SOUTH DAKOTA

Freight

PLAN

Photo: Courtesy of Bill Stahl

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Abbreviations and Acronyms

AADT	Average Annual Daily Traffic
ABR	Aberdeen Regional Airport
BNSF	Burlington Northern Santa Fe
CATT	Center for Advanced Transportation Technology
DoD	Department of Defense
FSD	Joe Foss Field in Sioux Falls
GDP	Gross Domestic Product
ITS	Intelligent Transportation System
LCV	Long Combination Vehicle
LRTP	Long Range Transportation Plan
MDU	Montana Dakota Utilities
MEC	MidAmerican Energy
MPO	Metropolitan Planning Organization
NHPF	National Highway Freight Program
NHPP	National Highway Performance Program
NHS	National Highway System
NNG	Northern Natural Gas
NPMRDS	National Performance Management Research Data Set
NWE	Northwestern Energy
PCPI	Per Capita Personal Income
PHFN	Primary Highway Freight Network
PHFS	Primary Highway Freight System
PIR	Pierre Regional Airport
RAP	Rapid City Regional Airport
RCP&E	Rapid City, Pierre and Eastern
RITIS	Regional Integrated Transportation Information System
SCI	Surface Condition Index
SDDOT	South Dakota Department of Transportation
SHSP	Strategic Highway Safety Plan
STIP	Statewide Transportation Improvement Program
STRAHNET	Strategic Highway Network
TAMP	Transportation Asset Management Plan

Chapter 1: Mission, Vision, Goals and Purpose

Department Mission

To efficiently provide a safe and effective public transportation system.

Department Vision

Achieve excellence in providing transportation facilities that meet the needs of the public.

Goals and Purpose of the South Dakota Freight Plan

The South Dakota Department of Transportation (SDDOT) seeks to promote safety, monitor mobility, maintain assets, and support economic growth. This plan will accomplish these objectives by identifying opportunities, trends, technology and by depicting and facilitating the planning and coordination process that will allow the Department to take advantage of the strategies identified in the plan.

The purpose of the South Dakota Highway Freight Plan is to guide improvement of South Dakota's overall freight system and support SDDOT's mission to provide a safe and effective public transportation system.

The goals identified in the Long Range Transportation Plan (LRTP) are to:

- Preserve and maintain South Dakota's transportation system
- Promote transportation safety
- Support access and connectivity to important facilities like grain elevators, ethanol plants, pipeline terminals, wind energy facilities, airports, freight terminals and intermodal facilities
- Promote transportation efficiencies within and among all transportation modes
- Support economic growth and tourism
- Provide mobility and transportation choices
- Preserve South Dakota's quality of life

- Promote transportation security

Federal legislation, Fixing America's Surface Transportation (FAST) Act, requires states to develop a freight plan to be eligible for federal funds provided through the National Freight Policy (23 USC § 167). The South Dakota Highway Freight Plan is required to develop goals and strategies that support the national multimodal freight policy goals and the national highway freight program goals.

The national multimodal freight policy goals are to:

- identify infrastructure improvements, policies, and operational innovations that
    - strengthen the contribution of the National Multimodal Freight Network to the economic competitiveness of the United States;
    - reduce congestion and eliminate bottlenecks on the National Multimodal Freight Network; and
    - increase productivity, particularly for domestic industries and businesses that create high-value jobs;
- improve the safety, security, efficiency, and resiliency of multimodal freight transportation;
- achieve and maintain a state of good repair on the National Multimodal Freight Network;
- use innovation and advanced technology to improve the safety, efficiency, and reliability of the National Multimodal Freight Network;
- improve the economic efficiency and productivity of the National Multimodal Freight Network;
- improve the reliability of freight transportation;
- improve the short and long-distance movement of goods that
    - travel across rural areas between population centers;
    - travel between rural areas and population centers; and
    - travel from the Nation's ports, airports, and gateways to the National Multimodal Freight Network;
- improve the flexibility of States to support multi-State corridor planning and the creation of multi-State organizations to increase the ability of States to address multimodal freight connectivity;
- reduce the adverse environmental impacts of freight movement on the National Multimodal Freight Network.

The national highway freight program goals are to:

- invest in infrastructure improvements and to implement operational improvements on the highways of the United States that—
    - strengthen the contribution of the National Highway Freight Network to

the economic competitiveness of the United States;

- reduce congestion and bottlenecks on the National Highway Freight Network;
- reduce the cost of freight transportation;
- improve the year-round reliability of freight transportation; and
- increase productivity, particularly for domestic industries and businesses that create high-value jobs;

- improve the safety, security, efficiency, and resiliency of freight transportation in rural and urban areas;
- improve the state of good repair of the National Highway Freight Network;
- use innovation and advanced technology to improve the safety, efficiency, and reliability of the National Highway Freight Network;
- improve the efficiency and productivity of the National Highway Freight Network;
- improve the flexibility of States to support multi-State corridor planning and the creation of multi-State organizations to increase the ability of States to address highway freight connectivity; and
- reduce the environmental impacts of freight movement on the National Highway Freight Network.

Table 1-1 shows how the SDDOT LRTP goals relate to the national freight goals.

Table 1-1: Linkage between SDDOT LRTP Goals and National Freight Goals

	SDDOT Long Range Plan Goals					
National Freight Goals	Safety and Security	Preservation	Efficiency and Connectivity	Quality of Life	Economic Growth and Tourism	Mobility and Transportation Choices
Improve economic efficiency, productivity, and competitiveness			X	X	X	
Reduce Congestion, bottlenecks, and cost of freight transportation	X	X	X	X	X	X
Improve safety, security, and resiliency	X	X	X	X		
Improve state of good repair	X	X	X	X	X	
Use advanced technology, innovation, and competition	X		X	X	X	
Performance management and accountability	X	X	X	X	X	
Reduce adverse environmental and community impacts	X	X	X	X	X	X

The objectives for the SDDOT Freight Plan are:

- Safety and Security
  - Reduce the number of fatalities and serious injury crashes on freight corridors
  - Maintain rest area assets and explore the use Intelligent Transportation Systems (ITS) technology to enhance security
- Mobility
  - Maintain or improve connectivity between freight facilities and destinations
  - Monitor freight movements and travel time for bottlenecks and congestion on the Primary Highway Freight Network (PHFN)
  - Mitigate and maintain mobility of the freight system during natural disasters and extreme weather events
  - Use ITS technology to decrease delay and idle time for freight movers
- Economic Vitality
  - Support freight decision-making through analysis, dissemination, and use of data and industry trends in the planning process
  - Support freight investments that enhance economic competitiveness
- Maintenance
  - Maintain structure and pavement conditions on the state's preferential truck network and National Highway System (NHS)
  - Maintain auxiliary assets (signage, lights, culverts, guardrail, ITS infrastructure, rest areas, etc.) on the state's preferential truck network and NHS
- Environment
  - Improve energy efficiency of freight movement and idle time to reduce greenhouse gas emission.

Plan Integration

This plan will focus on freight movement primarily on the National Highway System, connectivity between modes, key goals, objectives and strategies developed through this plan, the Statewide Long Range Transportation Plan and other plans including.

- Strategic Highway Safety Plan
- South Dakota Aviation System Plan
- State Rail Plan
- Metropolitan Planning Organization's (MPO) Long Range Plans

- Statewide Intelligent Transportation Systems Architecture Plan
- Interstate Decennial Study
- Various Corridor Studies

This plan includes goals to maintain and improve South Dakota's freight transportation system and identifies issues and opportunities related to the safety, preservation, mobility, economic vitality, and environmental aspects of the freight system. The plan proposes strategies to achieve the state and national freight goals and objectives identified in the plan. It also provides framework, through performance measures, to implement the plan.

Outreach

The SDDOT held public open houses in Sioux Falls and Rapid City and conducted stakeholder meetings in Sioux Falls, Rapid City and Aberdeen to gather input on the plan.

The public open houses were advertised statewide in the South Dakota newspapers, a press release was issued and information is available on the SDDOT website. Attendance was low. The attendees expressed there are currently no freight issues but truck parking space should be a concern and may become an issue in the future.

Stakeholder outreach for the development of the State Freight plan included meetings in Sioux Falls, Rapid City and Aberdeen. South Dakota Association of Cooperatives members and South Dakota Trucking Association members were invited to the stakeholder meetings. The goal of the Stakeholder meetings was to receive input on the goals and strategies, ensure SDDOT captured the freight issues, and solicit input on the plan.

The SDDOT presented the draft freight plan to the Metropolitan Planning Organization (MPO) committees during their scheduled meetings. The MPOs have a Citizens Advisory Committee, Technical Advisory Committee and a Policy Board.

Chapter 2: Freight Characteristics

A safe, efficient and reliable freight transportation network is essential to the economics of the state. Highways, railroads, pipelines, and airports allow South Dakota businesses and consumers to export and receive goods to and from global markets. Improvements to our freight system will lower costs for consumers and make South Dakota products more attractive in global markets. Failure to continue to make improvements will result in a loss of economic productivity and limit development.

This chapter will evaluate trends and show a linkage between transportation and the economy.

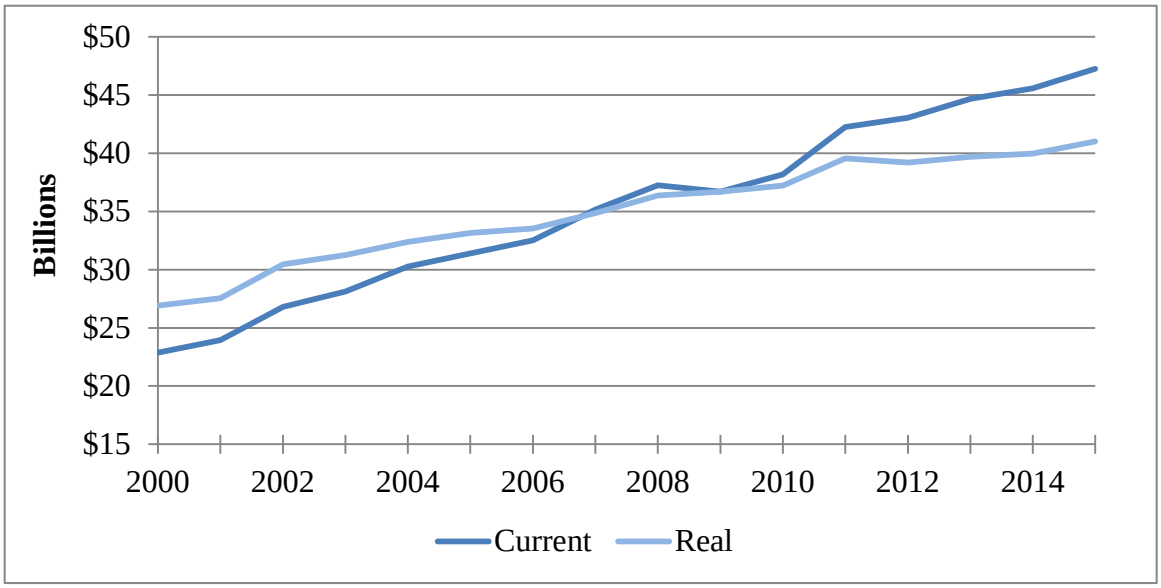
Freight and the Economy

South Dakota's economy is an agricultural economy. Moving farm commodities to market is vital to South Dakota. Although retail trade, finance and insurance, educational services, health care, and government have a greater impact to the Gross Domestic Product (GDP), nothing relies more on transportation system than agriculture. Failure to maintain the freight system will result in loss of jobs, economic development, and income for South Dakotans.

Gross Domestic Product (GDP)

The GDP is the total market value of everything produced in the economy. It is calculated in current and real dollars. Real dollars is the adjusted value removing the effects of inflation. South Dakota's GDP continues to grow as shown in Figure 2-1.

Figure 2-1: Total Gross Domestic Product for South Dakota



Source: U.S. Bureau of Economic Analysis

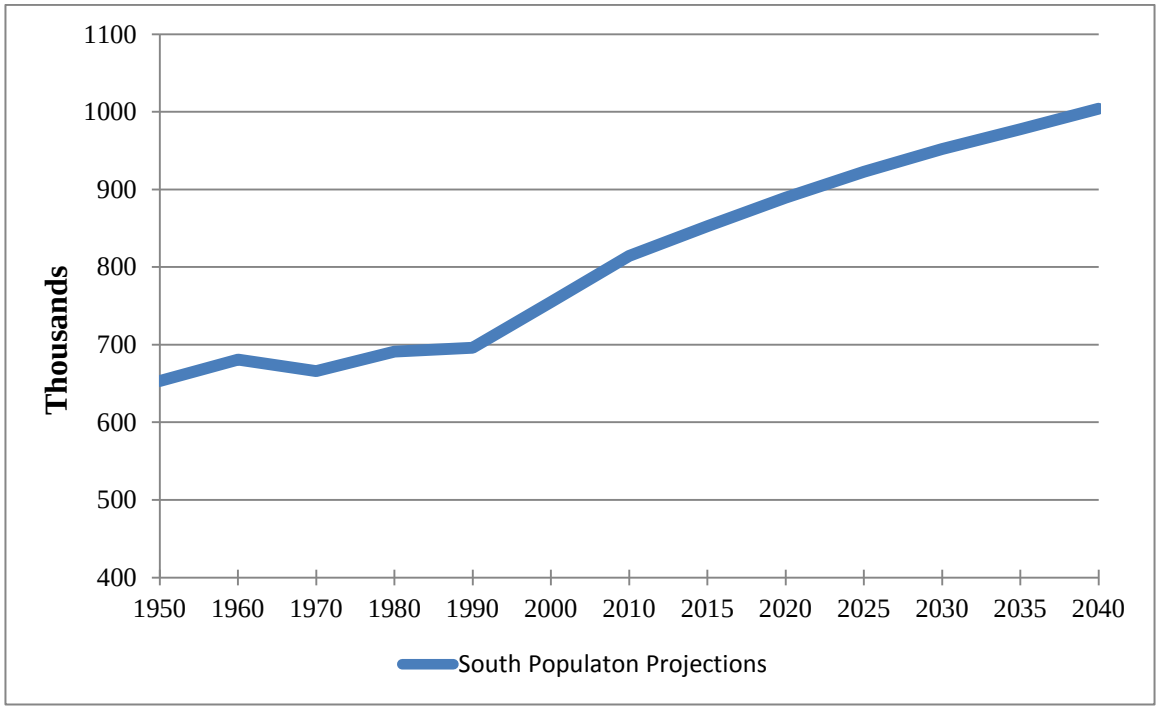
In 2005, South Dakota's current-dollar GDP was $31.4 billion. In 2015, South Dakota's current-dollar GDP increased 50.3 percent to $47.2 billion in current dollars, which ranks 47th in the United States. In 2015, South Dakota's real GDP grew 2.6 percent and the national average was 2.5 percent. The 2005-2010 compounded annual growth rate for South Dakota's real GDP was 2.1 percent and the compounded annual growth rate for the United States was 1.3 percent. South Dakota's GDP is growing faster than the national

average and is expected to continue that trend.

