# GRAIN DRAWING CAPABILITIES AND PLANT UPGRADE ANALYSIS OF THE MOORETON-DWIGHT COOPERATIVE

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# INTRODUCTION

## ELEVATOR LOCATIONS

Mooreton and Dwight are located in southeastern North Dakota and are both served by the Burlington Northern Railroad. Mooreton is situated on the northwest junction of Interstate 29 and Highway 13. Dwight is located two miles north of Highway 13 and one-half mile west of Highway 81. Both communities are currently served by both truck and rail.

## GRAIN PRODUCTION

Corn and hard red spring wheat (HRS) are the two principal crops grown in Richland County (Table 1). Corn production in 1982 was 11.6 million bushels while the 1978-82 average was 9.9 million bushels. Production of HRS in 1982 was 6.1 million bushels while the 1977-81 average was 5.7 million bushels. Barley, soybeans and oats are other crops that contribute significantly to total crop production in Richland County. Average production from 1977 to 1981 was 2.8 million bushels of barley and 2.2 million bushels of oats. Soybean production during the 1978-82 period averaged 1.9 million bushels.

## GRAIN MOVEMENTS

### Richland County

Minneapolis/St. Paul (MSP) and Duluth/Superior (D/S) were the two primary markets for hard red spring wheat shipments from Richland County during the 1978-79 to 1982-83 period (Table 2). MSP received an average of 2.7 million bushels (57 percent) of all HRS shipments while D/S received an average of 1.7 million bushels (35 percent) during the five year period.

Corn shipments from the county were primarily to Pacific Northwest (PNW) destinations. PNW destinations received 49 percent of all Richland

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TABLE 1.  PRODUCTION OF SELECTED CROPS, RICHLAND COUNTY, NORTH DAKOTA.

| Crop | 1982 | 1981 | Five Year Average (1977-1981) |
|------|------|------|------|
| HRS | 6,145,000 | 7,675,000 | 5,752,700 |
| Durum | 355,000 | 994,000 | 466,000 |
| Barley | 2,617,000 | 3,503,000 | 2,814,500 |
| Oats | 1,630,000 | 1,885,000 | 2,274,900 |
| Rye | 50,200 | 50,300 | 81,800 |
| Sunflower (cwt.) | 944,700 | 987,300 | 1,795,800 |
| Flax | 29,800 | 62,100 | 83,900 |
| Corn (for grain) | 11,663,800 | 13,745,100 | 9,945,300[a] |
| Dry Beans (cwt.) | 107,880 | 189,552 | -- |
| Soybeans | 2,032,300 | 2,266,200 | 1,969,940[a] |

[a]5-year average is 1978-82.

TABLE 2. GRAIN MOVEMENTS FROM RICHLAND COUNTY, 1978-79 TO 1982-83.

| Commodity/ Year | D/S | MSP | PNW | Other | Total |
|---|---|---|---|---|---|
| | ------------------------ bushels ---------------------- | | | | |
| **WHEAT** | | | | | |
| 1978-79 | 1,977,067 (44%) | 2,278,709 (51%) | 23,087 (1%) | 199,188 (4%) | 4,478,051 (100%) |
| 1979-80 | 1,504,684 (33%) | 2,778,383 (61%) | 3,370 (<1%) | 242,713 (5%) | 4,529,150 (100%) |
| 1980-81 | 2,292,979 (47%) | 2,042,773 (42%) | 3,320 (<1%) | 491,189 (10%) | 4,830,261 (100%) |
| 1981-82 | 1,761,302 (34%) | 3,075,360 (60%) | -- | 328,938 (6%) | 5,165,600 (100%) |
| 1982-83 | 1,006,898 (20%) | 3,589,951 (70%) | -- | 564,401 (10%) | 5,161,250 (100%) |
| 5 Yr. Avg. | 1,707,986 (35%) | 2,753,035 (57%) | 5,955 (<1%) | 385,286 (8%) | 4,852,262 (100%) |
| **BARLEY** | | | | | |
| 1978-79 | 256,155 (6%) | 966,617 (22%) | 9,292 (<1%) | 3,104,519 (72%) | 4,336,583 (100%) |
| 1979-80 | 241,261 (4%) | 727,932 (13%) | 3,861 (<1%) | 4,532,604 (82%) | 5,505,658 (100%) |
| 1980-81 | 182,884 (3%) | 436,366 (6%) | 27,021 (<1%) | 6,110,979 (90%) | 6,757,250 (100%) |
| 1981-82 | 144,777 (3%) | 491,235 (9%) | 10,949 (<1%) | 4,986,442 (89%) | 5,633,403 (100%) |
| 1982-83 | 213,665 (4%) | 497,462 (9%) | 1,891 (<1%) | 4,966,866 (87%) | 5,679,884 (100%) |
| 5 Yr. Avg. | 207,748 (4%) | 623,922 (11%) | 10,603 (<1%) | 4,740,282 (85%) | 5,582,555 (100%) |

TABLE 2 - continued

| Commodity/<br>Year | D/S | MSP | PNW | Other | Total |
|---|---|---|---|---|---|
| | | | -------- bushels -------- | | |
| **CORN** | | | | | |
| 1978-79 | 114,217<br>(3%) | 40,115<br>(1%) | 3,271,826<br>(83%) | 528,894<br>(13%) | 3,955,052<br>(100%) |
| 1979-80 | 144,712<br>(3%) | 57,172<br>(1%) | 4,603,500<br>(91%) | 231,370<br>(5%) | 5,036,754<br>(100%) |
| 1980-81 | 40,048<br>(1%) | 107,369<br>(2%) | 5,184,886<br>(88%) | 559,534<br>(9%) | 5,891,837<br>(100%) |
| 1981-82 | 88,523<br>(2%) | 344,288<br>(8%) | 3,607,570<br>(79%) | 524,410<br>(11%) | 4,564,791<br>(100%) |
| 1982-83 | 89,326<br>(2%) | 97,260<br>(2%) | 2,121,779<br>(49%) | 2,061,190<br>(47%) | 4,369,555<br>(100%) |
| 5 Yr. Avg. | 95,365<br>(2%) | 129,241<br>(3%) | 3,757,912<br>(79%) | 781,080<br>(16%) | 4,763,598<br>(100%) |
| **SUNFLOWER** | | | | | |
| 1978-79 | 2,991,719<br>(77%) | 154,364<br>(4%) | -- | 759,156<br>(19%) | 3,905,239<br>(100%) |
| 1979-80 | 3,047,392<br>(71%) | 337,549<br>(8%) | -- | 889,955<br>(21%) | 4,274,896<br>(100%) |
| 1980-81 | 2,112,759<br>(57%) | 385,256<br>(10%) | 55,920<br>(2%) | 1,131,266<br>(31%) | 3,685,201<br>(100%) |
| 1981-82 | 1,444,921<br>(53%) | 505,227<br>(19%) | 1,020<br>(<1%) | 767,600<br>(28%) | 2,718,768<br>(100%) |
| 1982-83 | 981,420<br>(58%) | 110,577<br>(6%) | 12,247<br>(1%) | 597,614<br>(35%) | 1,701,858<br>(100%) |
| 5 Yr. Avg. | 2,116,722<br>(65%) | 298,595<br>(9%) | 13,837<br>(<1%) | 829,118<br>(25%) | 3,258,272<br>(100%) |
| **OTHER \*** | | | | | |
| 1978-79 | 456,039<br>(16%) | 1,310,146<br>(45%) | 11,929<br>(<1%) | 1,105,918<br>(38%) | 2,884,032<br>(100%) |
| 1979-80 | 408,457<br>(13%) | 1,431,570<br>(46%) | 9,080<br>(<1%) | 1,245,393<br>(40%) | 3,094,500<br>(100%) |
| 1980-81 | 335,197<br>(14%) | 883,554<br>(36%) | 10,381<br>(<1%) | 1,240,056<br>(50%) | 2,469,188<br>(100%) |
| 1981-82 | 373,634<br>(11%) | 1,503,785<br>(42%) | 26,329<br>(1%) | 1,646,713<br>(46%) | 3,550,461<br>(100%) |
| 1982-83 | 181,939<br>(6%) | 1,386,620<br>(46%) | 346,913<br>(12%) | 1,088,471<br>(36%) | 3,003,943<br>(100%) |
| 5 Yr. Avg. | 351,053<br>(12%) | 1,303,135<br>(43%) | 80,926<br>(3%) | 1,265,310<br>(42%) | 3,000,424<br>(100%) |

*Includes soybean movements.

