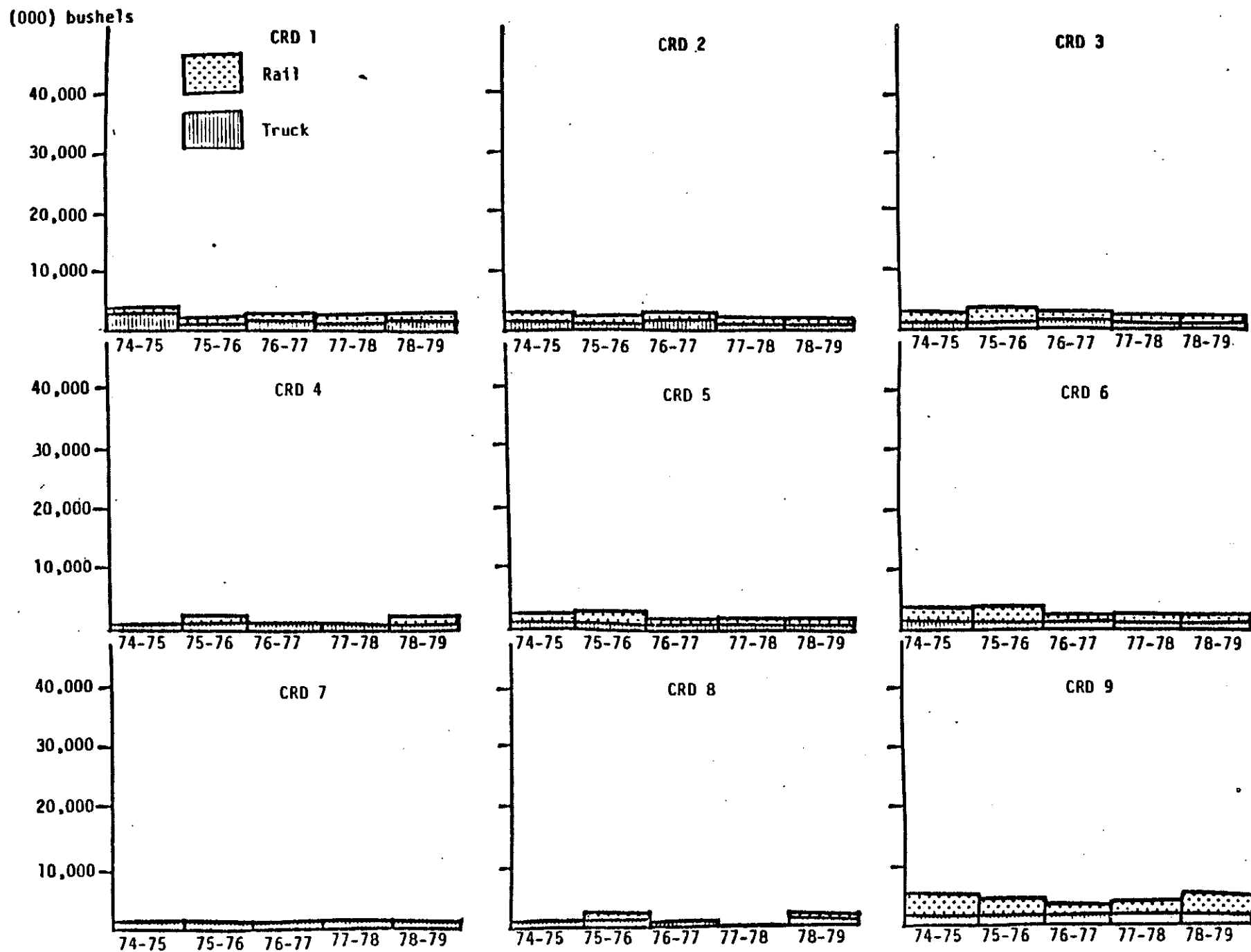


Figure B-6. Oats Shipments from North Dakota by Origin, by Mode, 1974-75 to 1978-79 Crop Years