Population

Freight demand is driven by multiple factors. Population growth is one which has a direct impact. Population growth and density can affect freight distribution patterns. Prior to 1990, South Dakota's population remained steady with no significant increase but since 1990, population has increased at a steady rate and is projected to increase 6 to 9 percent every 5 years through 2040. South Dakota is projected to be over 1 million people by 2040. This is shown in Figure 2-2.

Figure 2-2: South Dakota Population



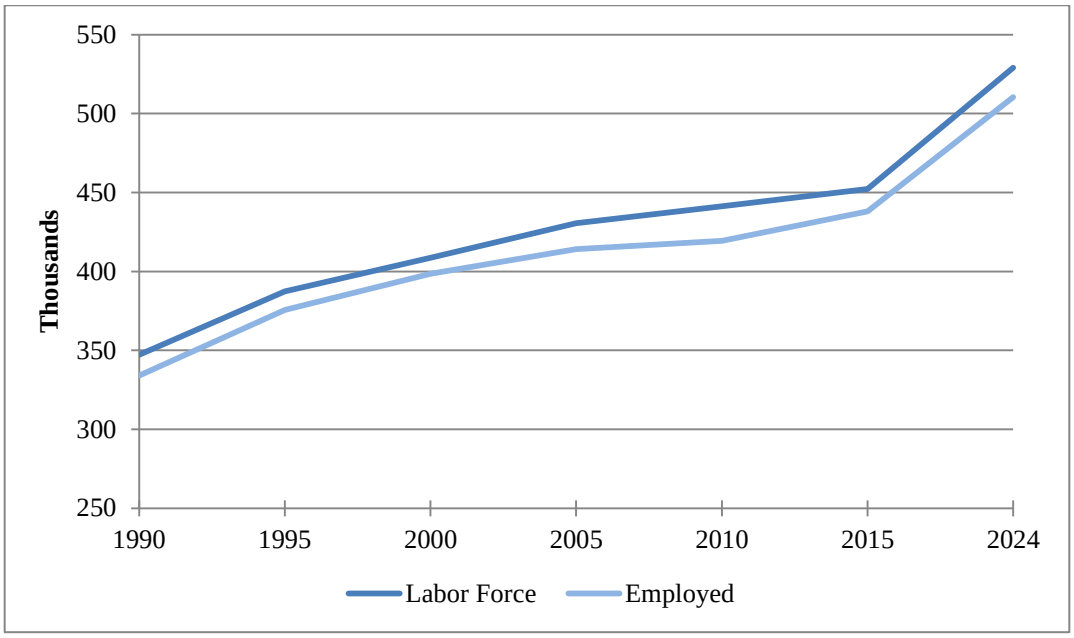
Source: U.S. Census Bureau

Population growth will increase the consumption of goods and services increasing the need for freight transportation. The population increases are occurring in the urban areas as the shift from rural to urban continues to be the trend.

Employment

Population growth will also increase workforce availability. South Dakota's 2.7% unemployment rate is the lowest in the nation. The workforce available is projected to increase as populations increases. Figure 2-3 shows South Dakota's actual and projected labor force and employment from 1990-2024.

Figure 2-3: South Dakota Labor Force and Employment, 1990-2024

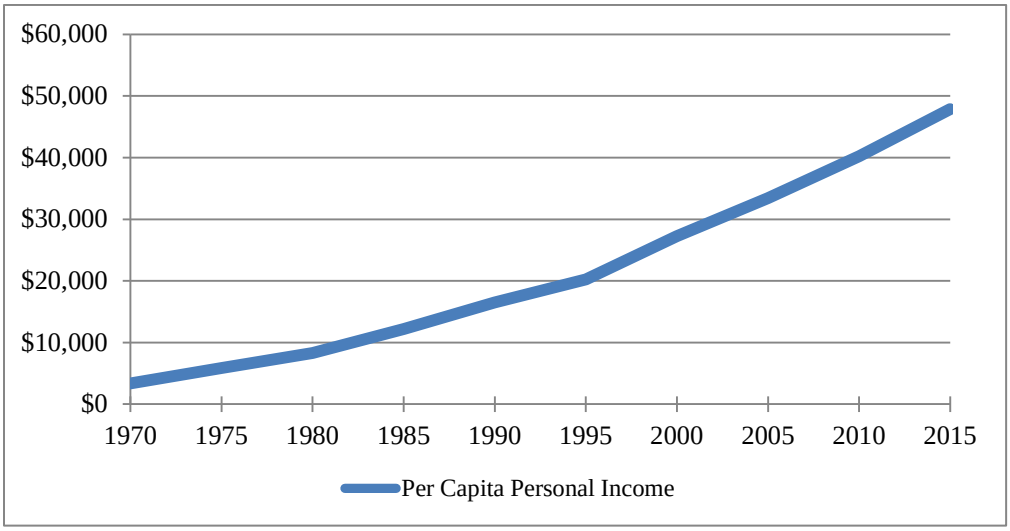


Source: South Dakota Department of Labor and Regulation

Per Capita Income

According to the Bureau of Economic Analysis, in 2015, South Dakota had a per capita personal income (PCPI) of $47,881 which ranked 21st in the United States and reflected a 4.2 percent increase from 2014. The national average PCPI in 2015 was $48,112 with an increase of 3.7 percent from 2014. South Dakotans are increasing their per capita personal income at a greater rate than the national average. In 2005 the South Dakota PCPI was $33,772 which ranked 24th in the United States. The 2005-2015 South Dakota compound annual growth rate of PCPI was 3.6 percent compared to the national average of 3.0 percent. Figure 2-4 shows the overall trend of PCPI in the state since 1970.

Figure 2-4: South Dakota Per Capita Personal Income, 1970-2015



Source: U.S. Bureau of Economic Analysis

Typically increases in personal income will increase the amount of capital going into the economy. This will have a direct impact on the freight system because the demand for goods and services increase with an increase in PCPI.

Freight Movement

South Dakota is an agricultural state supplying the world with commodities. Farm to market freight movements are vital to the state's economy. The majority of the top commodities moving to and from South Dakota are related to the agriculture industry. It is projected South Dakota will continue this trend into the future.

Freight movement is measured by weight and dollar value. Table 2-1 shows the top eleven commodities by weight moving to and from the state in 2015 and the projection for 2045. These commodities are typically high weight bulk shipments with a lower value. The top eleven commodities account for 89% of the total commodities shipped by weight in 2015 and are projected to account for 90% of the products moved in 2045.

Table 2-1: South Dakota Commodity Shipments Ranked by Weight

Commodity	2015 Thousand Tons	Commodity	2045 Thousand Tons
Total	166,283.74	Total	232,606.26
Cereal grains	54,146.43	Coal-n.e.c.	65,540.65
Coal-n.e.c.	34,129.61	Cereal grains	60,036.51
Other ag prods.	10,476.98	Nonmetal min. prods.	13,778.72
Animal feed	9,798.62	Gravel	13,327.23
Gravel	8,735.07	Animal feed	12,864.53
Nonmetal min. prods.	8,247.28	Other ag prods.	10,830.95
Fertilizers	6,862.59	Gasoline	9,338.67
Gasoline	4,819.23	Fertilizers	7,021.09
Natural sands	3,975.93	Natural sands	6,575.81
Other foodstuffs	3,317.90	Other foodstuffs	5,125.50
Live animals/fish	3,219.00	Live animals/fish	3,959.71

Coal n.e.c. – Coal - not elsewhere classified

Source: Freight Analysis Framework Version 4

Agricultural and mining commodities make up the majority of the top 11 commodities ranked in value with the exception of precision instruments and electronics. The value of commodities doesn't always correlate with the weight of commodities. Agricultural and mining commodities are typically high-weight but low-value bulk shipments whereas electronics and precision instruments tend to be high-value/low-weight shipments. Table 2-2 displays the top eleven commodities ranked by value for 2015 and the projection for 2045. The top eleven commodities account for 66% of the total commodities shipped by value in 2015 and are projected to be 67% in 2045.

Table 2-2: South Dakota Commodity Shipments Ranked by Value

Commodity	2015 Value (Million)	Commodity	2045 Value (Million)
Total	$95,240.69	Total	$149,436.06
Cereal grains	$12,823.55	Coal-n.e.c.	$17,368.98
Coal-n.e.c.	$8,573.11	Cereal grains	$14,031.17
Live animals/fish	$5,762.93	Precision instruments	$10,874.35
Motorized vehicles	$5,414.35	Machinery	$10,779.12
Machinery	$5,046.00	Electronics	$9,764.20
Other ag prods.	$4,856.86	Live animals/fish	$7,170.12
Precision instruments	$4,590.61	Motorized vehicles	$7,052.11
Electronics	$4,590.61	Gasoline	$6,647.08
Mixed freight	$4,316.64	Mixed freight	$6,573.14
Gasoline	$3,803.08	Other foodstuffs	$5,225.66
Other foodstuffs	$3,101.54	Other ag prods.	$5,162.65

Source: Freight Analysis Framework Version 4

Freight movement can be split into multiple categories, freight moving within South Dakota, freight moving from outside South Dakota to South Dakota (Inbound) and freight moving from South Dakota to a location outside South Dakota (Outbound).

The top commodities for freight shipments within the state by weight are agricultural and mining commodities. Figure 2-3 lists the top six commodities shipped within the state in 2015 and what is projected in 2045. In 2015, cereal grains, other agricultural and mining commodities account for 82% of the freight transported within the state with cereal grains leading the way, accounting for 48%.

In 2045, agricultural commodities are projected to continue top South Dakota's freight movement by weight with cereal grains accounting for 43% of the freight shipments and other agricultural and mining related commodities completing the top six. The top six commodities will account for 82% of the freight movement within the state. Table 2-3 shows the 2015 and 2045 projection for shipments of the top commodities within South Dakota by weight.

Table 2-3: Top Commodities Moving within South Dakota by Weight, 2015 and 2045

Commodity	2015 Thousand Tons	Commodity	2045 Thousand Tons
Total	79,676.59	Total	92,830.73
Cereal grains	38,584.01	Cereal grains	40,301.54
Other ag prods.	6,438.00	Gravel	8,789.66
Animal feed	6,095.94	Nonmetal min. prods.	7,777.52
Gravel	5,756.47	Animal feed	6,692.31
Nonmetal min. prods.	4,881.74	Natural sands	6,351.23
Natural sands	3,812.57	Other ag prods.	6,298.21
All Other	14,107.87	All Other	1,620.26

Source: Freight Analysis Framework Version 4

The value of the commodities transported within the state in 2015 is similar to the top commodities transported by weight. The top six commodities transported by value are all related to agriculture. Cereal grains are the top commodity shipped by value at $8.6 billion and live animals is second at $4.0 billion. The top six commodities account for 67% of the value of commodity shipments within the state.

The value of the commodities projected to be shipped within the state in 2045 is similar to the top commodities moved in 2015. The top six commodities shipped by value will continue to be related to agriculture. Cereal grains will be the top commodity shipped at $8.9 billion and live animals will be second at $4.9 billion. The top six commodities will account for 74% of the value of commodities projected to move within the state. Table 2-4 shows the top six commodities shipped by value in 2015 and 2045.

