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**Truck Shipments of Grain**  
by  
**NORTH DAKOTA ELEVATORS**  
with comparisons  
**1965 - 66**

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## FOREWORD

This publication represents a continuation of research into the factors affecting the marketing of North Dakota wheat. The study was made possible through financial assistance grants from the North Dakota State Wheat Commission. Reports published under this cooperative arrangement are:

1. Wheat Statistics for North Dakota, Agricultural Economics Report No. 20, August, 1961.
2. Protein Content of North Dakota Wheat, North Dakota Farm Research, March-April, 1962.
3. Market Factors of North Dakota Hard Red Spring Wheat, Agricultural Economics Report No. 21, April, 1962.
4. North Dakota Hard Red Spring Wheat Shipments, North Dakota Farm Research, September-October, 1962.
5. Durum Market Factors, 1962, North Dakota Farm Research, January-February, 1963.
6. Quality Factors of North Dakota Durum Shipments, 1960, 1961, 1962, Agricultural Economics Report No. 26, January, 1963.
7. Durum Data, Agricultural Economics Report No. 27, February, 1963.
8. Market Factors of North Dakota Hard Red Spring Wheat, 1962 Shipments, Agricultural Economics Report No. 28, February, 1963.
9. Market Factors of North Dakota Hard Red Spring Wheat, 1963 Shipments, Agricultural Economics Report No. 33, March, 1964.
10. Market Factors of North Dakota Durum Wheat, 1963 Shipments with Comparisons, Agricultural Economics Report No. 34, April, 1964.
11. Quality of Commodity Credit Corporation Wheat in North Dakota Country Warehouses and Subterminals, North Dakota Farm Research, May-June, 1964.
12. Movement of North Dakota Grain by Truck, October-November, 1963, North Dakota Farm Research, July-August, 1964.
13. Economic Implications of the Wheat Sedimentation Test on the North Dakota Economy, Clinton D. Kurtz, unpublished Master's thesis, Department of Agricultural Economics, North Dakota State University, Fargo, North Dakota, October, 1964.
14. Market Factors of North Dakota Hard Red Spring Wheat Shipments, July-December, 1964, Agricultural Economics Report No. 43, June, 1965.

15. Trends in Shipping Grain by Motor Carrier from North Dakota Origins, 1956-57 through 1963-64, Bulletin No. 462, December, 1965.
16. Addendum to Bulletin No. 462, Agricultural Economics Report No. 44, January 1966.
17. Market Factors of North Dakota Durum Wheat Shipments, July-December, 1965, Agricultural Economics Report No. 45, April, 1966.
18. Market Factors of North Dakota Hard Red Spring Wheat Shipments, July-December, 1965, Agricultural Economics Report No. 48, July, 1966.
19. The Importance of the Export Market to the North Dakota Wheat Producer, North Dakota Farm Research, November-December, 1966.
20. Compared with Hard Red Spring, Durum Yields Increasing, North Dakota Farm Research, March-April, 1967.
21. An Economic Analysis of the Costs of Operating Grain Trucking Firms in North Dakota, Agricultural Economics Report No. 54, July, 1967.
22. Trends in the Flow of Wheat Exports in the World Market, Agricultural Economics Report No. 56, August, 1967.

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## HIGHLIGHTS

The volume of grain shipped by truck from North Dakota country elevators to first destinations increased from 4.8 per cent in 1956-57 to 7.2 per cent in 1957-58 to 13.9 per cent in 1958-59 to 21.0 per cent in 1963-64. This figure decreased to 19.7 per cent in 1965-66.

Slightly more than 90 per cent of the trucked grain was shipped to out-of-state destinations. The balance went to instate destinations.

Approximately 25 per cent of the total grain trucked went to Minneapolis-St. Paul. About 48 per cent went to Duluth-Superior. About 8 per cent went to states directly south and southwest.

Wheat accounted for the major portion of the total truck movement. About 19 million bushels of wheat were shipped by motor carrier, representing about 30 per cent of all grains shipped by truck. Barley and oats each accounted for another 26 per cent of the total.

District 6 originated about 20 per cent of the total movement. District 3 accounted for nearly 19 per cent and District 2 nearly 16 per cent.

District 7 ranked first in proportion of total grains purchased shipped by truck. Elevators in this district shipped about 34 per cent of purchases by motor. District 8 ranked second with about 32 per cent, while District 2 shipped about 28 per cent of total purchases by truck.

There appeared to be little difference in the per cent of grain shipped by truck between the first eight months of the period studied and the last four months. About 22 per cent of the amount of grain purchased between October 1, 1965 and May 31, 1966 was shipped by truck. Approximately 23 per cent of the June 1, 1966 through September 30, 1967 purchases was moved by truck.

## TRUCK SHIPMENTS OF GRAIN BY NORTH DAKOTA ELEVATORS, 1965-66

David C. Nelson<sup>1</sup>

This is the fifth report by the Department of Agricultural Economics on truck shipments of grain from North Dakota country elevators. This report covers the movement of grain by motor carrier during the period of October 1, 1965 through September 30, 1966.

North Dakota continues to be one of the leading states in the production and marketing of grain. In 1966 North Dakota ranked first in the production of spring and durum wheat, barley, rye, and flaxseed; second in the production of all wheat; fourth in the production of oats; and fifth in total acreage of principal crops harvested.<sup>2</sup> Cash receipts from farm marketings of crops accounted for approximately 61 per cent of the North Dakota cash farm income from farm marketings, excluding government payments.<sup>3</sup>

Most of the grain produced in North Dakota is moved to terminal markets located in other states for sale and processing. Large volumes of hard red spring wheat have been into export since the last report concerning truck shipments of grain from North Dakota.<sup>4</sup> In recent years, there has been a gradual shift from the traditional method of shipping North Dakota grain by rail to shipment by truck. Generally, truck movements originate at country elevators, although there are indications that movements by motor carrier may now actually originate at the farm site, thereby bypassing the country marketing point. There presently exists no published evidence to indicate the degree to which this is occurring.<sup>5</sup>

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<sup>1</sup>Acting Director, Upper Great Plains Transportation Institute and Associate Professor of Agricultural Economics.

<sup>2</sup>Heltemes, C. J. and Fred R. Taylor, North Dakota Crop and Livestock Statistics, Annual Summary for 1966, Agricultural Statistics No. 17, Statistical Reporting Service, USDA, and Department of Agricultural Economics, North Dakota State University, Fargo, North Dakota, May, 1967, p. 2.

<sup>3</sup>Ibid., p. 74.

<sup>4</sup>The last report was made in December, 1965. See David C. Nelson, Trends in Shipping Grain by Motor Carrier from North Dakota: Origins, 1956-57 Through 1963-64, Bulletin No. 462, Department of Agricultural Economics, North Dakota State University, in cooperation with North Dakota State Wheat Commission, Bismarck, North Dakota, December, 1965.

<sup>5</sup>Future research in movements of grain by motor carrier from North Dakota should incorporate this activity in the analysis.



Approximately 5 per cent of the 1956-57 marketings of grain was shipped by motor carrier.<sup>6</sup> By 1958-59, this proportion increased to about 14 per cent and approximately 21 per cent in 1963-64.<sup>7</sup> Analysis of the 1965-66 movement of grain by motor carrier indicates that the trucking industry's share of the total shipments decreased about 20 per cent. It may be logical to conclude that where the controlling economic conditions do not change, the proportion of the total marketings will remain at about 20 per cent. It will be of great interest to see how this proportion changes, if at all, if the major North Dakota railroads participate in the Ex Parte 256 rate increases.<sup>8</sup>

### Source of Data

Data for this report were obtained from a mail survey of all known elevator firms in North Dakota. Seven hundred and seventy-three questionnaires were mailed. Two hundred and thirty-seven usable questionnaires were returned. This represents 30.7 per cent of the total mailed. The estimates in this report are based on the usable returned questionnaires.

The elevators were asked to furnish information for the period of October 1, 1965 through September 30, 1966. They also were asked to break the data into two periods; October 1, 1965 through May 31, 1966 and June 1, 1966 through September 30, 1966. Each elevator reporting furnished information concerning the amount of grains purchased from farmers or from the Commodity Credit Corporation (CCC). They were also asked to report how this grain was disposed of, i.e., retailed back to farmers, shipped by rail, or shipped by truck or sold to truckers. In addition to reporting the amount shipped by truck, they were asked to report how much was moved out of state and the respective destinations.

### Analysis Procedure

To provide areas of production with similar characteristics, the nine crop reporting districts (CRD) of the State were used for stratification purposes. The nine CRD's, the number of questionnaires mailed and the usable number returned for 1956-57, 1957-58, 1958-59, 1963-64, and 1965-66 are shown in Figure 1.

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<sup>6</sup>Taylor, Fred R. and David C. Nelson, Truck Shipments of Grain By North Dakota Elevators, 1956-57, Agricultural Economics Report No. 14, Department of Agricultural Economics, North Dakota Agricultural Experiment Station, Fargo, North Dakota, May, 1959.

<sup>7</sup>Nelson, Trends . . ., op. cit., p. 10.

<sup>8</sup>The author has estimated that the annual costs of shipping grain by rail from North Dakota origins will increase by about \$3 million when the Ex Parte 256 increases are put into effect.

The number of elevators in each CRD was grouped into classes according to licensed storage capacity. In each case, ratio estimators were developed to expand the sample data to represent the total population. The ratios are merely the number of questionnaires mailed divided by the usable number returned for each capacity class (Table 1). This method assumes that those elevators within each capacity class behave similarly.

The data were expanded into estimated totals for each CRD and aggregated to represent state totals. The data also were broken down into the two periods (October 1, 1965 to May 31, 1966 and June 1, 1966 to September 31, 1966) to determine the degree of difference between the periods concerning the percentage hauled by motor carrier versus rail.