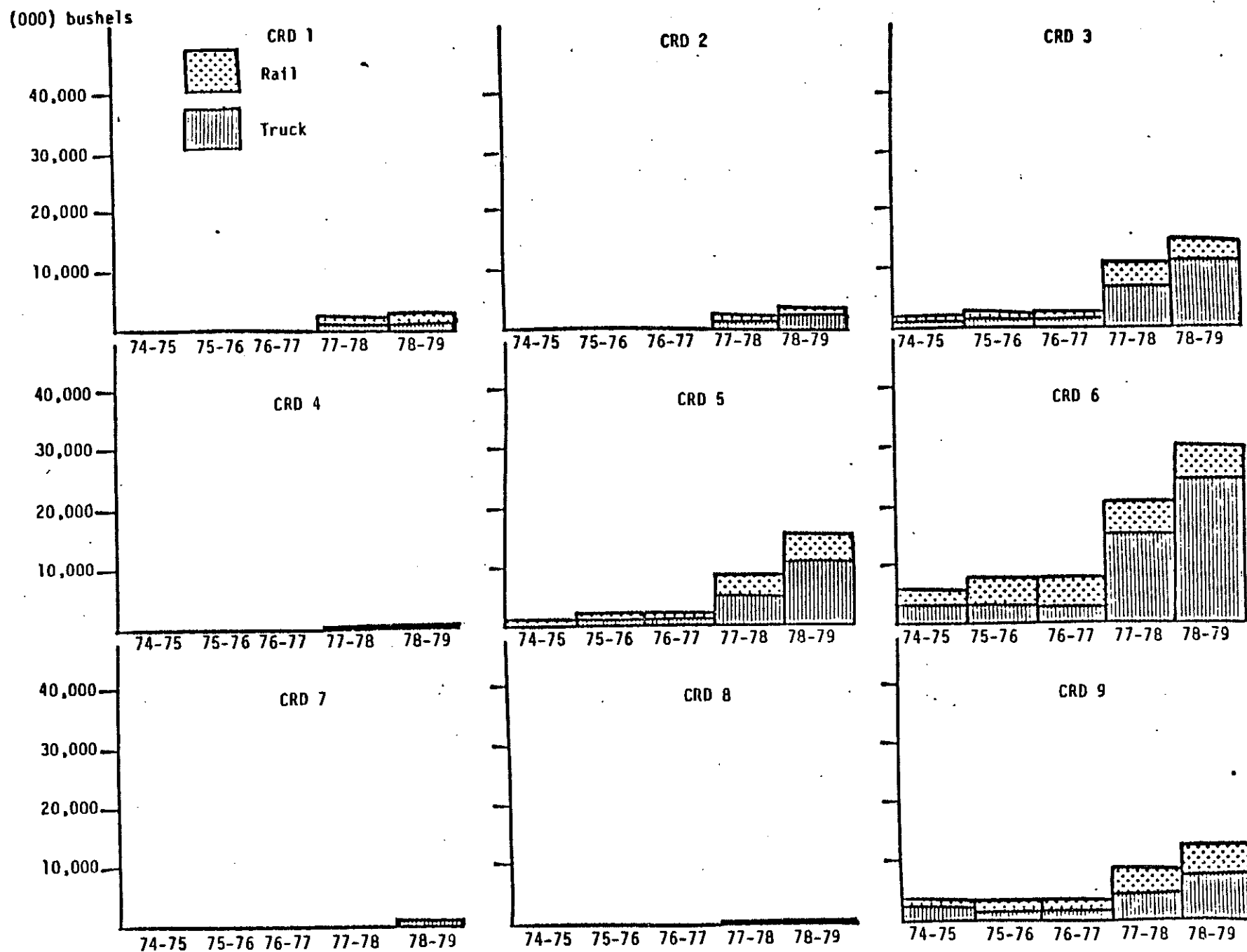


Figure B-7. Sunflower Shipments from North Dakota by Origin, by Mode, 1974-75 to 1978-79 Crop Years

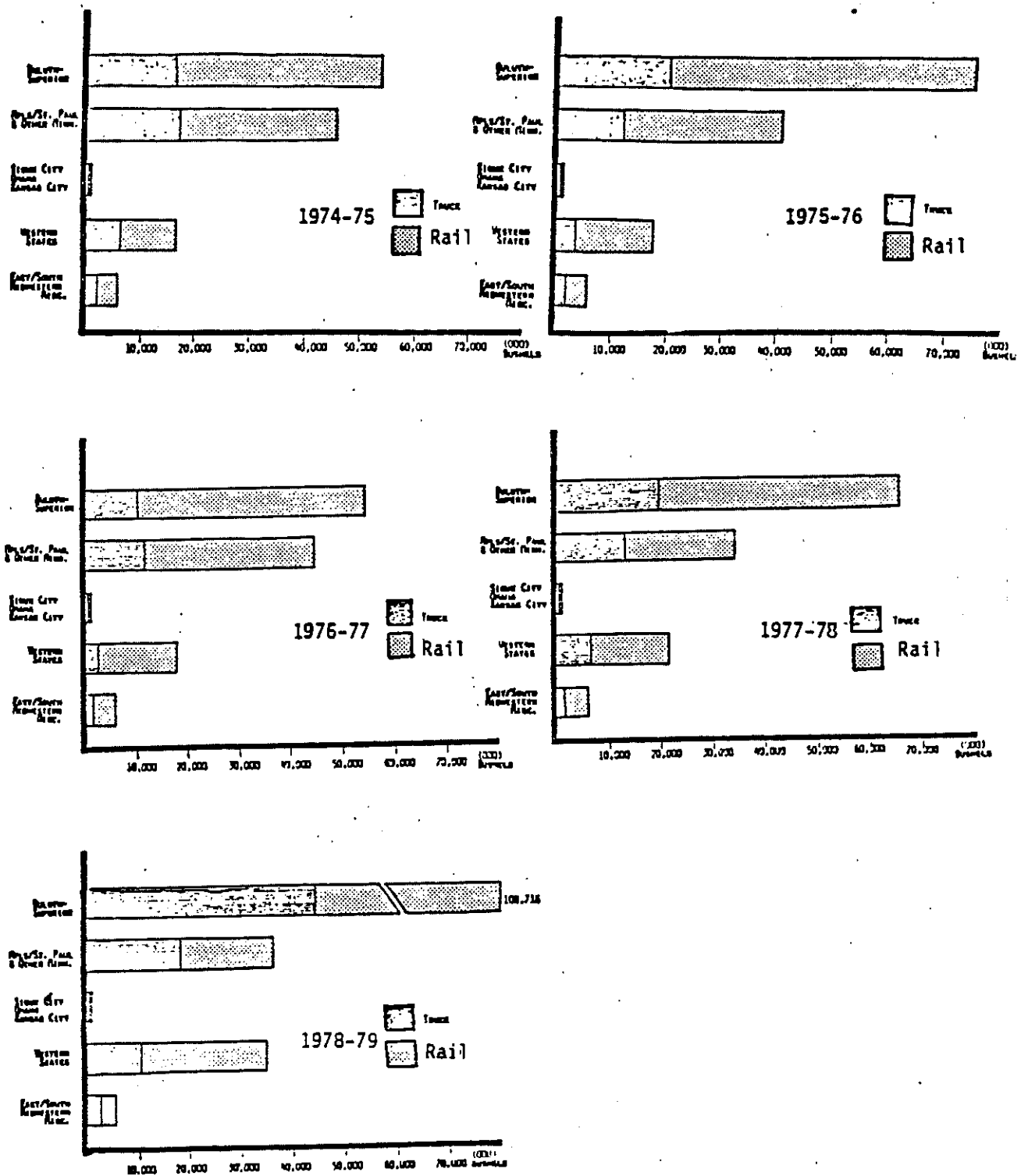


Figure B-8. Wheat Shipments from North Dakota by Destination and Mode, 1974-75 to 1978-79 Crop Years

