NEBRASKA RAILWAY COUNCIL STUDY

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TABLE OF CONTENTS

Appendices

EXHIBITS

Chapter 1

NEBRASKA RAIL SYSTEM

This chapter defines the Nebraska rail system by describing the major characteristics of each of the system's components and the use made of them. Also discussed are systemwide trends and conditions.

RAIL SYSTEM COMPONENTS

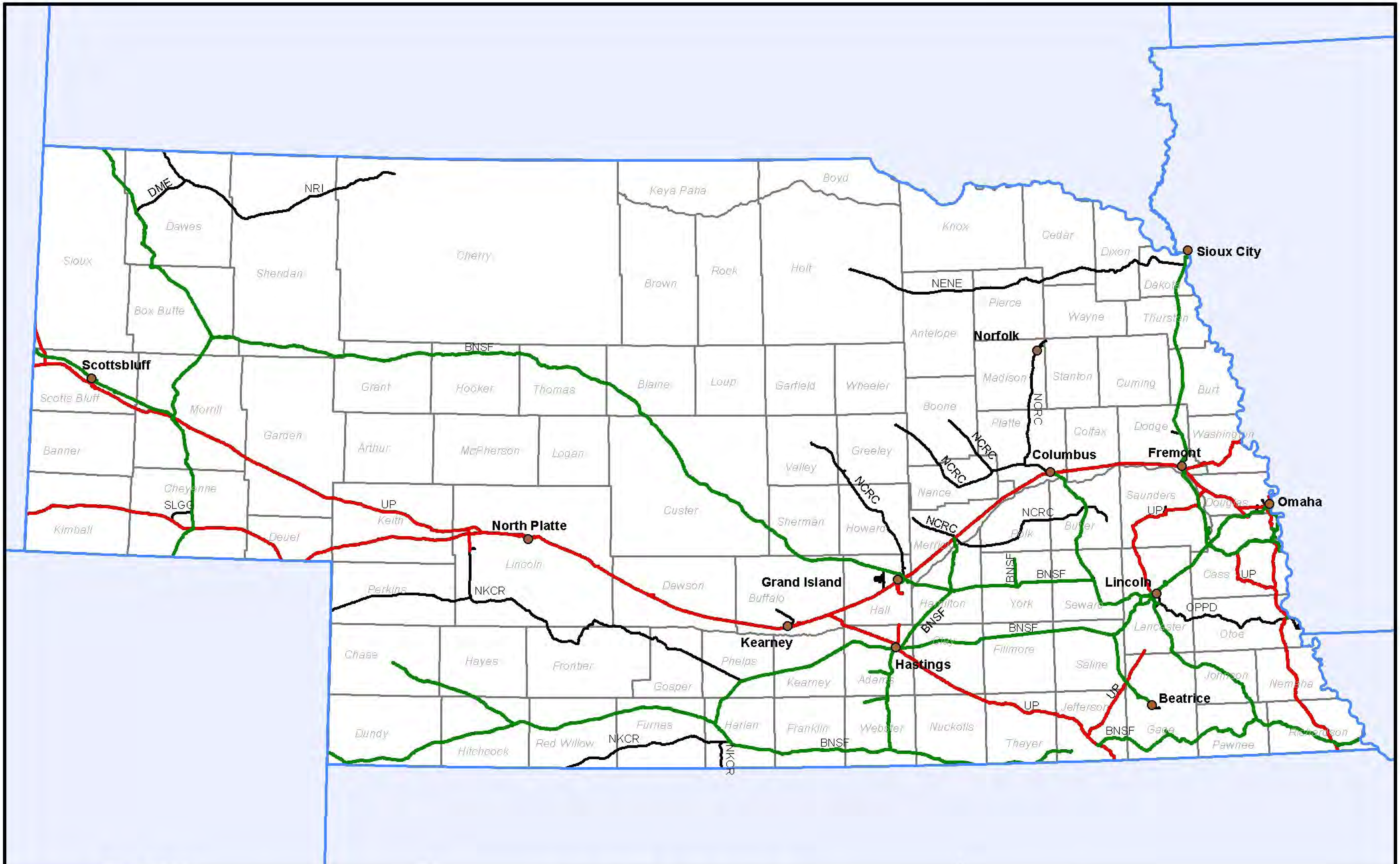
Freight Railroads

The Nebraska rail system, as depicted on Exhibit 1-1, is comprised of nine line-haul railroads and three terminal or switching companies. The line-haul carriers range in size from fairly small intrastate railroads to members of large rail systems extending across the western half of the country. Of the line-haul railroads, four are Class I carriers[1], one a Class II regional railroad, and the remainder fall into the Class III or local carrier category. As seen in Exhibit 1-2, these railroads comprise a 2002 state rail system of 3,461 miles. Burlington Northern and Santa Fe Railroad's 1,657 Nebraska route miles represent 48 percent of the statewide rail system. The Union Pacific Railway, with 995 route miles, is the second largest carrier in terms of Nebraska mileage accounting for 29 percent of the state rail system.

Brandon (BRAN) – A switching and terminal railroad serving South Omaha. It connects with both BNSF and UP.

Burlington Northern and Santa Fe Railway (BNSF) – Operating 1,700 route miles in the state, the Class I BNSF is Nebraska's largest railroad, and it is one of the largest in the nation. Its 33,000 route miles serve 28 states and 2 Canadian provinces and the carrier

[1] As of December 2001, Class I railroads have annual gross revenues of $266.7 million or more. Class II railroads have annual gross revenues of more than $20.5 million, but less than $266.7 million. Class III carriers have annual gross revenues less than $20.5 million. These limits are updated annually to reflect inflation.



Rail Lines:

- BNSF - Burlington Northern & Santa Fe
- DME - Dakota, Minnesota & Eastern
- OPPD - Omaha Public Power District
- NCRC - Nebraska Central
- NENE - Nebraska Northeastern
- NKCR - Nebraska, Kansas, & Colorado
- NRI - Nebkota
- SLGG - Sidney & Lowe
- UP - Union Pacific

NEBRASKA Rail System

2002

N
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30 0 30 Miles

Exhibit 1-1

Exhibit 1-2
NEBRASKA FREIGHT RAILROADS
2002

	Miles of Railroad Operated in Nebraska			**Percent of Nebraska Rail System Owned/Leased**
Railroad	**Owned/ Leased**	**Trackage Rights**	**Total**	
Brandon Corporation	2		2	0.1
Burlington Northern & Santa Fe	1,657	43	1,700	47.6
Canadian National/Illinois Central	3		3	0.1
Dakota, Minnesota & Eastern	41		41	1.2
Kansas City Southern		179	179	0
Omaha Public Power District	56		56	1.6
Omaha, Lincoln and Beatrice	3		3	0.1
Nebraska Central	273	39	312	7.8
Nebraska Northeastern	116	8	124	3.3
Nebraska, Kansas & Colorado	231	18	249	6.6
Nebkota	73	28	101	2.1
Sidney and Lowe	11		11	0.3
Union Pacific	995(1)		995	28.6
TOTALS	**3,461**	**315**	**3,776**	**100.0**

(1) Contains 52 miles leased from the Mid-States Port Authority.

(2) Total does not add due to rounding and omission of trackage owned by Nebraska Public Power District.

Source: Railroad Data

interchanges traffic with both Mexican and Canadian carriers. In Nebraska, the railroad transports principally farm products and coal. The railway is a subsidiary of Burlington Northern Santa Fe Corporation.

Canadian National/Illinois Central (CN) – The railroad owns 3 miles of track in Omaha which is the western terminus of a line which originates at Chicago.

Dakota, Minnesota and Eastern Railroad (DME) – This Class II railroad operates a large regional system of 1,103 route miles, and serves four states including Nebraska. Its presence in Nebraska, however, is limited to 41 route miles in the northwest corner of the state (former UP predecessor Chicago and Northwestern trackage) connecting Chadron and Crawford with lines in South Dakota.

Kansas City Southern – This Class I carrier has 179 miles of trackage rights into Lincoln and Omaha. The rights result from previous merger conditions.

Omaha, Lincoln and Beatrice (OLB) – This carrier owns 2.5 route miles of track in Lincoln and provides local switching service. It connects with both BNSF and UP.

Omaha Public Power District (OPPD) – The public utility owns 56.4 miles of former BNSF branch line running east from Lincoln (College View) to Arbor which handles principally coal destined to the Nebraska City Power Plant. It connects with BNSF at College View and UP at Nebraska City. The OPPD uses a contract operator for train service.

Nebraska Central Railroad (NCRC) – The largest intrastate rail carrier in the state, the NCRC operates 312 miles (including trackage rights) of five former UP branch lines and one former BNSF branch in north central and northeastern Nebraska. Traffic on the lines is a mixture of both agricultural-related (farm products and fertilizers) and non-agricultural-related commodities (mostly steel). It connects with the UP at Central City, Columbus and Grand Island, and with the BNSF at David City. The railroad is one of four affiliated with Rio Grande Pacific Corporation.

Nebraska Northeastern Railway (NENE) – Running from South Sioux City (Ferry) west to its terminus at O'Neill, the NENE operates 124.4 route miles (former BNSF branch) in Nebraska. The railroad transports principally agricultural products and fertilizers. It connects with the BNSF at Ferry and is affiliated with TNW Corporation.

Nebraska, Kansas and Colorado Railnet (NKCR) – The 454 route miles operated by NKCR serve parts of the three states in its name. Its 231 miles of line in Nebraska (former BNSF) run through the southwestern corner of the state and connect Holdrege with Sterling, Colorado, crossing the state line just west of Verrango, and Orleans with several points in Kansas. Principal commodities are coal and farm products. The railroad is one of four operated by Northern American Railnet, Inc.

Kebkota Railway (NRI) – The 73-mile-long railroad in the northwest corner of the state connects to the rest of the rail system via the DME in Chadron and the BNSF in Crawford, the latter by operating over 28 miles of trackage rights. Its eastern terminus is in Merriman. The line is a remnant of the former Chicago and NorthWestern's "Cowboy Line." It's traffic is comprised principally of farm and wood products.

Sidney and Lowe Railroad (SLGG) – The Sidney and Lowe is a switching railroad operating 11 miles of line connecting with UP and BNSF at Brownson and Huntsman, respectively. It serves an industrial area near the U.S. Army Big Sioux Depot.

Union Pacific Railroad (UP) – The Union Pacific is Nebraska's second largest railroad, with 995 route miles of truck, but the nation's largest. With an over 33,000-mile system, it serves 23 states and connects with both the Mexican and Canadian rail systems. UP's main line in Central Nebraska is the busiest in the country. The railroad is an operating subsidiary of Union Pacific Corporation.

RAIL SYSTEM USE

The state's rail system is used in a variety of manners. It serves as a means to ship Nebraska products and receive commodities used within the state from outside sources. It also serves in a large way as a conduit for traffic passing through Nebraska bound to and from other states.

Rail Freight Traffic

Movement Types – Four basic rail movement types can be identified from available data: 1) that which originates in the state but terminates outside of the state; 2) that which terminates in the state but originates elsewhere; 3) intrastate traffic that both originates and terminates within Nebraska; and, 4) through or overhead traffic that neither originates nor terminates in the state but passes through it.

As evident from Exhibit 1-3, overhead traffic is the dominate type of rail traffic movement. This results from the location of the state lying adjacent to the coal deposits and mining activity in the Powder River Basin and being home to a principal transcontinental route.

Exhibit 1-3
NEBRASKA RAIL MOVEMENTS
2000

Type Move	Tonnage	Percent of Total
Originating	25.0	6.3
Terminating	17.7	4.4
Intrastate	0.7	0.2
Overhead	354.4	89.1
	397.8	100.0

Source: 2000 STB Waybill Sample

Commodities – Exhibit 1-4 depicts commodity tonnages originating and terminating in Nebraska in 2000. Not surprising, farm products, principally grain, comprise the largest part of originating traffic (two-thirds). Terminating traffic is dominated by coal, also about two-thirds of total terminating tons. The two commodities comprise 69 percent of all Nebraska originating and terminating traffic.

Exhibit 1-4
NEBRASKA RAIL COMMODITY VOLUMES
2000

STCC	Commodity Description	Originating	Terminating	Intrastate	Total	Percent of Total
		(000 tons)				
01	Farm Products	16,044	712	69	16,825	38.8
11	Coal	1,247	11,849		13,096	30.2
20	Food or Kindred Products	5,241	618	79	5,938	13.8
28	Chemicals or Allied Products	500	1,423	43	1,966	4.5
32	Clay, Concrete, Glass or Stone Products	422	739	2	1,163	2.6
49	Hazardous Materials	718	239	92	1,049	2.4
	All Others	839	2,089	419	3,347	7.7
	TOTALS	25,011	17,669	704	43,384	100.0

Source: 2000 STB Waybill Sample

Other significant commodities are food products, chemicals, clay, concrete, glass or stone products, and hazardous materials.

Eighty percent of overhead traffic tonnage is comprised of coal. Farm products, food products and miscellaneous mixed shipments (intermodal) are approximately equal and together add up to just less than 11 percent. Intermodal tonnage is misleading, however, because of its low weight per unit as compared to the bulk commodities. It plays a much bigger role than indicated by tonnage alone.

Flows – The destination states for rail traffic shipped from Nebraska are the subject of Exhibit 1-5. The largest volumes are shipped to three states, Washington, California and Texas. The three account for over half of the total tonnage forwarded.

Commodities shipped by rail into the state originate in many states as shown in Exhibit 1-6 and in Canada but they all pale in comparison with Wyoming tonnage (67 percent of all tonnage received by rail). No other state ships over 3 percent of totals.

Traffic Density

The relative use of the various lines of the State's rail system can be determined by examining their annual traffic density. Rail traffic densities measured in terms of gross ton-miles per mile of track are the subject of Exhibit 1-7[2]. Gross ton-miles per mile are measured by the gross tons (weight of freight transported plus the weight of locomotives and rolling stock) which move over a mile of track in a year's time.

The traffic density map also provides an indication of the routing patterns employed by each railroad and the demand for service along each track section. Examination of Exhibit 1-7 reveals that the most heavily utilized sections of track are lines running east and west. Relatively few north-south routes exist in the state, and these generally are not high-density lines with the exception of the BN line through Alliance.