County corn shipments (2.1 million bushels) during 1982-83 and an average of 79 percent (3.8 million bushels) of all corn shipments during the 1978-79 to 1982-83 period.[1]

Dwight and Mooreton

The Dwight and Mooreton elevators shipped a total of 515,625 bushels of HRS during 1982-83 (Table 3). This was more than double the amount shipped during the 1981-82 crop year. The two elevators shipped an average of 399,605 bushels of HRS during the 1978-79 to 1982-83 period. The bulk of HRS shipments have historically been to Duluth/Superior. However, in 1982-83 only 87,958 bushels (17 percent of all HRS shipments) were shipped to Duluth/Superior. Minneapolis received 56 percent (290,538) of all HRS shipments in 1982-83.

Barley shipments from Dwight and Mooreton historically have been to both Minneapolis and Duluth/Superior. Average shipments over the 5-year period were 21,726 bushels to MSP (62 percent share) and 13,381 bushels to D/S (38 percent share).

Corn movements from the two elevators during the 1978-79 to 1982-83 period were primarily to the Pacific Northwest. During the five year period 89 percent of all corn shipments were to PNW destinations. However, in 1982-83 only 37 percent of the total corn movement was shipped west. Total corn shipments from Mooreton and Dwight declined substantially in 1981-82 and 1982-83 compared to the previous three years. Over 500,000 bushels were handled in 1980-81 compared to 166,000 bushels in 1981-82 and 249,000 bushels in 1982-83. The five year average was approximately 350,000 bushels.

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[1] This section details major commodity movements. Additional data are contained in Appendix Table I on movements by commodity, destination and mode.

TABLE 3.  GRAIN MOVEMENTS FROM DWIGHT AND MOORETON,  1978-79 TO 1982-83.

| Commodity/ Year | D/S | MSP | PNW | Other | Total |
|---|---|---|---|---|---|
| | | | bushels | | |
| **WHEAT** | | | | | |
| 1978-79 | 166,006 (41%) | 110,530 (27%) | 19,800 (5%) | 107,819 (27%) | 404,155 (100%) |
| 1979-80 | 142,223 (40%) | 143,797 (40%) | 6,226 (2%) | 65,994 (18%) | 358,240 (100%) |
| 1980-81 | 292,153 (59%) | 96,277 (19%) | -- | 110,438 (22%) | 498,868 (100%) |
| 1981-82 | 128,327 (58%) | 49,770 (23%) | -- | 43,043 (19%) | 221,140 (100%) |
| 1982-83 | 87,958 (17%) | 290,538 (56%) | -- | 137,129 (27%) | 515,625 (100%) |
| 5 Yr. Avg. | 163,333 (41%) | 138,182 (36%) | 5,205 (1%) | 92,885 (23%) | 399,605 (100%) |
| **BARLEY** | | | | | |
| 1978-79 | 44,204 (67%) | 21,802 (33%) | -- | -- | 66,006 (100%) |
| 1979-80 | 6,226 (18%) | 29,254 (82%) | -- | -- | 35,480 (100%) |
| 1980-81 | 5,707 (17%) | 29,613 (83%) | -- | -- | 34,320 (100%) |
| 1981-82 | -- | 21,329 (100%) | -- | -- | 21,329 (100%) |
| 1982-83 | 10,770 (59%) | 7,633 (41%) | -- | -- | 18,403 (100%) |
| 5 Yr. Avg. | 13,381 (38%) | 21,726 (62%) | -- | -- | 35,107 (100%) |

TABLE 3. - continued

| CORN | D/S | MSP | PNW | Other | Total |
|---|---|---|---|---|---|
| 1978-79 | -- | 4,000 (1%) | 336,609 (99%) | -- | 340,609 (100%) |
| 1979-80 | -- | 2,950 (1%) | 465,146 (99%) | -- | 468,096 (100%) |
| 1980-81 | -- | -- | 514,309 (99%) | 3,000 (1%) | 517,309 (100%) |
| 1981-82 | -- | -- | 143,053 (86%) | 23,429 (14%) | 166,482 (100%) |
| 1982-83 | -- -- | 6,660 (3%) | 93,071 (37%) | 149,679 (60%) | 249,410 (100%) |
| 5 Yr. Avg. | -- | 2,722 (1%) | 310,438 (89%) | 35,222 (10%) | 348,382 (100%) |
| SUNFLOWER | | | | | |
| 1978-79 | 325,800 (92%) | 20,000 (6%) | -- | 9,536 (2%) | 355,336 (100%) |
| 1979-80 | 203,695 (91%) | 1,911 (1%) | -- | 18,827 (8%) | 224,433 (100%) |
| 1980-81 | 95,764 (90%) | -- | -- | 10,543 (10%) | 106,307 |
| 1981-82 | -- | -- | -- | -- | -- |
| 1982-83 | -- | -- | -- | -- | -- |
| OTHER* | | | | | |
| 1978-79 | 8,904 (6%) | 60,635 (38%) | -- | 92,130 (57%) | 161,669 (100%) |
| 1979-80 | 46,696 (24%) | 74,047 (38%) | -- | 74,363 (38%) | 195,106 (100%) |
| 1980-81 | 9,348 (6%) | 51,799 (35%) | -- | 87,537 (59%) | 148,684 (100%) |
| 1981-82 | 15,461 (12%) | 13,910 (11%) | 3,065 (2%) | 98,129 (75%) | 130,565 (100%) |
| 1982-83 | 9,625 (3%) | 131,324 (46%) | -- | 146,123 (51%) | 287,072 (100%) |
| 5 Yr. Avg. | 18,007 (10%) | 66,343 (36%) | 613 (<1%) | 99,656 (54%) | 184,619 (100%) |

*Includes soybean movements.

Soybean shipments from the Mooreton and Dwight elevators increased substantially in 1982-83 compared to previous years (Table 4). Over 230,000 bushels of soybeans were moved in that year, approximately twice the amount moved in 1979-80. Most of the movement has traditionally been to "other Minnesota" destinations. However, in 1982-83 over 40 percent of total soybean shipments were to Minneapolis/St. Paul. Average soybean volume handled during the 1978-79 to 1982-83 period was 123,092 bushels.

TABLE 4.  SOYBEAN SHIPMENTS FROM MOORETON AND DWIGHT, 1978-79 TO 1982-83.

| Year | D/S | MSP | OTHER MINNESOTA | MISC. | TOTAL |
|------|-----|-----|-----------------|-------|-------|
| | | | -------------------------- bushels -------------------------- | | |
| 1978-79 | 5,904 (6%) | 917 (1%) | 89,722 (93%) | -- | 96,543 (100%) |
| 1979-80 | 18,071 (16%) | 19,687 (18%) | 72,763 (66%) | -- | 110,521 (100%) |
| 1980-81 | -- | 1,695 (2%) | 86,459 (98%) | -- | 88,154 (100%) |
| 1981-82 | -- | -- | 86,675 (97%) | 3,065 (3%) | 89,740 (100%) |
| 1982-83 | 9,625 (4%) | 93,721 (41%) | 67,855 (29%) | 59,298 (26%) | 230,499 (100%) |
| Five Year Average | 6,720 (5%) | 23,204 (19%) | 80,695 (66%) | 12,473 (10%) | 123,092 (100%) |

# RAIL RATE STRUCTURE

Rail rate structures and the level of the various rates are of extreme importance to enterprises considering investment alternatives. Rate spreads, (the price difference between alternative service levels), to a large extent dictate how much can be invested in a particular elevator. Volume is another key factor to be analyzed.

Basically, a four-tiered rate structure exists for shipping grain from Mooreton and Dwight to eastern market destinations. Rail rates to Minneapolis/St. Paul and Duluth/Superior include single-car, 3-car, 26-car and 52-car service levels (Table 5). Rate spreads among service levels from both Mooreton and Dwight to MSP are: 4 cents between single-car and 3-car, 8 cents between the 3-car and 26-car and 5 cents between the 26-car and 52-car. Rate spreads from both origins to D/S are 4 cents between single-car and 3-car, 10 cents between 3-car and 26-car and 5 cents between 26-car and 52-car.