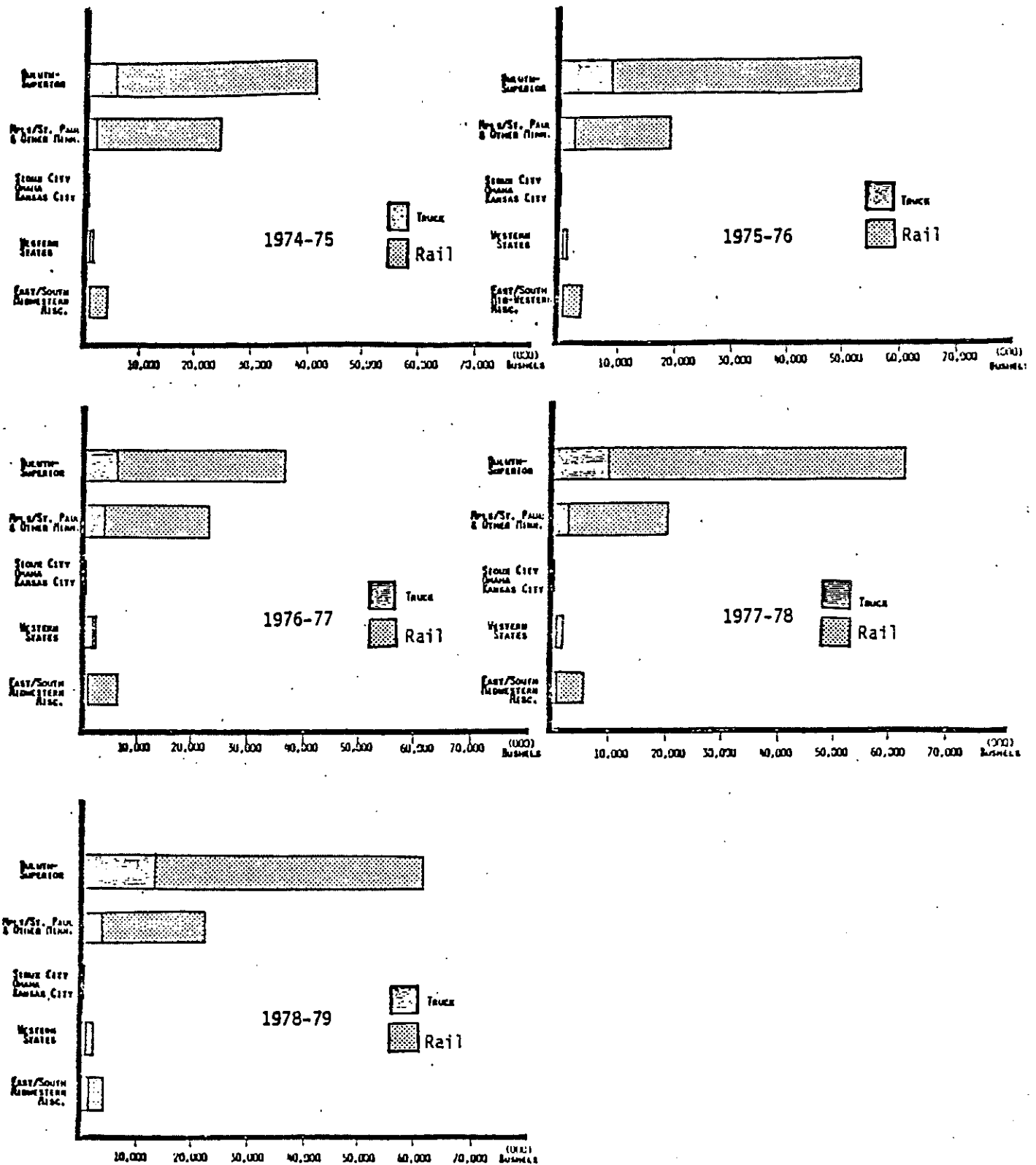


Figure B-9. Durum Shipments from North Dakota by Destination and Mode, 1974-75 to 1978-79 Crop Years