Comparison of Volume Produced and Estimated  
Volume Purchased By Elevators

North Dakota farmers produced a total of 424,072,000 bushels of grain in 1965.<sup>9</sup> It was estimated that about 315,561,000 bushels were purchased by elevators; about 74 per cent of the total produced. The remaining were either fed to livestock, retained for seed, sold to other farmers, stored on the farm for future sale, or sold directly from the farm (Table 2).

ESTIMATED GRAIN PURCHASED AND TRUCKED

All Grains

North Dakota elevators purchased an estimated 317,222,381 bushels of grain during the period of October 1, 1965 through September 30, 1966.<sup>10</sup> During this period an estimated 62,426,400 bushels were shipped by truck to the first destination from the elevators. This figure represents 19.7 per cent of the total purchased, which is slightly less than the 21 per cent in 1963-64. On the other hand, it exceeds the total 1963-64 volume of 51,651,000 bushels by nearly 11,000,000 bushels. The 1965-66 volume is approximately 6.7 times larger than the 1956-57 volume and more than double the 1958-59 volume. Consequently, the North Dakota trucking industry is expanding its tonnage absolutely but holding constant as to its share of the market.

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<sup>9</sup>North Dakota Crop and Livestock Statistics, 1966, Agricultural Statistics No. 17, Statistical Reporting Service, USDA and Department of Agricultural Economics, North Dakota State University, Fargo, North Dakota, May, 1967.

<sup>10</sup>This figure differs slightly from the total of the purchased figures in Table 2. The difference represents other grains, such as millet, sunflower seeds, etc., which do not appear in Table 2.

TABLE 1. NUMBER OF QUESTIONNAIRES MAILED, BY CAPACITY SIZE, NUMBER RETURNED AND RATIO ESTIMATORS, BY CROP REPORTING DISTRICT, 1965-66<sup>a</sup>

Volume (000 Bu.)	Crop Reporting Districts								
	1	2	3	4	5	6	7	8	9
	NM/NR=RE	NM/NR=RE	NM/NR=RE	NM/NR=RE	NM/NR=RE	NM/NR=RE	NM/NR=RE	NM/NR=RE	NM/NR=RE
0 - 199	105/21= 5.00	79/24= 3.29	113/36= 3.14	42/15= 2.80	50/19= 2.63	64/16= 4.00	30/8= 3.75	41/13= 3.15	74/22= 3.36
200 - 399	15/4= 3.75	18/5= 3.60	27/6= 4.50	8/2= 4.00	15/6= 2.50	23/10= 2.30	12/3= 4.00	11/1= 11.00	19/7= 2.71
400 - 599	1/1= 1.00	0/0= 0.00	1/1= 1.00	3/3= 1.00	2/2= 1.00	8/6= 1.33	1/1= 1.00	0/0= 0.00	0/0= 0.00
600 - α	3/2= 1.50	0/0= 0.00	0/0= 0.00	0/0= 0.00	1/1= 1.00	3/1= 3.00	4/1= 4.00	0/0= 0.00	0/0= 0.00

NM = Number of questionnaires mailed.  
 NR = Number of usable questionnaires returned.  
 RE = Ratio estimators.

<sup>a</sup>Ratio estimators for the 1956-57, 1957-58, 1958-59, and 1963-64 periods can be obtained from previous reports in this series.

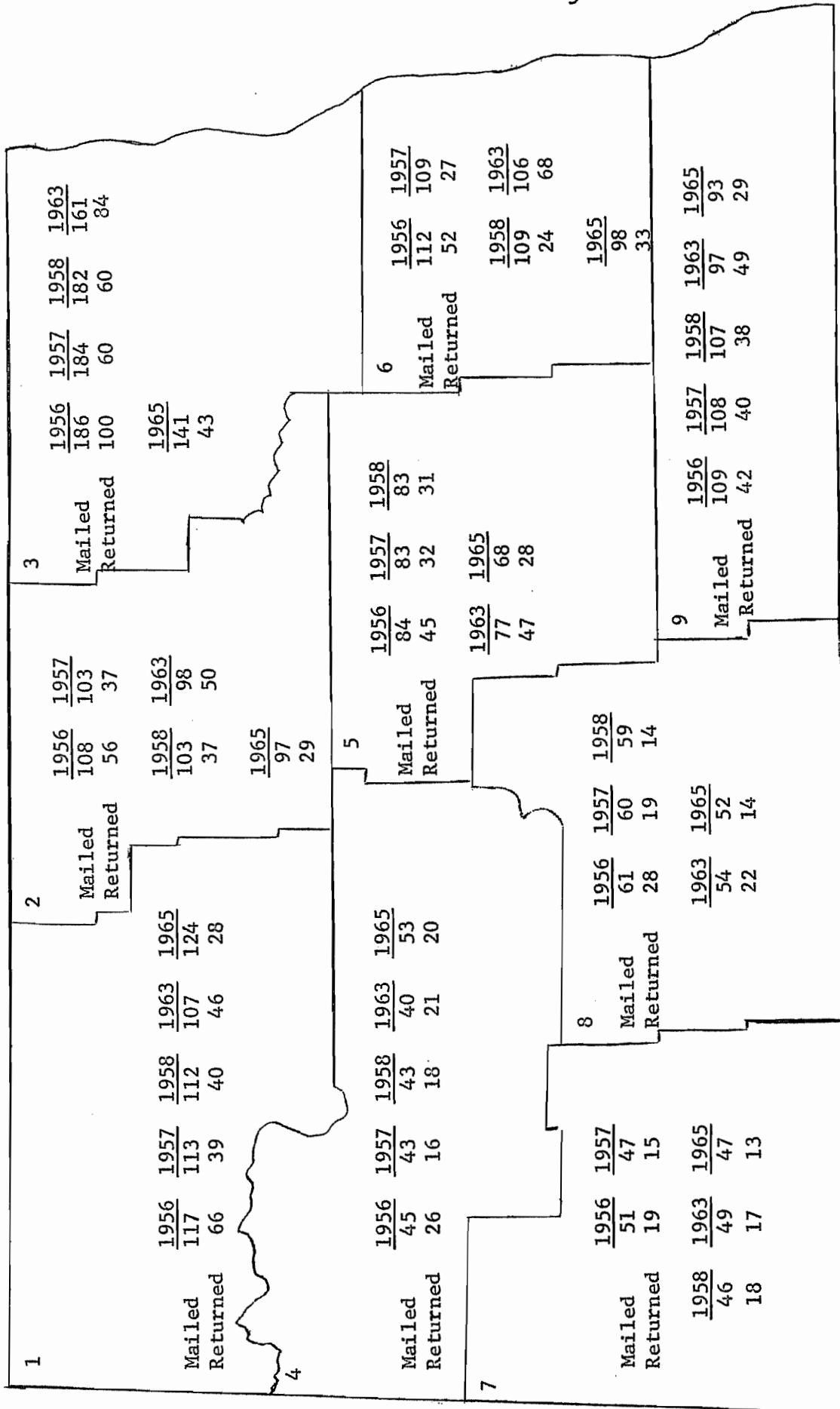


FIGURE 1. NORTH DAKOTA CROP REPORTING DISTRICTS, NUMBER OF QUESTIONNAIRES MAILED AND NUMBER OF USABLE QUESTIONNAIRES RETURNED.

	1956	1957	1958	1963	1965
Number Mailed	873	850	844	789	773
Number Returned	434	285	280	404	237
Per Cent	50	34	33	51	31

TABLE 2. GRAIN PRODUCED, ESTIMATED ELEVATOR PURCHASES AND GRAIN NOT SOLD, 1956-65

	Wheat	Barley	Oats	Corn	Flax	Rye	Soy-beans
	(000 Bu.)						
<b>Produced</b>							
1956	118,824	74,952	48,878	31,872	26,672	3,768	2,301
1957	119,227	76,956	60,125	35,192	15,282	4,248	3,312
1958	147,372	109,704	75,738	25,479	20,576	6,549	3,710
1963	150,842	90,950	86,817	5,700	13,440	10,479	2,688
1965	177,915	97,760	106,038	7,252	19,560	12,138	4,009
<b>Purchased</b>							
1956	104,267	47,625	16,973	2,551	17,297	2,862	1,453
1957	104,228	54,950	16,153	1,046	14,358	2,666	2,044
1958	99,042	58,765	19,211	1,996	14,698	3,022	1,226
1963	108,590	83,875	27,010	3,454	12,778	7,354	1,942
1965	153,220	87,003	47,045	1,943	15,014	7,048	4,287
<b>Not Sold</b>							
1956	14,557	27,327	30,905	29,291	9,375	906	848
1957	14,999	22,006	43,972	34,146	924	1,582	1,268
1958	48,330	50,939	56,527	23,483	5,878	3,527	2,484
1963	42,252	7,075	59,807	2,246	662	3,125	746
1965	24,695	10,757	58,993	5,309	4,546	5,090	278

Sources of Trucked Grain

As in past analyses, there appear to be trends in the pattern of changes in the origin of trucked grain (Table 3). Three changes appear important: (1) Truck shipments from CRD 6 ranked first in terms of proportion of total shipments, (2) CRD 1 slipped from the first position in 1958-59 and 1963-64 to sixth in 1965-66, and (3) CRD 2 moved into third position, which represents a continuing gradual climb toward being one of the major area sources for trucked grain. Of further importance, CRD 3 again ranked high as a major source of trucked grain. In total, this means that the north central, northeast, and east central areas of the state apparently provide the most lucrative sources of business for agricultural motor carriers hauling grain. Slightly over one-third of the total 1965-66 truck movement originated in these adjacent areas.

As occurred in the 1963-64 movement where the bulk of the total shipped by truck originated in six CRD's, the balance in the percentages representing each CRD in 1965-66 was high. About 85 per cent of the total 1965-66 movement originated in six CRD's (6,3,2,7,9, and 1). About 55 per cent originated in three CRD's (6,3, and 2).