[2] 2001 for BNSF
2002 for UP

Destination of Shipments Originating in Nebraska

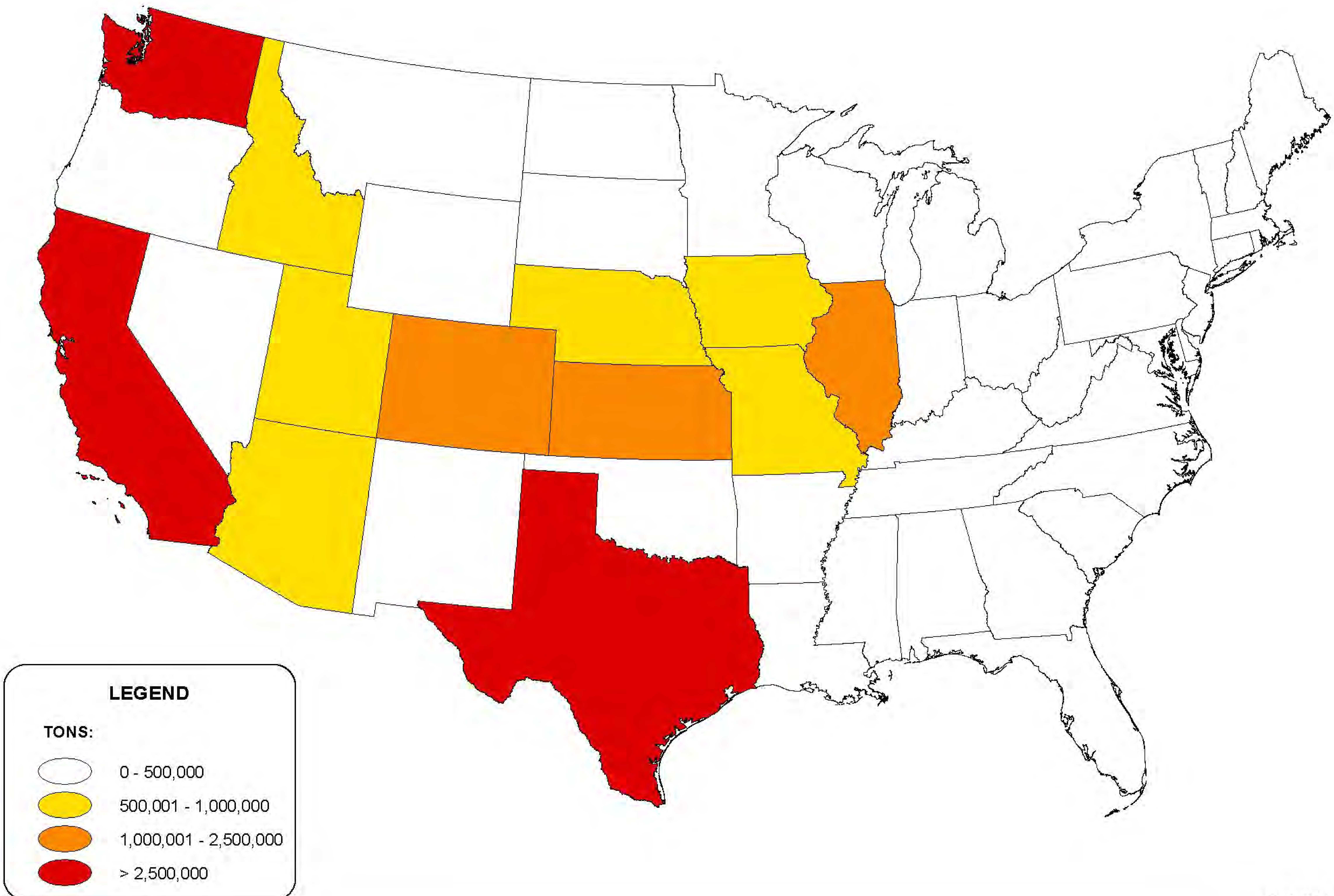


Exhibit 1-5

Origination of Shipments Terminating in Nebraska

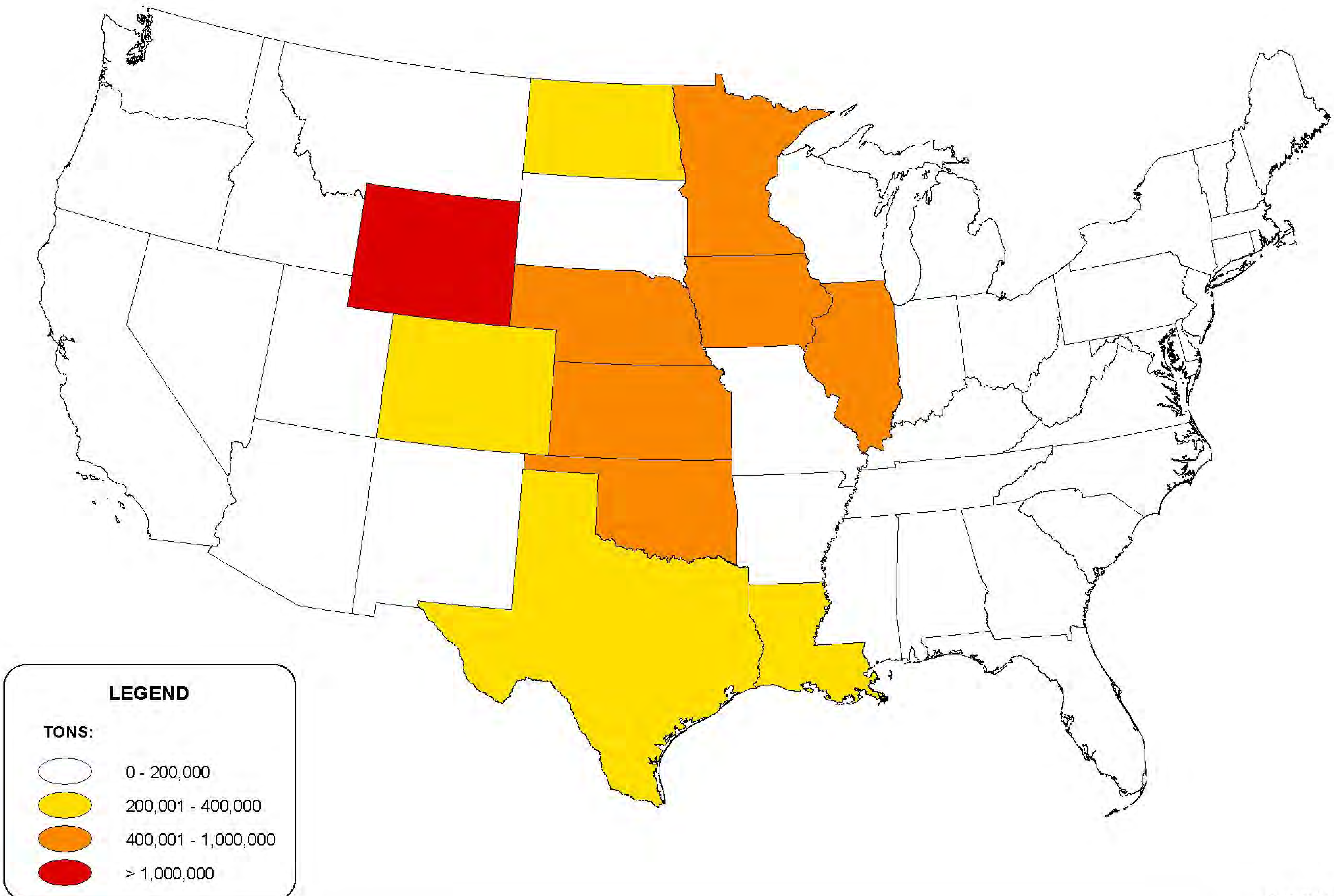
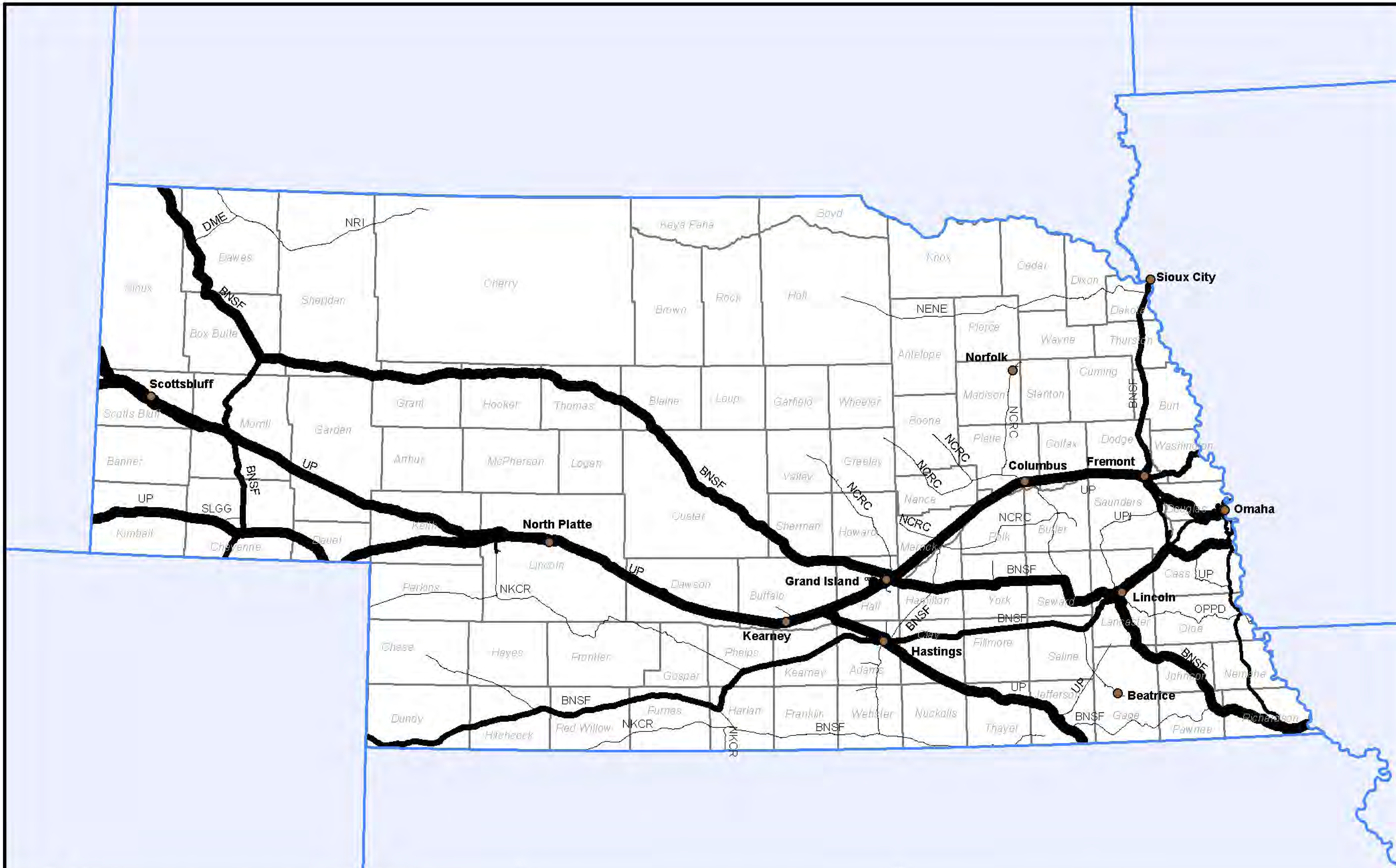


Exhibit 1-6



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SLGG - Sidney & Lowe
UP - Union Pacific

MGTM/M:

> 100
20 - 100
5 - 20
< 5

NEBRASKA Rail Density

N
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S

30 0 30 Miles

Exhibit 1-7

The most heavily utilized rail lines in the State are the UP and BN main lines. The UP main moves the highest gross ton-miles in the country.

Chapter 2

GRAIN TRANSPORTATION

There are many factors that influence the transportation of grain. Other than the obvious, service and rates, production and consumption trends also have to be considered. Details on current transportation demand and future production and market trends are presented.

Modal Share

While a wealth of data is available on rail transportation of grain, there is little data on highway transport. The U.S. Census Bureau's Commodity Flow Survey (CFS), a part of the Economic Census last performed in 1997 is the only readily available public data source. Based on that service, cereal grains originating in Nebraska were transported as shown below in Exhibit 2-1.

Exhibit 2-1
NEBRASKA CEREAL GRAIN TRANSPORTATION
1997

Mode	Tons		Ton-Miles		Average Miles per Shipment
	(000)	Percent	(000)	Percent	
Truck[1]	21,380	55.4	1,532	6.3	77
Rail	16,995	44.0	22,645	92.6	724
TOTALS[2]	38,619	100.0	24,467	100.0	91

(1) Does not include farm to elevator transportation.
(2) Totals do not add due to water movement data being withheld to avoid disclosure and some grain moving by combination of modes.

As evident from examination of the table, trucks handle a larger share of grain movements than rail based on tonnage, but do not move it near as far as rail. Rail shipments tend to be almost 10 times as distant as truck movements based on the CFS data.

Rail Shipments

Data were presented in Chapter 1 on rail shipments of farm products derived from the STB's 2000 Waybill Sample. Those data are broken down into more detail in the following discussion.

Volumes – Virtually all of the tonnage shown in Chapter 1 for farm products is comprised of grains (99 percent). The breakdown by grain type is the subject of Exhibit 2-2.

Exhibit 2-2
NEBRASKA RAIL GRAIN SHIPMENTS
2000

Grain	Tons (000)	Percent
Corn	11,305	71.1
Wheat	2,186	13.8
Soybeans	1,881	11.9
Sorghum	482	3.0
Others	38	0.2
TOTALS	**15,892**	**100.0**

Data Source: 2000 STB Waybill Sample

Destinations – The destinations of rail grain shipments from Nebraska in the year 2000 are shown in Exhibit 2-3. Note that three states stand out -- Washington, California and Texas. These three account for almost two-thirds (63 percent) of all grain tonnage. The fourth largest destination state, Illinois, accounts for over six percent.

The remaining 30 percent of the volume is spread over 24 states and Canadian provinces. Although it is not identified as such in the Waybill Sample, a closer examination of the data at the county level would suggest that most of the grain destined for Washington State is exported through its ports, and that significant Texas volumes cross the border into Mexico.

Rail Grain Destinations
2000

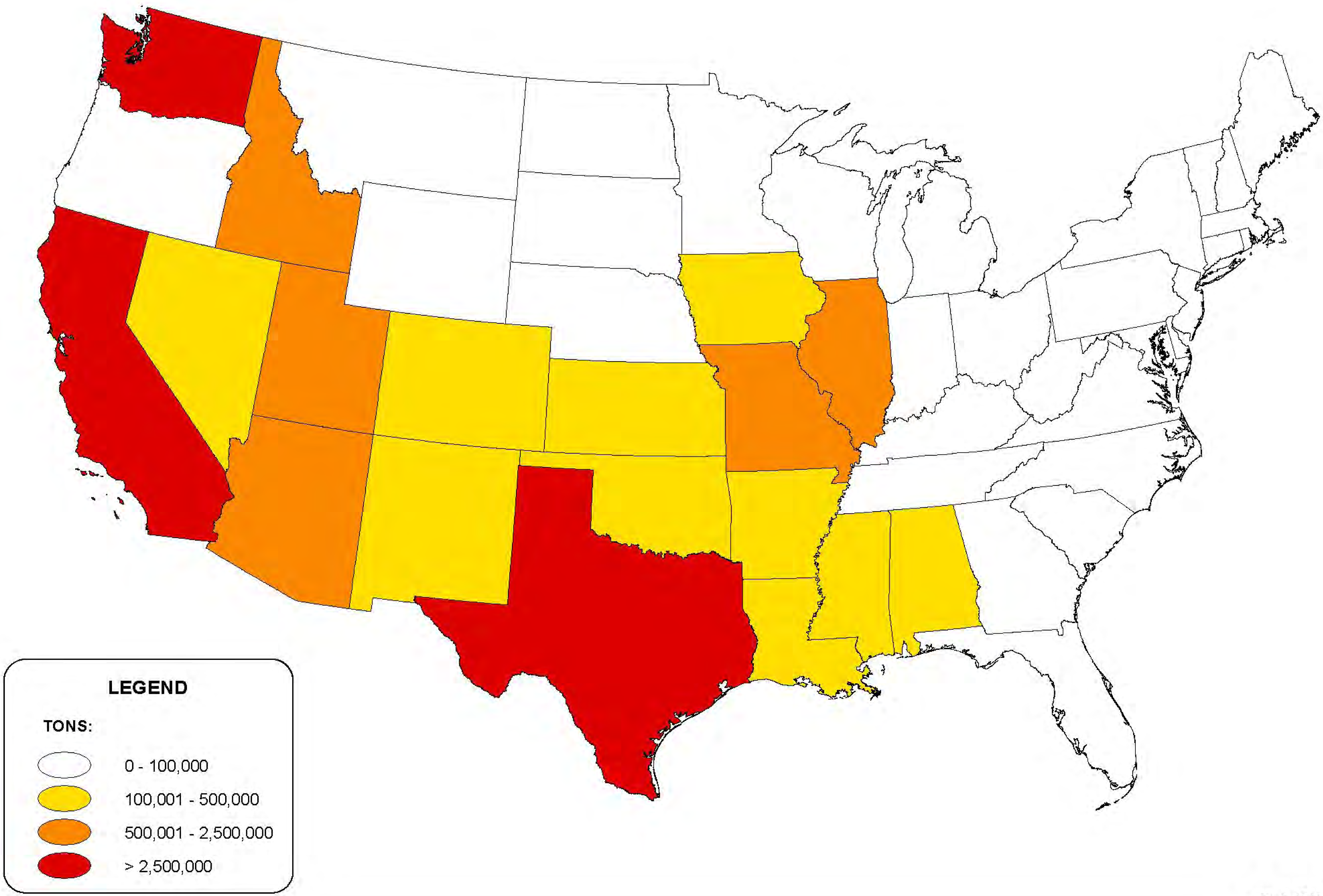

Exhibit 2-3

Major Grain Elevators – Exhibit 2-4 depicts the location of major grain elevators in Nebraska. A major grain elevator for the purposes of that illustration are all those with the capacity to load 100-car trains and/or are listed as shuttle train facilities[1]. The exhibit also displays corn production by county in order to provide an overview of the rail system and its principal loading facilities in relation to production. The correlation between the two, with the exception of the western part of the state, is readily apparent.

Strategic Agricultural Issues

Crop Production and Markets - Corn is by far the dominant crop in Nebraska. In 2002, 927 million bushels of corn were produced in the state. In 2002, the state of Nebraska produced more corn than any nation in the world except China and Brazil[2]. However, this production level was slightly less than the 10-year average of 1,057 million bushels.

In crop year 2001-2002, 29 percent of the total supply of corn in Nebraska (production plus net carry-in) was consumed as feed. Another 17 percent (or 202 million bushels) was processed in state. Altogether, 56 percent of the corn was used in state. The remaining 44 percent was moved out of the state[3].

More than 1,675 million bushels of grain storage capacity exists in Nebraska. On-farm storage accounts for approximately 1,000 million bushels of capacity. The remainder consists of commercial storage capacity[4].

Local Consumption of Corn for Ethanol - Seven ethanol plants were operational in the Spring of 2003 (see Exhibit 2-5). Collectively, these plants utilize 230 million bushels of corn, annually. In addition to these facilities, over 20 site feasibility studies are underway. As many as 9 new plants may be operational in 2004 or 2005. If built, these plants will require an additional 137 million bushels of corn, annually[5].

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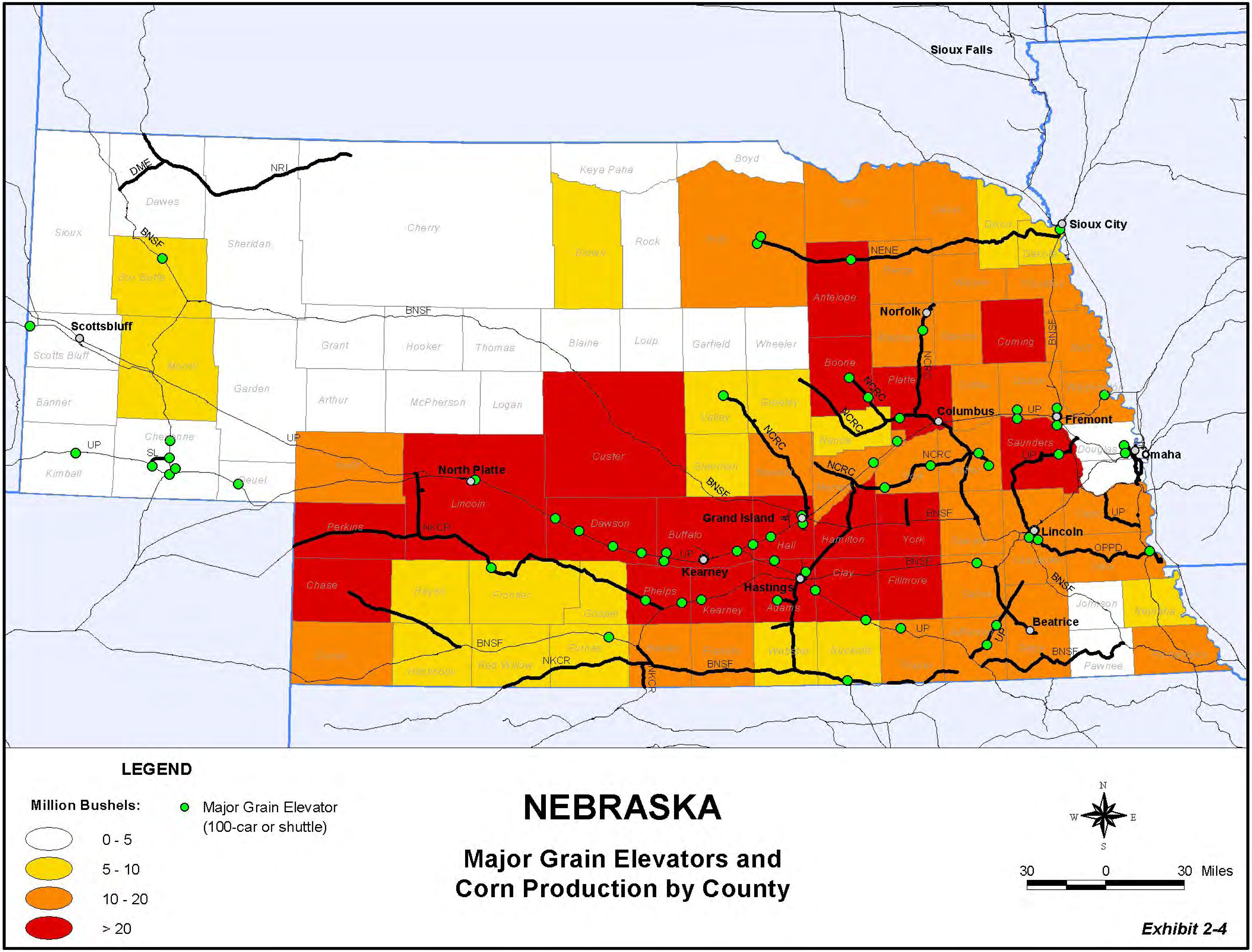
[1] Includes UP locations with 75-car shuttle train elevators.
[2] Nebraska Corn Board. *2002-2003 Nebraska Corn Quality Report*.
[3] Source for paragraph: Nebraska Corn Board. *2002-2003 Nebraska Corn Quality Report*.
[4] Source for paragraph: Nebraska Corn Board. *2002-2003 Nebraska Corn Quality Report*.
[5] Source for paragraph: Nebraska Ethanol Board.



NEBRASKA

Major Grain Elevators and Corn Production by County

Exhibit 2-4

Exhibit 2-5
ETHANOL PLANTS IN NEBRASKA

Location	Number	Type	Million Bushels
Aurora	1	Dry	14.0
Blair	1	Wet	65.0
Columbus	1	Wet	80.0
Hastings	2	Dry	44.0
Plainview	1	Dry	7.5
York	1	Dry	19.0
Totals	7		229.5

Note: Plants as of May 2003.
Source: Nebraska Ethanol Board

Typically, ethanol plants grow over time. Thus, long-term demand for corn may be greater than initial requirements. Moreover, there is potential for additional wet-milling plants, which generate higher throughput than dry-milling facilities. For example, the wet-milling plant at Blair could utilize 65 million bushels of corn per year. With only nominal growth in output, these 16 plants could utilize a third or more of the typical Nebraska corn crop in future years.