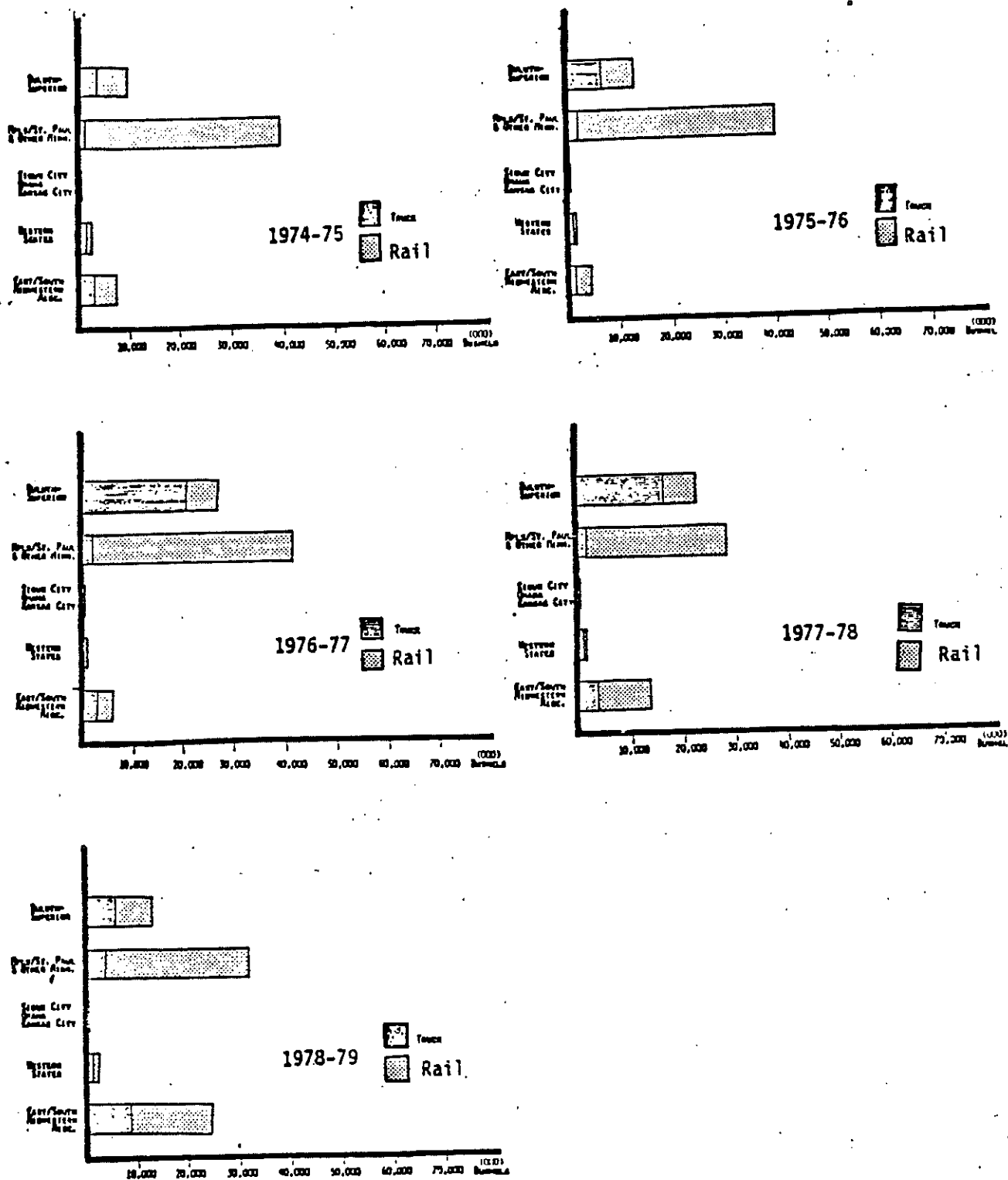


Figure B-10. Barley Shipments from North Dakota by Destination and Mode, 1974-75 to 1978-79 Crop Years

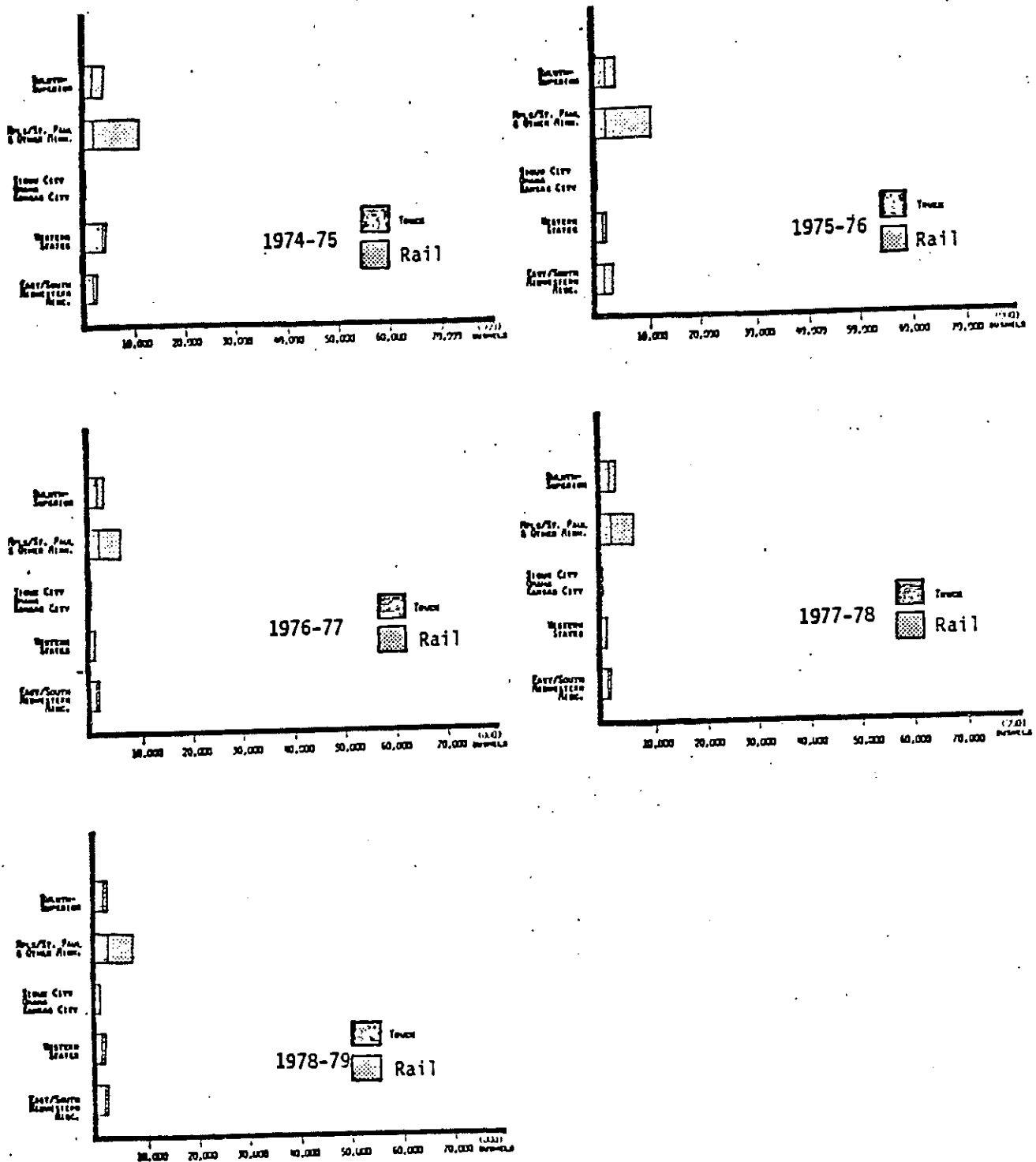


Figure B-11. Oats Shipments from North Dakota by Destination and Mode, 1974-75 to 1978-79 Crop Years