TABLE 3. CROP REPORTING DISTRICTS RANKED BY PERCENTAGE OF TOTAL GRAINS TRUCKED, NORTH DAKOTA, SPECIFIED CROP YEARS

Rank Position	Crop Reporting Districts and Per Cent Trucked				
	<u>1956 - 57</u> CRD %	<u>1957 - 58</u> CRD %	<u>1958 - 59</u> CRD %	<u>1963 - 64</u> CRD %	<u>1965 - 66</u> CRD %
1	9 24.3	6 24.0	1 43.4	1 20.7	6 20.1
2	6 22.3	1 20.7	6 21.4	3 14.9	3 18.9
3	3 14.4	3 14.1	9 11.8	6 14.1	2 15.7
4	7 9.5	9 13.9	3 8.9	7 13.7	7 11.3
5	1 9.2	7 8.5	8 4.4	2 13.1	9 9.8
6	8 7.1	5 8.4	7 3.8	9 10.2	1 8.9
7	5 5.7	4 4.9	5 3.2	5 5.5	8 6.6
8	4 4.9	8 3.8	2 1.9	8 4.6	5 5.0
9	2 <u>2.6</u>	2 <u>1.7</u>	4 <u>1.2</u>	4 <u>3.2</u>	4 <u>3.7</u>
TOTAL	100.0	100.0	100.0	100.0	100.0

Although relative positions of the several CRD's provide insight into the supply areas for trucked grain, the absolute volumes supplied by each area are of further interest (Table 4).

TABLE 4. VOLUME OF GRAIN SHIPPED BY TRUCK BY CROP REPORTING DISTRICTS, NORTH DAKOTA, SPECIFIED CROP YEARS

CRD	Year				
	1956-57	1957-58	1958-59	1963-64	1965-66
	(000 Bu.)				
1	870	2,928	12,090	10,694	5,555
2	244	239	521	6,749	9,813
3	1,339	1,992	2,478	7,684	11,801
4	459	686	338	1,671	2,320
5	531	1,179	901	2,858	3,133
6	2,074	3,394	5,972	7,284	12,567
7	884	1,205	1,064	7,080	7,030
8	665	535	1,230	2,358	4,112
9	<u>2,268</u>	<u>1,968</u>	<u>3,279</u>	<u>5,273</u>	<u>6,096</u>
TOTAL	9,324	14,126	27,873	51,651	62,427

The trucking industry experienced an increase in the volume of grain handled since 1963-64 by nearly 11 million bushels. Increases in the volume shipped by truck occurred in all CRD's except the northwest district, CRD 1 where a trend in reduction continued since the 1958-59 analysis. The largest increase occurred in CRD 6, which appears as a consistent trend since the 1956-57 analysis. Over 5.2 million more bushels of grain originated in CRD 6 in 1965-66 than in 1963-64. The next largest increase occurred in CRD 3 where over 4 million more bushels were shipped by truck in 1965-66 than in 1963-64. The increase in CRD 2 over this period amounted to just over 3 million bushels. Well over half of the total volume of trucked grain from North Dakota originated in these CRD's.

Additional information on the relative importance of motor truck transportation in the various districts is available from comparing the relative change in the ratio of grains purchased to grains shipped by truck (Table 5).

The largest increase in proportion of total purchases shipped by truck has occurred in CRD 2. Only one per cent of the purchases was shipped by truck in 1956-57 while 28 per cent moved by this method in 1965-66. In terms of the rank which indicates the proportion of grain shipped by truck, districts 7 and 8 have been the leaders over the past few years. Elevator operators in these two areas ship about one-third of purchases of all grains by motor carrier. The greatest increase from 1963-64 through 1965-66 occurred in CRD 2. About 16 per cent of the 1963-64 purchases was shipped by truck while 28 per cent of the 1965-66 purchases was moved by this transportation mode. A large increase also

TABLE 5. CHANGE IN TOTAL VOLUME SHIPPED BY MOTOR CARRIER AND CHANGE IN PROPORTION OF TOTAL CROP PURCHASED BY NORTH DAKOTA CROP REPORTING DISTRICTS, 1956-57, 1963-64, AND 1965-66

CRD	Volume Purchased (000 Bu.)	Volume Trucked (000 Bu.)	Per Cent of Purchased Trucked	Rank
1				
1956-57	32,066	870	3	8
1963-64	44,490	10,694	24	3
1965-66	50,416	5,555	11	9
2				
1956-57	20,669	244	1	9
1963-64	24,753	6,749	16	6
1965-66	35,575	9,813	28	3
3				
1956-57	43,603	1,339	3	6
1963-64	53,567	7,684	14	9
1965-66	70,378	11,801	17	6
4				
1956-57	10,272	459	5	5
1963-64	11,160	1,671	15	7
1965-66	14,564	2,320	16	7
5				
1956-57	17,714	530	3	7
1963-64	20,071	2,853	14	8
1965-66	23,353	3,133	13	8
6				
1956-57	28,044	2,074	6	4
1963-64	42,989	7,284	17	5
1965-66	53,107	12,567	24	4
7				
1956-57	12,258	884	7	2
1963-64	17,962	7,080	39	1
1965-66	20,869	7,030	34	1
8				
1956-57	9,522	665	7	3
1963-64	7,138	2,358	33	2
1965-66	12,952	4,111	32	2



TABLE 5. CHANGE IN TOTAL VOLUME SHIPPED BY MOTOR CARRIER AND CHANGE IN PROPORTION OF TOTAL CROP PURCHASED BY NORTH DAKOTA CROP REPORTING DISTRICTS, 1956-57, 1963-64, AND 1965-66 (CONTINUED)

CRD	Volume Purchased (000 Bu.)	Volume Trucked (000 Bu.)	Per Cent of Purchased Trucked	Rank
9				
1956-57	21,522	2,268	9	1
1963-64	24,062	5,273	22	4
1965-66	36,007	6,096	17	5
State				
1956-57	195,670	9,324	5	--
1963-64	246,192	51,651	21	--
1965-66	317,222	62,427	20	--

occurred in CRD 6 where the respective ratios were 17 and 24 per cent, respectively, 1963-64 through 1965-66. The largest decrease occurred in CRD 1 from 24 to 11 per cent. A decrease also occurred in CRD 9, from 22 to 17 per cent.

#### Destinations

Over the period 1956-57 through 1965-66, the major proportion of grain shipped by motor carrier has gone to destinations outside of the state borders. In each year studied, the out-of-state moved has exceeded 88 per cent of the total moved. About 90.2 per cent of the 1965-66 total truck shipments went to destinations outside North Dakota boundaries.

Previous to the 1963-64 analysis, about half of the out-of-state destined trucked grain went to Minneapolis-St. Paul. Analysis of the 1963-64 movement indicated that slightly less than 30 per cent went to the Twin Cities, while slightly over 47 per cent went to Duluth-Superior. This trend appears to be continuing (Table 6). The Duluth-Superior market is becoming increasingly attractive to trucked grain relative to the Minneapolis-St. Paul market.

For the state as a whole, the volume of all grains destined to Minneapolis-St. Paul has declined to about one-fourth of the total shipped. On the other hand, the Duluth-Superior market received nearly one-half of all grain trucked by North Dakota elevators in 1965-66. This relationship is nearly the reverse of the relationship of the two markets in 1957-58 when about 18 per cent went to Duluth-Superior and about 44 per cent went to

TABLE 6. MAJOR DESTINATIONS OF ALL GRAINS SHIPPED OUT OF STATE FROM THE CROP REPORTING DISTRICTS, NORTH DAKOTA, SPECIFIED CROP YEARS<sup>a</sup>

CRD	Destination	Year			
		1957-58	1958-59	1963-64	1965-66
		Per Cent			
1	Minneapolis-St. Paul	59	65	32	30
	Duluth-Superior	8	18	40	44
	Midland & Southwestern	11	12	10	13
2	Minneapolis-St. Paul	3	46	16	35
	Duluth-Superior	8	40	77	44
	Midland & Southwestern	5	--	3	11
3	Minneapolis-St. Paul	30	20	14	21
	Duluth-Superior	45	57	75	70
	Midland & Southwestern	--	2	1	--
4	Minneapolis-St. Paul	85	77	8	20
	Duluth-Superior	--	4	18	18
	Midland & Southwestern	6	8	44	21
5	Minneapolis-St. Paul	21	31	46	48
	Duluth-Superior	54	32	43	40
	Midland & Southwestern	21	27	6	8
6	Minneapolis-St. Paul	11	16	44	29
	Duluth-Superior	14	25	41	57
	Midland & Southwestern	3	3	1	6
7	Minneapolis-St. Paul	62	88	37	21
	Duluth-Superior	4	6	31	39
	Midland & Southwestern	18	--	27	22
8	Minneapolis-St. Paul	35	73	38	2
	Duluth-Superior	39	26	43	74
	Midland & Southwestern	21	--	12	5
9	Minneapolis-St. Paul	64	28	32	21
	Duluth-Superior	3	20	26	10
	Midland & Southwestern	9	13	21	25
State	Minneapolis-St. Paul	44	46	30	26
	Duluth-Superior	18	24	47	48
	Midland & Southwestern	8	9	10	8

<sup>a</sup> Figures represent per cent of all grain shipped rather than per cent of grain shipped out-of-state.

Minneapolis-St. Paul. The pattern of shipments to the midland and southwestern states remains about constant at 8-10 per cent of the total trucked.<sup>11</sup>

Commodities

The general trend in shipping grain by truck from North Dakota seems to be leveling off. The greatest increase in terms of the motor carrier's share of the market was between 1956-57 and 1963-64, from 4.8 per cent to 21 per cent.<sup>12</sup> The 1965-66 truck movement represented 19.7 per cent of the total purchased (Table 7).