TABLE 5. RAIL RATES TO MINNEAPOLIS/ST. PAUL AND DULUTH/SUPERIOR FROM MOORETON AND DWIGHT, FOR WHEAT, CORN, BARLEY, SUNFLOWER AND SOYBEANS, MARCH, 1984.

| Service Level | Minneapolis/St. Paul | | Duluth/Superior | |
| | Mooreton | Dwight | Mooreton | Dwight |
| --- | --- | --- | --- | --- |
| | --------------- cents/cwt. ------------------- | | | |
| Single-car | 65 | 62 | 71 | 71 |
| 3-car | 61 | 58 | 67 | 67 |
| 26-car | 53 | 50 | 57 | 57 |
| 52-car | 48 | 45 | 52 | 52 |

Westbound rail rates for corn from Mooreton and Dwight are contained in Table 6. A 10 cent per cwt. spread exists between the 27-car multiple origin and 27-car single origin rates, while a 21 cent per cwt. spread exists between the 27-car single origin and 54-car rate. One 54-car shipment, relative to two 27-car single origin shipments, would save over $20,000 (180,000 bushels times 12.6 cents per bushel rate spread). This savings would have to be analyzed relative to the investment required to upgrade to a 54-car loading facility. Obviously, the grain volume that can be handled at each of the rate levels will determine the level of investment which can be justified.

TABLE 6. WESTBOUND RAIL RATES FOR CORN FROM MOORETON AND DWIGHT, MARCH 1984.

| Service Level | Rate (cents/cwt.) |
|---|---|
| 27-car multiple origin | 176 |
| 27-car single origin | 166 |
| 54-car | 145 |

## INVESTMENT ANALYSIS

Any capital investment which is required in order to utilize the lower rate must be capitalized based on the rate spread. A simple example will help to illustrate this relationship. First, assume that an elevator is shipping 300,000 bushels of wheat to D/S at 60 cents per hundredweight (36 cents per bushel) which is the 3-car rail rate. Further assume that the manager wishes to ship via the 26-car rate (a rate savings of 10 cents per cwt. or 6 cents per bushel) and that $100,000 must be invested in the

facility in order to meet the 26-car loading requirements. Assuming that the investment can be financed at 14 percent, the necessary calculations are:

$$I^* = (V * S) - I(i)$$

where: $I^*$ = Investment criterion
  $V$ = Volume
  $S$ = Rate spread
  $I$ = Investment required to upgrade
  $i$ = Interest rate

Decision criterion:

If $I^*$ is positive the rate spread justifies the investment.

If $I^*$ is negative the rate spread does not justify the investment.

Substituting the above mentioned values:

$$I^* = (300,000 \text{ bu.} * \$0.06) - 100,000 (.14)$$

$$= \$4,000$$

$I^*$ is positive ($4,000), therefore the rate spread justifies the $100,000 investment.

This example illustrates the importance between utilizing a lower rate service level and the investment required to access the lower rate. However, it gives only a superficial view since factors such as competition, etc. are not taken into account. This type of analysis is applied to the Mooreton-Dwight cooperative in Appendix II.

## RAIL ABANDONMENT

Neither Mooreton nor Dwight are on branch lines that are currently being proposed for abandonment by the railroad providing service. The Boards of Directors of both facilities should be fully aware of Burlington Northern's intentions concerning future service before any investments are made. Figure 1 is a map depicting the abandonment status of North Dakota rail segments.

Figure 1. System Diagram Map for North Dakota.

EXISTING
# North Dakota State Highway and Rail Network
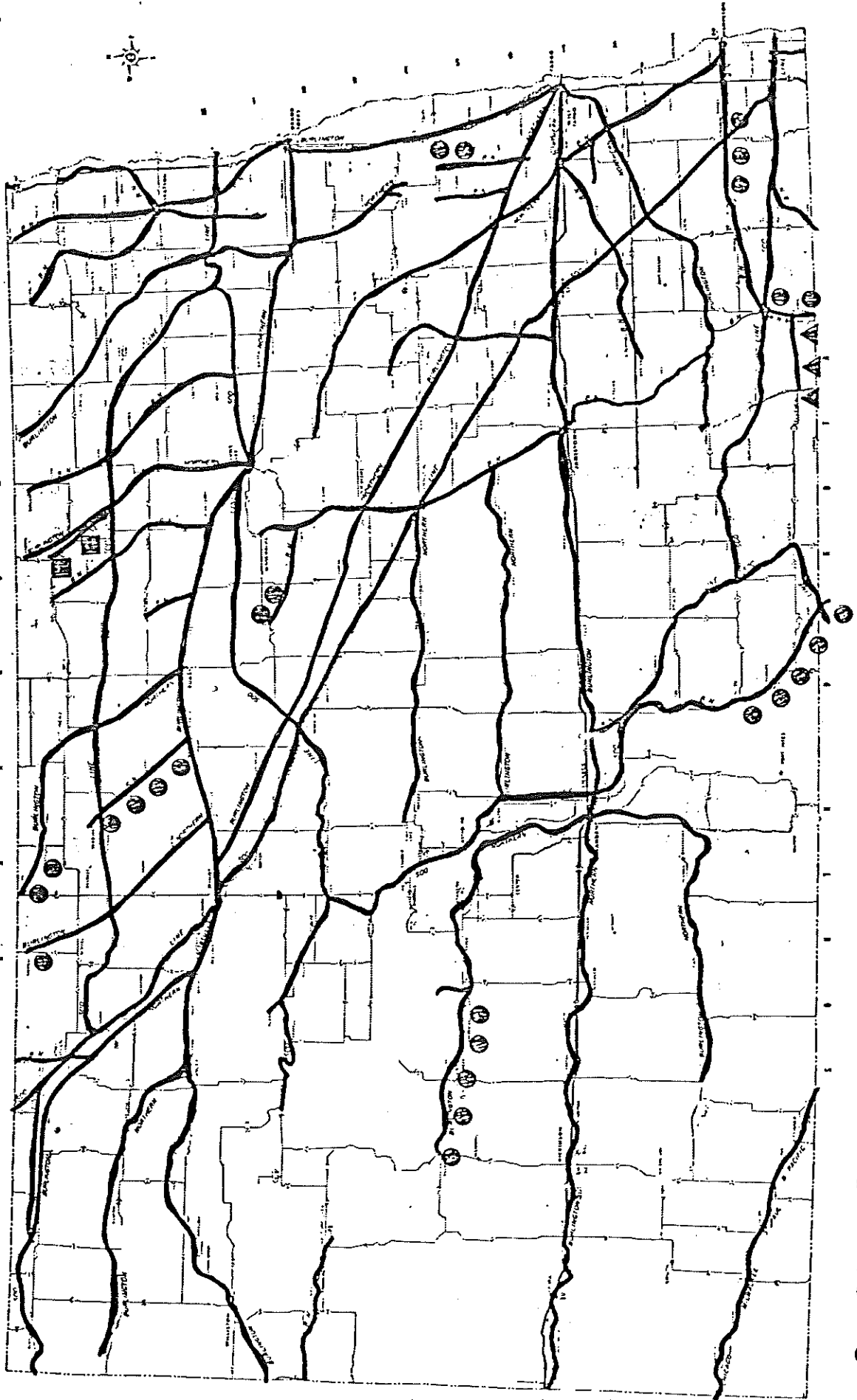
RAIL LINES

⊕ – Category I

▥ – Category II

▲ – Category III

1984

NORTH DAKOTA

SYSTEM DIAGRAM MAP

| CATEGORY I LINES | MILES |
|---|---|
| Hunter to Blanchard (BN) | 10.4 |
| Barney to Milnor (BN) | 22.1 |
| Valley City to Berea (BN) | 4.8 |
| | |
| Oakes to SD Border (CNW) | 14.2 |
| Linton to SD Border (BN) | 36.7 |
| Tuttle to Regan (BN) | 26.3 |
| Maddock to Esmond (BN) | 12.2 |
| Towner to Newburg (BN) | 35.3 |
| Westhope to Antler (BN) | 13.0 |
| Mohall to Sherwood (BN) | 14.6 |
| | |
| Zap to Killdeer (BN) | 40.9 |
| | |
| TOTAL | 230.4 |

CATEGORY II LINES

| | |
|---|---|
| Egeland to Armourdale (Soo) | 21.7 |

CATEGORY III LINES

| | |
|---|---|
| Ludden to Ellendale (BN) | 20.0 |
| | |
| TOTAL | 20.0 |

| | |
|---|---|
| Category I: (red) | All lines or portions of lines which the carrier anticipates will be the subject of an abandonment or discontinuance application to be filed within the 3-year period following the date upon which the diagram, or any amended program, is filed with the Commission. |
| Category II: (green) | All lines or portions of lines potentially subject to abandonment which the carrier has under study and believes may be the subject of a future abandonment application because of either anticipated operating losses or excessive rehabilitation costs, as compared to potential revenues. |
| Category III: (yellow) | All lines or portions of lines for which an abandonment or discontinuance application is pending before the Commission on the date upon which the diagram, or any amended diagram, is filed with the Commission. |

## Grain Volume Estimating Methodology

The "trade area" or region from which a country grain elevator is able to attract grain will vary in size depending on many factors. One of the most important of these factors is the freight rate (rail or truck) which can be utilized by the elevator to ship grain to terminal markets. The freight rate is the major factor in determining the difference between the terminal market price and the country grain elevator "board price" or price paid to farmers. Comparative costs of shipping from farms to competing elevators will also influence where producers haul grains. Other factors which will influence the grain volume available to an elevator are the density of grain production in the area, the physical road network in the region, elevator services available, and overall elevator management skills.