Table 2-4: Top Commodities Moving within South Dakota by Value, 2015 and 2045

Commodity	2015 Value (Million)	Commodity	2045 Value (Million)
Total	$29,811.13	Total	$35,533.28
Cereal grains	$8,565.30	Cereal grains	$8,946.58
Live animals/fish	$3,939.87	Live animals/fish	$4,973.04
Other ag prods.	$2,984.85	Other ag prods.	$2,920.04
Fuel oils	$1,893.24	Machinery	$2,358.88
Chemical prods.	$1,324.02	Chemical prods.	$2,041.40
Animal feed	$1,217.44	Fertilizers	$1,374.02
All Other	$9,886.40	All Other	$12,919.33

Source: Freight Analysis Framework Version 4

In 2015, weight of the top commodities moving inbound to South Dakota was coal n.e.c. followed by fertilizers and cereal grains. Examples of coal n.e.c. commodities are liquefied natural gas and propane. The majority of coal n.e.c. travels through pipelines to terminals where distribution begins. Propane is used to dry grains at elevators and is a

valuable resource for the agricultural industry. Cereal grains and fertilizers ranked second and third respectively. The top six commodities coming into South Dakota by weight accounted for 75% of the total commodities.
The top six commodities projected to move inbound in 2045 are not much different from what we see today except for mixed freight moving in and coal departing. The top six commodities will account for 83% of the total freight transported into South Dakota

Table 2-5: Top Commodities Moving Inbound to South Dakota by Weight, 2015 and 2045

Commodity	2015 Thousand Tons	Commodity	2045 Thousand Tons
Total	37,454.55	Total	58,784.86
Coal-n.e.c.	18,138.99	Coal-n.e.c.	38,027.68
Fertilizers	3,312.31	Nonmetal min. prods.	3,047.99
Cereal grains	2,642.26	Fertilizers	2,524.63
Nonmetal min. prods.	1,545.40	Cereal grains	2,442.53
Coal	1,222.28	Other foodstuffs	1,321.66
Other foodstuffs	1,087.75	Mixed freight	1,212.02
All Other	9,505.57	All Other	10,208.34

Source: Freight Analysis Framework Version 4

The 2015, weight of the top commodities moving outbound was Coal n.e.c. followed by cereal grains, other agricultural products, gravel, and animal feed. Three of the top five commodities were agriculture commodities and accounted for 76% of the freight moving out of South Dakota. The 2045 projected commodities moving outbound are similar to what is moving outbound in 2015 with the exception of gasoline. The top five commodities will continue to account for 76% of the total outbound freight movement.

Table 2-6: Top Commodities Moving Outbound from South Dakota by Weight, 2015 and 2045

Commodity	2015 Thousand Tons	Commodity	2045 Thousand Tons
Total	49,152.60	Total	80,990.67
Coal-n.e.c.	15,501.17	Coal-n.e.c.	25,648.99
Cereal grains	12,920.16	Cereal grains	17,292.44
Other ag prods.	3,177.83	Gasoline	8,605.94
Gravel	2,903.29	Animal feed	5,274.85
Animal feed	2,776.50	Gravel	4,433.09
All Other	11,873.65	All Other	19,735.36

Source: Freight Analysis Framework Version 4

The 2015, the value of the top six commodities moving inbound was coal n.e.c., mixed freight, electronics, motorized vehicles, machinery, and live animals. The value of these commodities made up approximately 50% of commodities coming into South Dakota.

The top commodities moving on the transportation system by value were commodities used by the consumer and are not as strongly related to agriculture as the commodities moving outbound or within the state. The top five commodities in 2045 are projected to be similar to those in 2015 except for the addition of pharmaceuticals and miscellaneous manufactured products. The top five commodities by value in 2045 will account for 60% of the commodities coming into South Dakota.

Table 2-7: Top Commodities Moving Inbound to South Dakota by Value, 2015 and 2045

2015		2045	
Commodity	Value (Million)	Commodity	Value (Million)
Total	$32,300.48	Total	$50,846.79
Coal-n.e.c.	$4,843.45	Coal-n.e.c.	$10,805.08
Mixed freight	$2,859.40	Electronics	$5,522.20
Electronics	$2,698.53	Mixed freight	$4,273.42
Motorized vehicles	$2,420.16	Machinery	$4,209.63
Machinery	$1,985.87	Pharmaceuticals	$3,390.99
Live animals/fish	$1,467.50	Misc. mfg. prods.	$2,407.16
All Other	$16,025.57	All Other	$20,238.31

Source: Freight Analysis Framework Version 4

The 2015 values of the top six commodities moving outbound were coal n.e.c., precision instruments, cereal grains, meat/seafood, motorized vehicles, and gasoline. The top six commodities account for 45% of the total commodities moved out of the state. The 2045 projections have precision instruments and gasoline as the top two commodities moving out of South Dakota, accounting for 25% of the freight moving outbound. The top six commodities will account for 54% of the commodities shipped out of the state.

Table 2-8: Top Commodities Moving Outbound from South Dakota by Value, 2015 and 2045

2015		2045	
Commodity	Value (Million)	Commodity	Value (Million)
Total	$33,129.08	Total	$63,055.99
Coal-n.e.c.	$3,547.03	Precision instruments	$9,864.10
Precision instruments	$3,406.63	Gasoline	$5,975.19
Cereal grains	$3,108.15	Coal-n.e.c.	$5,868.59
Meat/seafood	$2,357.47	Machinery	$4,210.61
Motorized vehicles	$1,971.34	Cereal grains	$4,210.19
Gasoline	$1,944.45	Meat/seafood	$3,933.79
All Other	$18,220.51	All Other	$28,993.51

Source: Freight Analysis Framework Version 4

Freight Movement by Mode

The majority of freight movement in South Dakota is by truck, pipeline and rail accounting for 97% of the shipments in 2015 and 2045 by weight. Table 2-9 shows the tonnage projections from 2012 to 2045. Trucks dominate 2015 and 2045 in moving freight. In 2015, trucks account for 67% of the freight movement, by weight, and are projected to account for 59% of the freight movement, by weight, in 2045.

Table 2-9: Mode of Freight Movement by Weight (Millions of Tons)

Mode	2015	2045	Percent change
Total	166.3	232.6	39.9%
Truck	111.0	137.1	23.5%
Pipeline	34.0	62.4	83.5%
Rail	17.1	25.2	47.4%
Multiple Modes and Mail	4.0	7.5	87.5%
Water	0.1	0.3	3.0%
Air (include Truck-air)	0.0	0.0	0.0%
Other and unknown	0.0	0.0	0.0%

Source: Freight Analysis Framework Version 4

The majority of freight movement in South Dakota is by truck, multiple modes and mail, pipeline and rail accounting for 98% of the shipments in 2015 and 2045 by value. Table 2-10 shows the value projections from 2015 to 2045. Trucks dominate 2015 and 2045 in moving freight. In 2015 trucks account for 71% of the freight movement, by value, and are projected to account for 63% of the freight movement, by value, in 2045.

Table 2-10: Mode of Freight Movement by Value (Millions)

Mode	2015	2045	Percent change
Total	$95,240.7	$149,436.1	56.9%
Truck	$67,452.6	$94,210.0	39.7%
Multiple Modes and Mail	$12,032.0	$24,993.4	100.1%
Pipeline	$8,603.7	$15,277.3	77.6%
Rail	$5,861.2	$10,478.9	78.8%
Air (include Truck-air)	$865.0	$3,127.3	61.5%
Water	$417.5	$1,317.2	15.5%
Other and unknown	$8.7	$32.1	70.0%

Source: Freight Analysis Framework Version 4

Trading Partners

South Dakota's top domestic trading partners in 2015 are bordering states and Illinois. In 2015, Minnesota was the top partner with the most tonnage and value and is projected to continue stay on top through 2045. The other top major domestic trading partners in 2015

included Nebraska, Iowa, Illinois and North Dakota and in 2045 will include Nebraska, Illinois, California, Texas, and Iowa.

Table 2-11 shows South Dakota's top trading partners in 2015, and Table 2-12 shows the projected top trading partners for 2045 by weight and value.

Table 2-11: Top Trading Partners in 2015 by Weight and Value

Tons (Thousands)			Value ($ Millions)		
State	Number	Percent	State	Number	Percent
Total	128,829	100.0%	Total	62,940	100.0%
Minnesota	21,880	17.0%	Minnesota	7,383	11.7%
Nebraska	4,811	3.7%	Iowa	2,212	3.5%
Illinois	3,851	3.0%	Illinois	2,004	3.2%
North Dakota	3,509	2.7%	Nebraska	1,955	3.1%

Source: Freight Analysis Framework Version 4

Table 2-12: Top Trading Partners in 2045 by Weight and Value

Tons (Thousands)			Value ($ Millions)		
State	Number	Percent	State	Number	Percent
Total	173,821	100.0%	Total	98,589	100.0%
Minnesota	36,215	20.8%	Minnesota	12,965	13.2%
Nebraska	6,479	3.7%	California	5,558	5.6%
Illinois	5,880	3.4%	Texas	3,541	3.6%
California	5,205	3.0%	Iowa	3,399	3.4%

Source: Freight Analysis Framework Version 4

In 2015, South Dakota internationally exported goods valued $1.4 billion. The top international trading partner was Canada with exports valued at $528 million, Mexico was second with exports valued at $394 million. Table 2-13 shows the breakdown of South Dakota's exports to foreign countries.

Table 2-13: Top International Trading Partners by Value Exported, 2015

Country	Value ($ millions)	Percent
Total	1,396	100
Canada	528	37.8
Mexico	394	28.2
Saudi Arabia	64	3.3
Japan	37	2.5
China	34	1.8
All Other	339	24.3

Source: U.S. Census Bureau, Foreign Trade Division

In 2015, Canada was also the leader in South Dakota's foreign import trade market with imports valued at $543 million, which is 47.6% of the market share. The rest of the top five included Brazil, China, Mexico, and Japan. The top five made up approximately 84% of the total imports to South Dakota. Table 2-14 shows the breakdown of South Dakota's imports from foreign countries.

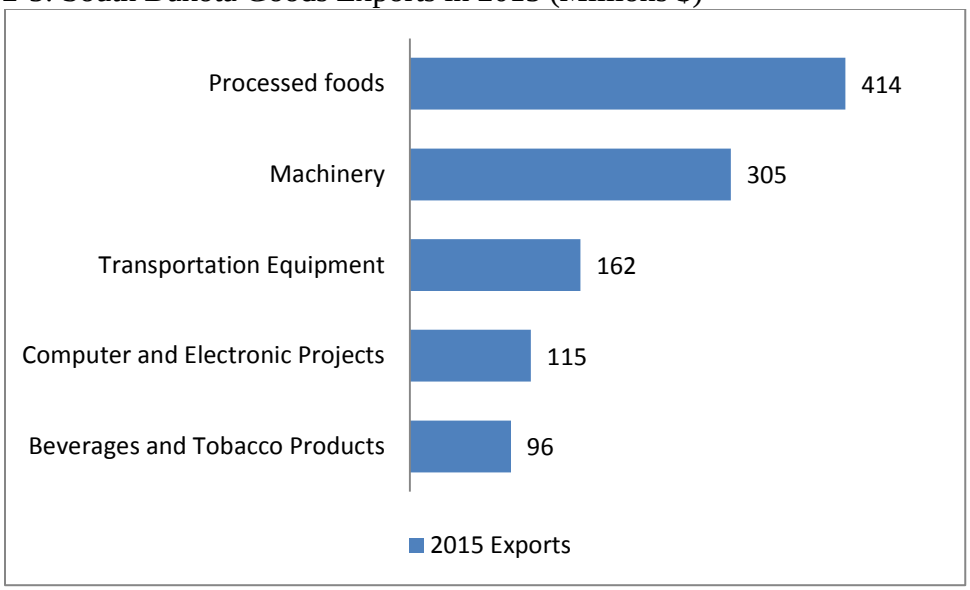
Table 2-14: Top International Trading Partners by Value Imported, 2015

Country	Value ($ millions)	Percent
Total	1,140	100
Canada	543	47.6
Brazil	158	13.9
China	153	13.4
Mexico	70	6.1
Japan	32	2.8
All Other	184	16.1

Source: U.S. Census Bureau, Foreign Trade Division

The top valued South Dakota goods exported in 2015 are in shown in Figure 2-5. Processed foods was the top export at $414 million followed by machinery, transportation equipment, computer and electronic products, and beverages and tobacco products.

Figure 2-5: South Dakota Goods Exports in 2015 (Millions $)