TABLE 7. PER CENT OF EACH SPECIFIC COMMODITY PURCHASED SHIPPED BY TRUCK, NORTH DAKOTA, SPECIFIED CROP YEARS

Commodity	Crop Year				
	1956-57	1957-58	1958-59	1963-64	1965-66
Per Cent					
Wheat	3.0	6.4	15.0	17.3	12.4
Oats	13.0	12.5	24.6	34.2	34.8
Flax	5.0	10.6	21.0	42.0	39.5
Barley	1.0	2.6	2.7	14.6	18.9
Soybeans	50.0	63.0	68.2	60.1	38.2
Corn	24.0	19.2	42.9	33.0	11.7
Rye	2.0	.8	3.0	43.4	38.3
Other Grains	11.0	74.3	85.9	41.5	6.6
All Grains	4.8	7.2	13.9	21.0	19.7

<sup>11</sup>Midland states are generally Nebraska, Kansas, Iowa, and Missouri. Southwestern states are generally Wyoming, Colorado, Oklahoma, and Texas. South Dakota is included in the aggregate of the two groups.

<sup>12</sup>Share of the market refers to the motor carrier's share of the total volume of grain purchased by elevators which was shipped by either rail or truck. Since not all the grain purchased is actually shipped during the period of time used in this study, the ratio does not exactly indicate the percentage the trucking industry has of that amount that was shipped only. However, the percentages are generally about the same.

Even though the percentages of total grain purchased shipped by truck are down slightly from the 1963-64 distribution analysis, the total volume moved by truck increased. This is also true of most commodities with the important exception being barley (Table 8). Total volume trucked increased nearly 11 million bushels. The increase in the volume of oats and barley moved by truck accounted for almost all of the net change. The volume of wheat trucked increased slightly (200,000 bushels); flax increased slightly (400,000 bushels); soybeans increased slightly (400,000 bushels); and rye decreased slightly (500,000 bushels). In periods of high grain production it is logical that the trucking industry would not increase its share of the total market while at the same time experiencing large increases in total volume trucked. This simply means that during good crop years, the supply of motor vehicles is insufficient to satisfy the historic ratio of rail to truck shipments elevator management has established.

TABLE 8. TOTAL BUSHELS OF SPECIFIC COMMODITIES SHIPPED BY TRUCK, NORTH DAKOTA, SPECIFIED CROP YEARS

Commodity	Crop Year				
	1956-57	1957-58	1958-59	1963-64	1965-66
	Per Cent				
Wheat	3.6	6.7	14.9	18.8	19.0
Oats	2.6	2.0	4.7	9.2	16.4
Flax	.9	1.5	3.2	5.4	5.9
Barley	.5	1.4	1.6	12.2	16.4
Soybeans	.7	1.3	.8	1.2	1.6
Corn	.6	.2	.9	1.1	.2
Rye	.06	.02	.09	3.2	2.7
Other Grain	.3	1.0	1.7	.5	.1
All Grains	9.3	14.1	27.9	51.6	62.4

Comparison of Two Periods of the Year

Elevator managers were asked to provide the data for two periods of the 1965-66 marketing year: October 1, 1965 through May 31, 1966 and June 1, 1966 through September 31, 1966. These periods were selected because they represent two situations which occur in North Dakota: (1) The first period (October 1, 1965 through May 31, 1966) represented a period of severe continued

TABLE 9. COMPARISON OF THE PROPORTION OF GRAIN SHIPPED BY TRUCK FROM NORTH DAKOTA FOR THE PERIODS, OCTOBER 1, 1965 THROUGH MAY 31, 1966, AND JUNE 1, 1966 THROUGH SEPTEMBER 30, 1966<sup>a</sup>

CRD	Commodity									Total
	Wheat	Oats	Flax	Barley	Soybeans	Corn	Rye	Other		
Per Cent										
1										
10-1-65 to 5-31-66	9	57	71	6	--	--	31	--		14
6-1-66 to 9-30-66	6	37	66	2	--	--	13	--		9
2										
10-1-65 to 5-31-66	21	62	77	28	--	--	76	--		31
6-1-66 to 9-30-66	27	58	91	16	100	--	85	--		36
3										
10-1-65 to 5-31-66	6	25	45	27	--	--	37	--		18
6-1-66 to 9-30-66	9	39	39	26	--	--	41	--		20
4										
10-1-65 to 5-31-66	11	45	48	32	--	--	2	--		17
6-1-66 to 9-30-66	15	59	61	14	--	--	7	--		21
5										
10-1-65 to 5-31-66	8	31	52	4	--	--	25	--		14
6-1-66 to 9-30-66	8	20	48	7	--	--	40	--		14
6										
10-1-65 to 5-31-66	7	45	51	19	62	--	64	22		23
6-1-66 to 9-30-66	7	45	34	38	59	100	37	5		32
7										
10-1-65 to 5-31-66	23	97	71	94	--	--	69	--		33
6-1-66 to 9-30-66	29	95	63	97	--	--	59	--		41
8										
10-1-65 to 5-31-66	38	26	8	26	--	--	44	--		35
6-1-66 to 9-30-66	43	41	23	41	--	--	91	--		42
9										
10-1-65 to 5-31-66	12	37	32	12	19	71	23	26		23
6-1-66 to 9-30-66	4	23	32	4	28	67	28	69		15
State										
10-1-65 to 5-31-66	13	43	47	21	42	40	38	23		22
6-1-66 to 9-30-66	15	39	50	22	48	27	46	30		23

<sup>a</sup>Figures represent the proportion of grain transported by motor carrier versus the proportion hauled by rail. All other truck percentages in this report represent the per cent of total purchases shipped by truck, which in most cases will be lower than the figures contained in this Table.

boxcar shortages, while the second period (June 1, 1966 through September 31, 1966) represented a period when the Interstate Commerce Commission exclusion orders were in effect.<sup>13</sup> (2) The two periods are roughly the same as the periods when the so-called railroad seasonal and nonseasonal rates are in effect. It was felt that a comparison of the two periods concerning the degree to which trucks were used would be useful information to the grain trade as well as the carriers (Table 9).

In the aggregate there appears to be a nonsignificant difference between the two time periods. The trucking industry's share of the market appears neither greater nor lesser comparing the two sets of figures. Two general conclusions can be made from this data: (1) in the aggregate, the North Dakota country elevator industry did not shift to motor carriers during the extreme boxcar shortage period of 1965-66; (2) there appears little difference between the high and low rail seasonal rate periods. In other words, the shipper does not appear to be concerned with the relative level of rail rates over time, but rather the relationship between rail and truck rates over time.

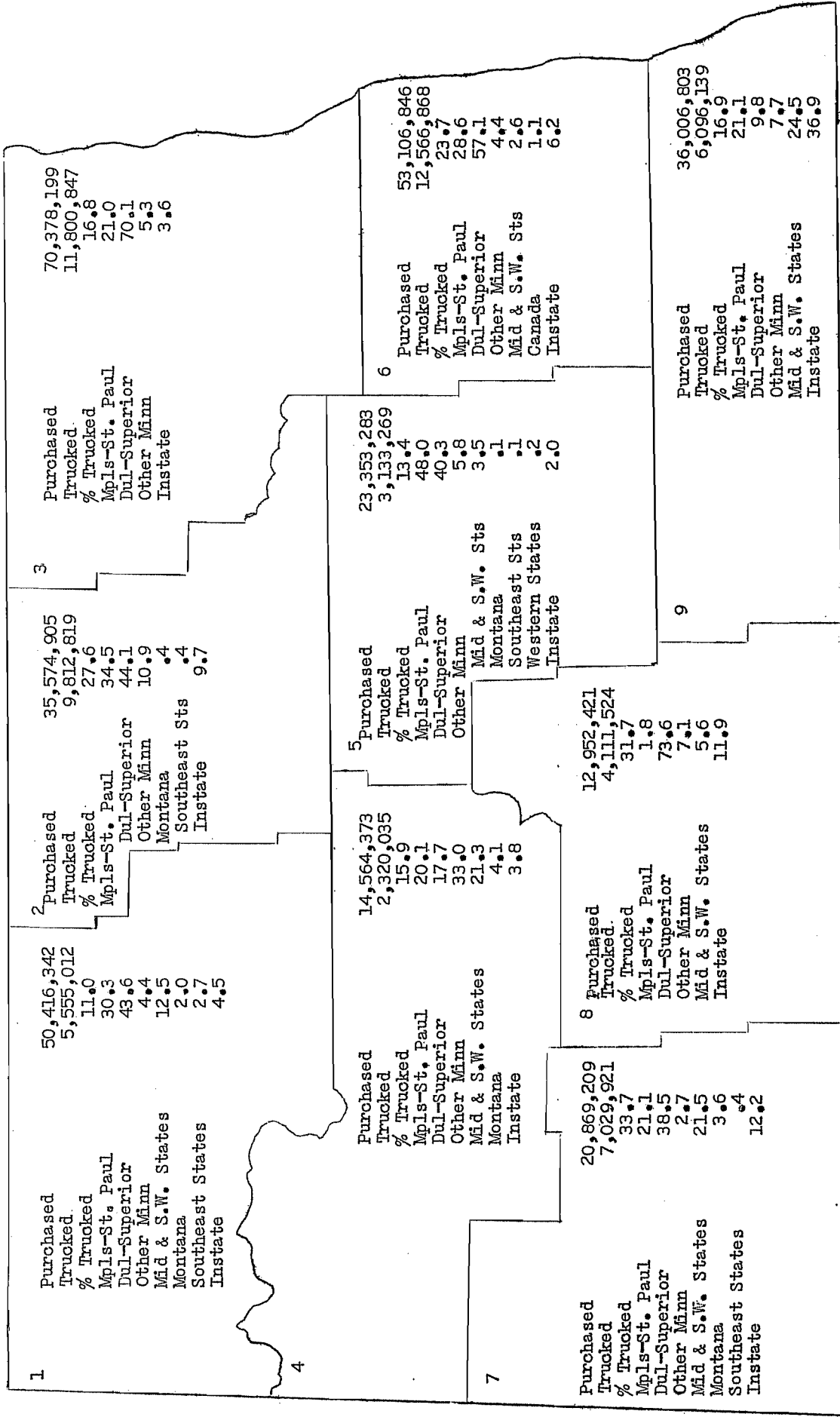
The motor carriers experienced about 22 per cent of the market in the first period and about 23 per cent during the second period. For the state as a whole, there appears roughly the same relationship among specific commodities.