Movement of ethanol to final markets is a key to future growth. The UP has developed a special service program to move ethanol to California, where a large market exists because of the oxygenated fuels program. UP now provides guaranteed delivery schedules to California with single-car, multi-car, and unit train service options[6]. It also offers forward inventory at rail yards with delivery to customers within 24 hours from these yards[7].

Future Yields and Production Issues - Several key factors will affect future crop production in Nebraska: yields, water, farm policy, and changing market demands. Corn yields

[6] Union Pacific Railroad web page. http://www.uprr.com/customers/ag-prod/ethanol.shtml.
[7] Ibid.

have increased by 60 bushels per acre during the last 30 years. The average yield during the 1995-2001 period was 138 bushels per acre. With irrigation, average corn yields in Nebraska now exceed 160 bushels per acre. Yields on prime irrigated land may exceed 200 bushels for acre.

Corn yields may continue to increase in the future with advances in hybrid crops and production technology. However, water could be a major constraint. Because of dry conditions, more corn is being irrigated. In 2002, about 60 percent of the acres were irrigated. These acres produced over 80 percent of the state's crop. However, declining irrigation potential exists in central and western Nebraska. Many acres are irrigated from aquifers, rivers, or other surface water sources. A multi-year dry trend has lowered water levels and placed constraints on irrigation. As much as 2 million acres may be impacted by water shortages.

Farm policies have generally been favorable to corn. Although the Farm Security and Rural Investment Act of 2002 contained many counter-cyclical features, it did not provide adequately for disaster relief. As a result, farm revenues in Nebraska have deteriorated in the short run. In the future, conservation program incentives may affect total acres under production. However, conservation programs may affect wheat more than corn

Specialty Crops - Nebraska is a leader in the production of specialty corn crops. Nebraska producers raise approximately 17 million bushels of white corn annually, which is used in the production of tortilla chips. Another specialty crop, waxy corn, has a variety of food and industrial uses. In addition to white and waxy corn, flint corn, high starch corn, high oil corn, and high amylose corn are also grown in Nebraska.

The state is activity promoting these and other crops as identity-preserved varieties. In the future, identity-preserved (IP) shipments will likely increase in importance. These niche markets may have beneficial impacts on short lines. IP shipments typically move in smaller lots to many different markets. IP requires controlled carloads or shipments in containers. Quality assurance of shipments is essential. Shipments must be free from contamination.

The high volume of on-farm storage is ideal for isolating specialty crops and marketing IP products. However, the demand for rail services in these markets is much different than traditional demands.

Railroad Rates and Grain Elevator Network Characteristics

The light-density railroad network may be impacted by future changes in the grain elevator industry as a result of market trends and railroad service levels. In particular, the expanded use of unit-train and shuttle-train rates may increase competitive pressure on smaller elevators located on short line railroads. Rate differences between shuttle facilities and smaller elevators may induce transshipments among elevators or longer farm-to-elevator truck hauls. If farmers bypass local elevators and deliver grain directly to shuttle stations, the local elevators may become satellites that handle specialty crops or provide storage for larger elevators. If traffic is diverted from elevators located on light density lines, or grain is transshipped from these elevators to shuttle stations, the annual carloads originated from LDLs may decrease.

Traditional Elevator Market Areas and Truck Delivery Characteristics - Exhibit 2-6 shows information from a 2001 survey of grain elevators located in the Great Plains region. As evident from the exhibit, approximately 80 percent of the corn delivered to elevators in Nebraska originated from within a 15-mile radius of the facility[8]. However, the survey also suggests that nearly 20 percent of the corn delivered to elevators in Nebraska traveled 15 miles or more.

Exhibit 2-6
AVERAGE PERCENTGES OF INBOUND GRAIN SHIPMENTS TO NEBRASKA ELEVATORS ORIGINATED AT VARIOUS DISTANCES FROM THE ELEVATOR

Miles	Corn	Soybeans	Wheat
≤ 8	59%	53%	33%
8 - 14	22%	26%	20%
15 - 29	11%	12%	17%
30 - 44	6%	7%	8%
≥ 45	2%	2%	22%

Source: Vachal and Tolliver, 2001. N=65.

[8] These estimates represent generalized market distances based on approximate circular market areas. Actual highway distances are usually greater than market area or radial distances.

Exhibit 2-7 displays the percentages of crops delivered to elevators in various types of trucks. In 2001, over 40 percent of the corn, wheat, and soybeans delivered to elevators in Nebraska was transported in trucks with five axles or more (e.g., tractor-semitrailer configurations). This finding is significant because tractor-semitrailer trucks offer more payload capacity than older single-unit farm trucks and are more efficient for longer trips.

Exhibit 2-7
AVERAGE PERCENTAGES OF GRAIN DELIVERED TO NEBRASKA ELEVATORS IN VARIOUIS TRUCK CONFIGURATIONS

	Crop		
Truck Axles	**Corn**	**Soybeans**	**Wheat**
≥ 5	43%	41%	72%
4	2%	2%	0%
3	32%	32%	18%
2	19%	21%	9%

Source: Vachal and Tolliver, 2001. N=65.

Shuttle Trains and Shuttle Elevator Requirements - A shuttle is a train of 100 cars or more of dedicated high-capacity 286,000-pound covered hopper cars which are part of a multi-train package purchased by a shipper. After unloading, the shuttle returns to the same station for reloading.

In the BNSF program, a set of locomotives is dedicated to each shuttle train so that the train can be moved immediately after loading and unloading[9]. In addition, BNSF pays incentives to shippers who load and unload in 15 hours. Under the Origin Efficiency Program (OEP), BNSF pays a $100 per car if the train is loaded in 15 hours at origin. Only shuttle shippers such as Roseland are eligible for OEP payments. Under the Destination Efficiency

[9] The BNSF program is described in this report. There are some differences between the BNSF and UP programs.

Program (DEP), BNSF pays an additional $100 per car if the train is unloaded in 15 hours at destination. The DEP incentive is paid to the receiver (i.e., the unloader).

Because of lower rates and greater volume requirements, the market area of a shuttle facility may be larger than the market area of a traditional elevator. Exhibit 2-8 shows the minimum circular market area of a shuttle facility based on assumptions regarding the percentage of land devoted to corn production. The market radius of a hypothetical facility located in dense corn production territory — where 40 percent of the land area is devoted to corn production — could range from 10 to 18 miles. This range depends upon the number of shuttles consigned per year.

Exhibit 2-8
RADIAL MARKET AREA OF HYPOTHETICAL SHUTTLE ELEVATOR
(in Miles)

Annual Shuttles	Million Bu.	Pct. Of Land Area	
		40%	20%
24	10.56	10	15
36	15.84	13	18
48	21.12	15	20
60	26.40	16	23
75	33.00	18	25

At the low end of the economic activity spectrum, the minimum market radius of a facility that generates 24 shuttles per year (or 2 per month) is 10 radial miles. At the high end of the economic activity spectrum, the minimum market radius of a facility that generates 75 shuttles per year (e.g., a shuttle every 4 to 5 days) is 18 radial miles.

These distances represent minimum market radii assuming that the facility captures all of the corn produced in the area, which is an unlikely outcome. Moreover, actual highway distances from farms located on the circumference of the market area will be greater than the radial distance. For example, in a grid highway network, the average trip distance from the market periphery of a 24-train facility will be more like 14 miles instead of 10 miles. Similarly, the average trip distance from the market periphery of a 75-train shuttle facility will be closer to 25 miles.

The percentage of land devoted to corn production will be much less than 40 percent in many areas of the state. If a shuttle facility is located in a region where 20 percent of the land area is devoted to corn production, the radial market distance range will increase (Exhibit 2-8). The average trip distances from the market periphery will be approximately 21 miles for a 24-train facility and 35 miles for a 75-train facility.

As this illustration suggests, a large shuttle facility will need to consistently draw corn from areas that result in 35-mile truck trips. Because of competition for the corn produced in the facility's market area, even longer truck hauls will occur. As shown earlier in Exhibit 2-6, some corn already moves into elevators at distances of at least 45 miles. The proportion of corn drawn from such distances is likely to be much greater for a large shuttle facility than for a traditional elevator.

Trucking and Transshipment Costs - The maximum economic trucking distance is affected by the type of truck and transfer or double-handling costs. Additional transfer costs will occur on transshipments from elevators to shuttle facilities.

In Appendix A, truck costs are estimated for a 5-axle tractor-semitrailer truck. The semitrailer is assumed to be a hopper trailer. This is a very common configuration used for custom-hauling grain. The truck is assumed to be used exclusively in short-haul service and accumulate 75,000 annual miles. This annual mileage would be representative of intense commercial trucking operations. A typical farm truck will accumulate much lower annual miles. Thus, the cost per mile for farmer-owned semis will be higher than the values estimated in Appendix A.

At 80,000 pounds gross vehicle weight, a grain semi can accommodate 56,600 pounds of payload[10]. This payload is equivalent to approximately 1,000 bushels of corn or 28 tons[11].

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[10] In this analysis, the tractor is assumed to weigh 13,900 pounds and the trailer 9,500 pounds.

[11] This assumes that the distance from the center of the first axle of the driving tandem-axle set, to the center of the last axle on the trailer is at least 36 feet. Otherwise, the gross weight of the truck could be restricted to less than 80,000 pounds under Bridge Formula B.

The assumed diesel fuel price is $1.75 per gallon. The imputed driver wage rate is $15 per hour. Other assumptions relate to trip time and empty miles. One hour of waiting time occurs per trip, at origin and/or destination. Over-the-road speed is 60 mph. Because the hopper is a specialized type of semitrailer, it returns empty to the elevator for re-loading. The tractor is assumed to cost $85,000, and have a useful life of 5 years and a salvage value of $25,500. The trailer is assumed to cost $31,800, and have a useful life of 10 years and a salvage value of $9,540[12].

Based on these assumptions and inputs, the estimated cost per mile is $1.39, or $2.78 per loaded mile. This is equivalent to .275 cents per bushel or approximately 10 cents per ton-mile. Given uncertainty in annual utilization and future input prices (especially fuel), the 10 cent per ton-mile should be viewed as a scoping number[13]. A double-handling cost of 5.5 cents per bushel or $2 per ton is used to represent the incremental transfer cost associated with a transshipment.

Rate Differentials between Shuttle - Train and Multi-Car/Single-Car Stations - In Appendix A, rate relationships are analyzed for four branch-line areas where smaller grain elevators are located within relatively short highway distances of shuttle facilities. These segments are:

- Hastings to Lester Junction, especially the segment from Ayr Junction to Lester Junction
- Hastings (or GH Junction) to Aurora
- Lester Junction to Endicott, via Superior
- Fairbury to Hallam, especially the segment from Plymouth to Hallam

Rate differentials are estimated by comparing the lowest effective rates; that is, the lowest rate that can be utilized by an elevator given its sidetrack capacity. Elevators with sidetrack capacity of less than 54 cars typically cannot assess the lowest published rates. The largest rate

[12] Based on these acquisition costs and life expectancies, depreciation and return on investment unit costs are computed. Other unit costs are computed for tires, maintenance, insurance, fees and taxes, and other overhead costs typical of an owner-operator.
[13] If a farm truck is used which accumulates only 20,000 annual miles, then the trucking cost will increase to over 3 cents a bushel because of poorer equipment utilization.

differences exist between shuttle-train stations and smaller elevators with track capacities of 25 cars or less. Corn rates are compared to three major market areas: southern California, the Pacific Northwest, and Texas. Because rates are published on a carload basis, and because different models of cars have different payload capacities, carload rates are converted to rates-per-ton for the comparisons.

Roseland Case Study

One of the case studies presented in Appendix A involves two stations located along the Hastings-to-Lester Junction line: Roseland and Blue Hill. Roseland is a 110-car shuttle loader, while Blue Hill — which is located 20 highway miles south of Hastings — is a single-car shipper. If both shippers use 110-ton heavy-axle load (HAL) cars, the effective rate differential for corn shipments to Houston, Texas is $3.41 per ton. In the California market, the lowest potential corn rate for Blue Hill is $4,149 per car, versus $3,036 for Roseland and Hastings − a difference of $1,113 per car (or $10.12 per ton). The effective rate for shipments from Blue Hill to Portland in 110-ton hopper cars is $32.82 per ton. Even without the origin efficiency payment (OEP) incentive, the effective shuttle train rate at Roseland is $11.06 per ton (or 51 percent) less than the effective rate at Blue Hill.

It is only 16 highway miles from Blue Hill to Roseland. At roughly 10 cents a ton-mile, the trucking cost comes to only $1.60 per ton. Even after the double-handling cost of $2 per ton is considered, the transshipment cost of $3.60 per ton is only one-third of the rate difference in the Portland market, and only 37 percent of the rate difference in the California market. Houston is the only market where the rate difference is less than the transshipment cost, and this relationship presumes that the elevator at Blue Hill can utilize 110-ton HAL cars.

Trumbull Case Study

The elevator at Trumbull, Nebraska has a track capacity of 27 cars. In comparison, several 100-car shippers' elevators are located in Grand Island. The effective rate differential between Trumbull and Grand Island ranges from $2.49 per ton for shipments in 110-ton HAL cars, to $4.46 per ton for shipments in 102-ton covered hopper cars In the Texas market. To simplify the comparison, only the 110-ton car rate is used. In the California market, the effective rate difference between Trumbull and the 100-car UP elevators located in Grand Island is

$1,417 per car or $12.88 per ton for shipments in 110-ton cars. In the Portland market, the effective rate differential is $6.08 per ton. The simple mean of these differences is $7.15 per ton. This is quite significant given that Trumbull is only 25 highway miles south of Grand Island. For this short distance, the transshipment cost is only $4.50 per ton. Clearly, the unit-train facilities at Grand Island overlap Trumbull's market area.

Other case studies are described in Appendix A. These analyses show that effective rate differentials between shuttle-train and non-shuttle train facilities may induce transshipments or longer farm-to-elevator hauls. However, the lower shuttle train rates are a direct benefit to grain elevators and may increase the net prices received by farmers.

The results of the comparisons as well as those shown in Appendix A should be qualified in several ways: (1) the rates are those effective in March of 2003, (2) potential railroad or motor carrier fuel surcharges are not considered, (3) it is assumed that track capacities are fixed and will not be expanded, and (4) it is assumed that commercial tractor-semitrailer trucks will be used to transport corn.

Chapter 3
LIGHT DENSITY LINES

The components of the rail system most susceptible to service discontinuance and abandonment are the light density lines (LDL) -- existing and former Class I railroad branch lines, the latter now operated by short line carriers. The Nebraska LDL system is examined with a focus on its agricultural use and a core system for further investigation is identified.

Light Density Line System

LDL Definition – The measure used by the Federal Railroad Administration (FRA) to define a light density line in its Local Rail Freight Assistance (LRFA) program, 5 million gross ton-miles per mile per year, was adopted for this evaluation. In the absence of actual tonnage quantification, all lines of short line railroads were assumed to meet the criterion.

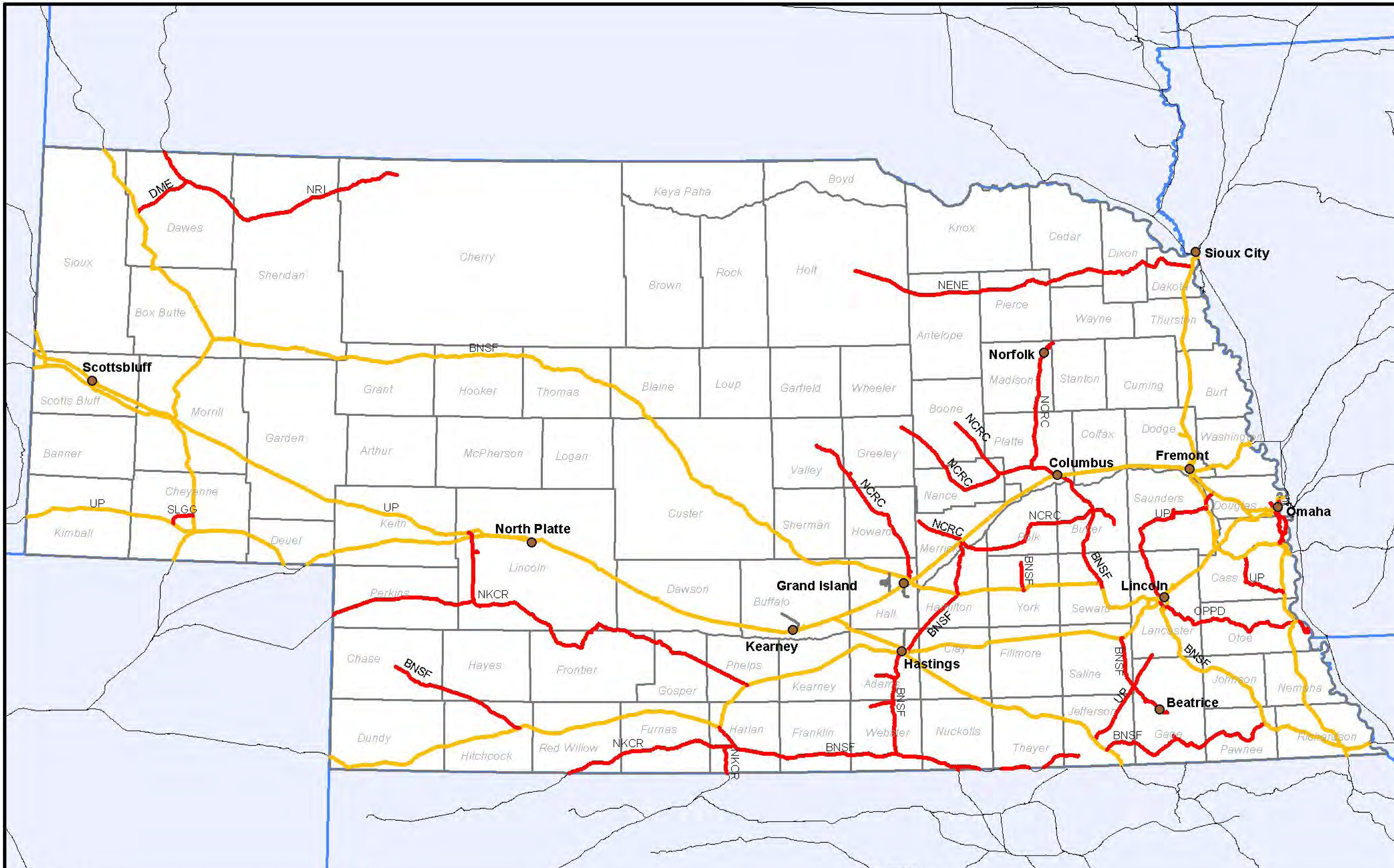
LDL Designation – The rail lines identified using the definition above are shown in Exhibit 3-1 and are listed by line segment in Appendix B. The designated lines total 1,359 miles (route miles) in length and as such, comprise 36 percent of the statewide rail system. The composition of the LDL system by carrier is contained in Exhibit 3-2 below.

Exhibit 3-2
LDL SYSTEM BY RAILROAD
2003

Railroad	Route Miles	Percent LDL System	Percent State Rail System
BNSF	419[1]	31	11
DME	41	3	1
NCRC	273	20	7
NENE	116	9	3
NKCR	249	18	7
NRI	73	5	2
OPPD	56	4	2
SLGG	11	1	--
UP	121	9	3
TOTALS	**1,359**	**100**	**36**

(1) 88 miles are in the process of being abandoned.