Source: U.S. Department of Commerce; International. Trade Administration

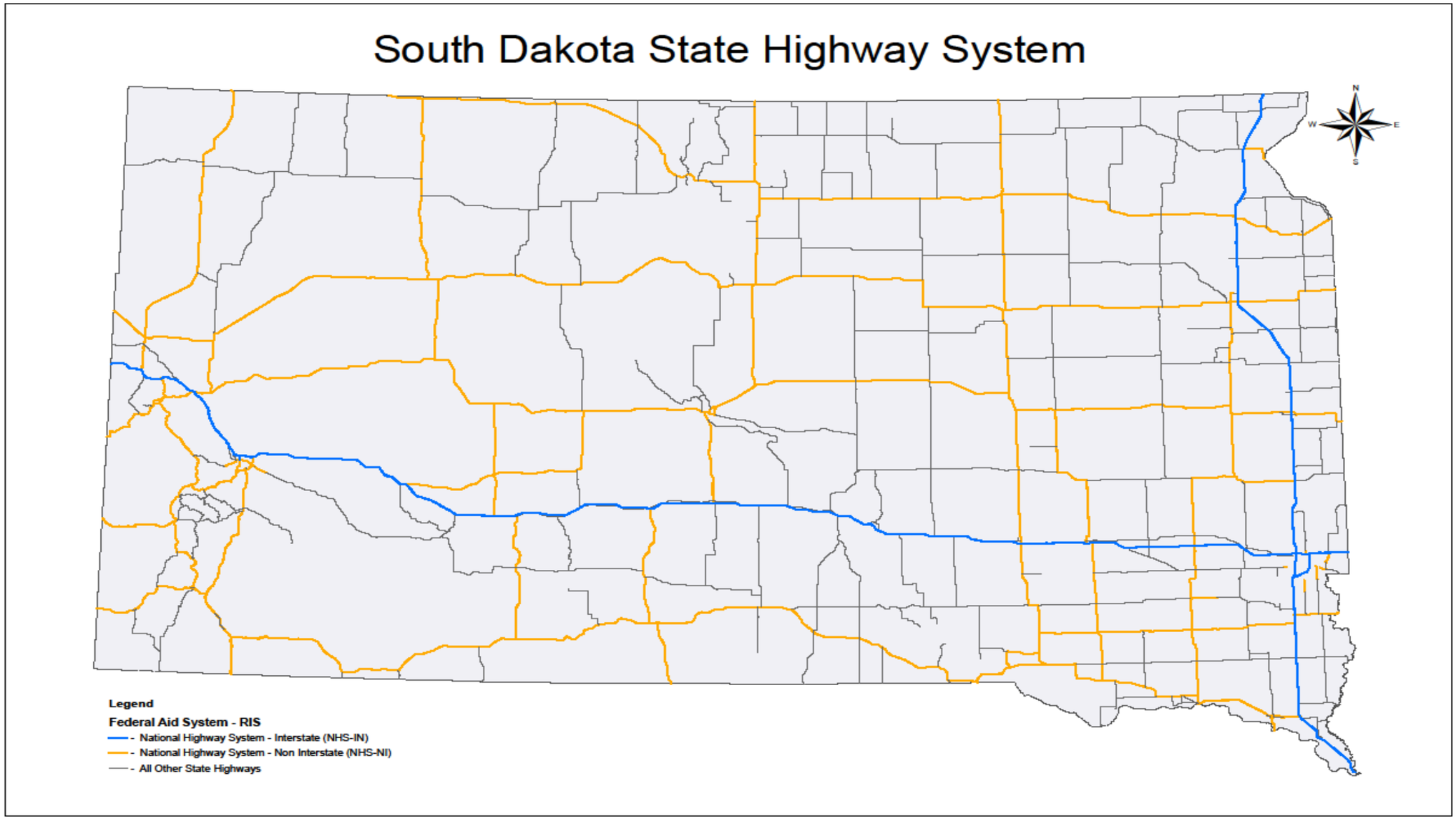
Chapter 3: Transportation System

South Dakota's Highway System

South Dakota's highway system is the lifeline of the transportation system that provides access to all areas of the state. South Dakota's roads range from Interstate, rural four-lane divided highways, multilane urban streets, paved secondary roads, and gravel roads. Bridges provide crossings to rivers, creeks, railroads and other roadways. The combination of roadways and bridges provides a high level of access and mobility for freight movement.

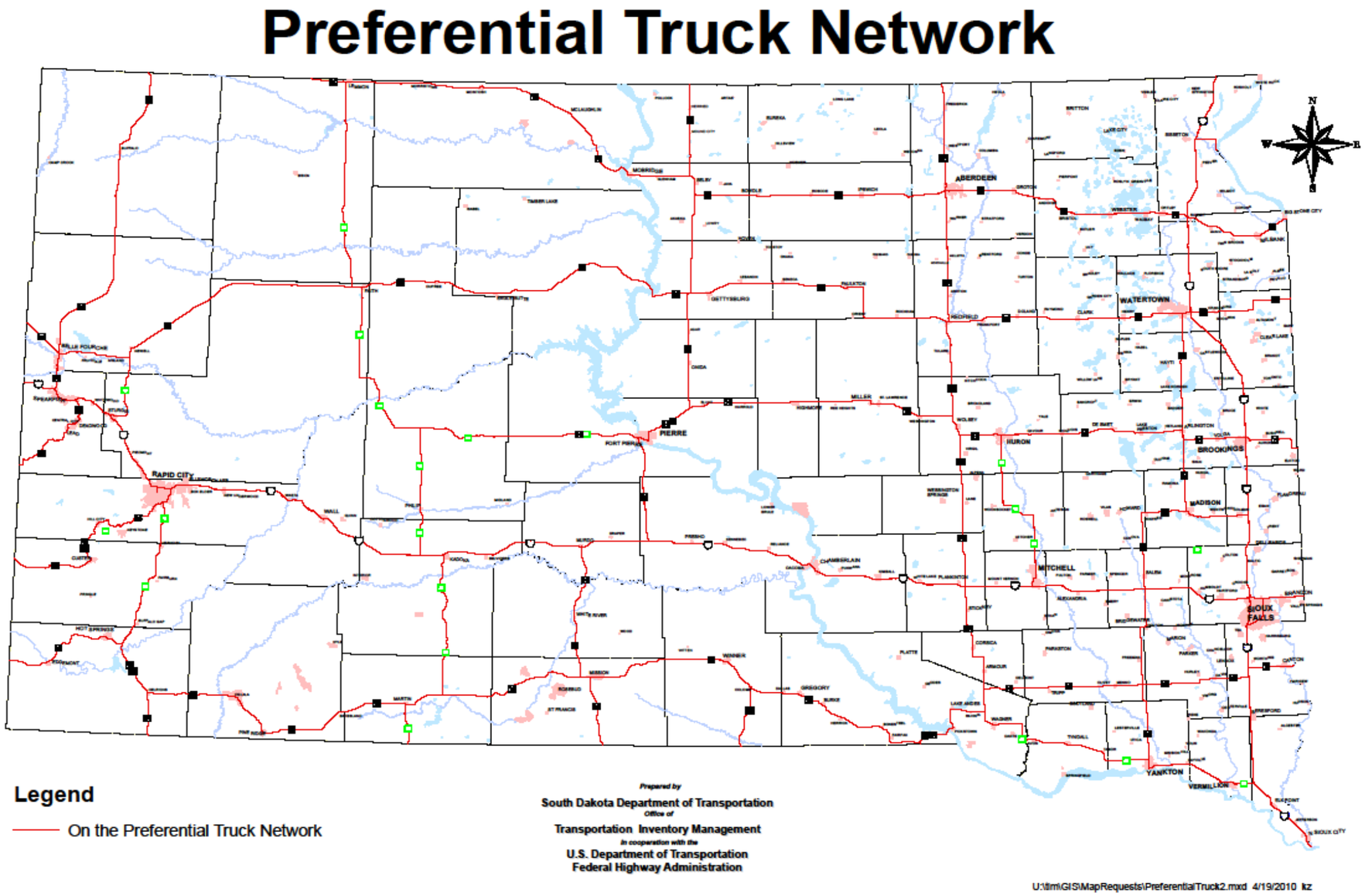
The state's highway system comprises more than 7,880 miles and approximately 1,800 structures. The state's preferential truck network comprises more than 4,700 miles with 969 structures. The state highway system is shown on Figure 3-1 and the state's preferential truck network on Figure 3-2. The entire preferential truck network is on the National Highway System but not all the National Highway System is included in the preferential truck network. The NHS includes the Interstate highway system as well as other roads important to the nation's economy, defense and mobility. The NHS provides connectivity to move freight to key intermodal freight facilities in South Dakota, the United States, Canada, and Mexico.

Figure 3-1: State Highway System



Source: South Dakota Department of Transportation

Figure 3-2: Preferential Truck Network



Pipelines

There are 10,398 miles of natural gas and hazardous liquid pipelines in South Dakota. This network supplies natural gas and liquefied petroleum/gas for residential and commercial consumption. Nearly all natural gas is delivered directly to consumers through the distribution lines. Petroleum and gas products are delivered to above ground terminals and distributed by truck to the final point of consumption. Propane is essential for heating rural South Dakota homes and drying crops after harvest.

South Dakota has pipelines transporting crude oil from the Bakken oil fields in North Dakota to various locations outside South Dakota. The construction of the Dakota Access pipeline is nearly complete and will transport crude oil from the Bakken in North Dakota to Illinois through South Dakota. Pipeline miles by commodity are shown in Table 3-1 and pipeline operators in Table 3-2.

Table 3-1: South Dakota Pipelines (Dec. 2015)

Type of Pipeline	Miles
Distribution Mains	4,804.00
Service Lines	3,291.20
Intrastate Gas Transmission Lines	287.69
Interstate Gas Transmission Lines	1,279.20
Intrastate Hazardous Liquid	0.00
Interstate Hazardous Liquid	
Crude	220.00
Refined Petroleum Products	516.50

Source: South Dakota Public Utilities Commission

Table 3-2: South Dakota Pipeline Operators (Dec. 2015)

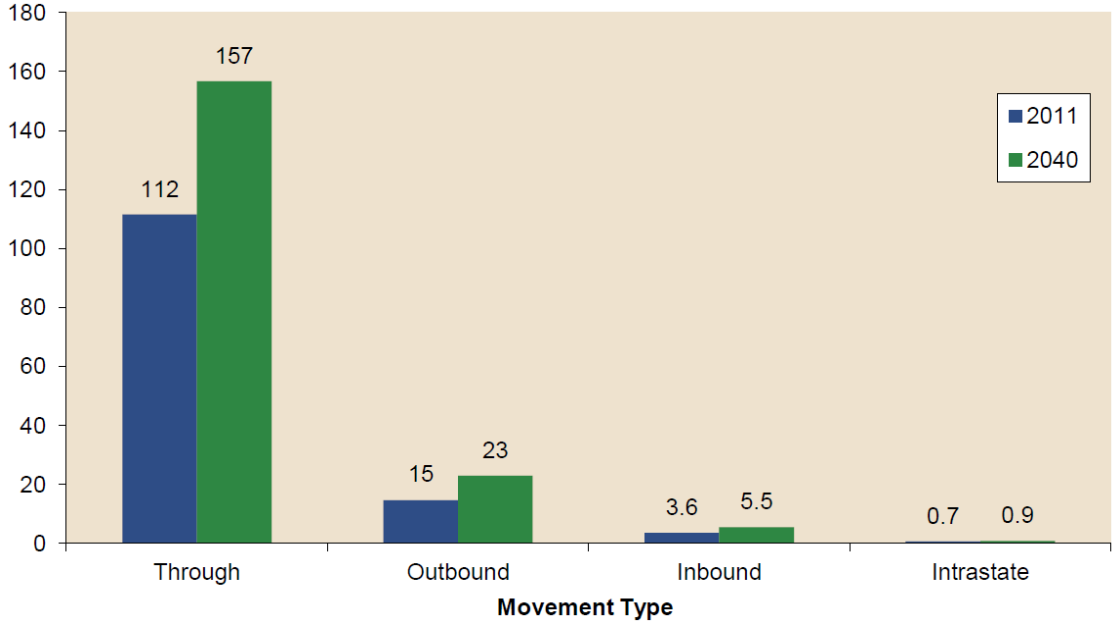
Pipeline	Company
Private Gas Distribution	MEC, MDU, NWE, NNG (farm taps)
Public Gas Distribution	Crooks, Garretson, Humboldt, Watertown
Intrastate Gas Transmission	Basin, Black Hills Power, MDU, NEW, SDIP, Sioux Falls Landfill, Xcel
Interstate Gas Transmission	Northern natural Gas, Norther Border Pipeline, WBI, Great Plains Natural Gas
Interstate Hazardous Liquid	Nustar, Magellan, EllsJet Terminal, TC Oil Pipeline Operations Inc.

Source: South Dakota Public Utilities Commission

Railroad

Railroads are critical to the state's agricultural industry and overall economy. Railroads move South Dakota agricultural products including ethanol to U.S. and global markets. Figure 3-3 shows the rail volumes by destination. The total volume for freight rail transportation in South Dakota is projected to increase from 130.6 million tons in 2011 to 186.1 million tons in 2040, a compounded annualized growth rate of 1.2 percent. Coal accounts for most of the through-movement tonnage, but the projections also show that outbound and inbound rail tonnage is projected to increase by 50 percent.

Figure 3-3: Rail Volumes by Direction, 2011 and 2040 (millions of tons)



Source: SBT 2011 Confidential Carloas Waybill Sample Data; FHWA FAF3 2011 provisional estimates and 2040 forecasts (SD State Rail Plan)

South Dakota has been producing greater amounts of grain commodities requiring the grain industry to construct additional facilities for storing and shipping commodities. A new facility has a storage capacity of 3 to 4 million bushels plus a temporary storage capacity of 1 to 3 million bushels. These facilities have increased the efficiency of unloading and loading grain commodities causing an increase if freight movements. The additional grain terminals have created a need to rehabilitate some rail facilities.