This situation also indicates that grains are generally marketed throughout the year. The volume substantiates this conclusion. Nearly 221 million bushels of grain were shipped by rail from October 1, 1965 through September 30, 1966. About 5.8 per cent of this amount was shipped during the first period while the remainder moved during the second period; that is, the latter one-third of the marketing period. About 56 per cent of the total volume shipped by truck moved during the first eight-month period and the remainder during June, July, August, and September. The same relationship holds for the total amount shipped (rail and truck); 58 per cent during the first period and the remainder during the second period.

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<sup>13</sup> All railroads were ordered to return boxcars owned by the Great Northern, Northern Pacific, Soo Line, Milwaukee, and Northwestern Railway Companies when emptied.

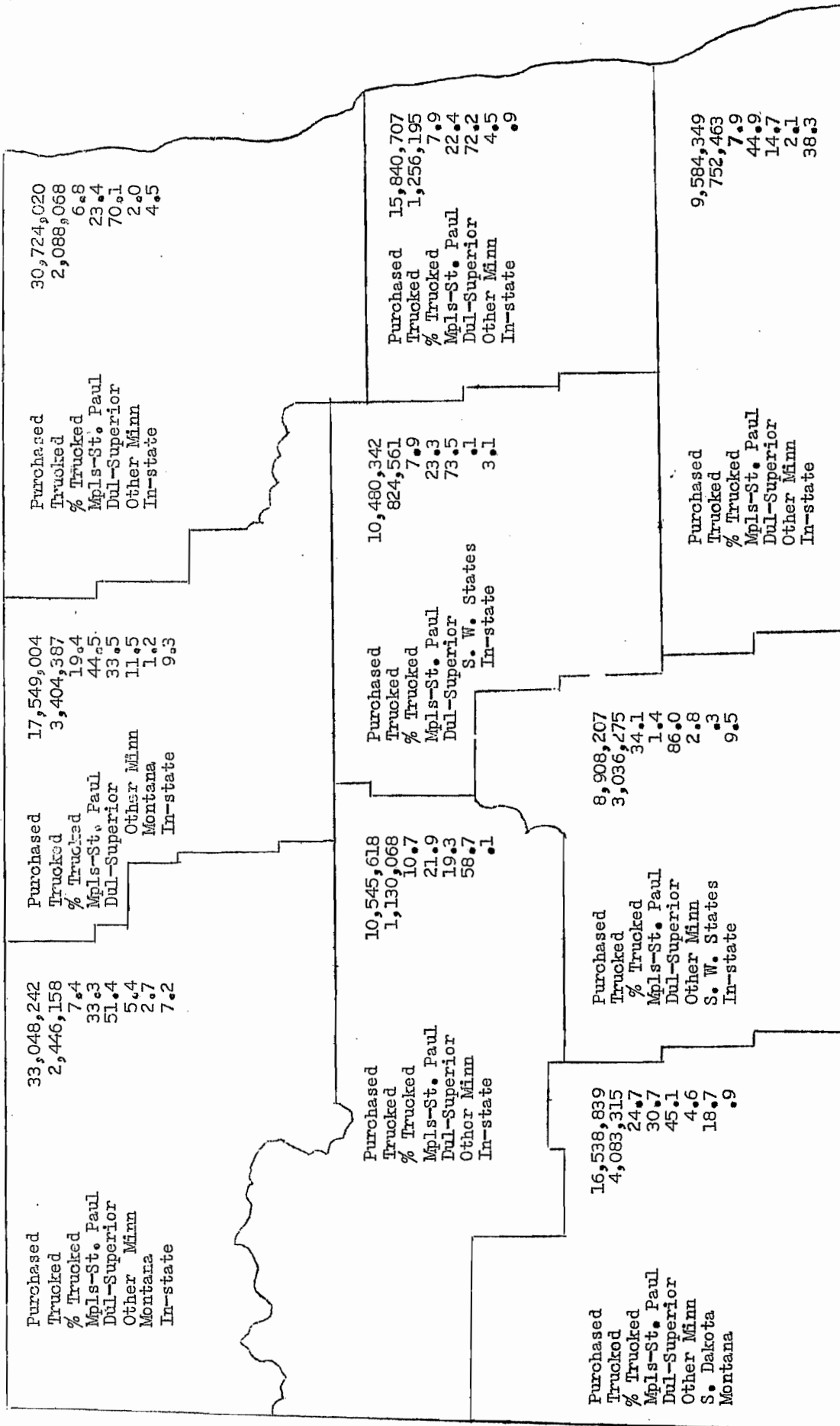
A P P E N D I X



APPENDIX FIGURE 1. ALL GRAINS. TOTAL ALL GRAINS PURCHASED, PER CENT TRUCKED, AND DESTINATIONS BY CROP REPORTING DISTRICTS, NORTH DAKOTA, 1965-66.

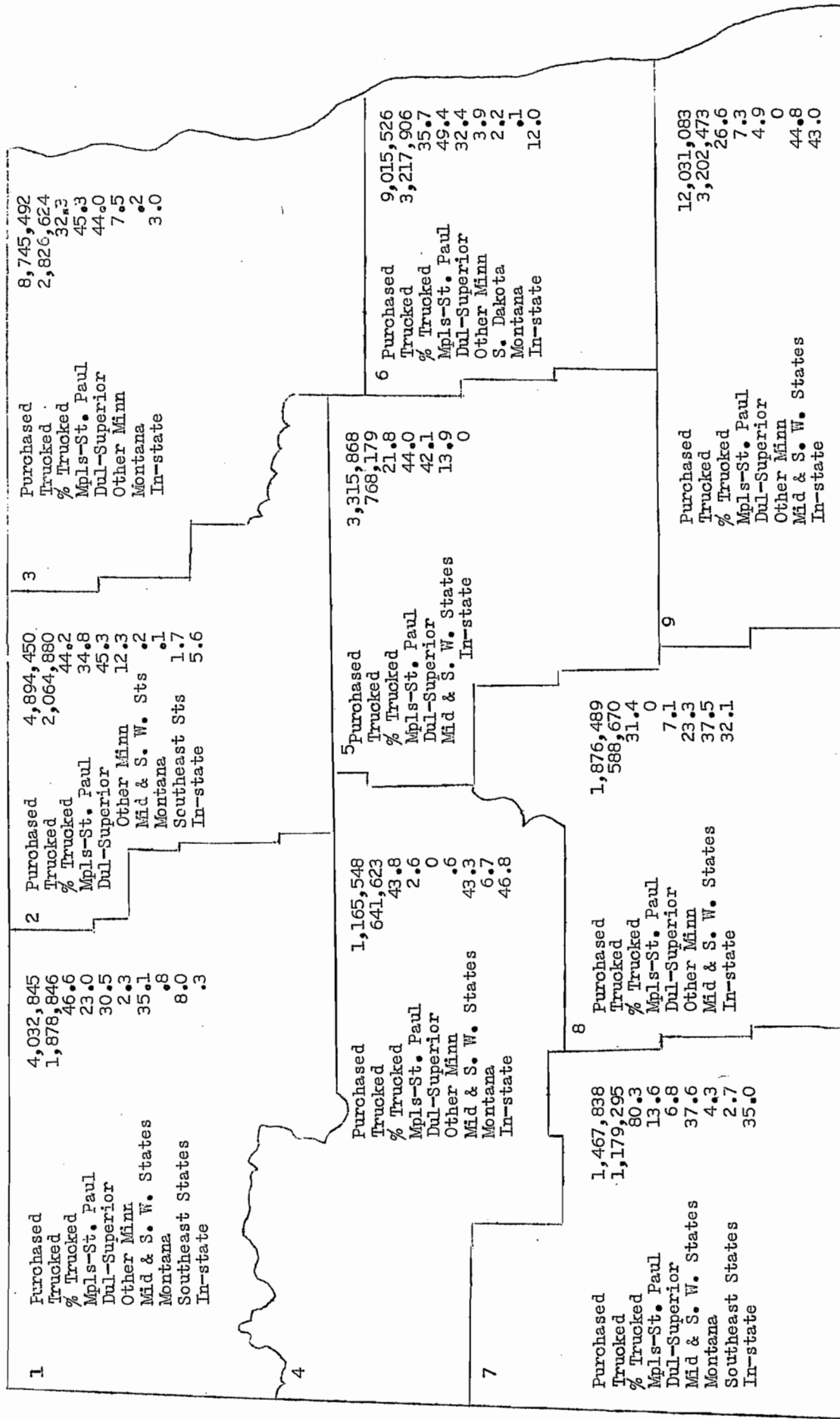
	1956	1957	1958	1963	1965
Purchased (000 Bu)	195,670	196,752	199,957	246,957	317,222
Trucked (000 Bu)	9,324	14,126	27,873	51,651	62,426
% Trucked	4.8	7.2	13.9	21.0	19.7
Mpls-St. Paul	44.3	43.6	46.0	29.8	25.6
Dul-Superior	10.2	18.2	23.9	47.3	48.4
Other Minn	11.9	8.1	46.0	1.3	7.0
Mid & S.W. States	9.6	8.3	8.5	9.9	7.8
Miscellaneous	12.0	9.6	7.0	1.3	1.4
Instate	12.0	12.1	8.6	10.4	9.8