Source: Railroad Data



Rail Lines:

BNSF - Burlington Northern & Santa Fe
DME - Dakota, Minnesota, & Eastern
OPPD - Omaha Public Power District
NCRC - Nebraska Central
NENE - Nebraska Northeastern
NKCR - Nebraska, Kansas, & Colorado
NRI - Nebkota
SLGG - Sidney & Lowe
UP - Union Pacific

NEBRASKA

Light Density Line System

30 0 30 Miles

Exhibit 3-1

It is evident from examination of the exhibit that branch lines of the BNSF comprise the largest portion of the LDL system, almost one-third, followed by the NCRC with one-fifth. Together, the two carriers account for one-half of the system. Nebraska lines of the NKCR comprise the next largest component at 19 percent. Given the trend toward branch line spin-offs by Class I railroads, it is interesting that 40 percent of the state's LDL system is still operated by BNSF and UP.

LDL G rain – Based on data obtained for purposes of this study, approximately 30 percent of the grain originated on the rail system is loaded on the identified LDL system. Given that rail transports 44 percent (1997) of Nebraska's grain, the LDL system originates about 13 percent of state totals.

Screening Process

A screening process was developed to select those LDLs most important to the state, a core system, and at the same time to reduce the universe of lines for further study. The process as developed is the subject of Exhibit 3-3.

Criteria – The criteria used for screening purposes were identified in discussions with the Railway Council. They were selected to assist in identifying those lines which would result in the most adverse impacts if they were abandoned, while at the same time screening out those which had the least chance of being economically viable and thus less likely to remain a component of the rail system over the long term. The thrust of the criteria is based on agricultural impacts.

The initial screen uses carloadings per mile measures generally accepted as default values for viability absent a financial analysis of revenues and costs. A line transporting less than 34 carloads per mile is not likely to be viable while one with over 100 cars per mile is.

Those lines with carloading densities lying between the two carloading criteria, 34 and 100 per mile, were addressed using additional measures. The presence of a major agricultural production facility, such as an ethanol plant, or a major non-agricultural facility, such as a coal-fired power plant, was considered a contributing factor to long-term viability as was the grain

SCREENING PROCESS
FLOW DIAGRAM

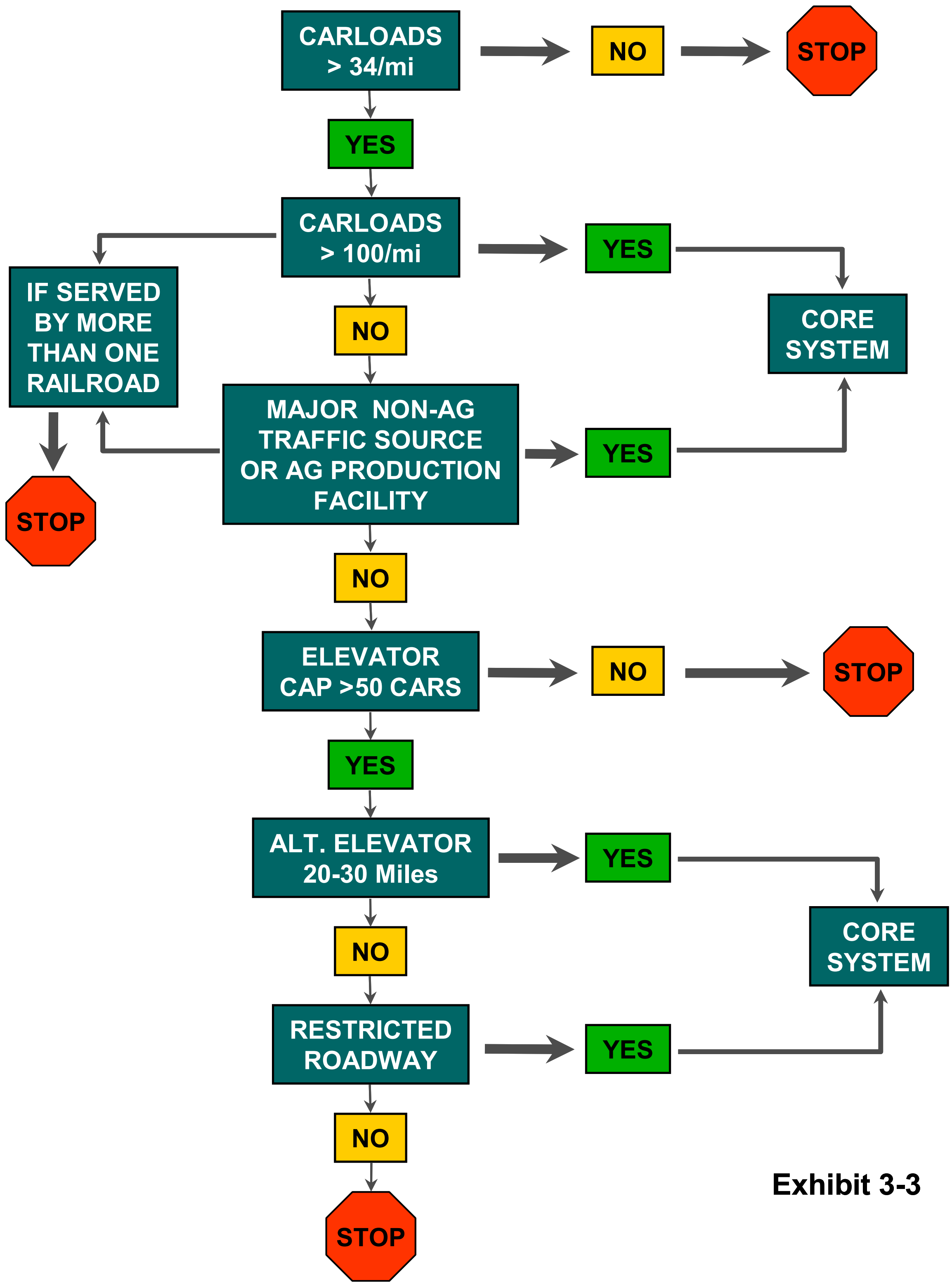


Exhibit 3-3

elevator capacity measure. Elevators without the capacity to load 50 cars at one time are not considered to be efficient from a rail perspective in today's operating and related transportation cost environment.

The results from application of the two criteria above, however, are to be reconsidered if the carload volume is driven by an on-line business or businesses, that are, or can be, served by more than one railroad. Assuming that the second railroad has an adequate track structure to maintain service, then the line segment is not considered to be part of the core system for funding purposes.

The remaining two criteria address impacts as they relate to access to alternate elevators, i.e., distance and permissible truck weights.

Core System Delineation

The screening process was applied to the previously identified LDL system. The core system components are identified based on the process as discussed in the following paragraphs.

Carloadings – On-line carloadings were for the most part identified from railroad supplied data. Some telephone survey work was performed to supplement the data. Once the data were compiled, the total volumes were divided by the length of the rail line involved. Line lengths were obtained from track charts provided by the railroads.

The process revealed that 11 lines had traffic densities exceeding the 100-car-per-mile criterion and 9 had less than the 34-car-per-mile criterion. Further examination and segmentation of the lines transporting less than 100 cars per mile, however, resulted in identification of two segments of two different lines that did meet the criterion.

AG Production/Non-Ag Facilities – Consideration of agricultural production facilities and major non-agricultural rail traffic generation sources added three LDLs to those that met the first two core system criteria. Non-agriculture related traffic volumes were significant contributors in exceeding the 100-car-per-mile threshold for several lines already included.

Multiple Railroad Service – Consideration of service to businesses by more than one railroad, however, eliminated three lines that had passed the first two screens. Two involved facilities not related to agriculture, and one an agricultural production facility.

Grain Elevator Capacity – Surprisingly, only a few LDLs were found not to have elevators capable of loading at least 50-car trains (see Appendix C for elevator location capacity on each line by rail carrier). This criterion by itself had no impact on the composition of the core system.

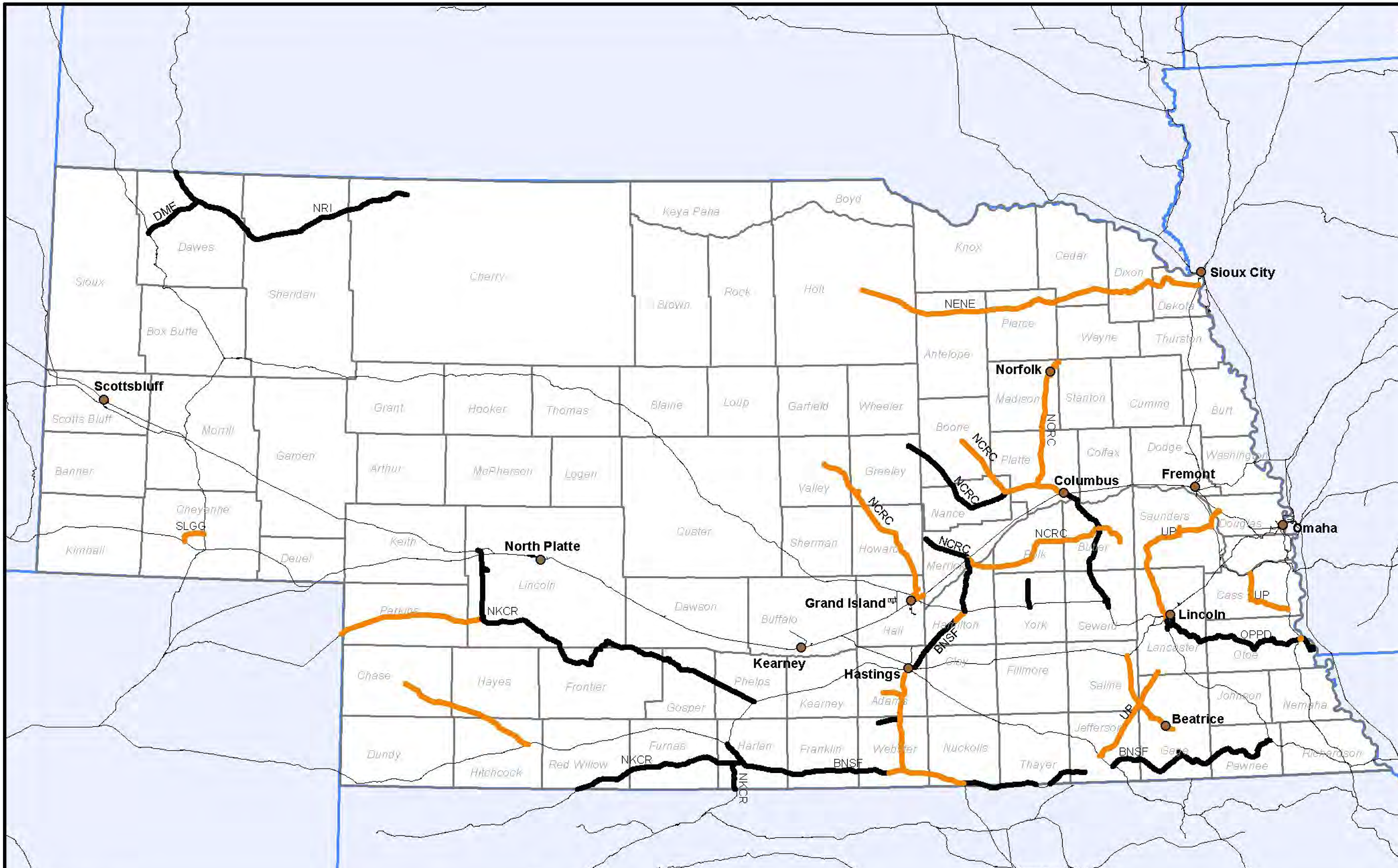
Alternate Elevator Access – This criterion, as it turned out, was significant in the designation of several LDLs. The discussion in Appendix A and summarized in Chapter 2 indicates that major elevators (100-car and/or shuttle train) can economically draw from 20 to 30 miles away. Both 20- and 30-mile radius zones were established from each major elevator located on either a mainline or a light density line already designated as an LDL core system component. Two lines were added to the core system using this criterion that had not already been included or eliminated (carload-per-mile density between 34 and 100), and one was reinstituted after having been eliminated because of two railroad service to a non-ag facility.

Restricted Roadway – Access to alternate elevators was examined for LDLs that had passed all of the steps in the screening process to this last consideration without a designation. Roadways between elevators or each such LDL and the nearest major elevator on another line, either mainline or core system LDL, were identified. Data on restrictions on use of the roadway segments were gathered from NDOR and country sources, as appropriate. None of the roadways were found to have any features that would prohibit the movement of grain trucks.

LDL Core System

The designated LDL core system is revealed in Exhibit 3-4. The sum of the individual components is 667.2 miles or just under one-half (49 percent) of the LDL system. The individual components are listed in Exhibit 3-5.

Exhibit 3-5 also displays two operating characteristics of each of the core system lines – maximum permissible operating speed and weight limitation. It is desirable for each component



Rail Lines:

BNSF	- Burlington Northern & Santa Fe
DME	- Dakota, Minnesota, & Eastern
OPPD	- Omaha Public Power District
NCRC	- Nebraska Central
NENE	- Nebraska Northeastern
NKCR	- Nebraska, Kansas, & Colorado
NRI	- Nebkota
SL	- Sidney & Lowe
UP	- Union Pacific

Core System Line

Non-Core Line

NEBRASKA

LDL Core System Lines

N
W E
S

30 0 30 Miles

Exhibit 3-4

Exhibit 3-5
CORE SYSTEM
LIGHT DENSITY LINES

UP LDLs	**Length (miles)**	**Max Operating Speed (mph)**	**Wt. Limits (1,000 lbs.)**
Valley to Lincoln	56.5	40	286
Fairbury to Sheldon Station	38.2	10	NA
Union to Louisville	26.2	20	NA
Subtotal	**120.9**		
BNSF LDLs			
Culbertson to Imperial	49.1	30	268
Hastings to Lester Junction	37.0	10/25	286
Ayr to Roseland	6.9	25	286
Crete to Beatrice	32.0	30	268
Red Cloud to Lester Junction	5.0	25	286
Lester to Superior	20.7	25	286
Giltner to Aurora	9.5	49	286
Subtotal	**160.2**		
NCRC			
Grand Island to Ord	60.8	25	286
Central City to Brainard	63.0	25	286
Albion to Oconee	34.7	25	286
Columbus to Norfolk	51.3	25	286
Subtotal	**209.8**		
NKCR			
CO State Line (Venango) to Wallace	48.9	40	286
SLGG			
Brownson to Huntsman	11.0	25	286
NENE			
Ferry to O'Neill	116.4	10	286
TOTAL	**667.2**		

of the core system to have the ability to support 25-mph operations (FRA Track Safety Class 2) and 286,000-lb. gross car weights. As evident from examination of the exhibit several of the core LDL's do not have these capabilities and a number of the others have multiple location-specific restrictions.

APPENDICES

APPENDIX A

Grain Transportation Analysis

Appendix A

Analysis of Corn Rates and Transshipment Costs at Select Nebraska Railway Stations

This paper presents background information relevant to an assessment of the light-density railroad network in Nebraska. In the future, the light-density network will be affected by broad transportation and marketing trends, such as the continued shift to shuttle trains and heavy-axle load cars. Moreover, the viability of these lines will be affected by the quality of the track infrastructure and the cost-efficiency of branch-line operations relative to short-haul trucking. Both railroad and trucking costs will be affected by potential increases in fuel prices.

In the future, branch-line elevators must be price-competitive with shuttle-train elevators, otherwise farmers will bypass them and deliver grain directly to shuttle stations. A branch-line elevator may be non-competitive if: the sum of the rail rate from a nearby shuttle facility to final market, plus the cost of trucking grain from the branch-line elevator to the shuttle facility, is less than the rail rate from the branch-line station to the same final market. This relationship is illustrated in Figure 1. If the rate from B to C, plus the trucking cost from A to B, is less than the rate from A to C, the shuttle facility will overlap the branch-line elevator's market area. If grain can be transshipped from a branch-line elevator to a shuttle facility without a net increase in transportation and handling cost, then the economic justification of the branch-line facility is in question.

The focus of this analysis is on four branch lines where smaller grain elevators are located within relatively short highway distances of shuttle facilities. These segments are:

- Hastings to Lester Junction, especially the segment from Ayr Junction to Lester Junction
- Hastings (or GH Junction) to Aurora
- Lester Junction to Endicott, via Superior
- Fairbury to Hallam, especially the segment from Plymouth to Hallam

Rate relationships are analyzed for three stations located on the Hastings-to-Lester Junction line: Hastings, Roseland, and Blue Hill. The two elevators at Hastings have track capacities of 54 and 88 covered hopper cars. Roseland is a 110-car shuttle loader, while Blue Hill—which is located 20 highway miles south of Hastings—is a single-car shipper.

Two important elevators are located between Hastings and Aurora: Giltner and Trumbull. Trumbull has a track capacity of 27 cars, which is the threshold for utilizing multi-car rates. Giltner has a track capacity of 54 cars. Both elevators are located approximately 25 highway miles south of a shuttle loader at Grand Island.

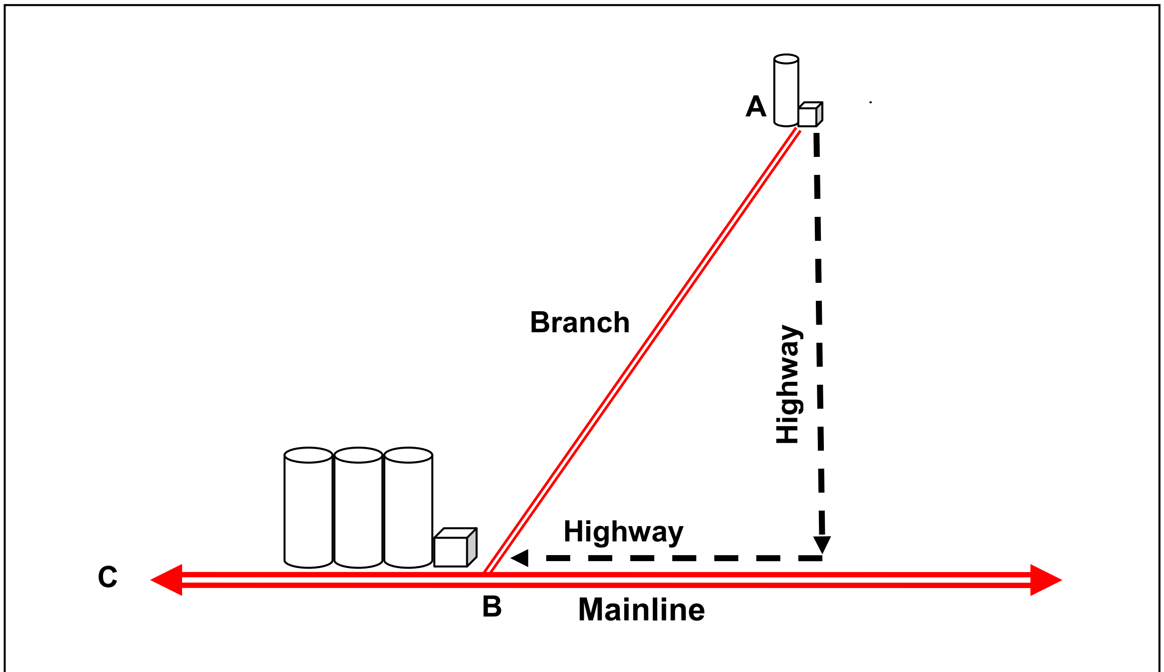


Figure 1. Illustration of Branch-Line/Mainline Relationship

Superior is a 100-car shipper. However, Byron—which is located 17 highway miles east of Superior—has a track capacity of only 14 cars. Guide Rock, which is located 20 highway miles west of Superior, has two grain elevators. However, their total track capacity is less than ten cars.