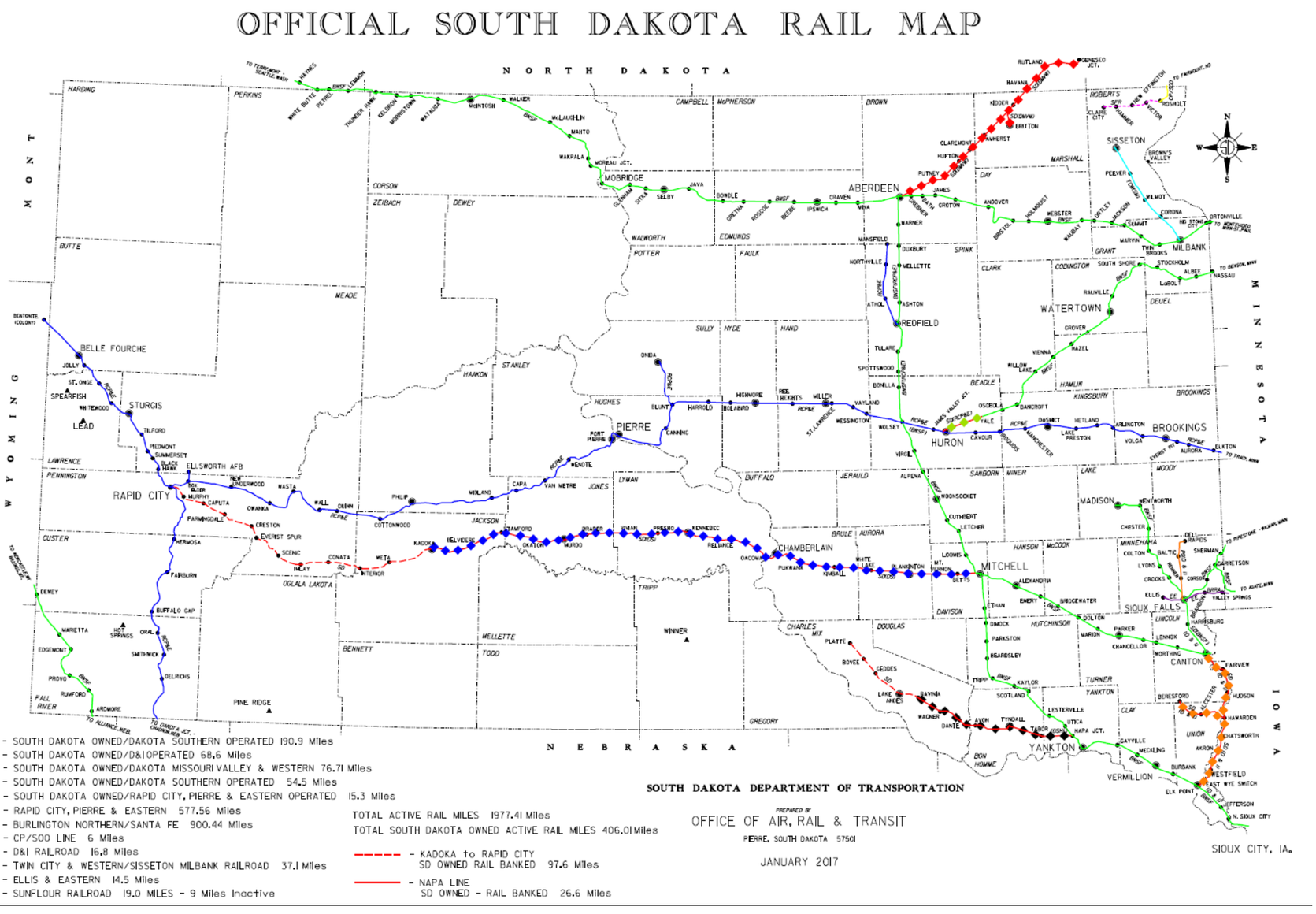
The construction of the Britton Terminal's new 110 railcar shuttle facility spawned the construction of a south leg of a wye at Jarrett Junction and the rehabilitation of 24 miles of light rail being replaced with heavy rail. The Britton line freight movement has increased 2000 cars per year and is expected to increase another 3,000 cars per year in the next few years.

The construction of Gavalon's 110 railcar shuttle facility east of Kimball and South Dakota Wheat Growers' 110 railcar shuttle facility west of Kennebec resulted in the rehabilitation of 110 miles of the State owned line between Mitchell and Presho. The rail upgrade has increased freight movement by 11,000 railcars per year. Rail freight on this line is projected to continue to increase in the future.

South Dakota has a substantial rail network, shown in Figure 3-4. There are 1,851 miles of rail in South Dakota. The owners of the system are as follows:

- Burlingon Northern Santa Fe (BNSF) owns approximately 50%
- Rapid City, Pierre & Eastern (RCP&E) owns aproximately 30%
- Shortline Railorads owns approximately 5%
    - Ellis & Eastern Railroad
    - Sisseton/Milbank Railroad
    - Sunflower Railroad and Canadian Pacific
- South Dakota owns approximately 15% with the following railway companies operating on the South Dakota owned rail lines
    - Dakota Southern Railroad Company
    - Dakota, Missouri Valley & Western
    - Rapid City, Pierre & Eastern

Figure 3-4: South Dakota Active Rail System



The South Dakota Rail Plan identified goals, strategies and projects for the rail network. The goals of the South Dakota State Rail Plan are:

- support economic growth and development
- ensure connectivity for critical industries
- maintain state railroad in a state of good repair
- reduce highway impacts
- improve railroad safety, security and resiliency

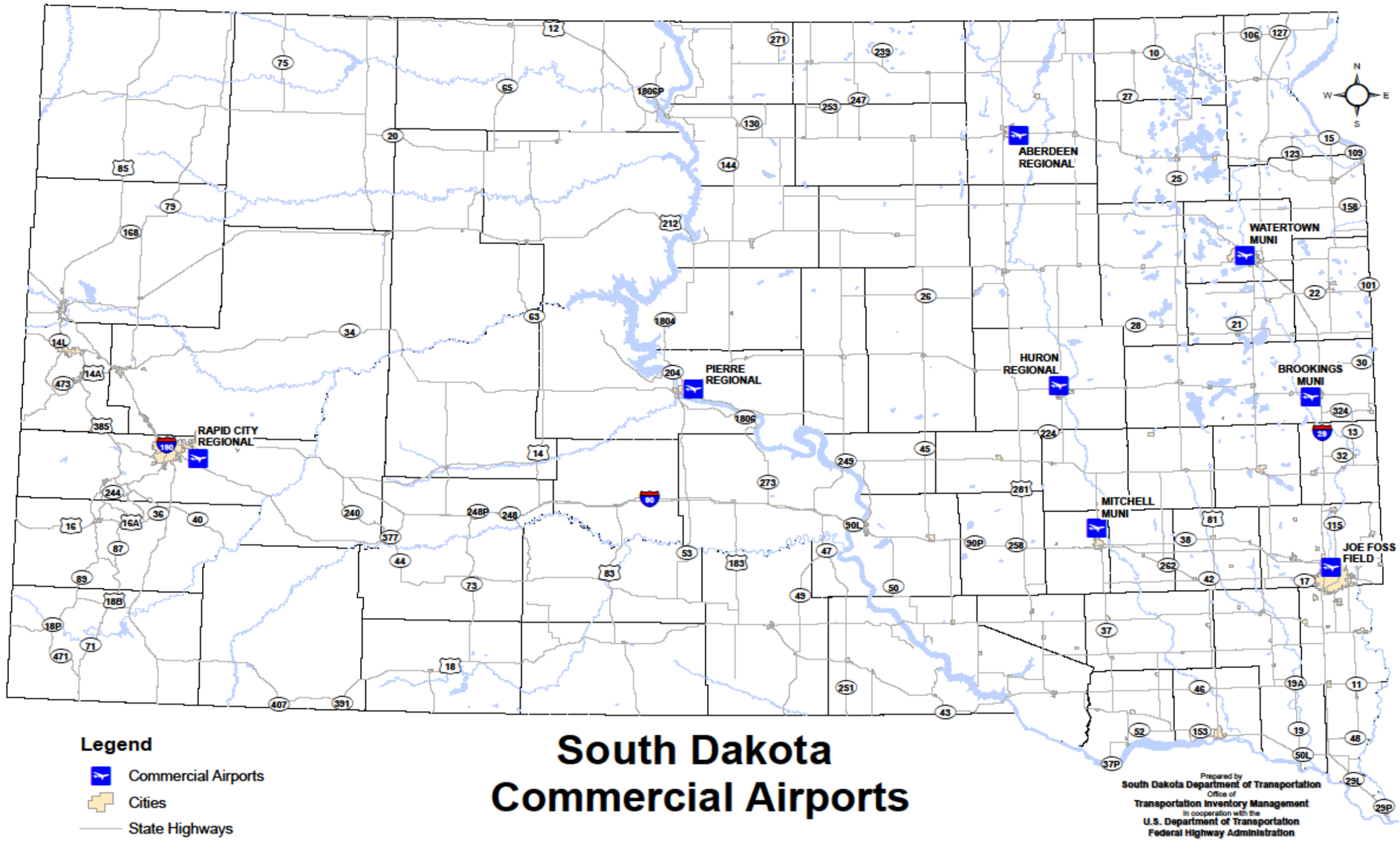
The South Dakota Rail Plan will support the South Dakota Freight Plan. The State Rail Plan has identified rail freight projects to improve the rail freight network.

Source: State Rail Plan

Air

Air cargo service plays an important role by providing fast and reliable freight movement to regional, national and international destinations. Nearly all the air freight inbound and outbound from the state is moved by commercial air service or air cargo carriers. The majority of the air freight shipments move through Joe Foss Field in Sioux Falls (FSD), Rapid City Regional (RAP), Pierre Regional (PIR), and Aberdeen Regional (ABR). The two main carriers are FedEx and UPS Inc. In 2016, Sioux Falls airport shipped 42.6 million pounds inbound and outbound. Rapid City was second with 3.1 million pounds, Pierre at 2.3 million pounds, and Aberdeen with 1.2 million pounds. The locations of the airports are shown in Figure 3-5.

Figure 3-5: South Dakota Commercial Airports



Freight Generating Facilities

Agriculture facilities lead the way in South Dakota's freight generating facilities. Agriculture intermodal facilities are grain elevators and ethanol plants. The majority of the intermodal freight generators are either adjacent to the preferential truck network or a rail network. Figure 3-6 shows the locations of intermodal facilities. Intermodal facilities transfer products between modes. Grain elevators and ethanol plants exchange product between truck and rail or rail to truck. These facilities are vital to the economy of South Dakota. The farmer relies on the transportation network to move commodities from the field to the elevator or ethanol plant. The grain elevators and ethanol plants rely on the transportation network to move the commodity or refined products to markets nationwide or globally. These connections are an integral part of the freight transportation network and provide seamless transition from one mode to another. The larger Class 1 cities house manufacturing industries that ship products internationally and globally. Sioux Falls, Brookings, Watertown, Brandon, Aberdeen, Huron, and Rapid City lead the way and are all either adjacent to an Interstate facility or have expressways linking them to the Interstate system. The products manufactured in South Dakota include electronics, wind turbine parts, fire and bucket trucks, medical supplies, processed beef, hog and poultry, and storm doors.

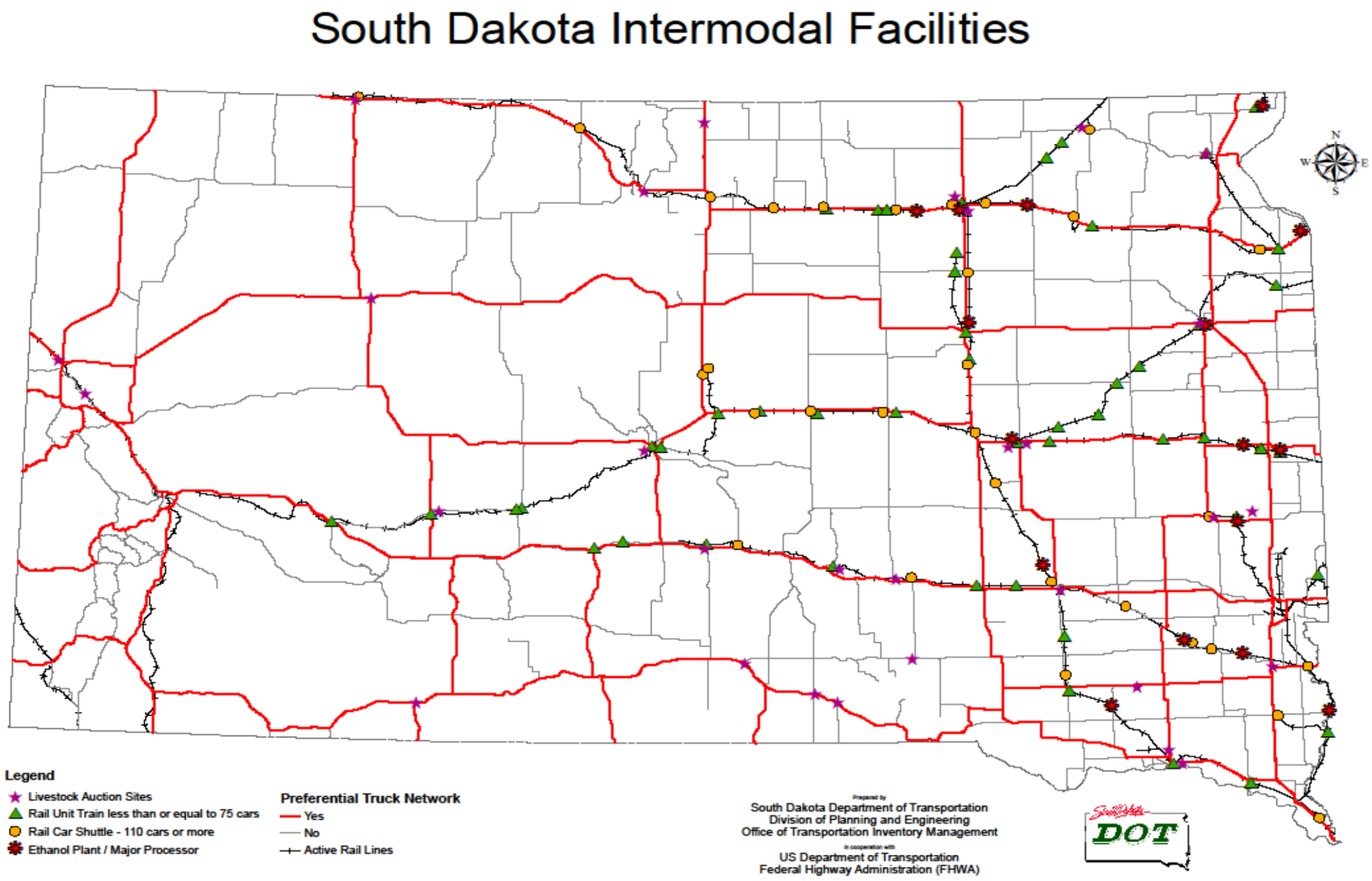
Military Installations

The U.S. military has a presence in South Dakota. Military installations require efficient and reliable access to the freight transportation system for national defense purposes. The U.S. military depends on the South Dakota freight system to move cargo to not only support the installations, but also to deploy personnel and equipment for national defense. To meet this critical need, the Strategic Highway Network (STRAHNET) was developed by the Department of Defense (DoD) in coordination with FHWA. The STRAHNET is a network of highways which provide the U.S. military access, continuity, and emergency capabilities for defense purposes.