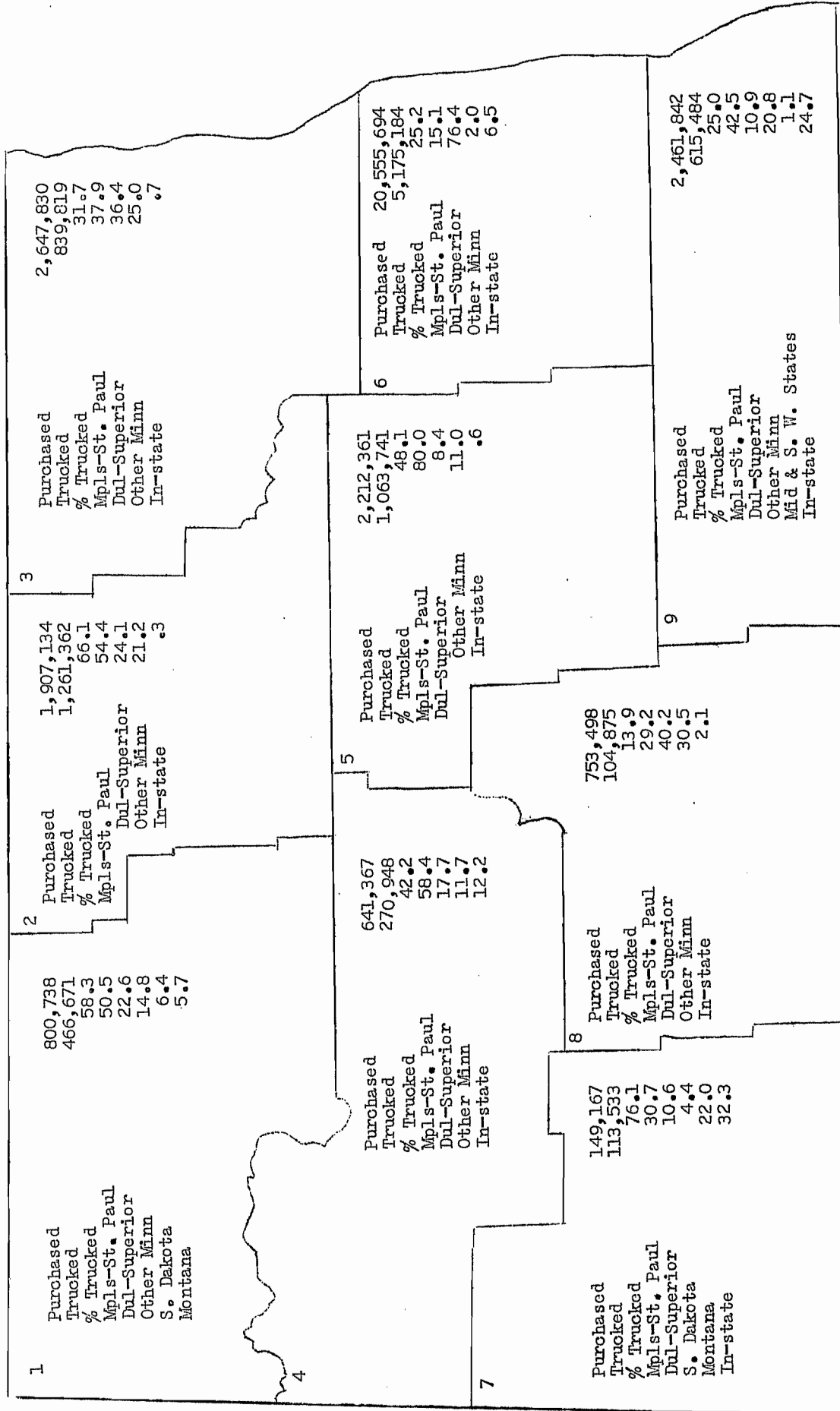
APPENDIX FIGURE 2. WHEAT. TOTAL WHEAT PURCHASED BY COUNTRY ELEVATORS, PER CENT OF PURCHASES TRUCKED, AND DESTINATIONS OF TRUCKED WHEAT BY CROP REPORTING DISTRICTS, NORTH DAKOTA, 1965-66.

Year	Purchased (000 Bu)	Trucked (000 Bu)	% Trucked	Mpls-St. Paul	Dul-Superior	Other Minn	Miscellaneous	In-state
1965	104,228	3,612	3.5	67.2	10.9	11.5	7.8	2.6
1966	104,228	3,612	3.5	67.2	10.9	11.5	7.8	2.6
1967	104,228	3,612	3.5	67.2	10.9	11.5	7.8	2.6
1968	99,042	14,863	15.0	64.2	30.2	1.7	.2	3.7
1965	108,590	18,820	17.3	36.9	59.3	—	—	3.8
1966	153,220	19,021	12.4	27.2	53.4	8.3	4.9	6.2
1967	153,220	19,021	12.4	27.2	53.4	8.3	4.9	6.2
1968	153,220	19,021	12.4	27.2	53.4	8.3	4.9	6.2



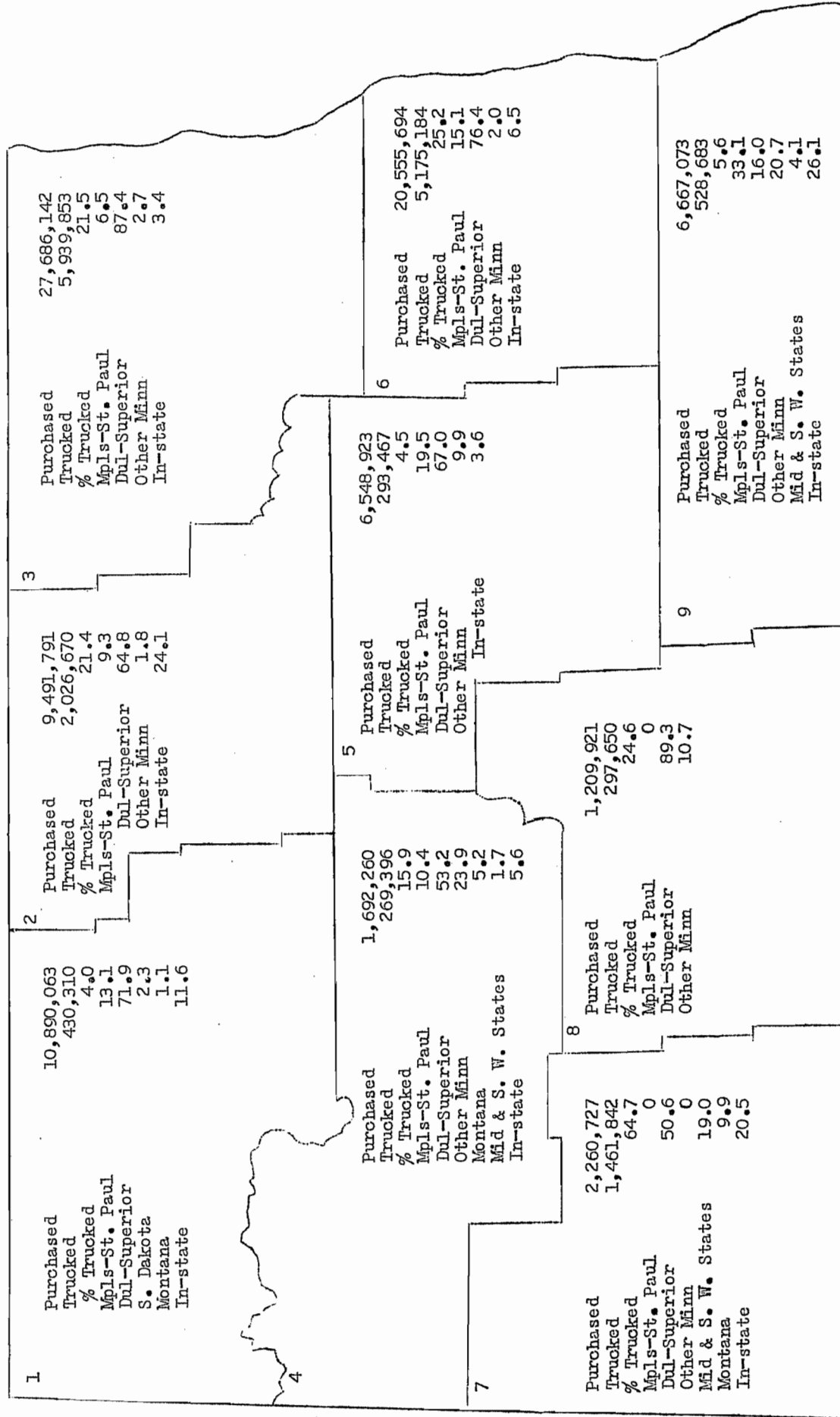
APPENDIX FIGURE 3. OATS. TOTAL OATS PURCHASED BY COUNTY ELEVATORS, PER CENT OF PURCHASES TRUCKED, AND DESTINATIONS OF TRUCKED OATS BY CROP REPORTING DISTRICTS, NORTH DAKOTA, 1965-66.

Year	Purchased (000 Bu)	Trucked (000 Bu)	% Trucked	Mpls-St. Paul	Dul-Superior	Other Minn	Mid & S. W. States	Miscellaneous	In-state
1956	16,973	2,605	15.3	15.4	1.5	11.0	32.4	37.9	1.8
1957	16,153	2,020	12.5	19.4	3.3	2.1	52.0	4.7	18.5
1958	19,211	4,719	24.6	14.2	14.3	13.7	43.1	5.3	9.4
1963	27,010	9,230	34.2	17.6	18.3	2.7	39.3	22.4	2.2
1965	47,045	16,369	34.8	29.2	26.9	4.8	22.4	2.2	14.5