The Fairbury-Hallam branch is a dead-end line. The Hallam Grain elevator—which is located at the end of the line—has a track capacity of 9 cars. However, the Farmers Coop Elevator at Plymouth and the Aurora Coop Elevator at Sedan are 100-car shuttle shippers.

In addition to these lines, rate relationships between Genoa and Silver Creek are analyzed. Genoa is a single-car shipper located on the Nebraska Central Railway. Silver Creek, which is located on the UP mainline, has a track capacity of 100 cars.

Part I of this paper describes the corn rate structure in eastern Nebraska and compares rates for the above-mentioned branch-line stations and shuttle facilities. Corn rates are examined for three major markets: Texas, California, and the Pacific Northwest. Both BNSF and UP rates are analyzed. In Part II of the paper, grain trucking costs are estimated and inferences are drawn about the relationships depicted in Figure 1. In Part III, the potential effects of energy costs are analyzed including a discussion of potential fuel surcharges. The adequacy of the highway network connecting branch-line and shuttle-train stations is addressed in a subsequent paper.

I. Corn Rate Structure in Eastern Nebraska

Many types and levels of corn rates exist. Rates vary by size of shipment (i.e., the number of cars per shipment), service level (shuttle versus non-shuttle), car capacity, and allowable gross weight on rails. The maximum gross weight on rails (GWOR) is determined by many factors including: (1) axle (journal) bearing size and wheel diameter, and (2) track structural capacity. Some segments of the railroad network are restricted to 268,000 pounds GWOR.

Railroads own several models of grain hopper cars. The oldest and smallest cars are rated at 263,000 pounds GWOR. In many instances, 268,000 and 286,000 pounds are the threshold weights at which rates take effect. Typically, the tare or empty weight of a covered hopper car ranges from 62,000 to 64,000 pounds, or 31 to 32 tons. Thus, a gross car weight of 268,000 pounds results in a net load of 102 to 103 tons of corn. With a tare weight of 31.5 tons, a car rated at 263,0000 pounds can accommodate 100 tons of corn.

Cars that can be loaded to 286,000 pounds are referred to generically as *Heavy Axle Load* (HAL) cars. However, there are several classes of HAL cars. Smaller HAL cars have capacities of 5,000 cubic feet or less. However, the newest HAL cars have capacities of 5,150 cubic feet or greater. In some cases, different rates are published for smaller and larger HAL cars.

Because rates are published on a carload basis, and because different models of cars have different pay load potential, it is useful to convert carload rates to rates per ton. The comparisons presented in this paper reflect the following assumptions: (1) the median capacity of covered hopper cars within the 4,750-to-5,000 cubic-foot range is 4,875 cubic feet, and (2) the typical capacity of HAL cars with capacities ≥ 5,001 cubic feet is 5,161 cubic feet. This latter value is used by BNSF when describing its shuttle train program.

At a median capacity of 4,875 cubic feet, the smaller HAL cars can accommodate approximately 110 tons of corn.[1] In comparison, the larger HAL cars can accommodate 116 tons of corn. A covered hopper car that is restricted to 268,000 pounds GWOR is assumed to be loaded to 102 tons. These non-HAL cars include the 263,000-pound (or 100 ton) covered hopper car. With this background, the paper now turns to a description of BNSF's shuttle train rates.

BNSF Shuttle Train Rates

BNSF defines a shuttle as a 110-car train of dedicated high capacity covered hopper cars – e.g., cars with 5,161 cubic feet of interior space. These heavy axle load cars can be loaded to a gross weight of 286,000 pounds.

BNSF dedicates a set of locomotives to each shuttle train, so that the train can be moved immediately after loading and unloading. In addition, BNSF pays incentives to shippers who load and unload in 15 hours. Under the Origin Efficiency Program (OEP), BNSF pays a $100 per car if the train is loaded in 15 hours at origin. Only shuttle shippers such as Roseland are eligible for OEP payments. Under the Destination Efficiency Program (DEP), BNSF pays an additional $100 per car if the train is unloaded in 15 hours at destination. The DEP incentive is paid to the receiver (i.e., the unloader).

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[1] All calculations of net car weights assume that corn weighs 56 pounds per bushels. Cubic feet are converted to bushels using a conversion factor of .8036.

In addition, BNSF offers a reload incentive of $100 per car to customers that can reload a shuttle train within 38 hours from the time the loaded train is officially spotted at the customer's facility. This incentive applies primarily to facilities that can receive and load shuttles.

The base shuttle train rates for corn shipments from Roseland to several destinations are shown in Table 1. These destinations are representative of others stations located in the same general vicinity. For example, Guernsey, Swanson, and Trigo — all of which are located in the San Joaquin Valley of California — are assigned the same rate as Kings Park. Vancouver, Kalama, Longview, Tacoma, and Seattle, Washington are assigned the same rate as Portland, Oregon. The shuttle train rates to Beaumont and Galveston, Texas are the same as the rates to Houston. Similarly, the rate to Hereford, Texas is the same as the rate to Amarillo.

Table 1. BNSF 110-Car Shuttle Train Rates Per Car from Roseland, Nebraska to Select Destinations (Effective Until 03/31)

	Gross Weight on Rail		
		286,000 lb (HAL)	
Destination	**268,000 lb**	**≤ 5,000 cu-ft**	**≥ 5,001 cu-ft**
Portland, OR	$ 2,268	$ 2,394	$ 2,520
Kings Park, CA	$ 2,088	$ 2,204	$ 2,320
Amarillo, TX	$ 1,620	$ 1,710	$ 1,800
Houston, TX	$ 1,872	$ 1,976	$ 2,080
Source: BNSF 4022, Item 39003			

As shown in Table 1, the rates vary with car size. If the loader or receiver cannot accommodate 286,000-pound cars, then the rates in Column 2 apply (i.e., the 268,000- pound rates). If a shipper loads HAL cars with capacities ranging from 4,750 to 5,000 cubic feet, the rates in Column 3 apply. However, if a shipper loads the larger HAL cars with capacities of 5,001 cubic feet or greater, the rates in Column 4 apply.

None of these rates reflect the OEP, DEP, or shuttle reload incentives discussed earlier. Thus, it is possible than the actual freight cost after OEP and DEP rebates may be $200 less per car than the rates shown in Table 1. Moreover, the base rates shown in Table 1 do not reflect COT premiums or discounts, which could increase or decrease the rate per car.

Shuttle Rates per Car-Mile

Table 2 shows the shortest BNSF distances from Roseland to the four destinations, while Table 3 shows the rates per car-mile. As Table 3 shows, corn rates are related inversely to distance. Thus, the rates to the Pacific Coast are lower on a car-mile basis than the rates to the Texas.

Table 2. Railroad Distances via BNSF from Roseland, Nebraska to Select Destinations	
Destination	**Distance**
Portland, OR	1,833
Kings Park, CA	1,845
Amarillo, TX	630
Houston, TX	919

Table 3. BNSF 110-Car Shuttle Rates Per Car-Mile from Roseland, Nebraska to Select Destinations (Effective Until 03/31)			
	Gross Weight on Rail		
		286,000 lb (HAL)	
Destination	**268,000 lb**	**≤ 5,000 cu-ft**	**≥ 5,001 cu-ft**
Portland, OR	$ 1.24	$ 1.31	$ 1.37
Kings Park, CA	$ 1.13	$ 1.19	$ 1.26
Amarillo, TX	$ 2.57	$ 2.71	$ 2.86
Houston, TX	$ 2.04	$ 2.15	$ 2.26

Shuttle Rates per Ton

All shuttle-train rates are carload rates. Thus, the rate per ton is affected by the capacity of the car and the load in the car. Table 4 presents a comparison of rates per ton for shuttle movements from Roseland to the four destinations. The comparison reflects the assumptions stated earlier — i.e., cars rated at 268,000 pounds GWOR or less are assumed to be loaded with 102 tons of corn, while the smaller and larger HAL cars are assumed to be loaded with 110 and 116 tons of corn, respectively.

Table 4. BNSF 110-Car Shuttle Rates Per Ton from Roseland, Nebraska to Select Destinations (Effective Until 03/31)			
	Gross Weight on Rail		
		286,000 lb (HAL)	
Destination	**268,000 lb**	**≤ 5,000 cu-ft**	**≥ 5,001 cu-ft**
Portland, OR	$ 22.24	$ 21.76	$ 21.72
Kings Park, CA	$ 20.47	$ 20.04	$ 20.00
Amarillo, TX	$ 15.88	$ 15.55	$ 15.52
Houston, TX	$ 18.35	$ 17.96	$ 17.93

As shown in Table 4, the rates per ton are essentially the same for both versions of HAL car. However, the rate per ton is somewhat higher in the 268,000-pound car, reflecting economies (or diseconomies) of load.

There are some differences in shuttle terminology and options between the UP and BNSF. UP refers to large 100-car shippers as shuttle stations. However, shuttle rates are included in the same tariff items as other (non-shuttle) rates. UP also distinguishes between HAL and smaller covered hopper cars. The typical weight threshold is 206,000 net pounds, which corresponds approximately to 268,000 pounds GWOR.

Corn Rates at Select BNSF and UP Stations

There are variations in service levels and rate options among railroads and destination markets. Therefore, each rate structure is reviewed separately.

Corn Rates to Houston

Table 5 illustrates BNSF's corn rate structure from eastern Nebraska to Houston, Texas. The Houston rates also apply to shipments destined for Beaumont and Galveston. The 110-car rate from Roseland is $109 per car higher than the shuttle-train rate for smaller HAL cars shown in Table 1 ($1,976 per car). However, as noted earlier, a shuttle loader could receive a $100 per car rebate under the Origin Efficiency Program, in which case the effective shuttle-train rate from Roseland would be $1,876 per car.

Table 5. BNSF Corn Rates for Non-Shuttle Movements from Blue Hill, Roseland, and Hastings, Nebraska to Houston, Texas

Cars per Shipment	Blue Hill	Roseland	Hastings
1 - 26	$ 2,460	$ 2,510	$ 2,560
27 - 53	$ 2,235	$ 2,285	$ 2,335
54 - 109	$ 2,135	$ 2,185	$ 2,235
110	$ 2,035	$ 2,085	$ 2,135

Source: BNSF 4022, Item 33150. **Note**: Gross Weight on Rail must be ≤ 286,000 pounds

Comparison of Rates Applicable to Blue Hill, Roseland, and Hastings

While Roseland is a shuttle loader and can load 110-car trains, Blue Hill is a small elevator that originates less than 26 cars per shipment. Hastings has several elevators, but none of them are shuttle loaders. In order to compare rates at these stations, carload rates are converted to rates per ton. Rates are computed for Blue Hill under two car scenarios: (1) use of 268,000-pound cars with a net load of 102 tons, and (2) use of smaller HAL cars with a net load of 110 tons.

Table 6. BNSF Corn Rates per Ton for Non-Shuttle Movements from Blue Hill, Roseland, and Hastings, Nebraska to Houston, Texas				
Cars per Shipment	**Blue Hill[1]**	**Blue Hill[2]**	**Roseland[2]**	**Hastings[2]**
1 - 26	$ 24.12	$ 22.36	$ 22.82	$ 23.27
27 - 53	$ 21.91	$ 20.32	$ 20.77	$ 21.23
54 - 109	$ 20.93	$ 19.41	$ 19.86	$ 20.32
110	$ 19.95	$ 18.50	$ 18.95	$ 19.41

Source: BNSF 4022, Item 33150. **Note**: Gross Weight on Rail must be ≤ 286,000 pounds
1. Rate applicable to 268,000-lb cars. **2.** Rate applicable to 286,000-lb cars with ≤ 5,000 cu-ft

When Blue Hill uses 268,000-pound cars, the rate per ton for 54-car shipments from Roseland to Houston is $4.26 less than the rate from Blue Hill to Houston (Table 6). The difference between the 110-car and single-car rates is even greater: $5.17 per ton, or 27 percent. However, the disparity is less if Blue Hill uses HAL cars. In this case, the single-car rate at Blue Hill ($22.36 per ton) is $3.41 per ton or 18 percent higher than the 110-car rate at Roseland.

In general, the rates from Hastings to Houston are lower than the rates from Blue Hill, but are higher than the rates from Roseland to Houston. Both elevators at Hastings have track capacities in excess of 54 cars. Their effective rate is $20.32 per ton for shipments in 110-ton cars.

Rates Applicable to Giltner, Trumbull and Grand Island

Table 7 shows a similar rate comparison for Giltner, Trumbull, and Grand Island. The BNSF rates at these stations are fairly-well equalized. However, as Table 8 shows, Union Pacific rates from Grand Island to Houston are lower than BNSF rates. For example, the UP rate for a 100-car shipment from Grand Island to Houston in 268,000-pound cars is $1,900 per car, or $18.63 per ton. The UP rate per ton for a 100-car shipment from Grand Island to Houston in 110-ton cars is $18.92. However, the rate for a 100-car shipment in a 116-ton car is $17.94 per ton. In essence, the lowest UP rate is comparable to the BNSF shuttle-train rate for large HAL cars shown earlier in Table 3 ($17.93 per ton).

Table 7. BNSF Corn Rates per Car for Non-Shuttle Movements from Giltner, Trumbull, and Grand Island, Nebraska to Houston Texas			
Cars per Shipment	**Giltner**	**Trumbull**	**Grand Island**
1 - 26	$ 2,580	$ 2,580	$ 2,660
27 - 53	$ 2,355	$ 2,355	$ 2,435
54 – 109	$ 2,255	$ 2,255	$ 2,335
110	$ 2,155	$ 2,155	$ 2,235

Source: BNSF 4022, Item 33150
Note: Gross Weight on Rail must be ≤ 286,000 pounds

Table 8. UP Corn Rates per Car from Grand Island, Nebraska to Houston, Texas		
	Net Weight in Pounds	
Cars per Shipment	**1 - to - 206,001**	**206,001 - to - 234,000**
69-91	$ 1,970	$ 2,157
92 -100	$ 1,900	$ 2,081
Source: UP 4051, Item 1132-G		

The 27-to-53 car rate is the lowest rate that can be utilized by the elevator at Trumbull. When shipments from Trumbull to Houston are made in 268,000-pound cars, the effective rate of $23.09 per ton (Table 9) is $4.46 higher than the 100-car UP rate for shipments originated from Grand Island in 268,000-pound cars ($18.63 per ton). When corn is shipped in 110-ton cars, the effective rate differential at Trumbull is $2.49 (Table 9). In essence, the rate differential ranges from 13 to 24 percent per ton, depending upon the weight of the car being used.

Table 9. Comparison of Effective Rates for Trumbull and Grand Island, Nebraska for Shipments of Corn to Houston (Rates in Dollars per Ton)		
	Net Car Weight in Tons	
	102	**110**
Effective Rate at Trumbull	$ 23.09	$ 21.41
Effective Rate at Grand Island	$ 18.63	$ 18.92
Effective Rate Differential	$ 4.46	$ 2.49
Percent Difference in Rate	24%	13%

The rate differential is less between Giltner and Grand Island, because the elevator at Giltner can utilize the 54-car rate. The effective rates at Giltner are 8 to 19 percent higher than the 100-car rates from Grand Island to Houston, depending upon the weight of car being used (Table 10).

Table 10. Comparison of Effective Rates for Giltner and Grand Island, Nebraska for Shipments of Corn to Houston (Rates in Dollars per Ton)		
	Net Car Weight in Tons	
	102	**110**
Effective Rate at Giltner	$ 22.11	$ 20.50
Effective Rate at Grand Island	$ 18.63	$ 18.92
Effective Rate Differential	$ 3.48	$ 1.58
Percent Difference in Rate	19%	8%

Rates Applicable to Byron, Guide Rock, and Superior

BNSF corn rates for shipments from Byron, Guide Rock, and Superior to Houston are shown in Table 11. The rate structures are almost identical for these stations, expect that a 110-car rate is not published for Byron, which has a track capacity of only 14 cars. The two elevators at Guide Rock have track capacities of 5 cars or less. Consequently, these elevators must utilize the highest rate levels shown in Table 11. In comparison, Agrex, Inc. at Superior can accommodate 110 cars. Thus, the effective rate differential between Guide Rock and Superior is $425 per car or $4.17 per ton for shipments in 268,000-pound cars (Table 12). If both stations use small HAL cars, the effective rate differential is $3.86 per ton (Table 13). If Superior is able to use larger cars than Guide Rock, the rate disparity could increase from 21 to 30 percent.

The rates shown for Byron are generic mileage rates that apply to movements anywhere in the Southwest. They could be superceded by any specific rates that BNSF publishes in the future. These rates should be interpreted cautiously, since they do not reflect local rate relationships or market competition.

Table 11. BNSF Corn Rates for Non-Shuttle Movements from Byron, Guide Rock, and Superior, Nebraska to Houston Texas

Cars per Shipment	Byron	Guide Rock	Superior
1 - 26	$ 2,417	$ 2,460	$ 2,460
27 - 53	$ 2,317	$ 2,235	$ 2,235
54 – 109	$ 2,219	$ 2,135	$ 2,135
110		$ 2,035	$ 2,035

Source: BNSF 4022, Item 33150, except for Byron (Item 33945). Rates at Byron are mileage rates that apply only in the absence of other published rates. **Note**: GWOR must be ≤ 286,000 pounds

Table 12. A Comparison of Effective Rates for Byron, Guide Rock, and Superior, Nebraska for Shipments of Corn to Houston in 268,000-Pound Cars (Rates in Dollars per Ton)

	Byron	Guide Rock
Effective Rate	$ 23.70	$ 24.12
Effective Rate at Superior	$ 19.95	$ 19.95
Rate Differential	$ 3.75	$ 4.17
Percent Difference in Rate	19%	21%

Table 13. A Comparison of Effective Rates for Byron, Guide Rock, and Superior, Nebraska for Shipments of Corn to Houston in 110-Ton Cars (Rates in Dollars per Ton)

	Byron	Guide Rock
Effective Rate	$ 21.97	$ 22.36
Effective Rate at Superior	$ 18.50	$ 18.50
Rate Differential	$ 3.47	$ 3.86
Percent Difference in Rate	19%	21%

Rates Applicable to Hallam, Plymouth and Sedan

The Hallam Grain elevator has a track capacity of only 9 cars and thus is a single-car shipper. The only published rate from Hallam to Houston is $2,478 per car. In comparison, Table 14 shows unit-train rates for Plymouth and Sedan. The Farmers Coop Elevator at Plymouth and the Aurora Coop Elevator at Sedan are 100-car shuttle shippers.

Table 14. UP Corn Rates per Car from Plymouth and Sedan, Nebraska to Houston, Texas		
	Net Weight in Pounds	
Cars per Shipment	**1 - to - 206,001**	**206,001 - to - 234,000**
69-91	$ 1,900	$ 2,081
92 -100	$ 1,830	$ 2,004
Source: UP 4051, Item 1132-G		

As shown in Table 14, the 100-car rate at these stations ranges from $1,830 per car for the 268,000-pound car to $2,004 for shipments in HAL cars. If Hallam Grain ships in 268,000-pound cars while the Farmers Coop Elevator at Plymouth and the Aurora Coop Elevator at Sedan load the largest HAL cars, these latter two elevators will have an effective rate advantage of $6.35 per ton (i.e., $17.94 per ton versus $24.29 per ton at Hallam). The price differential is $4.31 per ton if all facilities load small HAL cars and $4.08 per ton if all facilities load large HAL cars. In percentage terms, the rate difference ranges from 24 to 35 percent.