The methodology used herein utilizes comparative freight rates and distances to competing elevators to estimate the trade area of the Mooreton and Dwight grain elevators. It is presumed that a farmer's decision on where to ship his grain is affected by two variables: 1) the elevator "board price" (which is determined by the elevator's applicable freight rate), and 2) the relative distances the producer must haul his grain by farm truck to area elevators. The "net farm price" or the net price per bushel received by a farmer will be equal to the elevator board price less costs of trucking from farm to elevator. The producer's net farm price can therefore be represented in mathematical notation as:

$$P_f = P_e - T(D)$$

where: $P_f$ = net farm price

$P_e$ = elevator board price

T = farm truck cost per unit of distance

D = distance from farm to elevator

At some point between two competing elevators, the net farm price of hauling to the two markets will equal. That is, the producer would be indifferent as to which elevator he would haul to -- his net price per bushel would be the same. This point where the net farm price is equal to both elevators would define the boundary of market areas. Producers on the "elevator A" side of this point would receive a higher price per bushel by shipping to elevator A than elevator B, and vice versa. For example, if the straight line distance between two elevators is 14 miles, some point along this 14 mile segment would exist where the net farm price to producers would be equal hauling to either elevator. Assuming a rail rate of 60 cents per hundredweight (cwt.) at both elevators, and a farm trucking cost of .35 cents per bushel-mile,[2] that point of equal net return can be identified as follows:

$$P_a - \$.0035/\text{bushel-mile} (X) = P_b \ \$.0035/\text{bushel mile} (14-X)$$

Using a terminal market price of one dollar (constant) at both elevators and applicable freight rates, the point of equal net return is:

$$.64 - .0035X = .64 - .0462 + .0035X$$

$$X = 7$$

Therefore, producers within seven miles of elevator A would be better off shipping grain to elevator A rather than to elevator B. In this case, the point of equal net return is midway between the two elevators because the applicable freight rates are the same for both

[2]Griffin, Gene; Wesley Wilson; and Ken Casavant, "Characteristics and Costs of Operation of North Dakota's Farm Trucks," Upper Great Plains Transportation Institute, North Dakota State University, Fargo. Report forthcoming.

elevators. The procedure involved herein computes that point of equal

producer returns for all elevators surrounding Mooreton and Dwight.

The territory contained within the cellular shaped figure connecting

these points would define the drawing territory or trade area of the

Mooreton-Dwight cooperative.

### Mooreton-Dwight Trade Area Size and Volume

The concentration of grain elevators in Richland county is high

compared to most areas in North Dakota. Therefore, those elevators must

share the actual grain produced in the county. However, grain production

is also relatively high so sufficient volume is available to support the

larger number of shippers. The relative amounts of grain handled by each

will change depending on which of these stations producers decide to pat-

ronize. This decision as to market outlet will be affected by such fac-

tors as the distances to various elevators, the level of ancillary services

offered by each, and others.

The primary criteria used by producers when deciding where to sell

grain is price received. And, as prices among competing elevators change,

producers will re-evaluate their net price they would receive by hauling to

different markets. Therefore, it is critical to analyze effects of pro-

posed price changes on an elevator's trade area and expected level of

patronage.

The size of trade area and volume for the Mooreton and Dwight

elevators was estimated collectively. That is, an estimate of the total

volume handled is presented rather than estimates for each elevator. Com-

peting elevators which are included in the analysis are presented in Table 7.

Also included in Table 7 are rail rates accessible, service levels

utilized by each elevator, and elevator board prices which were offered

on March 7, 1984 (corn) and on March 9, 1984 (wheat). Estimates of the

Mooreton-Dwight trade area volume are therefore computed using the elevator board prices given in Table 7. It should be noted that the results depends heavily on the relative prices among elevators rather than the absolute levels of prices. If these relative prices change, the results will also change. Much of the following analysis involves changing these price relationships to study effects on the trade area if competing elevators react to various changes in the local competitive situation.

TABLE 7.   RAIL RATES AND SERVICE LEVELS UTILIZED,[a] AND CORN AND WHEAT PRICES OFFERED BY SELECTED RICHLAND COUNTY ELEVATORS.

| Elevator | Service Level | | Rail Rate | | Board Price | |
| | Corn | Wheat | Corn | Wheat | Corn[b] | Wheat[c] |
|---|---|---|---|---|---|---|
| Dwight | 27mo | 3 | 176 | 58 | 3.03 | 3.75 |
| Mooreton | 27mo | 3 | 176 | 61 | 3.00 | 3.73 |
| Breckinridge | 27so | 3 | 166 | 56 | 3.06 | 3.73 |
| Galchutt | 27so | 3 | 166 | 61 | 3.03 | 3.80 |
| Colfax | 27mo | 3 | 176 | 64 | 3.06 | 3.78 |
| Barney | 27mo | 3 | 176 | 64 | 3.03 | 3.69 |
| Wyndmere | 27mo | 3 | 176 | 65 | 3.04 | 3.78 |
| Hankinson[d] | 27mo | 3 | 176 | 57 | 3.09 | 3.77 |
| Fairmount | 27so | 3 | 166 | 52 | 2.90 | 3.78 |
| Great Bend | -- | -- | -- | -- | 3.00 | 3.74 |
| Lidgerwood | 54so | 3 | 145 | 61 | 3.05 | 3.74 |
| Mantador | 27mo | 3 | 176 | -- | 3.02 | 3.75 |
| Abercrombie | -- | -- | -- | -- | 3.00 | 3.82 |

[a]Although some stations have physical capabilities to utilize multiple car rates, the lower rate is not necessarily attained due to problems accumulating grain, etc.

[b]Elevator prices for corn were quoted on March 7, 1984.

[c]Elevator prices for wheat were quoted on March 9, 1984.

[d]The 54 car station in Hankinson is a transshipment/loading station, and does not buy from farmers.  The elevator prices quoted here are for the commercial elevator in Hankinson.

Two situations were analyzed regarding the size of the Mooreton-Dwight

trade area. First, the size of the trade area was estimated assuming

Mooreton is able to utilize 27 car (corn) and 26 car (wheat) service

levels for grain shipment. Also, effects of competitors' reactions

were analyzed. The size of the trade area was estimated assuming

Barney, Galchutt, and Breckinridge are also able to increase their prices

to farmers by utilizing multiple car rates. Second, the size of the trade

area was estimated assuming Mooreton is able to utilize 54 car (corn) and

26 car (wheat) service levels and their associated rates. Effects of

competitors reactions were also analyzed in this case.

Scenario 1

Under Scenario 1, Mooreton and Dwight were presumed to be able to

increase their corn price as a result of upgrading to load 25-27 car

trains at Mooreton. Board prices at Mooreton and Dwight were assumed to

increase by four cents and two cents per bushel, respectively. Dwight's

board price was presumed to increase less to account for the fact that

grain will either be trucked to Mooreton for subsequent reshipment or

loaded as a multiple origin shipment. The underlying assumption

is that not all of the rate savings between 27 multiple origin and 27

single origin shipments (10 cents per hundredweight) can be passed on

to patrons -- some is required to amortize debt and pay for cost of

trucking grain from Dwight to Mooreton. Also, somewhat less

than 100 percent of the grain handled will actually be shipped under

the lowest rate possible. Total corn volume estimated to be contained

within the Mooreton-Dwight trade area was 386,320 bushels (Table 8).

TABLE 8. CORN PRODUCTION CONTAINED IN MOORETON-DWIGHT TRADE AREA, SCENARIO 1.

| Township | Township Production as Percent of County | Township Percent Contained in Trade Area | County Production | Trade Area Volume |
|----------|------------------------------------------|------------------------------------------|-------------------|-------------------|
| Antelope | 3.57 | 34 | 4,763,598 | 57,820 |
| Ibsen | 2.38 | 68 | 4,763,598 | 77,094 |
| Dwight | 1.19 | 82 | 4,763,598 | 46,483 |
| Barney | 2.97 | 35 | 4,763,598 | 49,601 |
| Mooreton | 3.57 | 73 | 4,763,598 | 124,144 |
| Center | 1.19 | 55 | 4,763,598 | 31,178 |
| TOTAL | | | | 386,320 |

The trade area size and volume was estimated separately for wheat and other crops due to the different rail rate structures in existence for corn vs. other commodities. Estimated volumes of wheat and miscellaneous commodities contained in the Mooreton-Dwight trade area are presented in Table 9. Volume of other crops is about 50 percent higher than wheat volume. This maybe somewhat unrealistic, and is addressed later in this report.