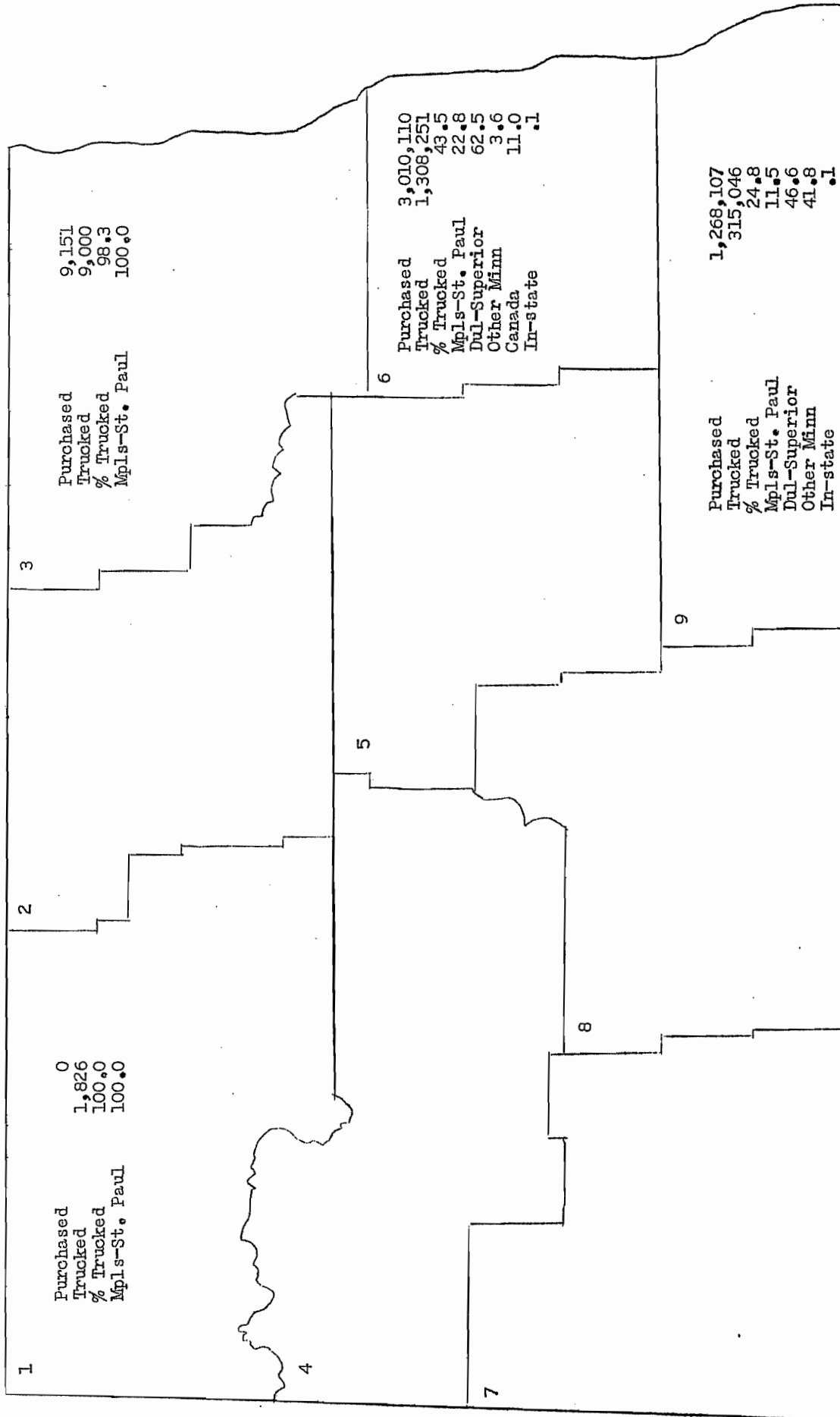
APPENDIX FIGURE 4. FLAX. TOTAL FLAX PURCHASED BY COUNTY ELEVATORS, PER CENT OF PURCHASES TRUCKED, AND DESTINATIONS OF TRUCKED FLAX BY CROP REPORTING DISTRICTS, NORTH DAKOTA, 1965-66.

Year	Purchased (000 Bu)	Trucked (000 Bu)	% Trucked	Mpls-St. Paul (%)	Dul-Superior (%)	Other Minn (%)	Miscellaneous (%)	In-state (%)
1956	17,297	888	5.1	75.3	3.0	15.4	4.5	1.8
1957	14,358	1,516	10.6	65.0	7.0	13.9	8.7	5.4
1958	14,698	3,233	21.0	59.3	30.7	2.4	4.4	3.2
1959	5,364	42.0	39.5	73.9	19.3	1.2	1.7	5.6
1960	5,364	42.0	39.5	73.9	19.3	1.2	1.7	5.6
1961	5,364	42.0	39.5	73.9	19.3	1.2	1.7	5.6
1962	5,364	42.0	39.5	73.9	19.3	1.2	1.7	5.6
1963	5,364	42.0	39.5	73.9	19.3	1.2	1.7	5.6
1964	5,364	42.0	39.5	73.9	19.3	1.2	1.7	5.6
1965	5,364	42.0	39.5	73.9	19.3	1.2	1.7	5.6
1966	5,364	42.0	39.5	73.9	19.3	1.2	1.7	5.6



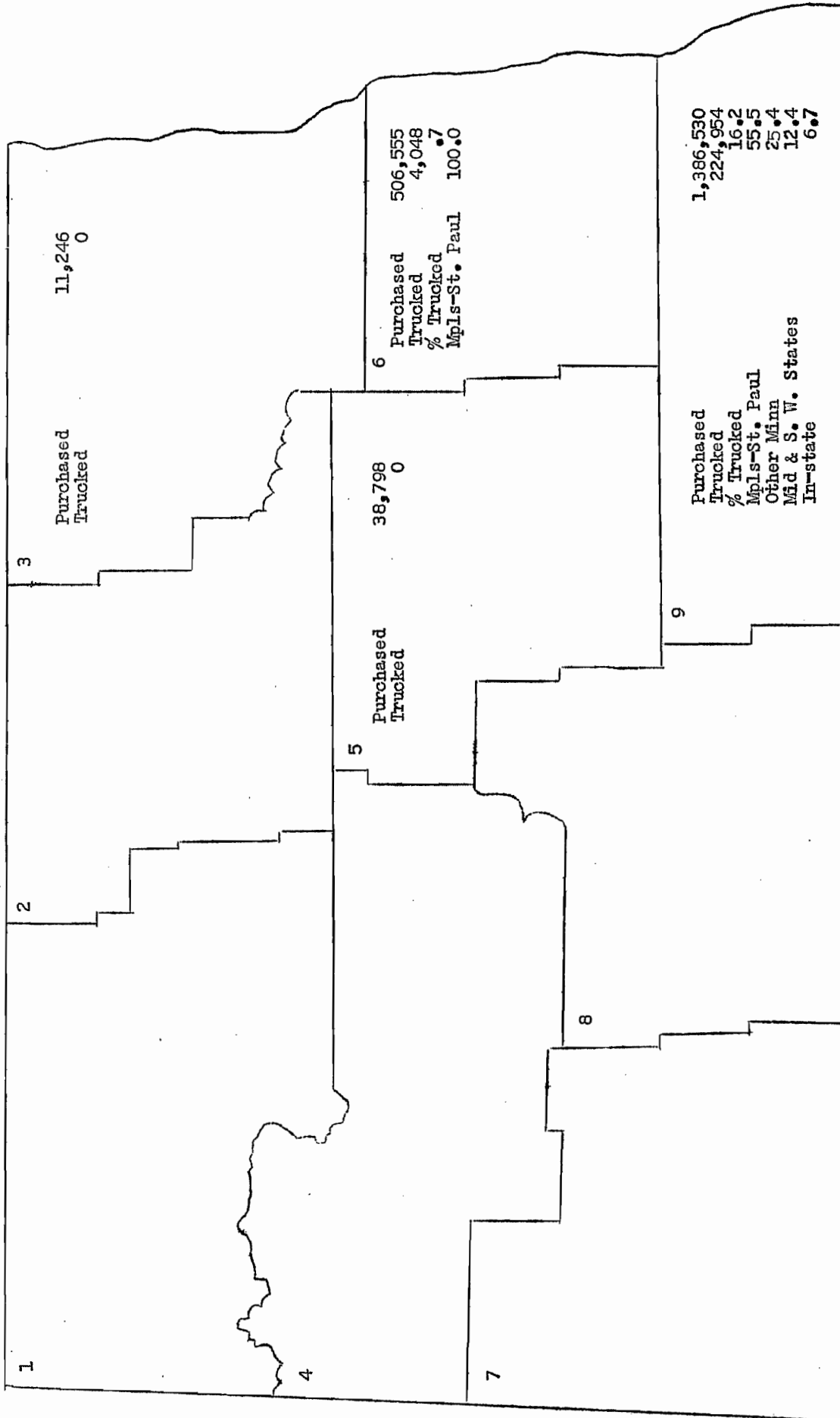
APPENDIX FIGURE 5. BARLEY. TOTAL BARLEY PURCHASED BY COUNTRY ELEVATORS, PER CENT OF PURCHASES TRUCKED, AND DESTINATIONS OF TRUCKED BARLEY BY CROP REPORTING DISTRICTS, NORTH DAKOTA, 1965-66.

	1956	1957	1958	1963	1965
Purchased (000 Bu)	47,625	59,950	58,765	83,875	87,003
Trucked (000 Bu)	518	1,432	1,559	12,245	16,423
% Trucked	1.1	2.6	2.7	14.6	18.9
Mpls-St. Paul	35.3	21.6	31.2	12.4	10.2
Dul-Superior	1.4	53.7	23.1	59.5	74.3
Other Minn	25.8	3.4	16.1	3	3.2
Mid & S. W. States	4.2	5.1	2.7	14.8	1.9
Miscellaneous	3.0	16.2	1.3	.2	1.0
In-state	30.3		25.6	12.8	9.4