Rates Applicable to Genoa and Silver Creek

The Frontier Cooperative Elevator at Silver Creek is a 100-car shuttle shipper. In comparison, the Tri-Valley Cooperative at Genoa has a track capacity of only 6 cars. At present, the only corn rate published from these stations to Houston is $2,799 per car. Thus, any rate differences between stations is the result of car capacities.

Genoa is located 55 miles from Grand Island, where the 268,000-pound carload rate is $1,900, or $7.84 less per ton than the effective rate at Genoa. As described later in the paper, it costs about 10 cents per ton-mile to haul grain in a hopper semitrailer, including the cost of the empty return. The additional “double-handling” cost is about $2.00 per ton. In essence, the sum of the trucking cost from Genoa to Grand Island, the cost of dumping and re-elevating the corn at Grand Island, and the 100-car rate from Grand Island to Houston is slightly lower than the effective rate from Genoa to Houston.

Transshipment costs are examined in Part II of the paper. Next, the corn rate structure from eastern Nebraska to California is examined.

Corn Rates to California

Both BNSF and UP offer unit train and HAL rates to the San Joaquin Valley of California. Two destinations are selected for analysis: Kings Park and Tulare. Both stations are located south of Fresno in Kings County. They are very close to each other, located at approximately the same latitude. Kings Park is on the BNSF line while Tulare is on the UP line.

Table 15 shows distances from BNSF stations to Kings Park, Houston, and Portland, OR. Table 16 shows comparable distances for UP stations.

Table 15. BNSF Rail Miles from Nebraska Origins to Major Corn Markets			
	Destination City and State		
Origin City	**Kings Park, CA**	**Portland, OR**	**Houston, TX**
Blue Hill	1,829	1,835	903
Byron	1,807	1,891	881
Giltner	1,847	1,797	941
Grand Island	1,875	1,769	969
Guide Rock	1,805	1,859	879
Hastings	1,828	1,816	922
Roseland	1,845	1,833	919
Superior	1,790	1,874	864
Trumbull	1,838	1,806	932

Table 16. UP Rail Miles from Nebraska Origins to Major Corn Markets			
	Destination City and State		
Origin City	**Tulare, CA**	**Portland, OR**	**Houston, TX**
Grand Island	1,708	1,628	1,037
Hallam	1,819	1,739	940
Plymouth	1,800	1,720	921
Sedan	1,738	1,658	949
Silver Creek	1,752	1,673	1,069

BNSF Heavy Axle Load Rates

BNSF publishes a HAL rate for movements in the covered hopper with capacities of 5,001 cubic feet or greater. The rate requires a minimum tender of 54 cars and a maximum of 109 cars. The applicable HAL rate is $3,316 per car for shipments originated from Blue Hill, Roseland, Hastings, and Superior destined for Kings Park. In a 116-ton car, this rate is equivalent to $28.59 per ton. The applicable HAL rate is $3,376 for shipments originated from Giltner, Trumbull, and Grand Island, or $29.10 per ton in a 116-ton car.

BNSF Rates for Smaller Cars

BNSF also publishes rates for shipments in smaller cars from many of the same stations (Table 17). These rates are applicable to cars with 5,000 cubic feet of interior capacity or less. They are applicable to both smaller HAL cars (e.g., 110-ton cars) and 268,000 pound cars (e.g., 102-ton cars).

Table 17. BNSF Rates from Select Nebraska Stations to Kings Park, CA in Covered Hopper Cars with less than 5,001 Cubic Feet of Capacity			
	Origin Stations		
Cars per Shipment	Superior	Blue Hill, Roseland, and Hastings	Giltner, Trumbull, and Grand Island
1-26	$ 4,062	$ 4,149	$ 4,210
27-53	$ 3,809	$ 3,896	$ 3,957
54-110	$ 3,136	$ 3,036	$ 3,096
Source: BNSF 4022, Item 33350			

Table 18 shows UP rates from Grand Island and Silver Creek to Tulare, CA. The UP HAL rate for shipments up to 68 cars is comparable to the BNSF HAL rate of $3,316 per car from Blue Hill, Roseland, Hastings, and Superior to Kings Park. Otherwise, the UP rates from Grand Island and Silver Creek to California are lower than BNSF rates.

Table 18. UP Corn Rates per Car from Grand Island and Silver Creek to Tulare, CA		
	Carload Weight in Pounds	
Cars per Shipment	1 - to - 206,001	206,001 - to - 234,000
1-68	$ 3,060	$ 3,310
69-82	$ 2,360	$ 2,610
83 -90	$ 2,290	$ 2,540
Source: UP 4051, Item 2306		

Comparison of Rates from Blue Hill, Roseland, and Hastings to California

As shown in Table 17, the rates from Superior, Blue Hill, Roseland, and Hastings to Kings Park are the same. These are 1 to 2 percent lower than comparable rates for Giltner, Trumbull, and Grand Island. However, BNSF rates from Superior to Kings Park are about 2 percent lower than the rates from Hill, Roseland, and Hastings. These differences are explained by differences in distance (Table 16).

Blue Hill and Trumbull cannot utilize the 116-ton car rate of $3,316 because of limited track capacity. Neither elevator can accommodate 54 cars in a single switch. The lowest potential rate for Blue Hill is $4,149 per car, versus $3,036 for Roseland and Hastings (Table 17). This difference of $1,113 per car (or $10.12 per ton) would appear to make Blue Hill non-competitive with the larger elevators in the San Joaquin market.

Comparison of Rates from Grand Island, Giltner, and Trumbull to California

Trumbull can utilize the 27-car 110-car rate of $3,957 per car. Thus, there is a rate differential of $861 per car or $7.83 per ton, as compared to BNSF stations in Grand Island. However, UP shippers in Grand Island have a significant rate advantage over BNSF elevators for shipments to the same general area of California. Both the Aurora Coop and Peavey elevators are 100-car loaders, and can utilize the lowest rate of $2,540 per car. Thus, the effective rate difference between Trumbull and the 100-car UP elevators located in Grand Island is $1,417 per car or $12.88 per ton for shipments in 110-ton cars. The rate difference between Giltner and the UP stations at Grand Island is $556 per car or $5.05 per ton for shipments in 110-ton cars.

Comparison of Rates from Byron, Guide Rock, and Superior to California

The rates from Byron and Guide Rock to Kings Park are mileage rates that apply only in the absence of other published rates. The mileage rates apply to shipments in any covered hopper car. Since Byron and Guide Rock have track capacities of 14 cars or less, these stations can utilize only the highest rate level shown in Table 19.[2] Under the mileage scale, these elevators are not at a significant disadvantage relative to Superior, as the rate differential is only $124 per car (or $1.13 per ton) for shipments in 110-ton cars.

Table 19. Rates from Byron and Guide Rock to Kings Park, CA in Covered Hopper Cars

	Origin Station	
Cars per Shipment	**Byron**	**Guide Rock**
1-26	$ 3,260	$ 3,260
27-53	$ 3,160	$ 3,160
54-110	$ 3,060	$ 3,060
Source: BNSF 4022, Item 33945		

Comparison of Rates from Hallam, Plymouth, and Sedan to California

The single-car rate from Hallam to Tulare is a mileage-based rate of $3,946 per car. As shown in Table 21, the rates from Plymouth to Tulare are much lower. Since the Farmers Coop Elevator has a track capacity of 100 cars, it can utilize the lowest rate of $2,470 per car. The difference in effective rates between Hallam and Plymouth is $1,476 per car or $14.47 per ton.

Table 20. Corn Rates per Car from Plymouth to Tulare, CA

	Carload Weight in Pounds
Cars per Shipment	**1 - to - 206,001**
1-68	$ 3,170
69-82	$ 2,470
Source: UP 4051, Item 2306	

Table 21 shows UP rates from Sedan to Tulare. If both Hallam and Sedan use 102-ton cars, the effective rate difference is $15.16 per ton. However, if both shippers use 110-ton cars, the effective rate differential is $11.78 per ton.

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[2] The mileage-based rates in Item 33945 are essentially the same for Blue Hill, Roseland, Hastings, Bryon and Guide Rock. However, the rates shown in Table 15 do not apply to Blue Hill, Roseland, Hastings because specific rates are published for these stations in Item 33350.

Table 21. Corn Rates per Car from Sedan to Tulare, CA		
	Carload Weight in Pounds	
Cars per Shipment	**1 - to - 206,001**	**206,001 - to - 234,000**
1-68	$ 3,100	$ 3,350
69-82	$ 2,400	$ 2,650
83 -90	$ 2,330	$ 2,580
Source: UP 4051, Item 2306		

Comparison of Corn Rates from Genoa and Silver Creek to California

The single-car rate from Genoa to Kings Park is a mileage-based rate of $3,845 per car. In comparison, the rate from Silver Creek to Tulare for shipments in 102-ton cars is $2,290. Thus, the rate differential at Genoa for shipments in 102-ton cars to the same general area of California is $1,555 per car, or $15.25 per ton. If both shippers use 110-ton cars, the rate differential is $11.86 per ton ($34.95 per ton at Genoa versus $23.09 per ton at Silver Creek).

Corn Rates to Portland

Many different corn rates are published to areas of the Pacific Northwest. To simplify the comparison, this analysis focuses on rates to Portland Oregon. In many cases, the rates to Vancouver, Kalama, Longview, Tacoma, and Seattle, Washington are the same as the rate to Portland. However, this is not always the case.

Rates Applicable to All Stations

BNSF publishes several blanket rates that apply to all origins in Nebraska. The rate to Portland for shipments in 110-ton cars is $3,610 per car, or $32.82 per ton.[3] The applicable rate for shipments in 102-ton cars is $3,430 per car, or $33.63 per ton.[4] These are single-car rates that apply to all stations. Because of limited track capacity, Blue Hill, Byron, and Guide Rock can only utilize these rates. In addition, BNSF publishes mileage rates that apply to some stations, including Trumbull. These rates are discussed throughout the analysis.

Co-Load Rates

In Item 31005 of 4022, BNSF publishes 54-car and 110-car rates to Portland. The unique aspect of this tariff item is that it allows two stations to co-load a 110-car shipment of corn, if the BNSF approves the co-loading arrangement in advance. It is unclear how frequently this rate element is used by the stations included in this study.

The co-loading rates are shown in Table 22, along with the applicable single-origin rates. The elevator at Trumbull is effectively precluded from using this rate table, since it can load only 27 cars at a time. Since the 110-car co-load rate is only 45 cents per ton less than the single-origin 54-car rate, it may not have a major effect on this rate structure. However, as shown in Table 23, a single rate applies to co-loaders and single-origin shippers in Item 31010 of 4022 (Table 23).

[3] Source: BNSF 4022, Item 31740.
[4] Source: BNSF 4022, Item 31735.

Table 22. Rates for Corn Shipments from Giltner, Grand Island, Hastings, Roseland, and Superior to the Portland, Oregon in 110-ton Cars			
Cars per Shipment	**Origins**	**Rate per Car**	**Rate per Ton**
54-109	1	$ 2,800	$ 25.45
110-120	2	$ 2,750	$ 25.00
110-120	1	$ 2,650	$ 24.09
Source: BNSF 4022, Item 31005			

The rates in Tables 23 and 24 apply only to corn shipments in large (116 ton) HAL cars. As the comparison shows, there isn't a substantial difference in the rates per ton for small HAL cars (Table 22) and large HAL cars (Table 24).

Table 23. Carload Rates for Corn Shipments from Grand Island, Hastings, Roseland, and Superior to Portland, Oregon in 116-Ton Cars		
	Minimum Cars per Shipment	
Origin City	**54-Car**	**110-Car, 2 Origins**
Roseland	$ 2,880	$ 2,920
Grand Island	$ 2,830	$ 2,870
Hastings	$ 2,830	$ 2,870
Superior	$ 2,830	$ 2,870
Source: BNSF 4022, Item 31010		

Table 24. Rates per Ton for Shipments from Grand Island, Hastings, Roseland, and Superior to the Portland, Oregon in 116-ton Cars		
	Minimum Cars per Shipment	
Origin City	**54-Car**	**110-Car, 2 Origins**
Roseland	$ 24.83	$ 25.17
Grand Island	$ 24.40	$ 24.74
Hastings	$ 24.40	$ 24.74
Superior	$ 24.40	$ 24.74

UP Rates from Grand Island to Portland

The rates from Grand Island to Portland are shown in Table 25. As shown in Table 26, the 100-car rate per ton for shipments in the largest HAL cars (116 tons) is $21.47, which is substantially lower than the BNSF 100-car rate from Grand Island. For shipments in 110-ton cars, the imputed UP rate of $22.64 per ton is lower than the comparable BNSF rate of $24.09.

Table 25. UP Corn Rates per Car from Grand Island to Portland, Oregon		
	Net Weight in Pounds	
Cars per Shipment	**1 - to - 206,001**	**206,001 - to - 234,000**
> 92	$ 3,330	$ 3,580
92 -100	$ 2,274	$ 2,490
Source: UP 4051		

Table 26. UP Corn Rates per Ton from Grand Island to Portland, Oregon			
	Net Weight in Tons		
Cars per Shipment	**102**	**110**	**116**
> 92	$ 32.65	$ 32.55	$ 30.86
92 -100	$ 22.29	$ 22.64	$ 21.47

Comparison of Rates at Blue Hill, Roseland, and Hastings

As noted earlier, the effective rate for shipments from Blue Hill to Portland in 110-ton hopper cars is $32.82 per ton. In comparison, the effective rate for shipments from Roseland is $24.09 per ton. If the elevators at Hastings co-load a 110-car shipment, then their effective rate is $25 per ton; otherwise, the 54 car rate is $25.45 per ton. However, as noted in Table 4, the BNSF shuttle-train rate from Roseland is $21.76 per ton, which makes it roughly comparable to 100-car UP rate at Grand Island. With the $100 OEP incentive, Roseland's shuttle-train rate would be slightly lower than the UP rate at Grand Island. Even without the OEP incentive, Roseland's effective rate is $11.06 per ton (or 51 percent) less than the effective rate at Blue Hill. This may have serious implications for Blue Hill.

Comparison of Rates at Giltner, Trumbull, and Grand Island to Portland

The applicable rates at Trumbull are:

- The single-car rate for shipments in 110-ton cars of $3,610 per car, or $32.82 per ton
- The single-car rate for shipments in 102-ton cars of $3,430 per car, or $33.63 per ton
- A mileage rate of $3,160 per car for shipments of 27 to 53 cars

The mileage rate is equal to $30.98 per ton if the shipment occurs in a 102-ton car, or $28.72 per ton is the shipment occurs in a 110-ton car. In comparison, the lowest rate from Grand Island in a 110-ton car is $22.64. The difference of $6.08 per ton is quite significant, given that Trumbull is only 25 highway miles from Grand Island.

The elevator at Giltner is able to use the 110-ton 54-car rate of $2,800 per car or $25.45 per ton. Thus, the effective rate differential is $2.81 per ton.

Comparison of Rates from Byron, Guide Rock, and Superior to Portland

The lowest applicable rates from Byron and Guide Rock to Portland are:

- The single-car rate for shipments in 110-ton cars of $3,610 per car, or $32.82 per ton
- The single-car rate for shipments in 102-ton cars of $3,430 per car, or $33.63 per ton

In comparison, the elevator at Superior (which has a track capacity of 100 cars) can ship under the 110-ton 54-car rate of $2,800 per car or $25.45 per ton. Thus, the difference in effective rates between Byron (or Guide Rock) and Superior is $7.37 per ton, or 29 percent.

Comparison of Rates from Hallam, Plymouth, and Sedan to Portland

The only UP rate published for Hallam is a generic single-car rate of $3,748. Two small hopper car rates are published for Plymouth: (1) a rate of $3,440 for shipments of less than 92 cars, and (2) a rate of $2,128 for shipments of 92 cars or more. If both shippers use 102 ton cars, then the effective rate difference is $15.89 per ton (i.e., $36.75 versus $20.86).

Rates from Sedan to Portland are shown in Table 27. The lowest effective rate of $21.81 per ton is slightly higher than the lowest rate from Plymouth to Portland. If both Hallam and Sedan use 110 ton cars, then the effective rate difference is $11.07 per ton (i.e., $34.07 versus $23.00).

Table 27. UP Corn Rates per Car for Shipments from Sedan to Portland

Cars per Shipment	Carload Weight in Pounds	
	1-to-206,001	206,001-to-234,000
< 92	$3,370	$3,620
92 -100	$2,311	$2,530

Table 28. UP Corn Rates per Ton from Sedan to Portland, Oregon

Cars per Shipment	Net Weight in Tons		
	102	110	116
> 92	$33.04	$32.91	$31.21
92 -100	$22.66	$23.00	$21.81

2. Truck Cost Analysis

Truck costs are calculated for a 5-axle tractor/semitrailer truck using an economic-engineering model. The semitrailer is a hopper trailer. The truck is used exclusively in short-haul service and accumulates 75,000 annual miles. The tractor weighs 13,900 pounds and the trailer weighs 9,500 pounds. At 80,000 pounds gross vehicle weight, this truck can accommodate 56,600 pounds of payload (28.3 tons).[5]

The diesel fuel price is $1.75 per gallon. The imputed driver wage rate is $15 per hour. One hour of waiting time occurs per trip, at origin and/or destination. Over-the-road speed is 60

[5] This assumes that the distance from the center of the first axle of the driving tandem-axle set, to the center of the last axle on the trailer is at least 36 feet. Otherwise, the gross weight of the truck could be restricted to less than 80,000 pounds under Bridge Formula B.

mph. Because the hopper is a specialized type of semitrailer, it returns empty to the elevator for re-loading.

The tractor costs $85,000, has a useful life of 5 years, and a salvage value of $25,500. The trailer costs $31,800, has a useful life of 10 years, and a salvage value of $9,540. Based on these acquisition costs and life expectancies, depreciation and return on investment unit costs are computed. Other unit costs are computed for tires, maintenance, insurance, fees and taxes, and other overhead costs typical of an owner-operator.

Based on these assumptions and inputs, the estimated cost per mile is $1.39, or $2.78 per loaded mile. With a payload of 28.3 tons, this is equivalent to approximately 10 cents per ton-mile.

3. Implications for Smaller, Branch-Line Elevators

Summary of Rate Relationships Between Blue Hill and Roseland

Roseland will have a significant impact on Blue Hill. Roseland is a 110-car shuttle shipper, while Blue Hill can only utilize the highest single-car rates. If both shippers use 110-ton HAL cars, the effective rate differential for shipments to Houston is $3.41 per ton. In the California market, the lowest potential rate for Blue Hill is $4,149 per car, versus $3,036 for Roseland and Hastings. This difference of $1,113 per car (or $10.12 per ton) may cause Blue Hill to become non-competitive in the San Joaquin Valley market.

The effective rate for shipments from Blue Hill to Portland in 110-ton hopper cars is $32.82 per ton. Even without the OEP incentive, the effective shuttle train rate at Roseland is $11.06 per ton (or 51 percent) less than the effective rate at Blue Hill.