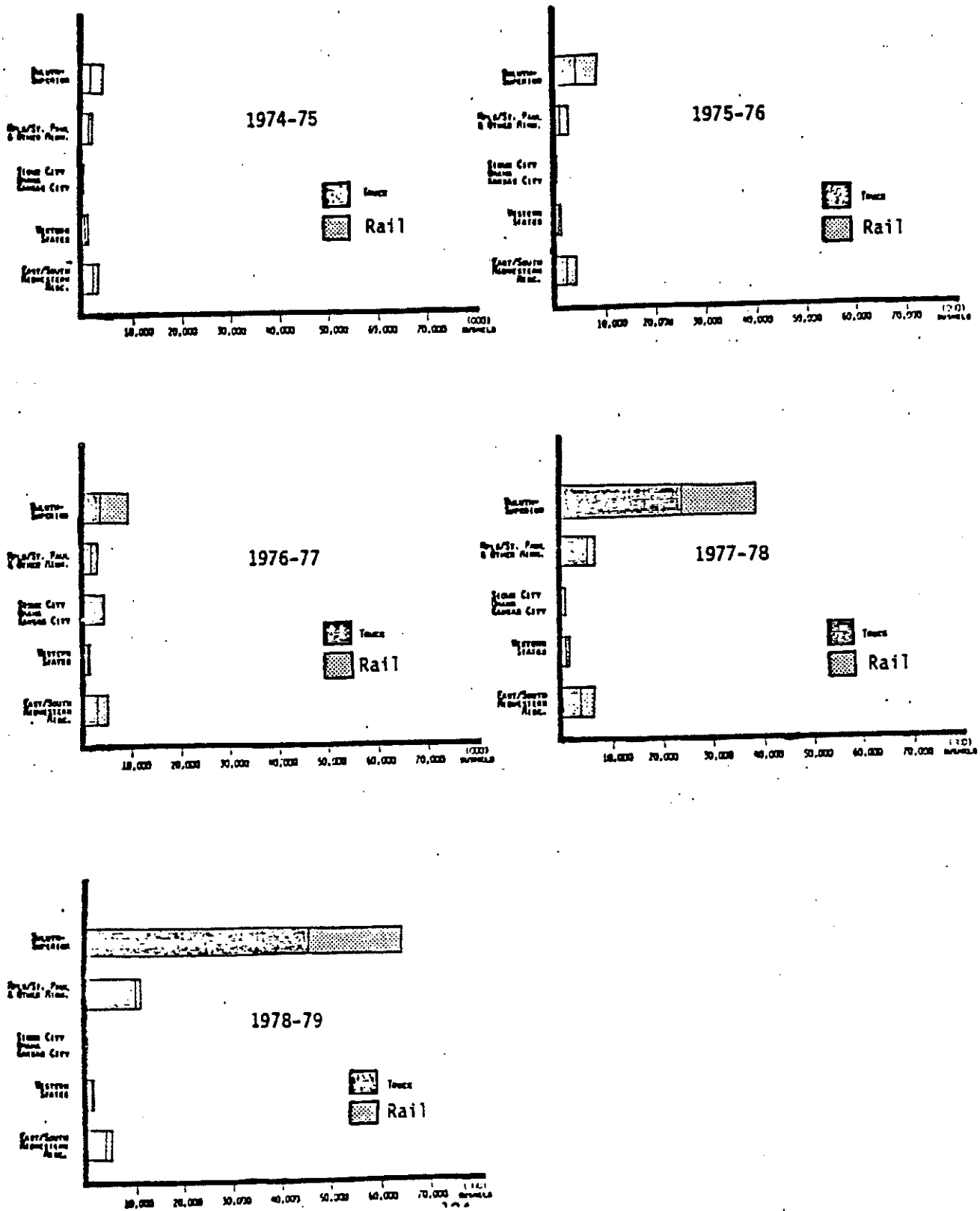


Figure B-12. Sunflower Shipments from North Dakota by Destination and Mode, 1974-75 to 1978-79 Crop Years