The state's military installations serve as freight generators and consumer markets which need connectivity to the freight transportation system. At Ellsworth Air Force Base, the U.S. Air Force is home to the 28th Bomb Wing and is one of two B-1B bases in the world. The 28th Bomb Wing is home to 3,700 airmen and DoD civilians and operates 27 B-1B Lancers. The South Dakota National Guard has numerous Army and Air Guard units domiciled throughout the state including the 114th Fighter Wing based in Sioux Falls, which operates F-16 Fighter Jets.

Diverse and complex supply chains are necessary to efficiently and reliably provide support to these military sites. Fuel, food, ammunition, maintenance, equipment and materials, and medical supplies are critical to maintaining these units in a combat-ready posture. Transportation infrastructure to include highways and air are critical to supporting these supply chains and to support deployment of units.

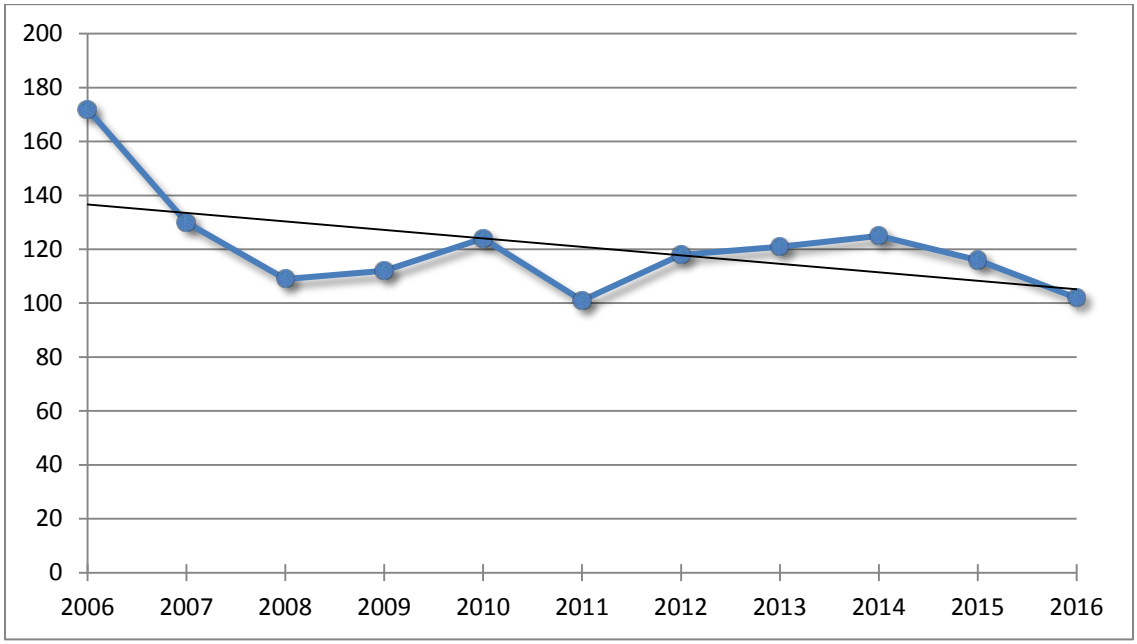
Figure 3-6: Intermodal Freight Facilities



Safety

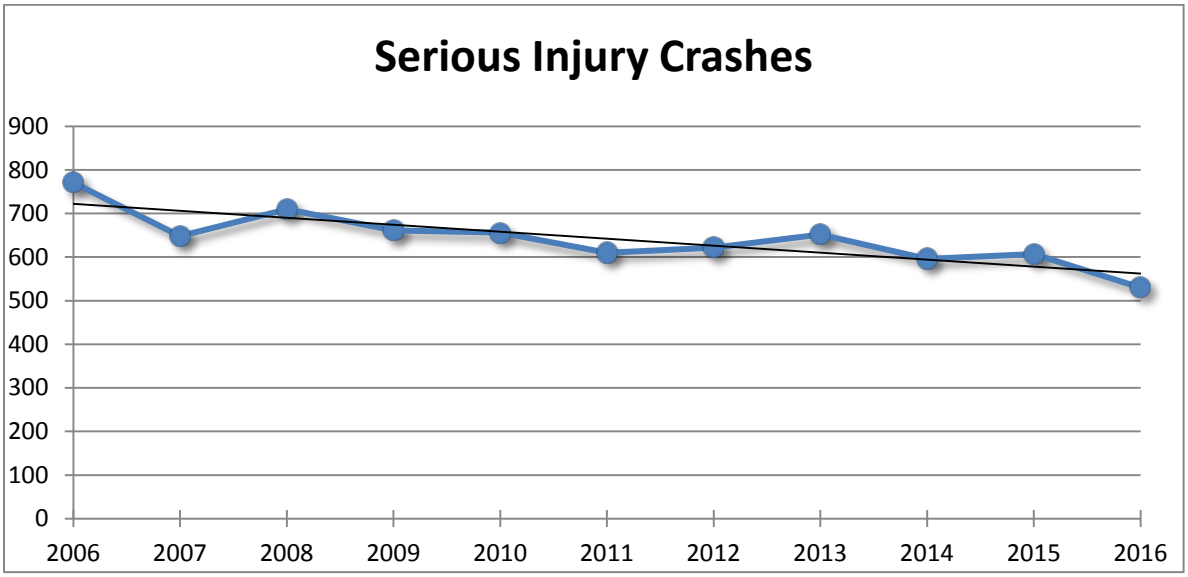
The South Dakota Freight Plan supports the goals and strategies identified in the South Dakota Strategic Highway Safety Plan (SHSP). The vision of the SHSP is – **Every Live Counts: Partnering to Save Lives.** The goal of the SHSP is to reduce the five year fatal and serious injury crash rate at least 15 percent from 2015 to 2020. To achieve the reduction in the crash rate throughout the state, partnerships with transportation safety stakeholders will need to be enhanced and SHSP strategies implemented. Since 2006, fatal crashes have been trending downward from 172 in 2006 to 102 in 2016 with the low of 101 in 2011. Figure 3-7 shows the number of fatalities per year and the trend line. The trend is the same for serious injury crashes with 771 in 2006 trending downward to 530 in 2016. Figure 3-8 shows the number of serious injury crashes per year from 2006 to 2016 and the trend line. Some of the reasons for the downward trend in fatalities and serious injury crashes are vehicle safety improvements, improved signing and pavement markings, roadway geometric improvements, seatbelt campaigns, and rumble strips. Run-off-the-road crashes and unbelted occupants account for the majority of the fatalities and serious injury crashes in South Dakota. To decrease the run-off-the-road crashes, the SDDOT is installing rumble strips on the edge of the roadways to warn drivers they are approaching the edge of the roadway and give them time to recover. South Dakota continues a media campaign to educate drivers the importance of seat belts in saving lives.

Figure 3-7: Total Fatalities in South Dakota 2006-2016



Source: South Dakota Department of Transportation

Figure 3-8: Total Serious Injury Crashes in South Dakota 2006-2016



Source: South Dakota Department of Transportation

From 2011-2015, heavy truck crashes accounted for 78 fatal crashes or 13.43 percent of the total fatal crashes and 233 serious injury crashes or 7.55 percent of the total serious injury crashes. Fatal and serious injury crashes for heavy trucks account for 8.48 percent of the total fatal and serious injury crashes from 2011-2015. Table 3-3 shows the total crashes, heavy truck crashes and fatal and serious injury crashes from 2011-2015.

Table 3-3: Total Crashes and Heavy Truck Crashes 2011-2015 (Does not include Animal Hits)

Severity	Total Crashes	Heavy Truck Crashes	Percentage
All	63311	4159	6.57%
Serious Injury	3088	233	7.55%
Fatal	581	78	13.43%
Fatal and Serious	3669	311	8.48%

Source: South Dakota Department of Transportation

Based on data analysis, South Dakota has identified seven safety emphasis areas in the SHSP:

- roadway departure
- unbelted vehicle occupants
- speeding-related
- intersections
- drug and alcohol related
- young drivers

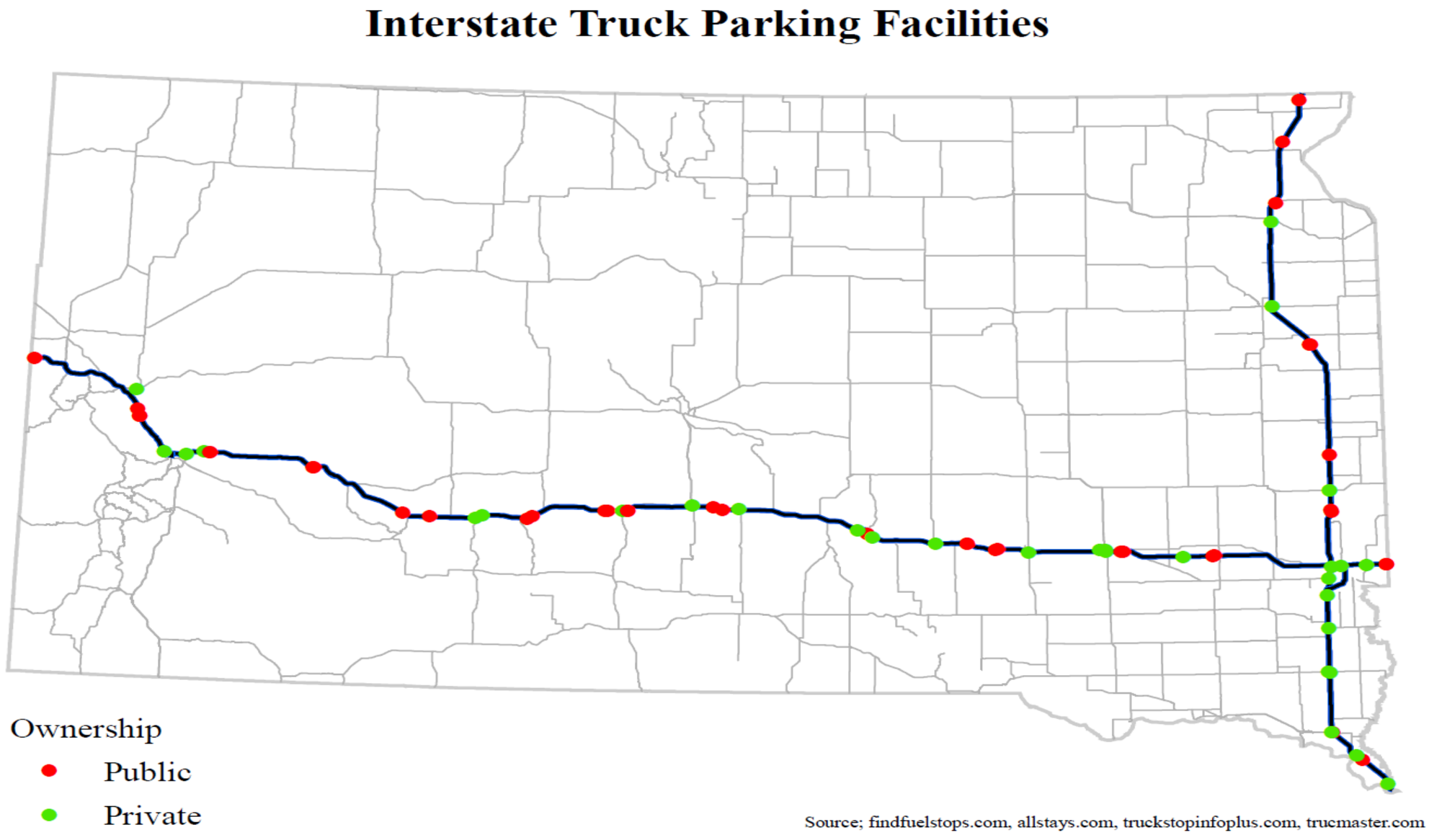
- motorcycles

Although heavy truck crashes are not an emphasis area in the SHSP, the goal is to reduce fatalities and serious injury crashes in South Dakota for all vehicles using these basic approaches:

- **Education:** better educating drivers and promoting safe driving
- **Enforcement:** enforcing traffic safety laws and supporting effective arrest and prosecution offenses
- **Engineering:** implementing infrastructure safety improvements that are effective at reducing and preventing lane-departure and intersection related crashes
- **Emergency Medical Services:** providing timely and professional emergency response and trauma care to crash victims
- **Project Planning Partnerships:** capitalizing on multidisciplinary safety knowledge at the federal, state, local and tribal government level to develop safety projects
- **Research and Data:** improving the crash data analysis from all entities for more complete identification of crash issues.

Fatigue driving is a national safety concern. Changes have been made in the "hours of service rules" to require drivers to take breaks to decrease fatigue. Freight drivers are required to install electronic logging devices in their trucks by the end of 2017. This device will electronically log hours of service and rest time for motor carrier to download. Truck parking is a concern because when a driver reaches their maximum hours of service for the day or week, they will be required to immediately stop driving to rest and recover from fatigue or risk a fine. Truck stops and state truck parking locations along the Interstate system are shown in Figure 3-9.