It is only 16 highway miles from Blue Hill to Roseland. At roughly 10 cents a ton-mile, the trucking cost comes to only $1.60 per ton. Even after the double-handling cost of $2 per ton is considered, the transshipment cost of $3.60 per ton is only one-third of the rate difference in the Portland market, and only 37 percent of the rate difference in the California market. Houston is the only market where the rate difference is less than the transshipment cost, and this relationship presumes that the elevator at Blue Hill uses 110-ton cars.

It is difficult to say how rate differences in various markets are translated into a composite price difference between Blue Hill and Roseland. Of the three markets, the San Joaquin Valley is the largest, attracting over 20 percent of the rail-hauled corn originated from the Grand Island, Lincoln, and Omaha Business Economic Analysis (BEA) areas (Table 29). The Portland and Seattle BEAs are next in significance, attracting about 17.5 percent of the corn moved by rail.

Houston is not a large market, in and of itself. However, about 17 percent of the corn originated by railroads in the Grand Island, Lincoln, and Omaha BEAs is terminated in the Texas BEAs of Houston, Amarillo, San Antonio, and Dallas-Ft. Worth. If the rate relationships in the Houston market are representative of those in Texas, then a simple average of rate differences across the 3 major markets is probably warranted; in which case, the rate difference between Blue Hill and Roseland is $8.20 per ton. Clearly, the Roseland shuttle facility has overlapped Blue Hill's market area.

Table 29. Nebraska Rail Corn Shipments from Grand Island, Lincoln, and Omaha BEAs
Estimated Tons of Freight from 2000 Public Waybill Sample

Destination BEA	Estimated Tons	Percent of Tons
Portland-Salem, OR-WA	1,472,465	12.04
San Francisco-Oakland-San Jose, CA	1,316,914	10.77
Fresno, CA	1,163,166	9.51
San Antonio, TX	818,349	6.69
Seattle-Tacoma-Bremerton, WA	674,215	5.51
Los Angeles-Riverside-Orange County, CA-AZ	660,888	5.40
Little Rock-North Little Rock, AR	602,108	4.92
Amarillo, TX-NM	551,917	4.51
Houston-Galveston-Brazoria, TX	514,333	4.20

Summary of Rate Relationships Between Trumbull and Grand Island

The elevators at Trumbull and Giltner have track capacities of 27 and 54 cars, respectively. Several of the elevators in Grand Island are 100-car shippers.

In the Texas market, the effective rate differential between Trumbull and Grand Island ranges from $2.49 per ton for shipments in 110-ton cars, to $4.46 per ton for shipments in 102-ton cars. To simplify the comparison, only the 110-ton car rate is used. In the California market, the effective rate difference between Trumbull and the 100-car UP elevators located in Grand Island is $1,417 per car or $12.88 per ton for shipments in 110-ton cars. In the Portland market, the effective rate differential is $6.08 per ton. The simple mean of these differences is $7.15 per ton. This is quite significant given that Trumbull is only 25 highway miles south of Grand Island. For this short distance, the transshipment cost is only $4.50 per ton. Clearly, the unit-train facilities at Grand Island have overlapped Trumbull's market area.

Summary of Rate Relationships between Giltner and Grand Island

Unlike Trumbull, the elevator at Giltner can utilize 54-car rates. In the Texas market, the effective rate differential between Giltner and Grand Island is $1.58 per ton for shipments in 110-ton cars. In the California market, the effective rate difference between Giltner and the 100-car UP elevators located in Grand Island is $5.05 per ton for shipments in 110-ton cars. In the Portland market, the effective rate difference is $2.81 per ton. The simple mean of these differences is $3.15 per ton.

Like Trumbull, Giltner is located only 25 highway miles south of Grand Island. For this short distance, the transshipment cost is only $4.50 per ton. Although the unit-train facilities at Grand Island are encroaching upon Giltner's market area, it has not been overlapped completely.

Summary of Rate Relationships between Byron and Superior

The elevator at Byron can only utilize single-car rates. In comparison, the elevator at Superior is a 100-car shipper. In the Texas market, the effective rate differential between Byron and Superior is $3.47 per ton for shipments in 110-ton cars. In the California market, the effective rate difference is $1.13 per ton. However, the effective rate differential in the Portland market is $7.37 per ton. The simple mean of these differences is $3.99 per ton.

Byron is located only 17 highway miles west of Superior. For this short distance, the transshipment cost is only $3.70 per ton. Apparently, the unit-train facility at Superior has overlapped Byron's market area.

Summary of Rate Relationships between Guide Rock and Superior

The elevators at Guide Rock can only utilize single-car rates. Thus, in the Texas market, the effective rate differential between Guide Rock and Superior is $3.86 per ton for shipments in 110-ton cars. In the California market, the effective rate difference is $1.13 per ton. However, the effective rate differential in the Portland market is $7.37 per ton. The simple mean of these differences is $4.12 per ton.

Guide Rock is located only 20 highway miles northwest of Superior. For this short distance, the transshipment cost is only $4 per ton. Apparently, the unit-train facility at Superior has overlapped the market areas of the elevators at Guide Rock.

Summary of Rate Relationships between Hallam and Plymouth

The Hallam Grain elevator has a track capacity of only 9 cars and thus is a single-car shipper. In comparison, the Farmers Coop Elevator at Plymouth is a 100-car unit-train shipper. In the Texas market, the effective price differential is $4.31 per ton for shipments in 110-ton cars. Only small hopper car rates are published for Plymouth to Tulare. Thus, if both shippers use 102 ton cars, then the effective rate difference in the California market is $14.47 per ton. Likewise, only small hopper car rates are published for Plymouth to Portland. Thus, if both shippers use 102 ton cars, the effective rate difference is $15.89 per ton. The simple mean of these differences is $11.56 per ton.

Hallam is located approximately 33 highway miles north of Plymouth. For this distance, the transshipment cost is only $5.30 per ton. Clearly, the unit-train facility at Plymouth has overlapped Hallam's market area.

Summary of Rate Relationships between Hallam and Sedan

The Aurora Coop Elevator at Sedan is also a 100-car unit-train shipper. In the Texas market, the effective price differential between Hallam and Sedan is $4.31 per ton for shipments in 110-ton cars. In the California market, the effective rate difference is $11.78 per ton. The effective rate differential in the Portland market is $11.07 per ton. The simple mean of these differences is $9.05 per ton.

Hallam is located approximately 74 highway miles northeast of Sedan. For this distance, the transshipment cost is $9.40 per ton. Thus, the total shipping cost is still less from Hallam than transshipment via Sedan. The rates at Plymouth are quite competitive with the rates at Sedan. Thus, there doesn't appear to be a market impact in this regard.

Qualifications

The results of the comparisons presented in this report should be qualified in several ways: (1) the rates are those effective in March of 2003, (2) potential railroad or motor carrier fuel surcharges are not considered, (3) it is assumed that track capacities are fixed and will not be expanded, and (4) it is assumed that commercial tractor-semitrailer trucks will be used to transport corn.

This last assumption is relevant to transshipments from elevators to shuttle facilities. In most cases, commercial trucks will be used for transshipments. However, farmer-owned trucks may be used for direct farm-to-elevator movements. The trucking cost per ton-mile for direct movements from farms to shuttle facilities may be higher than the commercial trucking cost used in this report, because of poorer equipment utilization. However, double-handling costs would not be incurred for direct shipments.

APPENDIX B

Light Density Lines

Appendix B
NEBRASKA RAILWAY COUNCIL

Light Density Lines
2003

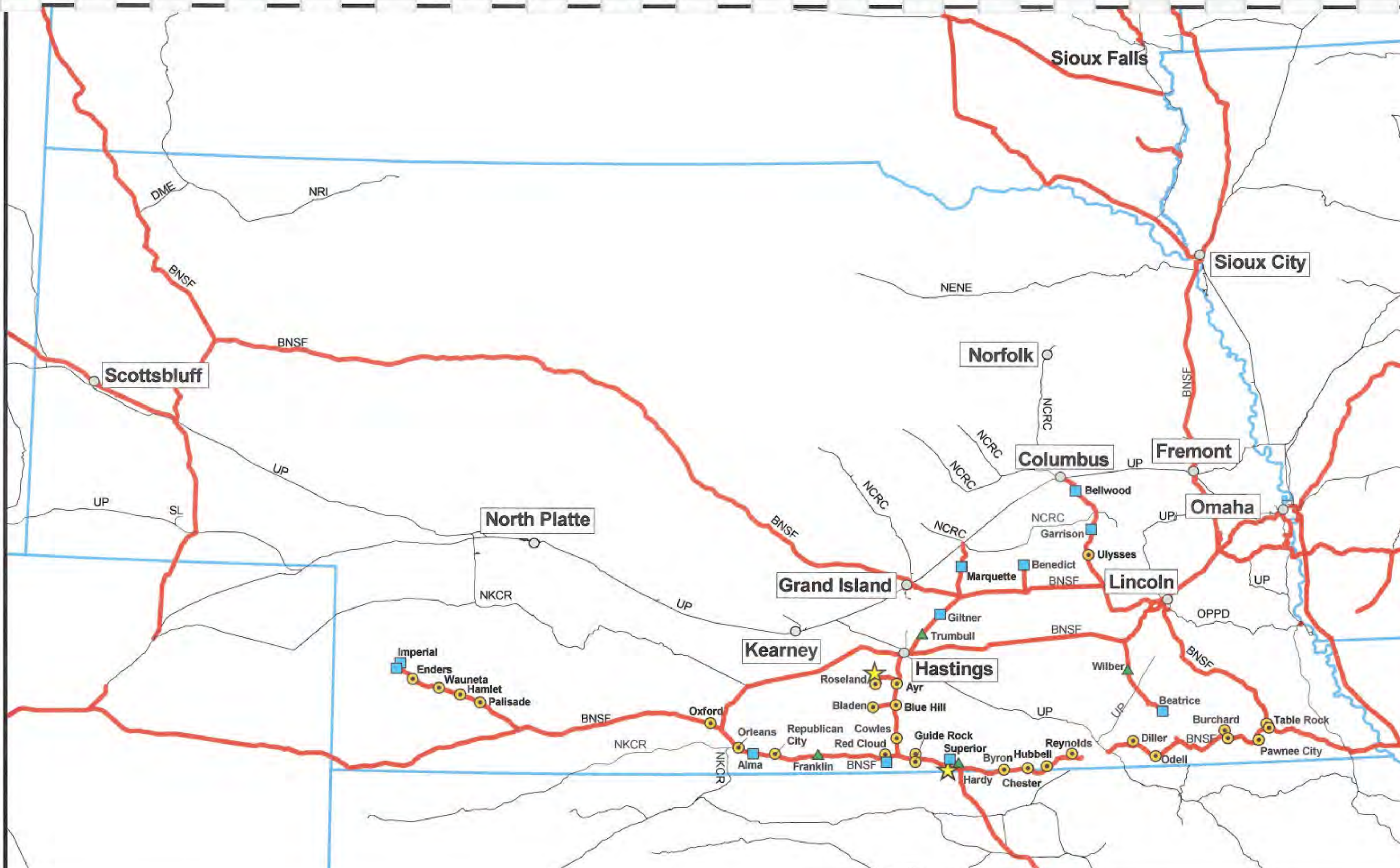
UP LDLs	Length (miles)
Valley to Lincoln	56.5
Fairbury to Sheldon Station	38.2
Union to Louisville	26.2
Subtotal	**120.9**
BNSF LDLs	
Culbertson to Imperial	49.1
Hastings to Lester Junction	37.0
Blue Hill to Bladen	8.0
Ayr to Roseland	6.9
Crete to Beatrice	32.0
Orleans Junction to Oxford Junction	9.6
Orleans Junction to Lester Junction	56.7
Lester to Superior	20.7
Superior to Table Rock	111.4[(1)]
GH Junction (Hastings) to Aurora	26.8
Aurora to Marquette	10.4
Benedict to York	9.5
Seward to Columbus	41.0
Subtotal	**419.1**
NCRC	
Grand Island to Ord	60.8
Palmer to Central City	18.2
Central City to Brainard	63.0
Spalding to Genoa	44.6
Albion to Oconee	34.7
Columbus to Norfolk	51.3
Subtotal	**272.6**
NKCR	
CO State Line (Venango) to Holdrege	161.4
Wallace to Gentleman Power Plant	17.6
KS State Line (Stamford) to Flynn	9.9
KS State Line to Orleans Junction	59.8
Subtotal	**248.7**
OPPD	
Lincoln to Arbor	56.4

LDL's	Length (miles)
DME	
Crawford to Chadron	28.1
Dakota Junction to Crawford	13.1
Subtotal	**41.2**
NRI	
East Chadron to Merriman	72.5
NENE	
Ferry to O'neil	116.4
SLGG	
Brownson to Huntsman	11.0
TOTAL	**1,358.8**

(1) 10.8 miles of this line was abandoned during the course of this study. The line is now actually two segments – Table Rock to Endicott and Reynolds to Superior.

APPENDIX C

LDL Elevator Locations



Number of Rail Cars:

- Less Than 25
- 25 - 50
- 50 - 100
- More Than 100

Rail Lines:

DME - Dakota, Minnesota, & Eastern
OPPD - Omaha Public Power District
NCRC - Nebraska Central
NENE - Nebraska Northeastern
NKCR - Nebraska, Kansas, & Colorado
NRI - Nebkota
SL - Sidney & Lowe

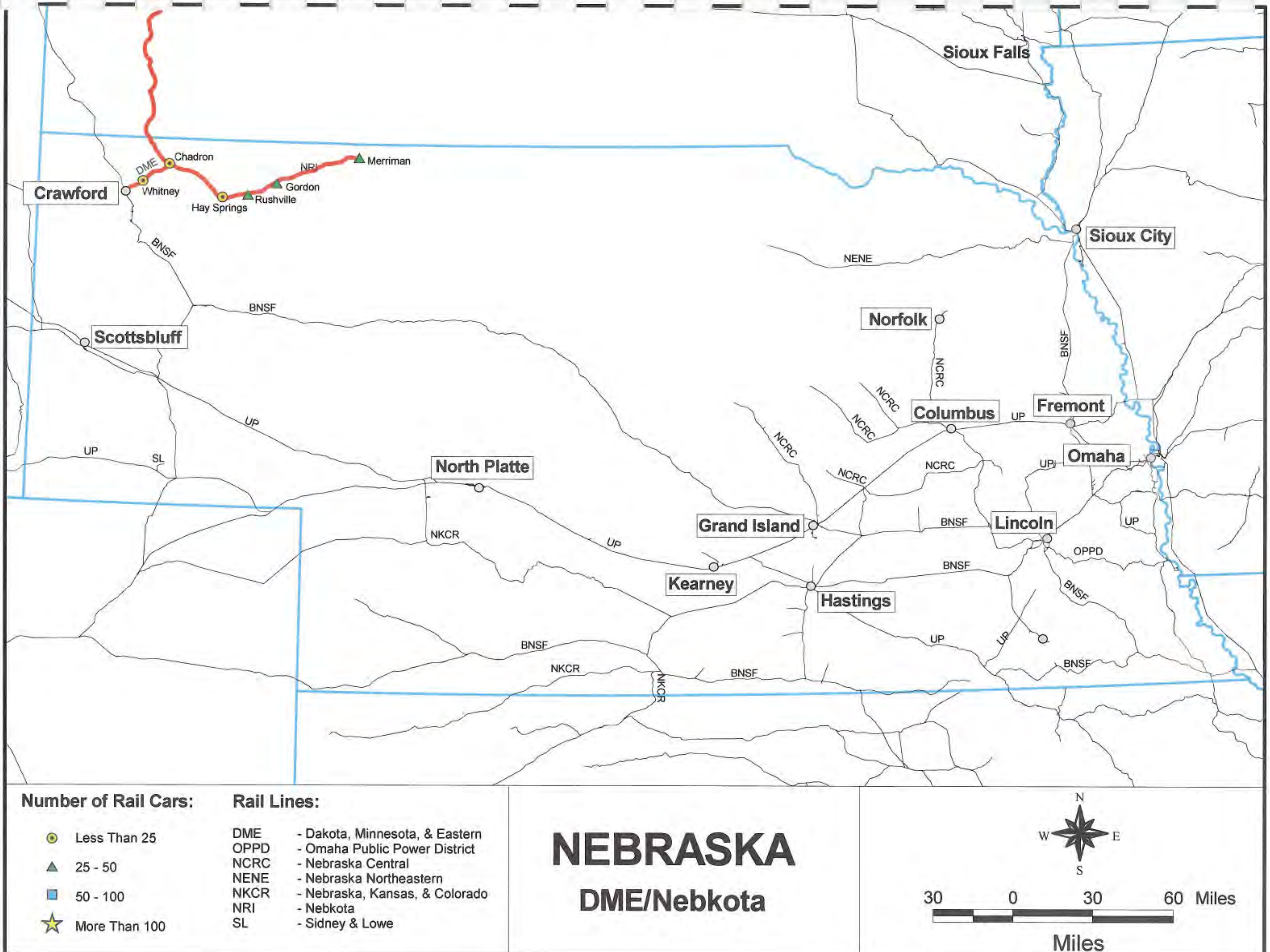
NEBRASKA

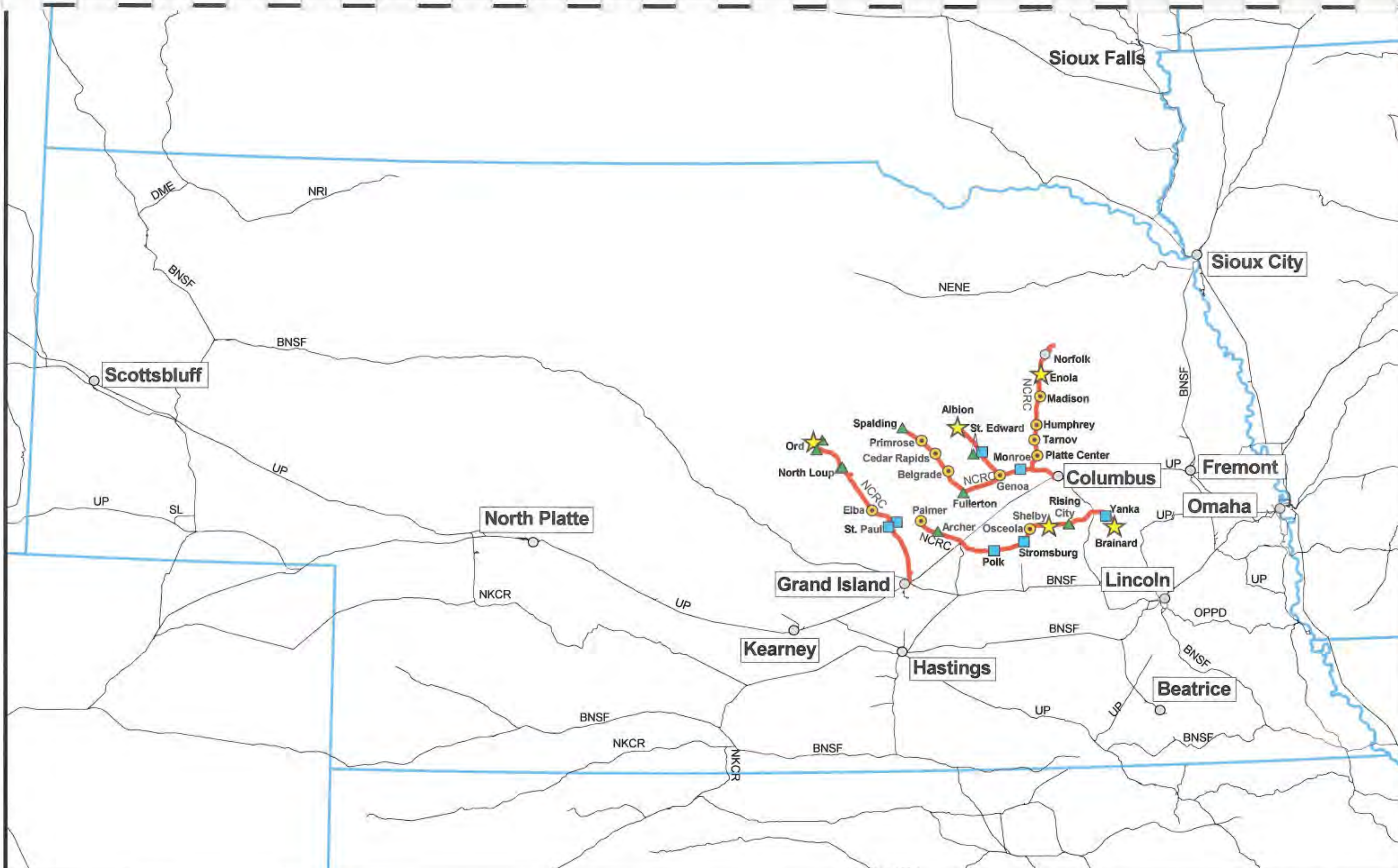
BNSF Branch Lines

N W E S

30 0 30 60 Miles

Miles


Sioux Falls
Sioux City
Crawford
Chadron
Whitney
DME
Hay Springs
Rushville
Gordon
NRI
Merriman
BNSF
Scottsbluff
UP
SL
NENE
Norfolk
NCRC
Columbus
Fremont
Omaha
North Platte
NKCR
Grand Island
Lincoln
OPPD
Kearney
Hastings
Number of Rail Cars:
Less Than 25
25 - 50
50 - 100
More Than 100
Rail Lines:
DME - Dakota, Minnesota, & Eastern
OPPD - Omaha Public Power District
NCRC - Nebraska Central
NENE - Nebraska Northeastern
NKCR - Nebraska, Kansas, & Colorado
NRI - Nebkota
SL - Sidney & Lowe
NEBRASKA
DME/Nebkota
N
W
E
S
30 0 30 60 Miles
Miles