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TABLE 9. VOLUME OF WHEAT AND MISCELLANEOUS COMMODITIES CONTAINED IN MOORETON-DWIGHT TRADE AREA, SCENARIO 1.

| Township | Township Production as Percent of County | | Township Percent Contained in Trade Area | County Production | | Trade Area Volume | |
|---|---|---|---|---|---|---|---|
| | | | | Wheat | Other | Wheat | Other |
| | | | | | bushels | | |
| Antelope | 3.1 | 1.37 | 36 | 4,852,262 | 11,841,251 | 54,151 | 58,401 |
| Ibsen | 3.72 | 2.74 | 32 | 4,852,262 | 11,841,251 | 57,761 | 103,824 |
| Dwight | 3.72 | 3.42 | 31 | 4,852,262 | 11,841,251 | 55,956 | 125,724 |
| Barney | 3.72 | 2.05 | 71 | 4,852,262 | 11,841,251 | 128,158 | 172,770 |
| Mooreton | 3.72 | 2.05 | 100 | 4,852,262 | 11,841,251 | 180,504 | 243,338 |
| Center | 3.72 | 2.74 | 66 | 4,852,262 | 11,841,251 | 119,133 | 214,137 |
| Belford | 3.1 | 3.42 | 3 | 4,852,262 | 11,841,251 | 4,513 | 12,167 |
| Brandenburg | 3.1 | 2.74 | 9 | 4,852,262 | 11,841,251 | 13,538 | 29,201 |
| TOTAL | | | | | | 613,714 | 959,201 |

Trade area volume was also estimated after changing some of the conditions to analyze effects of adjustments in the competitive surroundings. Grain volume was estimated assuming three Mooreton-Dwight competitors reacted to the upgrading and also upgraded to competing service levels. Wyndmere, Gulchutt and Breckenridge are assumed to upgrade to also be able to offer similar prices to producers. The effects of the three competitors also being able to increase corn and wheat prices by four cents per bushel is presented in Table 10.

TABLE 10.  EFFECTS OF COMPETITIVE PRICE REACTIONS BY THREE MOORETON COMPETITORS, SCENARIO 1.

| Commodity | Base Case Volume | Wyndmere (Barney) Increases Price by Four Cents[a] | Barney and Calchutt Increase Corn Price by Four Cents | Wyndmere (Barney), Galchutt and Breckenridge Increase Corn and Wheat Price by Four Cents |
|-----------|------------------|----------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------------|
| | | | (bushels) | |
| Corn | 386,320 | 292,617 | 275,621 | 243,470 |
| Wheat | 613,714 | 432,307 | 432,307 | 405,231 |
| Other | 959,562 | 721,902 | 721,902 | 669,179 |
| Total | 1,959,596 | 1,446,826 | 1,429,830 | 1,317,880 |

[a]Barney's price increase does not affect wheat volume but does affect corn volume.

It should be noted that corn volume in any of these cases is not as large as either wheat or other crop volume.  This is due to existing price differentials among competing elevators and relative changes that may occur among those elevators.  Competing elevators' corn prices were high and allowed competitors to capture a larger share of available corn production.

### Scenario 2

Under Scenario 2, Mooreton and Dwight were presumed to be able to further increase prices paid to producers as a result of upgrading to 50-54 car loading capabilities.  Prices for corn at Mooreton and Dwight were assumed to increase first by an additional five cents then ten cents per bushel.  Trade areas were estimated under both of these situations.  The actual rate spread between 27 car single origin and 54 car single origin service levels is approximately 12 cents per bushel.  However, it is doubtful that this entire rate savings would be reflected

in prices to farmers. At least a portion of it would likely be required to amortize principal and interest on construction financing, and part may be required to pay for transshipments from Dwight to Mooreton. Also, not all corn volume would be able to be shipped under the lowest rate.

Wheat price was not increased as was corn price. Although some rate savings may be realized from an occasional 52 car shipment of wheat, few such shipments have actually been taking place for east-bound movements due to the smaller rate spread between 26 and 52 car service levels.

The estimated corn volume contained within the trade area if both Mooreton and Dwight raised corn prices by nine cents per bushel (5 cents plus the 4 cent increase from Scenario 1) is presented in Table 11. Also the volume estimate if Mooreton and Dwight increased corn price by 14 cents per bushel (10 cents plus the four cent increase from Scenario 1) is presented in Table 11. The total estimated corn volume in the trade area after prices were increased by nine cents was 957,817 bushels. This volume estimate increased to 1,689,999 bushels when board prices were raised by 14 cents.

TABLE 11.  CORN PRODUCTION CONTAINED IN THE MOORETON-DWIGHT TRADE AREA,
SCENARIO 2.

| Township | Proportion of Township Contained in Trade Area | | Trade Area Volume | |
|---|---|---|---|---|
| | 9 cent increase | 14 cent increase | 9 cent increase | 14 cent increase |
| | ----------- percent -------- | | ------------ bushels ------------- | |
| Garborg | 2 | 70 | 3,968 | 138,883 |
| Nansen | 33 | 92 | 65,473 | 182,532 |
| Abercrombie | 33 | 96 | 28,060 | 81,629 |
| Homestead | 5 | 70 | 7,086 | 99,202 |
| Antelope | 100 | 100 | 170,060 | 170,060 |
| Ibsen | 100 | 100 | 113,374 | 113,374 |
| Dwight | 100 | 100 | 56,687 | 56,687 |
| Dantan | 11 | 71 | 18,707 | 120,743 |
| Barney | 100 | 100 | 141,717 | 141,717 |
| Mooreton | 100 | 100 | 170,060 | 170,060 |
| Center | 100 | 100 | 56,687 | 56,687 |
| Liberty Grove | 0 | 38 | -0- | 43,082 |
| Belford | 18 | 76 | 30,611 | 129,246 |
| Brandenburg | 34 | 94 | 38,547 | 106,571 |
| Summitt | 27 | 90 | 22,958 | 76,527 |
| Total | | | 957,817 | 1,689,999 |

Competitors' corn prices were also adjusted in order to analyze effects of
reactions by elevators surrounding Mooreton and Dwight.  Corn volume
for Mooreton-Dwight was first estimated assuming Barney increased their price
by 14 cents as a result of 54 car shipments.  Corn volume was then estimated
assuming board prices at Barney and Mooreton were equalized.  Results of this
sensitivity analysis are presented in Table 12.

TABLE 12.  CORN VOLUME CONTAINED IN MOORETON-DWIGHT TRADE AREA AFTER
  COMPETITORS' PRICE REACTIONS.

| Competitive Situation | Corn Volume (bushels) |
|---|---|
| Mooreton-Dwight 9 cent increase | 957,817 |
| Mooreton-Dwight 14 cent increase | 1,686,999 |
| Mooreton-Barney equal prices | 920,025 |
| Barney 14 cent increase | 679,958 |

## Summary

Corn and HRS wheat are the predominant crops grown in the Mooreton-Dwight
area, but a variety of other commodities such as barley, soybeans and oats are
also marketed through area grain elevators.  Total commodity movements from
the Mooreton and Dwight elevators has been erratic for the last five years,
with an average of approximately one million bushels shipped from both
stations between the 1978-79 and 1982-83 crop years.  The rail rate savings
which can be attained by shipping corn and other commodities in multi-car
or trainload lots has been the primary impetus for consideration of up-
grading elevator facilities.  The purpose of this study was to describe the
Mooreton-Dwight trade area, estimate the approximate size of the trade area,
and estimate the volume of grain the two stations could expect to attract
if they were capable of utilizing multi-car and trainload rail rates.

The rail rate structures in effect for westbound corn provide more incen-
tive for elevator management to utilize trainload shipments.  A rate savings
of approximately 17 cents per bushel can be attained by shipping corn in 54
car lots westbound rather than in 27 car multiple origin lots.  This large
rate spread provides significantly more incentive for trainload shipments
than narrower spreads on other commodities shipped to eastern markets.

The size and shape of an elevator's trade area will depend on many factors such as the competing elevators' prices, distances among elevators, and farmers' partonage. The amount of grain available for marketing within this trade area will depend on factors such as density of production and proportion of production actually shipped through country grain elevators.