Figure 3-9: South Dakota Interstate Truck Parking Locations



Chapter 4: Condition and Performance

South Dakota's economy depends on an efficient and reliable transportation system. Agriculture producers and shippers rely on the transportation system to move their product to U.S. and global markets. South Dakota's transportation infrastructure has provided agriculture producers and shippers the network needed to maximize their market potential to maintain a strong economy.

Condition of the Highway System

Efficiently moving freight across the highway system is vital to the economy of South Dakota. Sixty-seven percent of the freight moved in South Dakota is moved by truck. Agriculture commodities lead the way so it is vital for the highway system to be in adequate condition to move these items from farm to market. The majority of the first and last miles of the commodity chain are moved by truck.

South Dakota uses a pavement management system to create a Surface Condition Index (SCI) for pavement condition. Data used to compute SCI is gathered on a yearly basis. SCI takes into account different types of cracking, roughness, rutting, punchouts, faulting, joint condition and patching. It uses a scale from 0 to 5 with four categories, excellent, good, fair and poor.

South Dakota's National Highway System is in very good condition with 87 percent of the roadways in excellent or good condition and 3 percent in poor condition. Table 4-1 shows the surface condition composite index value for excellent, good, fair and poor and the percent of pavement in excellent, good, fair and poor on the National Highway System. South Dakota is developing performance targets for pavements that will be published in the Transportation Asset Management Plan (TAMP). The performance measures and targets in the TAMP will support the freight plan's goals and strategies.

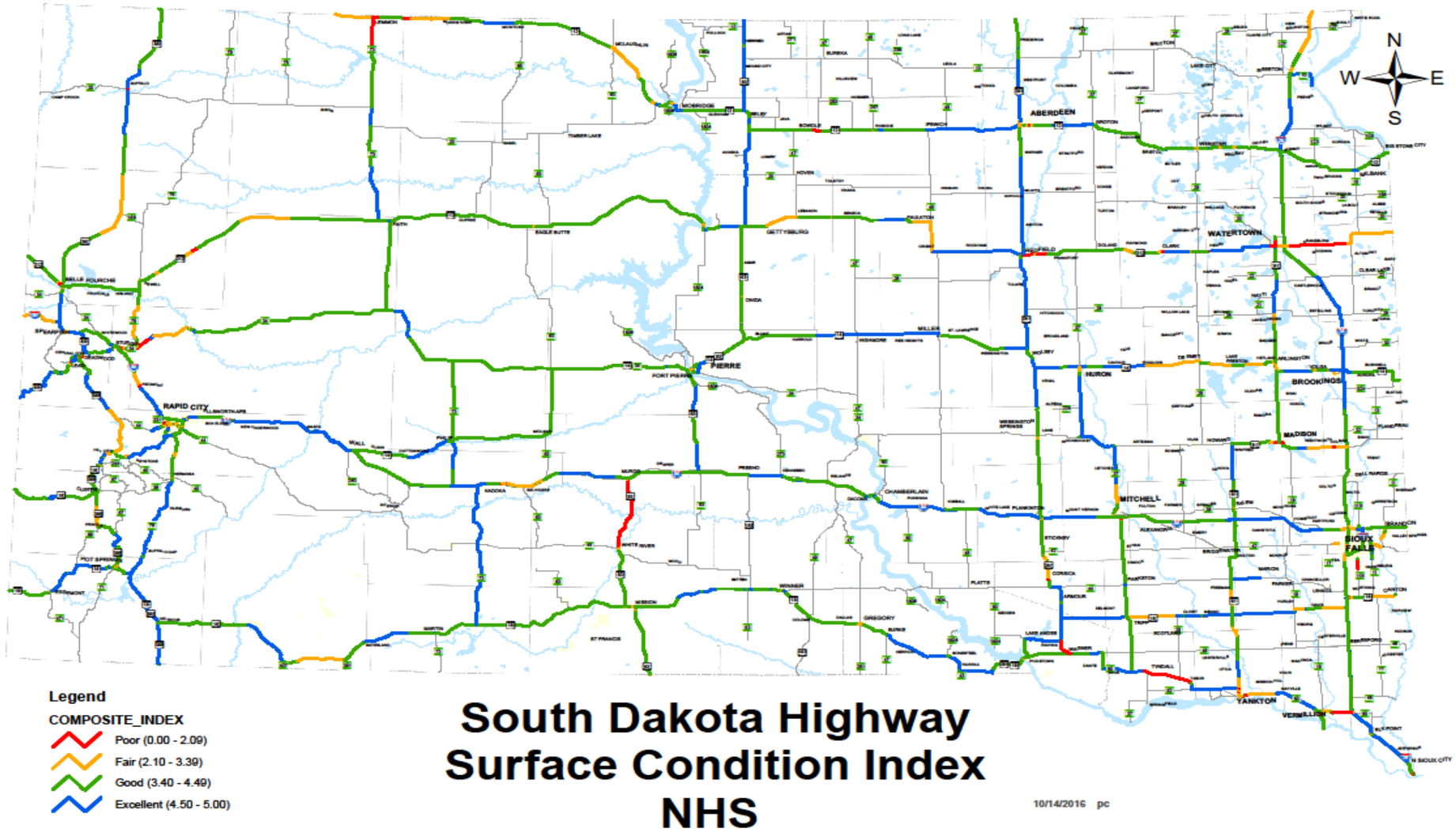
Table 4-1: Surface Condition Index Values and 2016 Pavement Condition on the NHS

Composite Index Values	Rating	SD NHS Pavement Condition
5.00 to 4.50	Excellent	37%
4.49 to 3.40	Good	50%
3.39 to 2.10	Fair	10%
2.09 to 0.00	Poor	3%

Source: South Dakota Department of Transportation

Figure 4-1 shows the locations of the pavement condition on the NHS. The interstate has a few locations with the pavement condition in the fair category. These projects are programmed in the 2017-2020 Statewide Transportation Improvement Program (STIP).

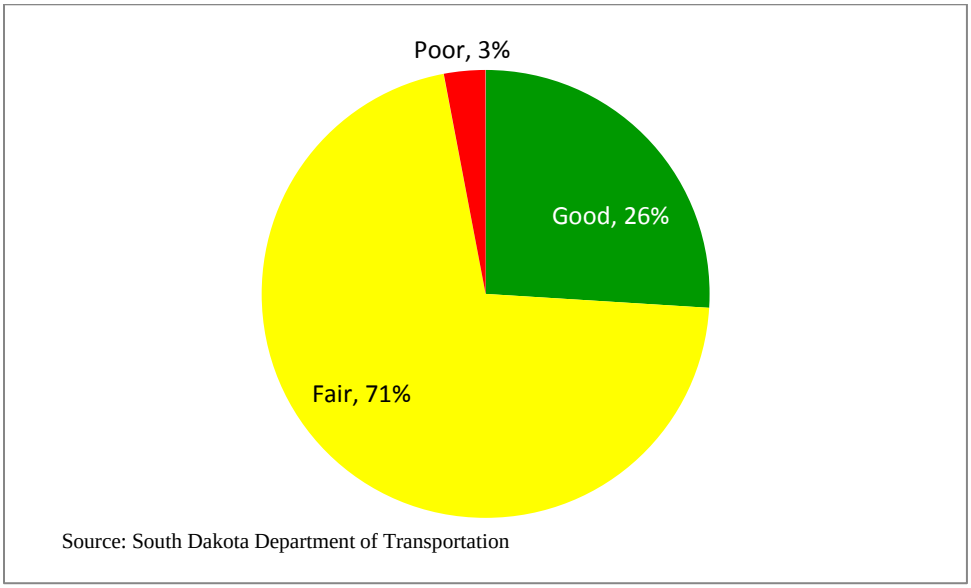
Figure 4-1: Surface Condition on the National Highway System



Source: South Dakota Department of Transportation

Bridge condition is determined from the condition rating of the bridge deck, substructure and superstructure. The condition of the bridge is measured by good, fair and poor. South Dakota has 969 bridges on the National Highway System with 26 percent rated in good condition, 71 percent in fair condition, and 3 percent in poor condition. South Dakota's goal is to have less than 5 percent of the bridge condition in the poor category. In 2016, South Dakota had 3 percent of the bridge condition on the National Highway System in poor condition. South Dakota is developing performance targets for bridges that will be published in the Tranportation Asset Management Plan. The performance measures and targets will support South Dakota's Freight Plan strategies. Figure 4-3 shows the amount percent of bridges in good, fair and poor.

Figure 4-3: Condition of Bridges on the National Highway System



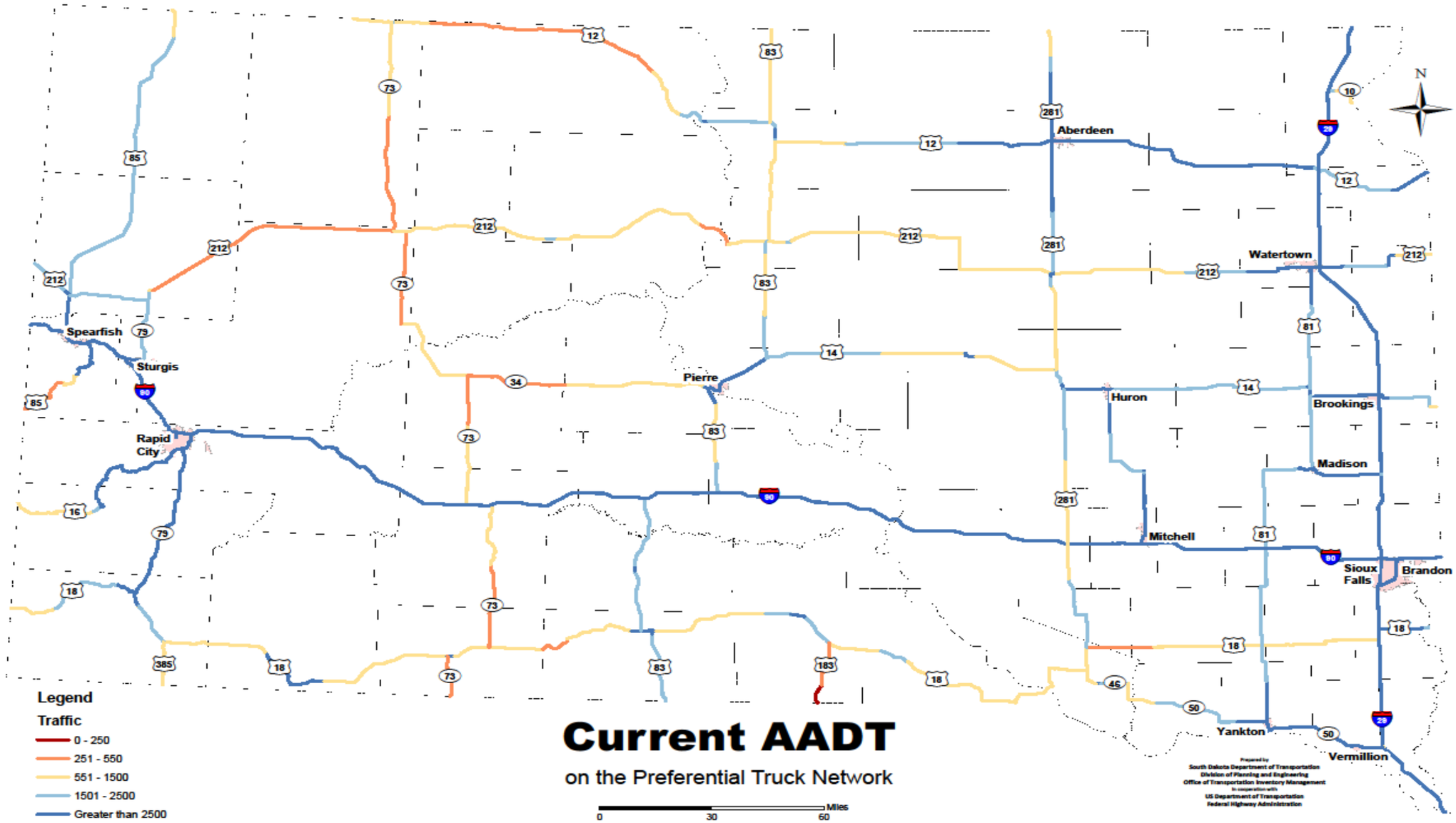
Source: South Dakota Department of Transportation

Traffic

Efficiently moving freight across the highway system is vital to the economy of South Dakota. Truck traffic in the state is concentrated on the Interstate system, where truck traffic ranges from 1000 to greater than 5000 trucks per day depending on the highway segment. The greater amount of truck traffic is located around the Sioux Falls area where segments show greater than 5000 trucks per day. Overall the truck traffic on the Interstate is approximately 20 to 25 percent of the total traffic.