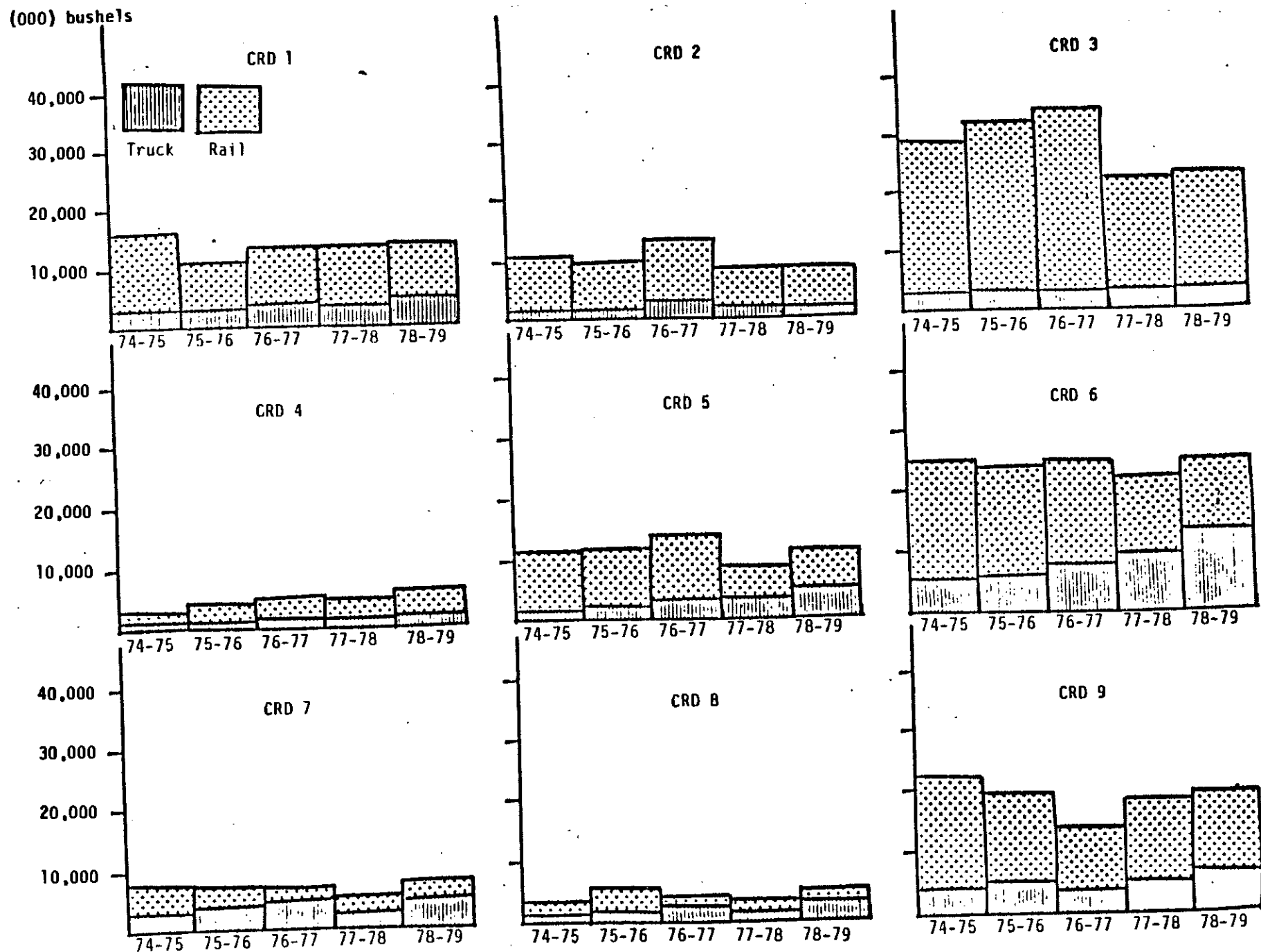


Figure B-14. Minneapolis/St. Paul/other Minnesota Receipts by Origin and Mode, 1974-75 to 1978-79 Crop Years

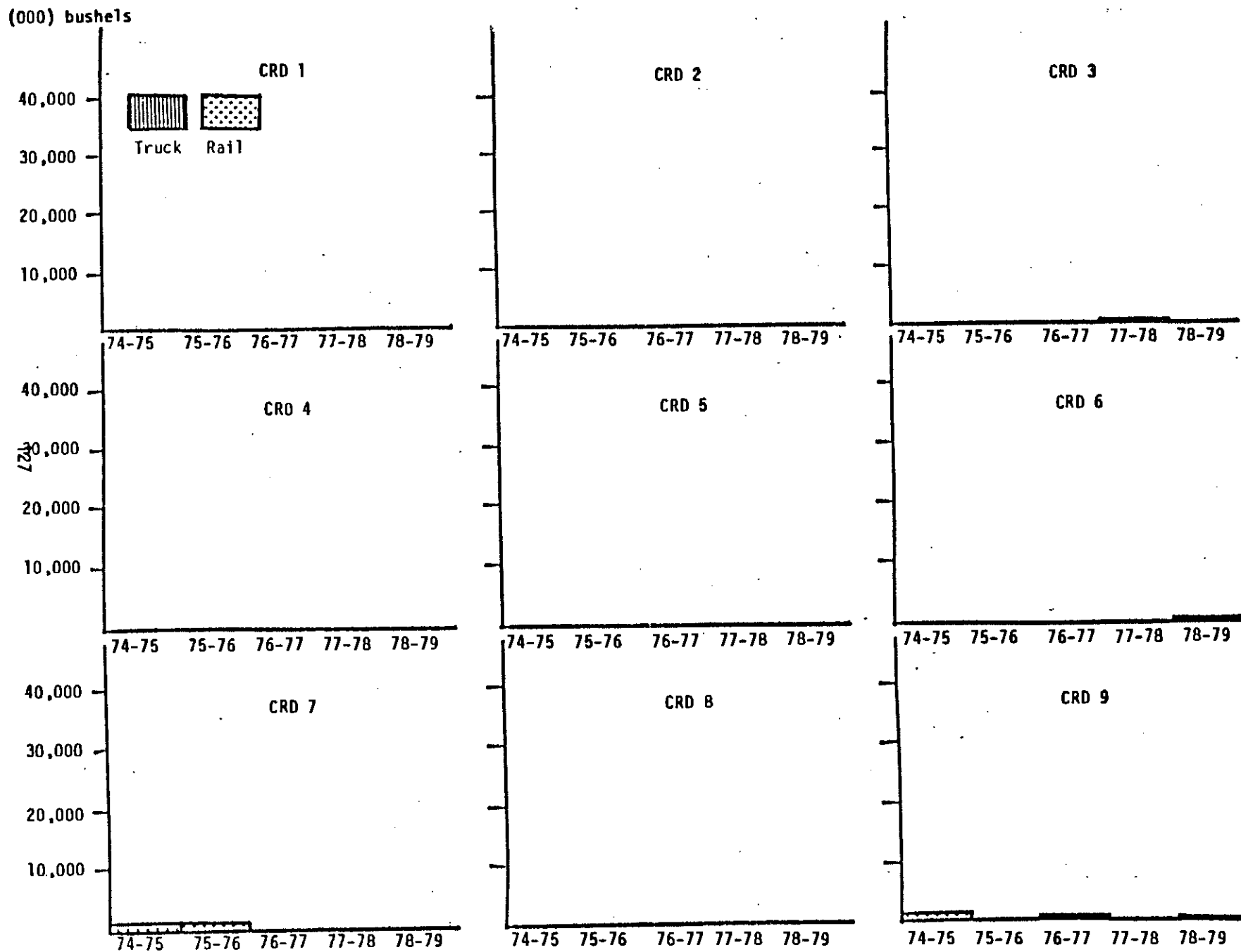


Figure B-15. Sioux City/Omaha/Kansas City Receipts by Origin and Mode, 1974-75 to 1978-79 Crop Years