The approximate size and shape of the Mooreton-Dwight trade area after upgrading to 26 car loading capabilities (wheat) is shown in Figure A-1 (Appendix). It's shape is determined primarily by competition from Barney, Hankinson, Great Bend and Galchutt. The size and shape did change, however, as the relative prices at competing stations were altered to project competitive reactions. The size of the trade area after upgrading to 54 car loading capabilities (corn) becomes larger and is shown in Figure A-2 (Appendix). Table 13 is a summary of estimated grain volume contained in the Mooreton-Dwight trade area under different competitive circumstances.

Volume of crops other than wheat and corn was adjusted downward from previously quoted estimates. Volume increases as a result of trainload shipping capabilities would not likely be as significant for lower-volume or specialty crops because of their shipping characteristics. These commodities are not as conducive to multiple car shipments and therefore do not have associated lower rates. For this reason, the proportion of crops other than corn and wheat was maintained at the level prior to these projected changes. Volume of other crops was estimated to be 32 percent of wheat and corn volume at all throughput levels.

TABLE 13. MOORETON-DWIGHT ESTIMATED TRADE AREA GRAIN VOLUME, SELECTED
COMPETITIVE CONDITIONS.

| Competitive Situation | Corn | Wheat | Other Crops | Total |
|---|---|---|---|---|
| | | | (bushels) | |
| **Scenario 1.** | | | | |
| a. M/D increases C&W prices by 4 cents and 2 cents | 386,320 | 613,714 | 320,011 | 1,320,045 |
| b. Wynd/Barney increase C&W prices 4 cents and 2 cents | 292,617 | 432,307 | 231,976 | 956,900 |
| c. Barney/Galchutt increase corn price by 4 cents | 275,621 | 432,307 | 226,537 | 934,465 |
| d. Wynd/Barney/Galchutt/ Breck increase C&W price by 4 cents | 243,470 | 405,231 | 207,584 | 856,285 |
| **Scenario 2.** | | | | |
| a. M/D increases corn price by 9 cents, wheat by 4 cents and 2 cents | 957,817 | 613,714 | 502,890 | 2,074,421 |
| b. M/D increases corn price by 14 cents and wheat by 4 cents and 2 cents | 1,689,999 | 613,714 | 737,188 | 3,040,901 |
| c. M/D increase corn 14 cents and wheat 4 cents and 2 cents. Barney equalizes corn price and increases wheat by 4 cents | 920,025 | 432,307 | 432,746 | 1,785,078 |

Actual volume of grain handled depends on the relative prices at Mooreton-Dwight and competing stations, as well as other factors. However, given that Mooreton does upgrade to 54 car loading capabilities and some competitive reaction occurs from surrounding elevators, the trade area volume can be expected to be approximately 1.7 to 2.0 million bushels. This range is consistent with situations "Scenario 2-a." and "Scenario 2-c" in Table 13. This estimate consists of approximately 50 percent corn, 27 percent wheat, and 23 percent other crops.

This estimate of potential grain volume available for the Mooreton-Dwight cooperative will provide a guideline or starting point for managers, board members and patrons to use when considering the potential for their elevator. Other factors which cannot be included in the analysis should be considered by the individual and evaluated as their effect on potential grain volume. Some of these other factors include:

1. Previous years handle

2. Road system

3. Producer patronage and loyalty

4. Ancillary services offered

5. Expected reactions of competing elevators

6. Merchandising skills of each elevator

7. Special rate considerations such as contract rates

8. Subjective views of management.

APPENDIX I

Grain Movement from Mooreton and Dwight

1982-83

1981-82

1980-81

1979-80

# GRAIN MOVEMENT FROM MOORETON AND DWIGHT, 1982-83


COM=WHEAT    COM=WHEAT    DEST=DULUTH/SUPERIOR

|  |  |
|---|---|
| TOTBU | 87958 |
| TRUCKBU | 0 |
| RAILBU | 87958 |

COM=WHEAT    COM=WHEAT    DEST=MINNEAPOLIS/ST PAUL

|  |  |
|---|---|
| TOTBU | 290538 |
| TRUCKBU | 4150 |
| RAILBU | 286388 |

COM=WHEAT    COM=WHEAT    DEST=OTHER MINNESOTA

|  |  |
|---|---|
| TOTBU | 124829 |
| TRUCKBU | 0 |
| RAILBU | 124829 |

COM=WHEAT    COM=WHEAT    DEST=SOUTHEASTERN STATES

|  |  |
|---|---|
| TOTBU | 3300 |
| TRUCKBU | 0 |
| RAILBU | 3300 |

COM=WHEAT    COM=WHEAT    DEST=SOUTHWESTERN MIDLAND STATES

|  |  |
|---|---|
| TOTBU | 9000 |
| TRUCKBU | 0 |
| RAILBU | 9000 |

COM=DURUM    COM=DURUM    DEST=MINNEAPOLIS/ST PAUL

|  |  |
|---|---|
| TOTBU | 2100 |
| TRUCKBU | 0 |
| RAILBU | 2100 |

COM=BARLEY    COM=BARLEY    DEST=DULUTH/SUPERIOR

|  |  |
|---|---|
| TOTBU | 10770 |
| TRUCKBU | 0 |
| RAILBU | 10770 |

COM=BARLEY    COM=BARLEY    DEST=MINNEAPOLIS/ST PAUL

|  |  |
|---|---|
| TOTBU | 7633 |
| TRUCKBU | 0 |
| RAILBU | 7633 |

COM=OATS    COM=OATS    DEST=MINNEAPOLIS/ST PAUL

|  |  |
|---|---|
| TOTBU | 26420 |
| TRUCKBU | 0 |
| RAILBU | 26420 |

```
COM=OATS     COM=OATS     DEST=SIOUX CITY/OMAHA/KANSAS CITY

                    TOTBU               9470
                    TRUCKBU                0
                    RAILBU              9470

COM=OATS     COM=OATS     DEST=SOUTHWESTERN MIDLAND STATES

                    TOTBU               9500
                    TRUCKBU                0
                    RAILBU              9500

   COM=CORN     COM=CORN     DEST=MINNEAPOLIS/ST PAUL

                    TOTBU               6660
                    TRUCKBU                0
                    RAILBU              6660

   COM=CORN     COM=CORN     DEST=PACIFIC NORTHWEST

                    TOTBU              93071
                    TRUCKBU                0
                    RAILBU             93071

   COM=CORN     COM=CORN     DEST=MISCELLANEOUS

                    TOTBU             149679
                    TRUCKBU           107679
                    RAILBU             42000

 COM=SOYBEANS    COM=SOYBEANS    DEST=DULUTH/SUPERIOR

                    TOTBU               9625
                    TRUCKBU                0
                    RAILBU              9625

 COM=SOYBEANS    COM=SOYBEANS    DEST=MINNEAPOLIS/ST PAUL

                    TOTBU              93721
                    TRUCKBU            10539
                    RAILBU             83182

 COM=SOYBEANS    COM=SOYBEANS    DEST=OTHER MINNESOTA

                    TOTBU              67855
                    TRUCKBU            67855
                    RAILBU                 0

 COM=SOYBEANS    COM=SOYBEANS    DEST=MISCELLANEOUS

                    TOTBU              59298
                    TRUCKBU            22998.
                    RAILBU             36300

COM=PINTO BEANS    COM=PINTO BEANS    DEST=MINNEAPOLIS/ST PAUL

                    TOTBU               9083
                    TRUCKBU                0
                    RAILBU              9083
```

GRAIN MOVEMENT FROM MOORETON AND DWIGHT, 1981-82

COM=WHEAT COM=WHEAT DEST=DULUTH/SUPERIOR

  TOTBU   128327
  TRUCKBU  19965
  RAILBU   108362

COM=WHEAT COM=WHEAT DEST=MINNEAPOLIS/ST PAUL

  TOTBU   49770
  TRUCKBU  .10270
  RAILBU   39500

COM=WHEAT COM=WHEAT DEST=OTHER MINNESOTA

  TOTBU   43043
  TRUCKBU   0
  RAILBU   43043

COM=DURUM COM=DURUM DEST=DULUTH/SUPERIOR

  TOTBU   15461
  TRUCKBU  .0
  RAILBU   15461

COM=DURUM COM=DURUM DEST=OTHER MINNESOTA

  TOTBU   2974
  TRUCKBU   0
  RAILBU   2974

COM=BARLEY COM=BARLEY DEST=MINNEAPOLIS/ST PAUL

  TOTBU   21329
  TRUCKBU   0
  RAILBU   21329

COM=OATS COM=OATS DEST=MINNEAPOLIS/ST PAUL

  TOTBU   13910
  TRUCKBU   0
  RAILBU   13910

COM=CORN COM=CORN DEST=OTHER MINNESOTA

  TOTBU   20129
  TRUCKBU  20129
  RAILBU   0

COM=CORN COM=CORN DEST=PACIFIC NORTHWEST

  TOTBU   143053
  TRUCKBU   0
  RAILBU   143053

```
       COM=CORN      COM=CORN      DEST=MISCELLANEOUS

                     TOTBU                  3300
                     TRUCKBU                   0
                     RAILBU                 3300


    COM=SOYBEANS     COM=SOYBEANS     DEST=OTHER MINNESOTA

                     TOTBU                 86675
                     TRUCKBU               86675
                     RAILBU                    0


    COM=SOYBEANS     COM=SOYBEANS     DEST=PACIFIC NORTHWEST

                     TOTBU                  3065
                     TRUCKBU                   0
                     RAILBU                 3065


  COM=PINTO BEANS    COM=PINTO BEANS    DEST=MISCELLANEOUS

                     TOTBU                  8480
                     TRUCKBU                8480
                     RAILBU                    0
```