NEBRASKA

NCRC Lines

Number of Rail Cars:

- Less Than 25
- 25 - 50
- 50 - 100
- More Than 100

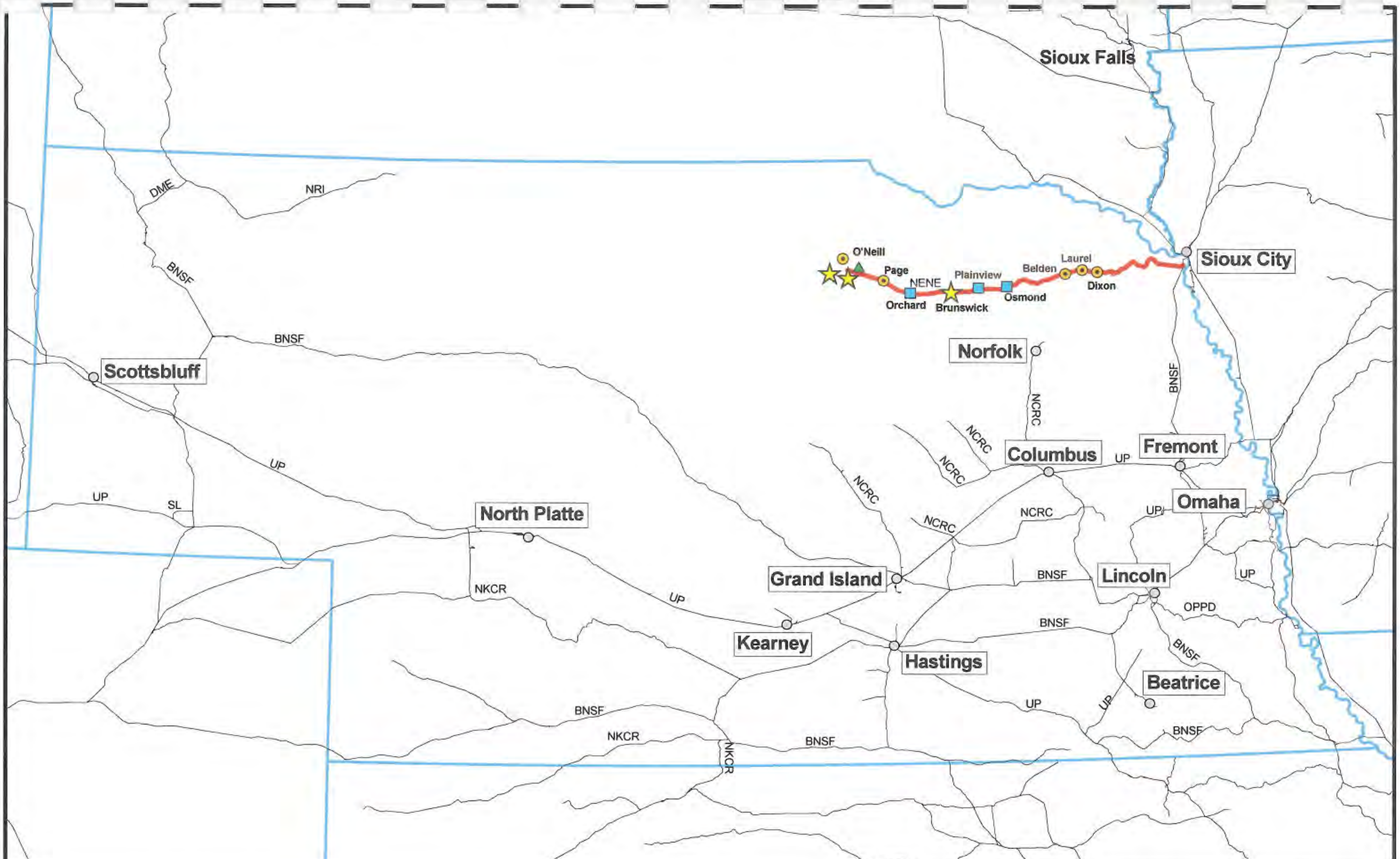
Rail Lines:

DME	- Dakota, Minnesota, & Eastern
OPPD	- Omaha Public Power District
NCRC	- Nebraska Central
NENE	- Nebraska Northeastern
NKCR	- Nebraska, Kansas, & Colorado
NRI	- Nebkota
SL	- Sidney & Lowe

N W E S

30 0 30 60 Miles

Miles



NEBRASKA

NENE

Number of Rail Cars:

- Less Than 25
- 25 - 50
- 50 - 100
- More Than 100

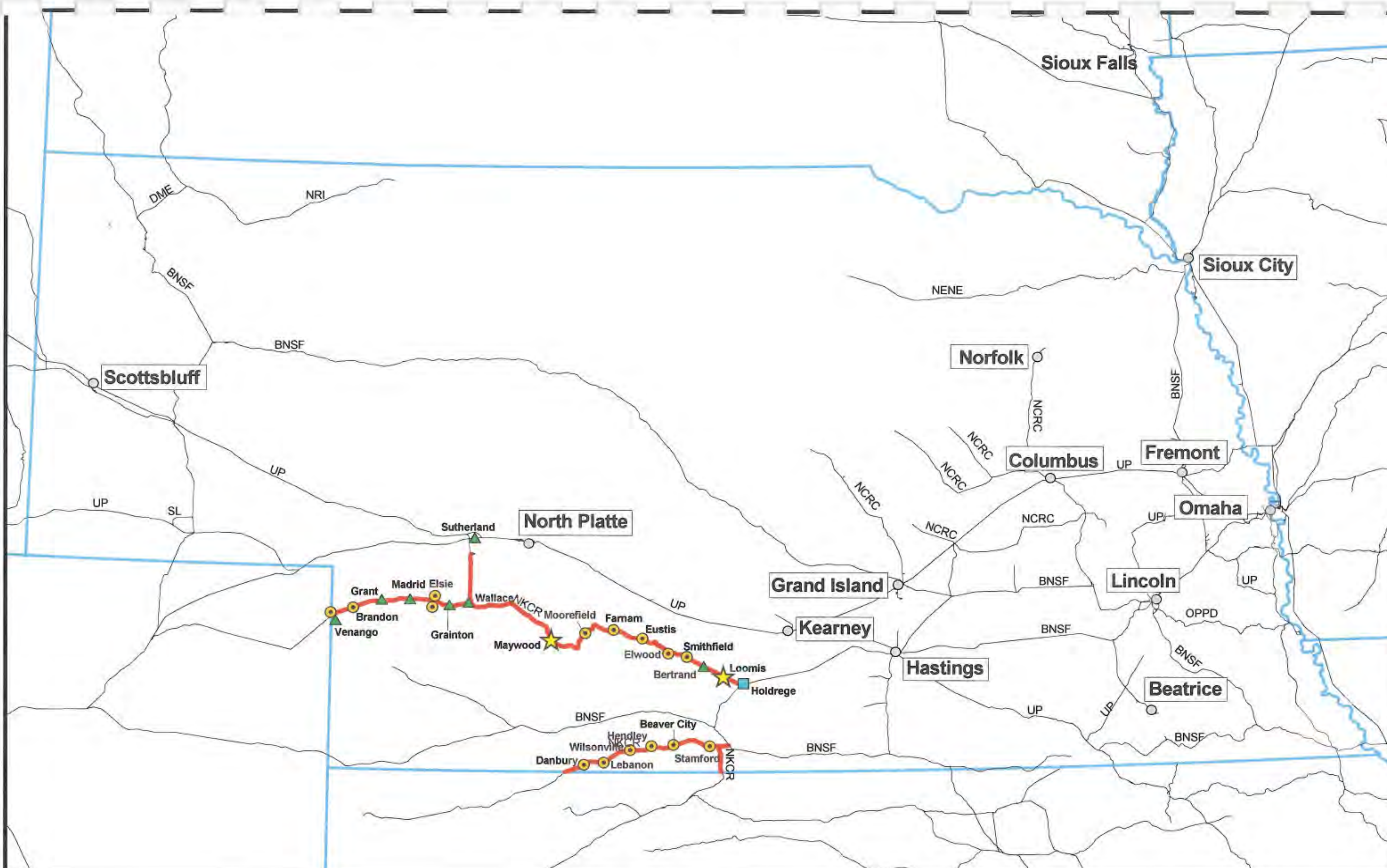
Rail Lines:

DME	- Dakota, Minnesota, & Eastern
OPPD	- Omaha Public Power District
NCRC	- Nebraska Central
NENE	- Nebraska Northeastern
NKCR	- Nebraska, Kansas, & Colorado
NRI	- Nebkota
SL	- Sidney & Lowe

N W E S

30 0 30 60 Miles

Miles



Number of Rail Cars:

- Less Than 25
- 25 - 50
- 50 - 100
- More Than 100

Rail Lines:

DME	- Dakota, Minnesota, & Eastern
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SL	- Sidney & Lowe

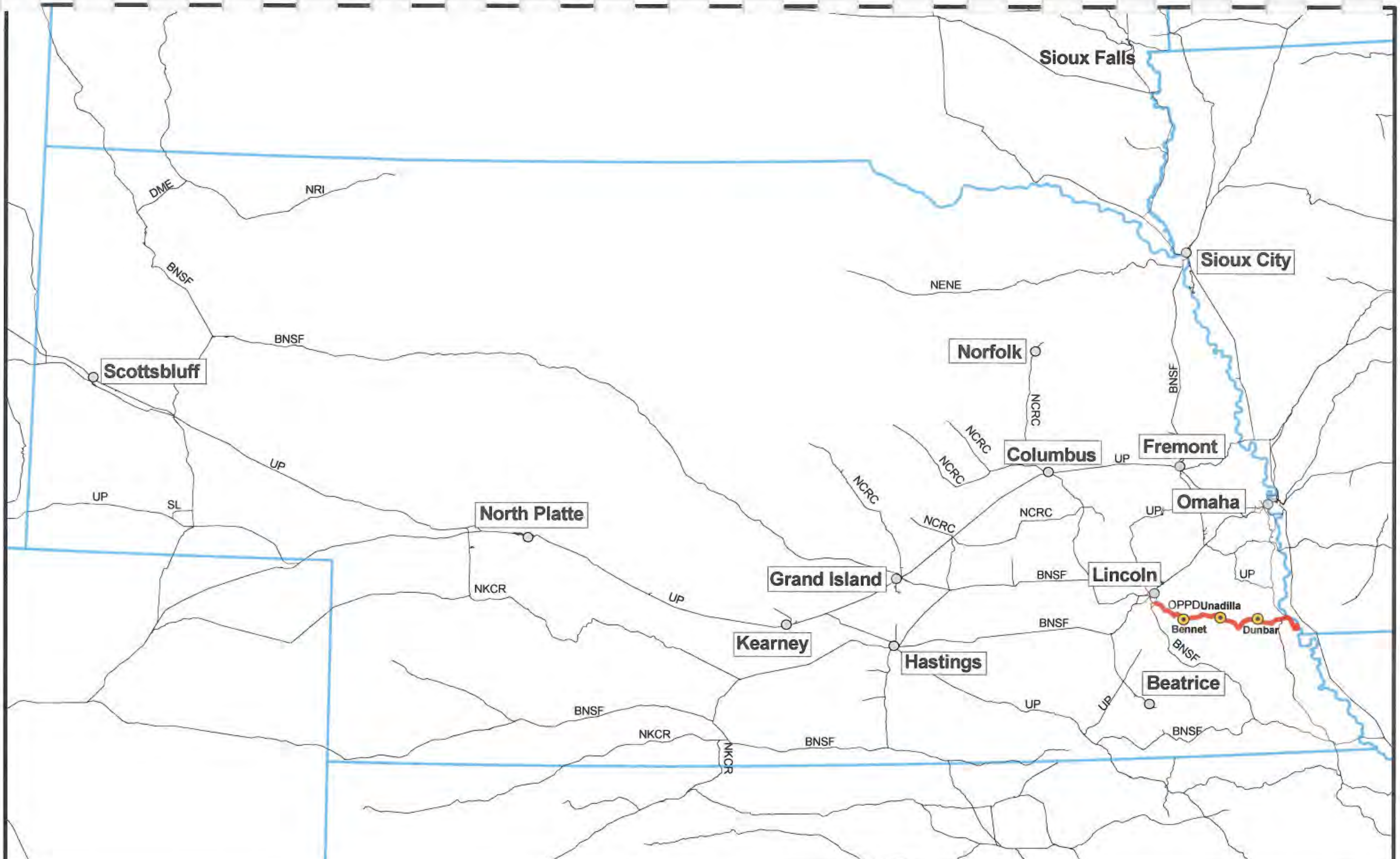
NEBRASKA

NKCR Lines

N W E S

30 0 30 60 Miles

Miles



Number of Rail Cars:

- Less Than 25
- 25 - 50
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- More Than 100

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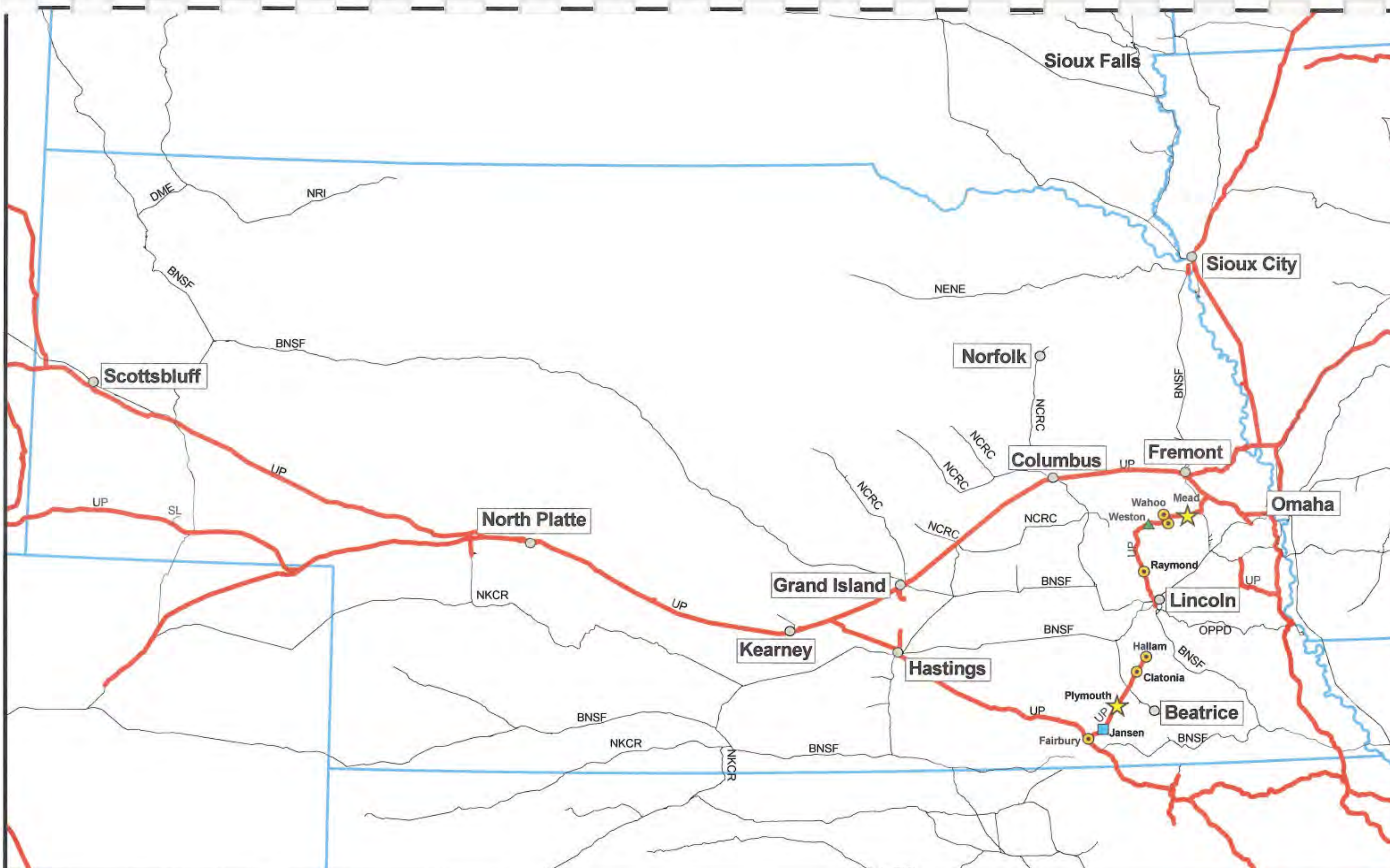
NEBRASKA

OPPD

N
W E
S

30 0 30 60 Miles

Miles



NEBRASKA

UP Branch Lines

Number of Rail Cars:

- Less Than 25
- 25 - 50
- 50 - 100
- More Than 100

Rail Lines:

DME	- Dakota, Minnesota, & Eastern
OPPD	- Omaha Public Power District
NCRC	- Nebraska Central
NENE	- Nebraska Northeastern
NKCR	- Nebraska, Kansas, & Colorado
NRI	- Nebkota
SL	- Sidney & Lowe