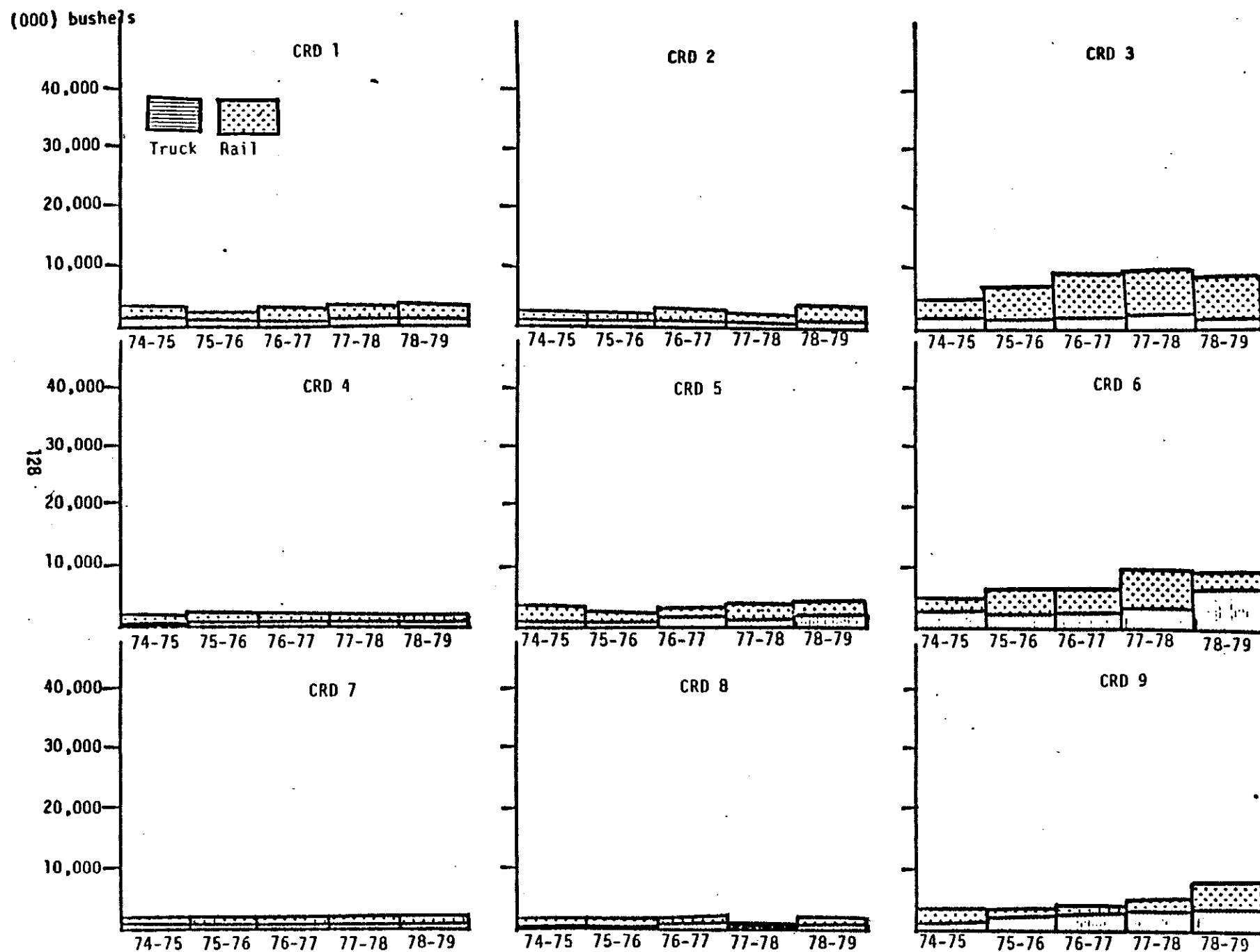


Figure B-16. East/South/Midland/Southwestern Misc. Receipts by Origin and Mode, 1974-75 to 1978-79 Crop Years