# GRAIN MOVEMENT FROM MOORETON AND DWIGHT, 1980-81

COM=WHEAT    COM=WHEAT    DEST=DULUTH/SUPERIOR

```
        TOTBU          292153
        TRUCKBU             0
        RAILBU         292153
```

COM=WHEAT    COM=WHEAT    DEST=MINNEAPOLIS/ST PAUL

```
        TOTBU           96277
        TRUCKBU         13498
        RAILBU          82779
```

COM=WHEAT    COM=WHEAT    DEST=OTHER MINNESOTA

```
        TOTBU          107138
        TRUCKBU             0
        RAILBU         107138
```

COM=WHEAT    COM=WHEAT    DEST=SOUTHWESTERN MIDLAND STATES

```
        TOTBU            3300
        TRUCKBU             0
        RAILBU           3300
```

COM=DURUM    COM=DURUM    DEST=DULUTH/SUPERIOR

```
        TOTBU            9348
        TRUCKBU             0
        RAILBU           9348
```

COM=BARLEY    COM=BARLEY    DEST=DULUTH/SUPERIOR

```
        TOTBU            5707
        TRUCKBU          2172
        RAILBU           3535
```

COM=BARLEY    COM=BARLEY    DEST=MINNEAPOLIS/ST PAUL

```
        TOTBU           28613
        TRUCKBU             0
        RAILBU          28613
```

COM=OATS    COM=OATS    DEST=MINNEAPOLIS/ST PAUL

```
        TOTBU           50104
        TRUCKBU             0
        RAILBU          50104
```

COM=OATS    COM=OATS    DEST=MISCELLANEOUS

```
        TOTBU            1078
        TRUCKBU          1078
        RAILBU              0
```

```
COM=CORN     COM=CORN     DEST=PACIFIC NORTHWEST

             TOTBU              514309
             TRUCKBU                 0
             RAILBU             514309


   COM=CORN     COM=CORN     DEST=MISCELLANEOUS

             TOTBU                3000
             TRUCKBU                 0
             RAILBU               3000


COM=SOYBEANS    COM=SOYBEANS    DEST=MINNEAPOLIS/ST PAUL

             TOTBU                1695
             TRUCKBU              1695
             RAILBU                  0


 COM=SOYBEANS    COM=SOYBEANS    DEST=OTHER MINNESOTA

             TOTBU               86459
             TRUCKBU             86459
             RAILBU                  0


COM=SUNFLOWERS    COM=SUNFLOWERS    DEST=DULUTH/SUPERIOR

             TOTBU               95764
             TRUCKBU                 0
             RAILBU              95764


COM=SUNFLOWERS    COM=SUNFLOWERS    DEST=OTHER MINNESOTA

             TOTBU               10543
             TRUCKBU             10543
             RAILBU                  0
```

GRAIN MOVEMENT FROM MOORETON AND DWIGHT, 1979-80

COM=WHEAT    COM=WHEAT    DEST=DULUTH/SUPERIOR

| | |
|---|---|
| TOTBU | 142223 |
| TRUCKBU | 61804 |
| RAILBU | 80419 |

COM=WHEAT    COM=WHEAT    DEST=MINNEAPOLIS/ST PAUL

| | |
|---|---|
| TOTBU | 143797 |
| TRUCKBU | 24684 |
| RAILBU | 119113 |

COM=WHEAT    COM=WHEAT    DEST=OTHER MINNESOTA

| | |
|---|---|
| TOTBU | 56994 |
| TRUCKBU | 6553 |
| RAILBU | 50441 |

COM=WHEAT    COM=WHEAT    DEST=SOUTHWESTERN MIDLAND STATES

| | |
|---|---|
| TOTBU | 9000 |
| TRUCKBU | 0 |
| RAILBU | 9000 |

COM=DURUM    COM=DURUM    DEST=DULUTH/SUPERIOR

| | |
|---|---|
| TOTBU | 23625 |
| TRUCKBU | 2367 |
| RAILBU | 21258 |

COM=DURUM    COM=DURUM    DEST=MINNEAPOLIS/ST PAUL

| | |
|---|---|
| TOTBU | 12000 |
| TRUCKBU | 0 |
| RAILBU | 12000 |

COM=DURUM    COM=DURUM    DEST=OTHER MINNESOTA

| | |
|---|---|
| TOTBU | 1600 |
| TRUCKBU | 1600 |
| RAILBU | 0 |

COM=BARLEY    COM=BARLEY    DEST=DULUTH/SUPERIOR

| | |
|---|---|
| TOTBU | 6226 |
| TRUCKBU | 3226 |
| RAILBU | 3000 |

COM=BARLEY    COM=BARLEY    DEST=MINNEAPOLIS/ST PAUL

| | |
|---|---|
| TOTBU | 29254 |
| TRUCKBU | 0 |
| RAILBU | 29254 |

COM=OATS    COM=OATS    DEST=DULUTH/SUPERIOR

TOTBU    5000
TRUCKBU    0
RAILBU    5000

COM=OATS    COM=OATS    DEST=MINNEAPOLIS/ST PAUL

TOTBU    42360
TRUCKBU    0
RAILBU    42360

COM=CORN    COM=CORN    DEST=MINNEAPOLIS/ST PAUL

TOTBU    2950
TRUCKBU    0
RAILBU    2950

COM=CORN    COM=CORN    DEST=PACIFIC NORTHWEST

TOTBU    465146
TRUCKBU    0
RAILBU    465146

COM=CORN    COM=CORN    DEST=MISCELLANEOUS

TOTBU    17732
TRUCKBU    14732
RAILBU    3000

COM=SOYBEANS    COM=SOYBEANS    DEST=DULUTH/SUPERIOR

TOTBU    18071
TRUCKBU    12071
RAILBU    6000

COM=SOYBEANS    COM=SOYBEANS    DEST=MINNEAPOLIS/ST PAUL

TOTBU    19687
TRUCKBU    0
RAILBU    19687

COM=SOYBEANS    COM=SOYBEANS    DEST=OTHER MINNESOTA

TOTBU    72763
TRUCKBU    72763
RAILBU    0

COM=SUNFLOWERS    COM=SUNFLOWERS    DEST=DULUTH/SUPERIOR

TOTBU    203695
TRUCKBU    109005
RAILBU    94690

COM=SUNFLOWERS     COM=SUNFLOWERS     DEST=MINNEAPOLIS/ST PAUL

                   TOTBU                      1911
                   TRUCKBU                    1911
                   RAILBU                        0

COM=SUNFLOWERS     COM=SUNFLOWERS     DEST=OTHER MINNESOTA

                   TOTBU                     18827
                   TRUCKBU                   18827
                   RAILBU                        0

APPENDIX II

Investment Analysis Using Trade Area

Grain Volume Estimates

# Investment Analysis

$$I^* = [(VOL_1 \times SPR_1) + (VOL_2 \times SPR_2) + \ldots + (VOL_n \times SPR_n)] - INV (i)$$

$I^*$ = investment criteria

$VOL_1$ = expected volume of commodity 1

$VOL_2$ = expected volume of commodity 2

$VOL_n$ = expected volume of commodity n

$SPR_1$ = rate savings (spread) on commodity 1

$SPR_2$ = rate savings (spread) on commodity 2

$SPR_n$ = rate savings (spread) on commodity n

$INV$ = level of investment required

$i$ = interest rate or desired return on investment

## Sceanrio 1

$$I^* = [(386,320 \times .056) + (613,714) \times .048)] - 650,000 (.12)$$

$$= 21,634 + 29,458 - 78,000$$

$$= - \$26,908$$

Assuming only 50% of each commodity can be shipped under the new rates

$$I^* = [(193,160 \times .056) + (306,857 \times .048)] - 650,000 (.12)$$

$$= 10,817 + 14,729 - 78,000$$

$$= - \$52,454$$

Scenario 2      (using situation "2-a" figures from Table 13)