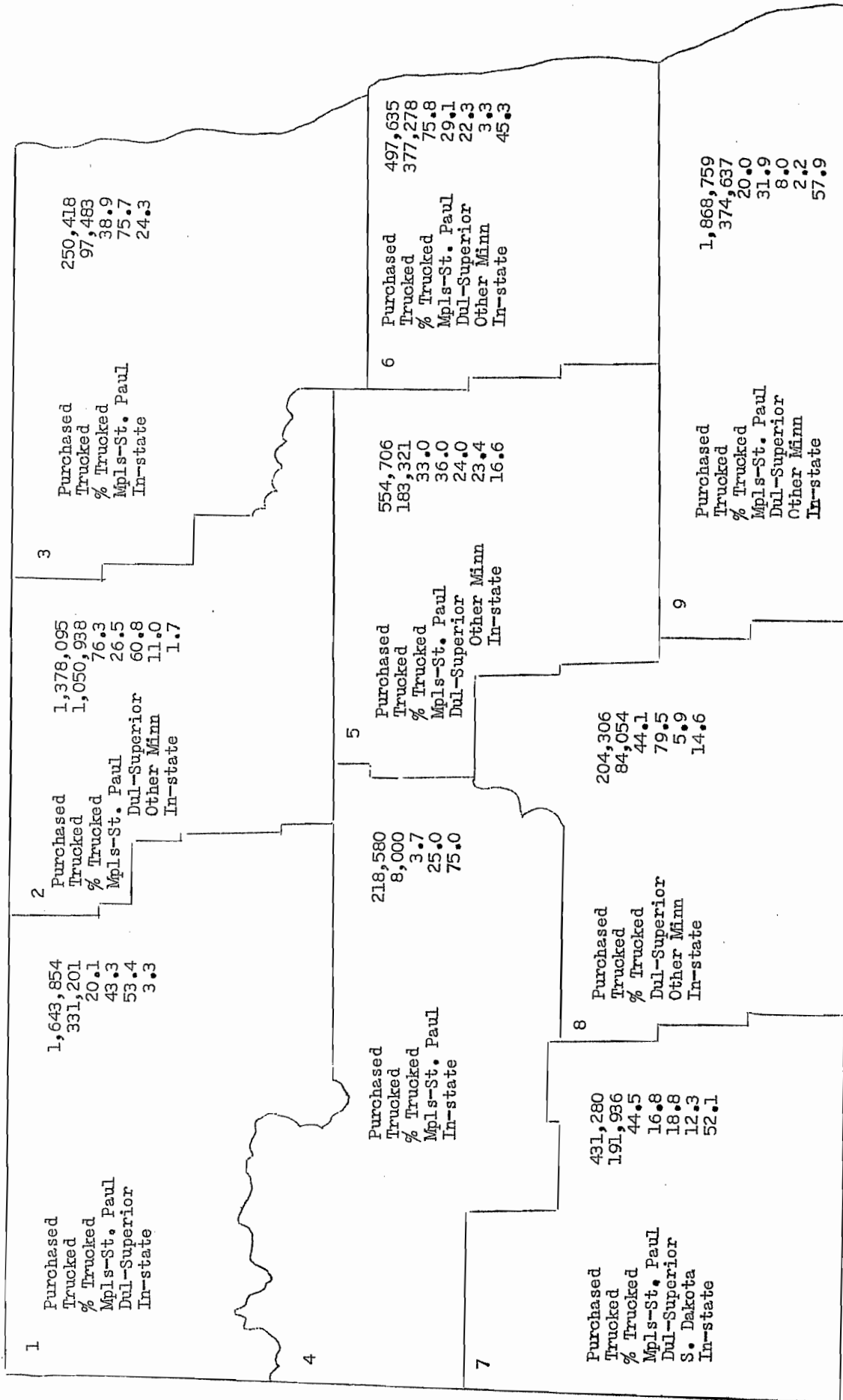
APPENDIX FIGURE 6. SOYBEANS PURCHASED BY COUNTRY ELEVATORS, PER CENT OF PURCHASES TRUCKED, AND DESTINATIONS OF TRUCKED SOYBEANS BY CROP REPORTING DISTRICTS, NORTH DAKOTA, 1965-66.

	1957	1958	1963	1965
Purchased (000 Bu)	2,044	1,226	1,942	4,287
Trucked (000 Bu)	1,288	836	1,167	1,639
% Trucked	63.0	68.2	60.1	38.2
Mpls-St. Paul	34.8	9.9	21.3	21.1
Dul-Superior	.7	—	55.0	58.9
Other Minn	26.7	34.4	4.3	11.2
Canada	13.9	44.4	14.7	8.8
In-state	11.8	11.3	4.7	—



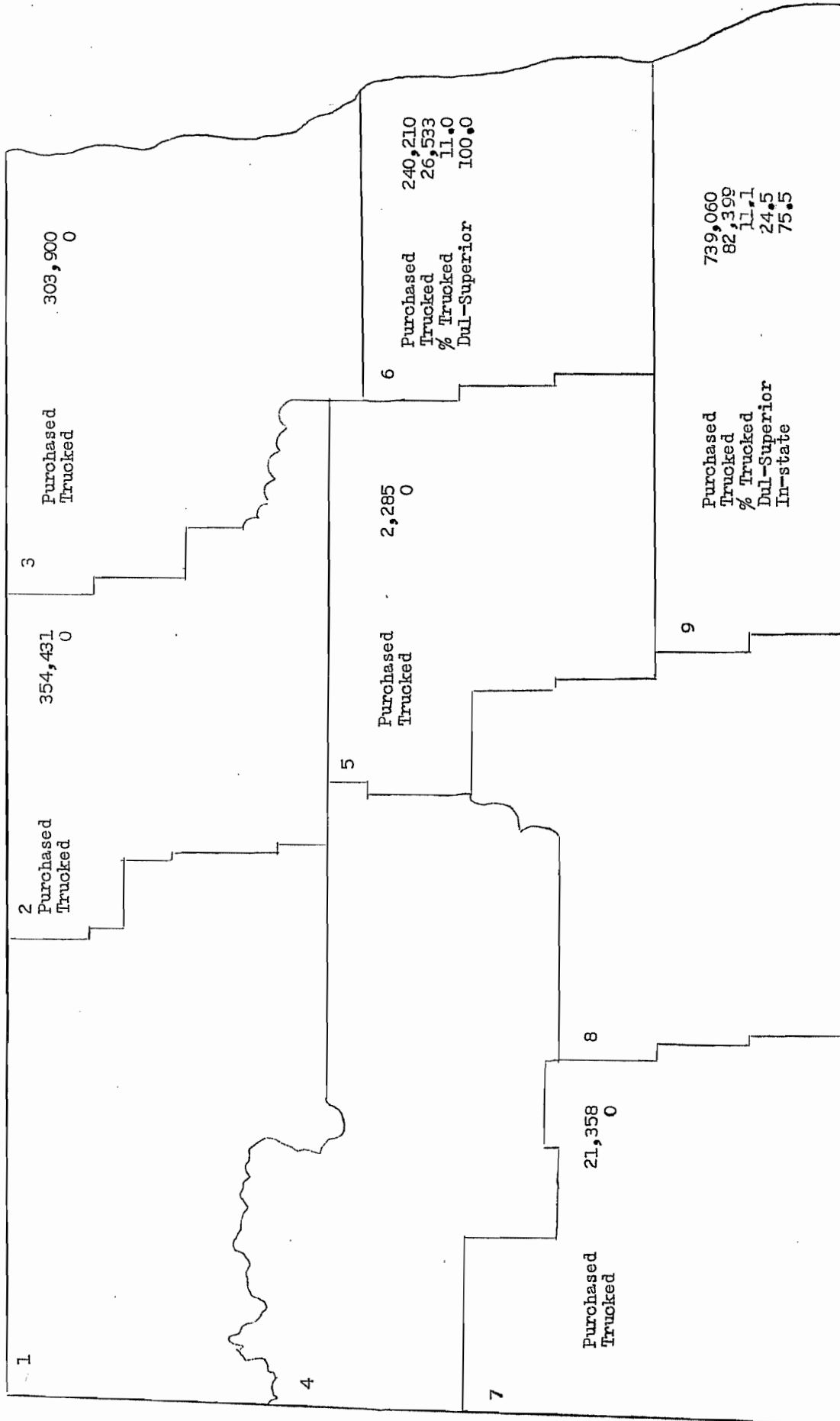
APPENDIX FIGURE 7. CORN. TOTAL CORN PURCHASED BY COUNTY ELEVATORS, PER CENT OF PURCHASES TRUCKED, AND DESTINATIONS OF TRUCKED CORN BY CROP REPORTING DISTRICTS, NORTH DAKOTA, 1965-66.

	1956	1957	1965	1966
Purchased (000 Bu)	2,581	1,046	1,996	3,454
Trucked (000 Bu)	620	221	856	1,139
% Trucked	24.0	19.2	42.9	33.0
Mpls-St. Paul	5.0	46.6	2.7	10.5
Other Minn	1.6	37.3	6.0	16.6
Mid & S. W. States	2.7	3.3	19.0	—
In-state	73.9	11.1	56.3	33.4



APPENDIX FIGURE 8. RYE. TOTAL RYE PURCHASED BY COUNTRY ELEVATORS, PER CENT OF PURCHASES TRUCKED, AND DESTINATIONS OF TRUCKED RYE BY CROP REPORTING DISTRICTS, NORTH DAKOTA, 1965-66.

Year	Purchased (000 Bu)	Trucked (000 Bu)	% Trucked	Mpls-St. Paul	Dul-Superior	Other Minn	Miscellaneous	In-state
1957	2,666	21	.8	47.0	19.4	—	—	8.9
1958	3,022	302	10.0	32.6	54.3	2.2	—	10.9
1965	7,354	3,192	43.4	27.1	69.2	1.0	—	2.7
1966	7,048	2,699	38.3	28.1	42.7	6.8	—	21.5



APPENDIX FIGURE 9. OTHER GRAINS. TOTAL OTHER GRAINS PURCHASED BY COUNTY ELEVATORS, PER CENT OF PURCHASES TRUCKED, AND DESTINATIONS OF TRUCKED OTHER GRAINS BY CROP REPORTING DISTRICTS, NORTH DAKOTA, 1965-66.

Year	Purchased (000 Bu)	% Trucked	Mpls-St. Paul	Dul-Superior	Other Minn	Miscellaneous	In-state
1956	2,610	287	11.0	9.9	-	4	15.8
1957	1,306	971	74.3	2.6	-	67.5	29.9
1958	1,997	1,716	85.9	3.5	-	7.0	18.4
1963	1,187	493	41.5	15.6	2	9.5	51.3
1965	1,661	109	6.6	42.9	-	-	-
1966	1,661	109	6.6	42.9	-	-	-