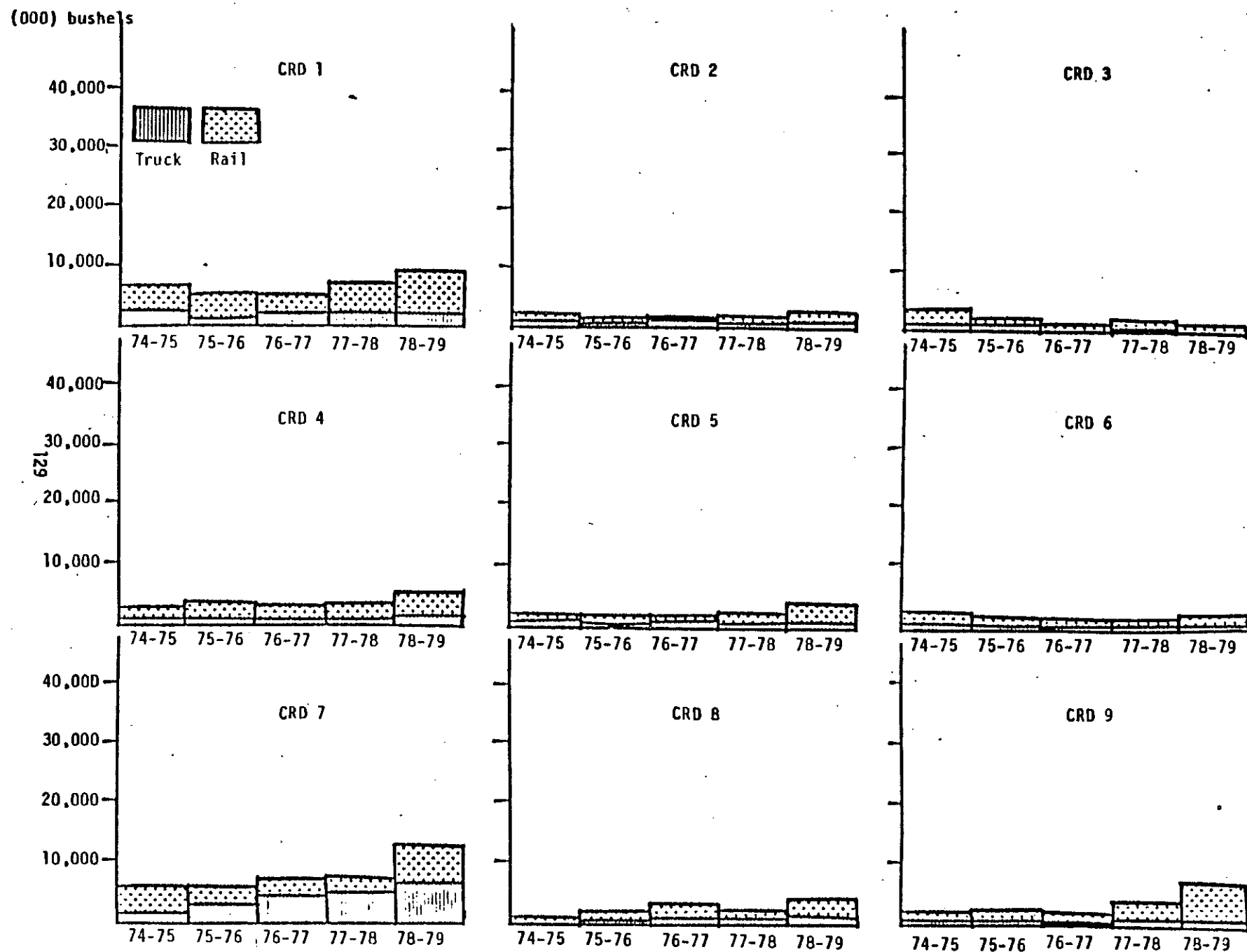


Figure B-17. Western States Receipts by Origin and Mode, 1974-75 to 1978-79 Crop Years



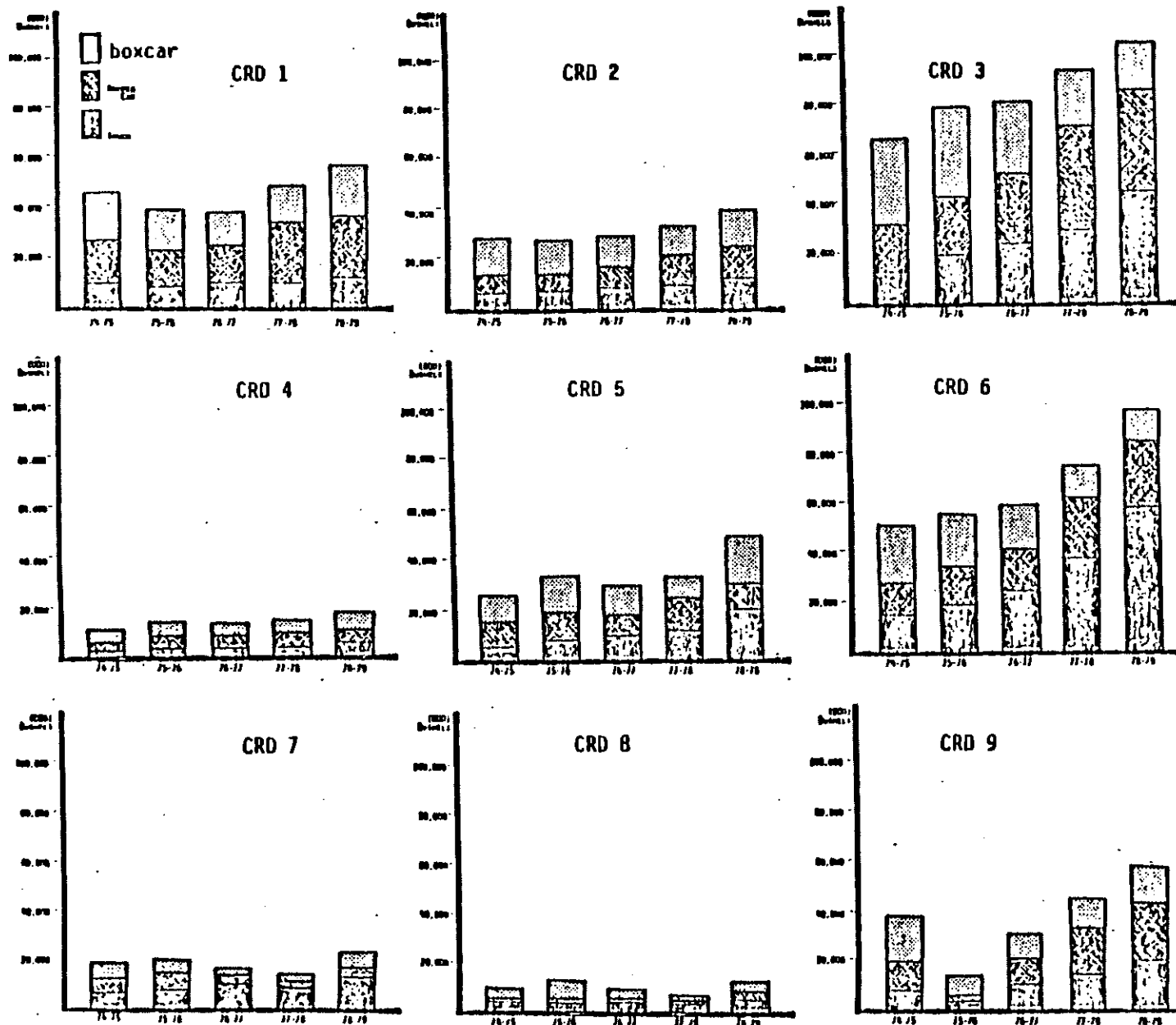


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