$I^* = [(957,817 \times .1736) + (613,714 \times .048)] - 650,000 \ (.12)$

$= 166,277 + 29,458 - 78,000$

$= \$117,735$

if only 50% of each commodity can be shipped under the new rates,

$I^* = [(478,908 \times .1736) + (306,857 \times .048)] - 650,000 \ (.12)$

$= 83,138 + 14,729 - 78,000$

$= \$19,867$
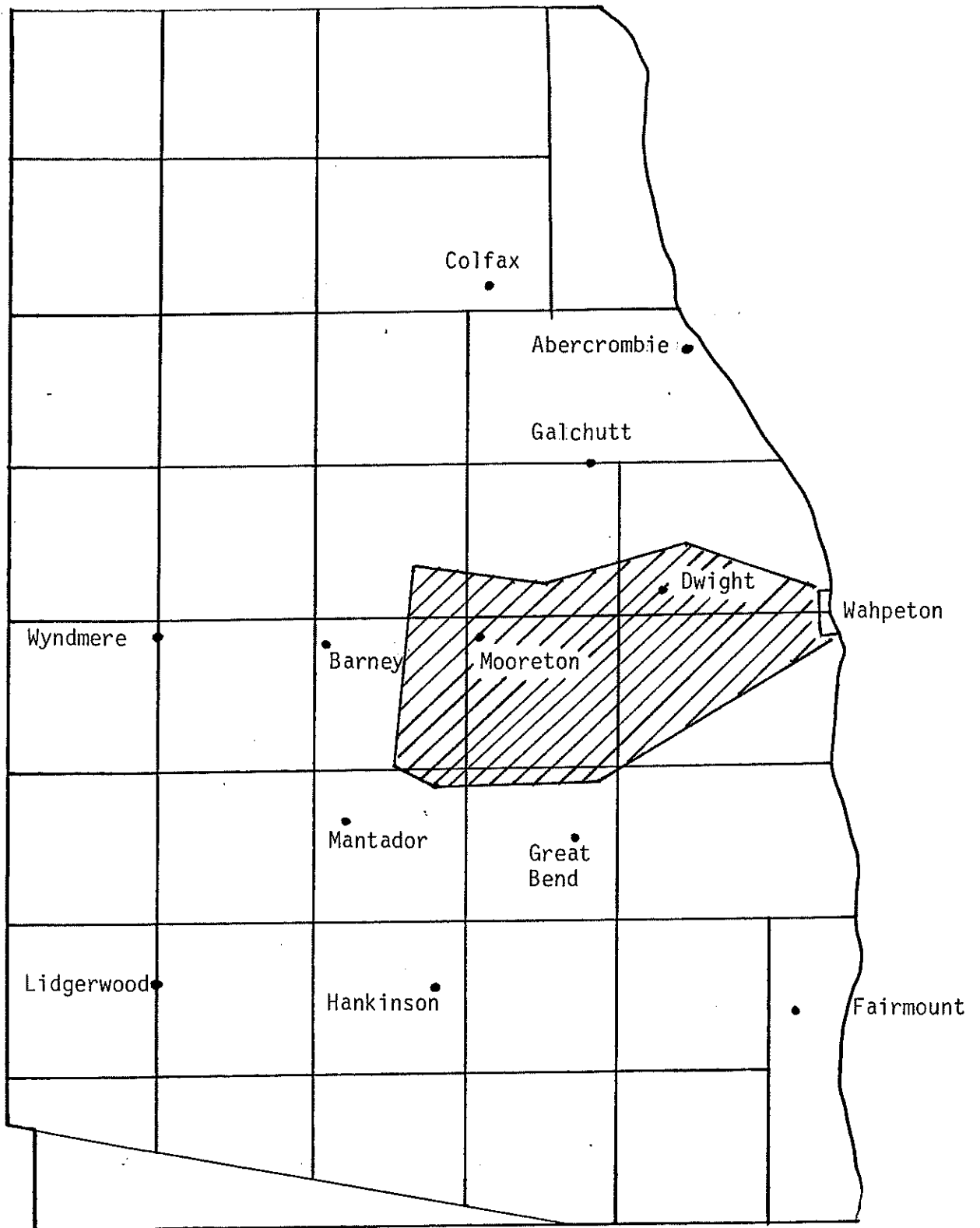
Figure A-1.  Approximate Size and Shape of the Mooreton-Dwight Trade
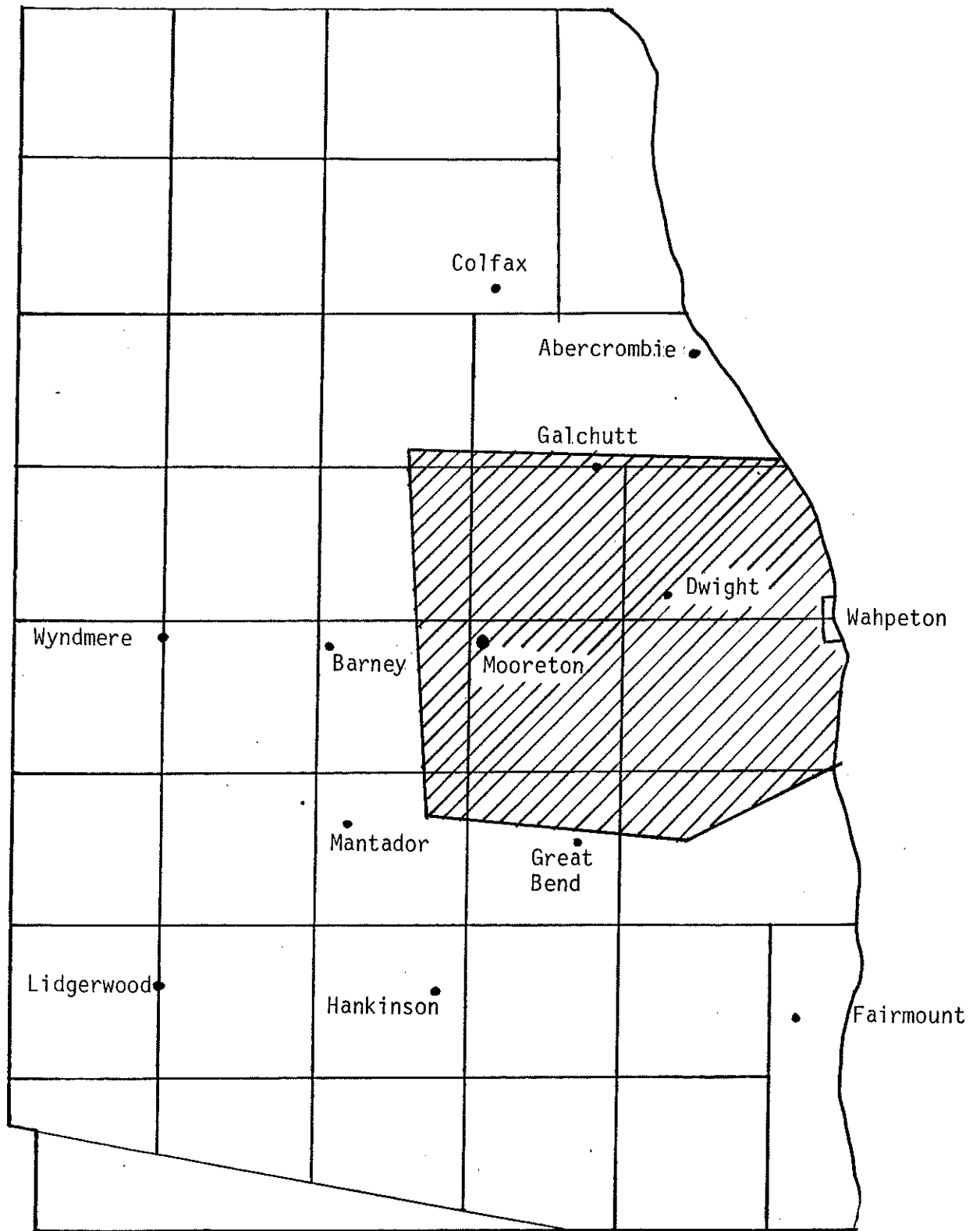Area (wheat).

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Figure A-2.  Approximate Size and Shape of the Mooreton-Dwight Trade Area (corn).