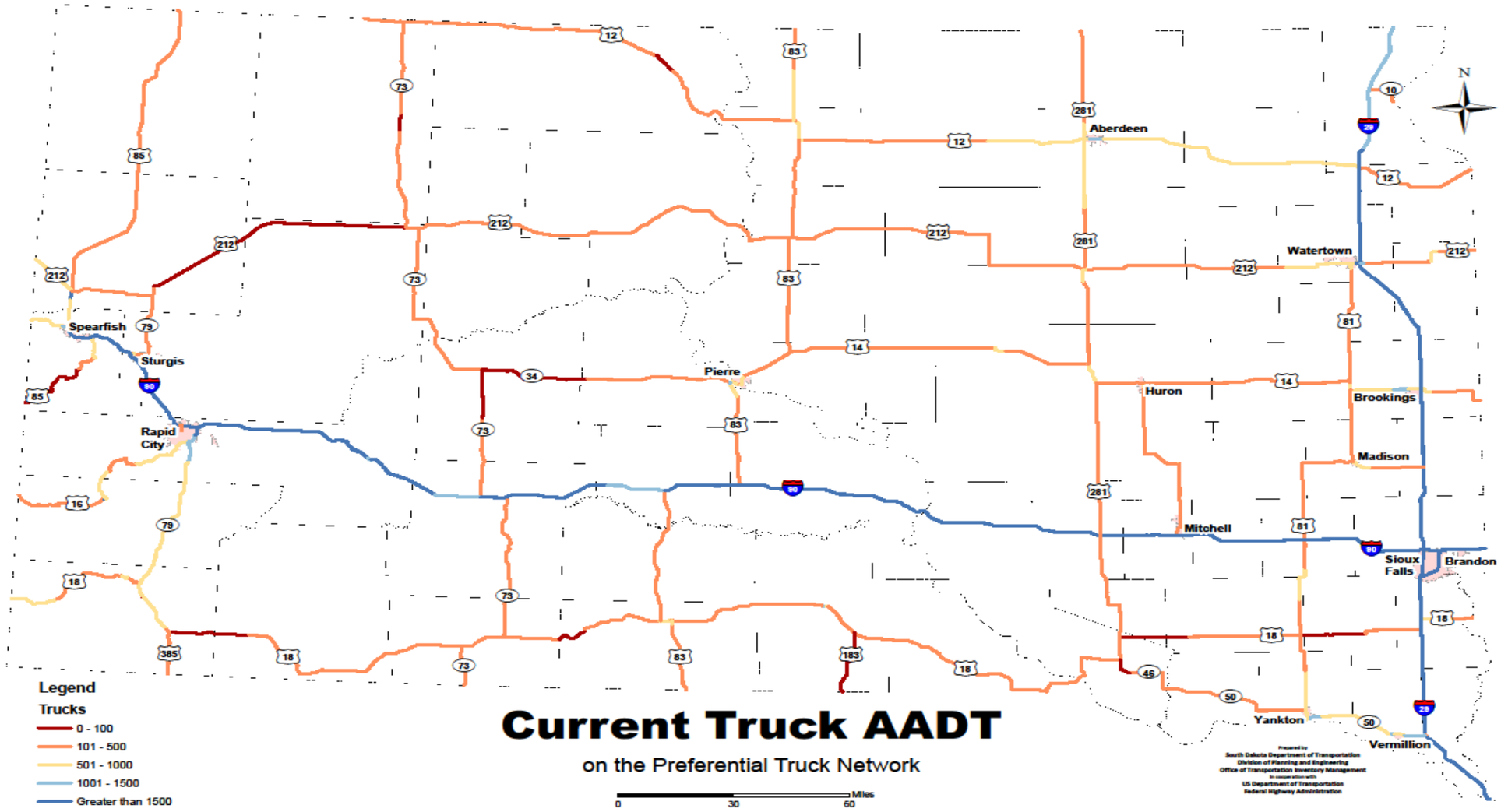
The average truck traffic on the non-Interstate preferential truck network ranges from 10 to 20 percent of the total traffic. The majority of the non- Interstate preferential truck network consists of two-lane rural highways which have an average annual daily traffic (AADT) of 2000 or fewer vehicles per day and truck traffic less than 200 per day. Figure 4-4 shows the 2015 AADT and Figure 4-5 shows the 2015 AADT truck traffic on the preferential truck network.

Figure 4-4: 2015 Average Annual Daily Traffic on the Preferential Truck Network



Source: South Dakota Department of Transportation

Figure 4-5: 2015 Average Annual Daily Truck Traffic on the Preferential Truck Network



Source: South Dakota Department of Transportation

A performance measure to measure system performance is travel time reliability. The Federal Highway Administration is contracting the collection of travel time data throughout the nation on the National Highway System. Regional Integrated Transportation Information System (RITIS) is a tool developed by the Center for Advanced Transportation Technology (CATT) Laboratory that uses this data to show how the National Highway System is moving traffic in relationship to the speed limit. In 2016, South Dakota's Interstate system had a 99.9 percent travel time reliability rating. The Interstate was flowing at acceptable speeds 99.9 percent of the time. South Dakota's National Highway System-non Interstate had a 97.2 percent rating in 2016. These ratings show South Dakota has minimal freight congestion on the state's highways. Table 4-2 shows the travel time reliability for the Interstate for all vehicles and trucks and the NHS-non Interstate for all vehicles.

Table 4-2: Travel Time Reliability on the Interstate and NHS

	Interstate	Interstate Trucks	NHS- Non Interstate
Year	Reliability	Reliability	Reliability
2016	99.9%	98.8%	97.2%
2015	99.9%	98.9%	98.4%
2014	100.0%	98.6%	99.0%
2013	100.0%	99.8%	100.0%
2012	100.0%	99.8%	100.0%
2011	100.0%	100.0%	100.0%

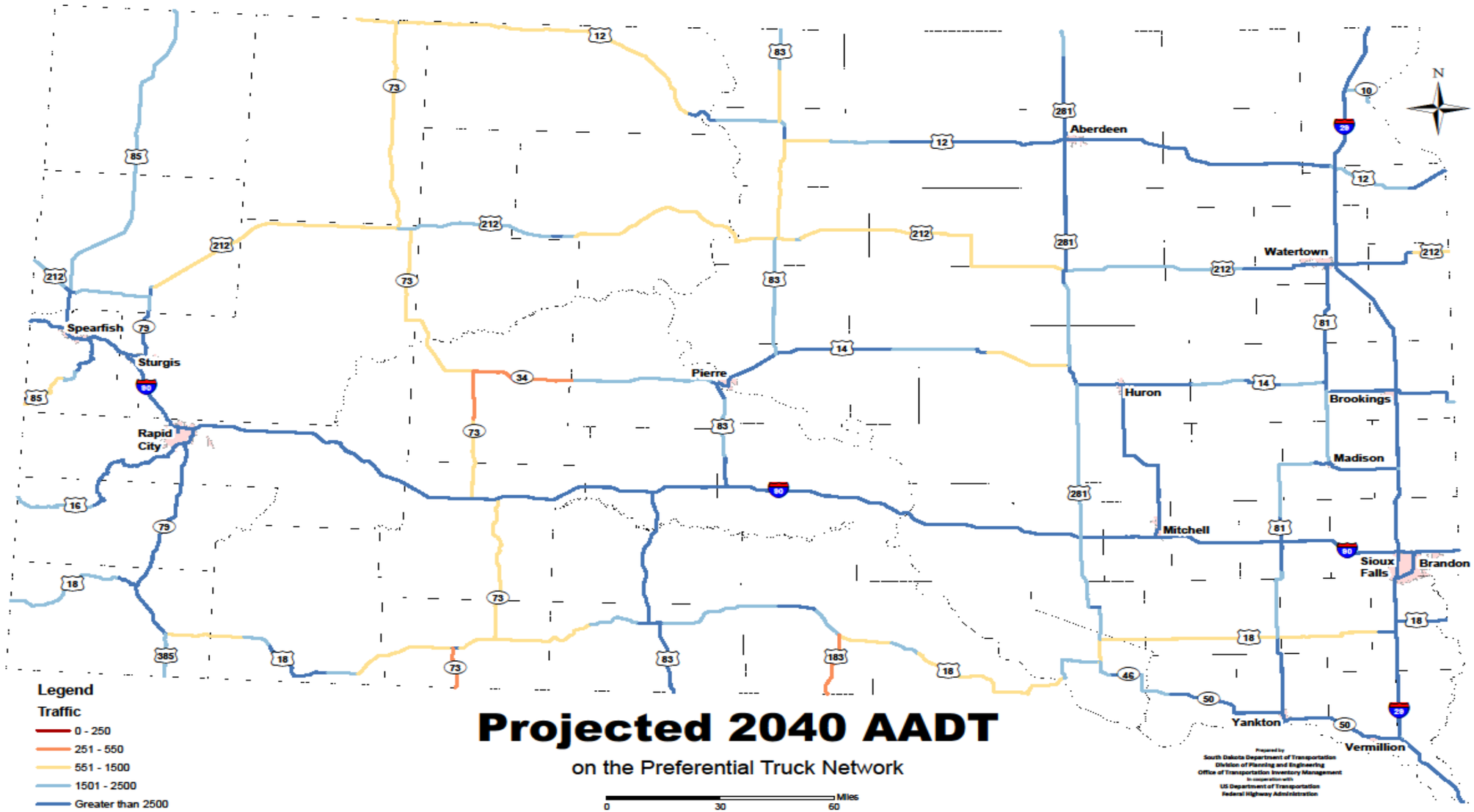
Source: RITIS

Winter weather has the largest impact on travel time in South Dakota. In a winter weather event, traffic slows and travel time reliability decreases. On most of the highway system in South Dakota, traffic flow depends more on the speed the driver prefers to drive and not due to congestion. The SDDOT is developing performance measure targets required by the FAST-Act. The SDDOT will set travel time reliability targets for the State Freight Plan. The targets must be identified by May 20, 2018.

South Dakota monitors traffic on the highway system using automatic traffic recorders and annually conducts traffic counts at specified locations. South Dakota also conducts a decennial Interstate study to look at the operation of the Interstate system to ensure that mainline and interchanges operate at an acceptable level of service and to verify compliance with current Interstate design standards. South Dakota analyzes current and 20 year projected traffic and recommends improvements to mitigate any issues or deficiencies.

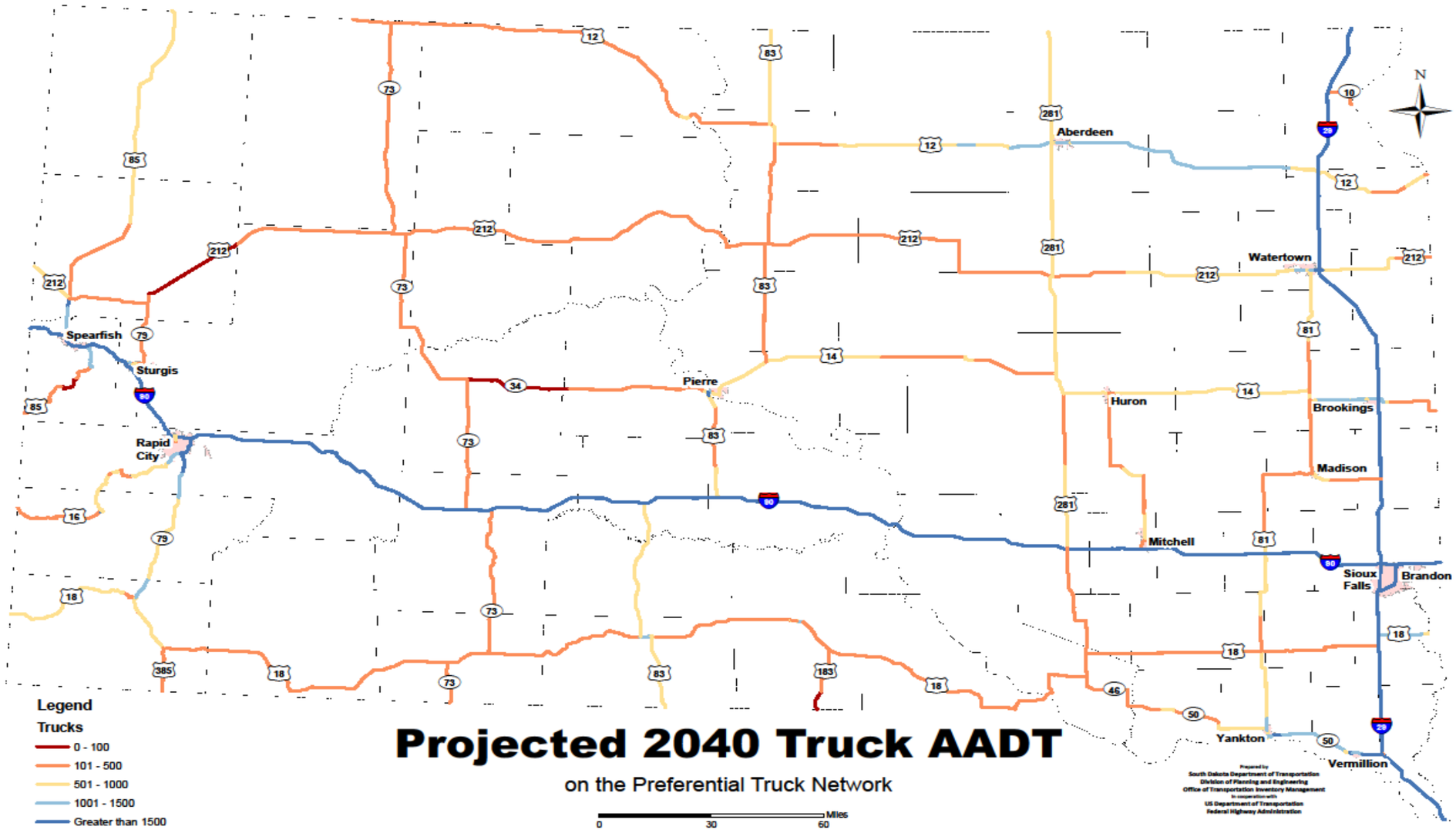
Traffic is expected to increase on the preferential truck network along with truck traffic. Figure 4-6 shows the 2040 projected traffic on the preferential truck network and Figure 4-7 shows the 2040 projected truck traffic.

Figure 4-6: 2040 Average Annual Daily Traffic on the Preferential Truck Network



Source: South Dakota Department of Transportation

Figure 4-7: 2040 Average Annual Daily Truck Traffic on the Preferential Truck Network



Source: South Dakota Department of Transportation

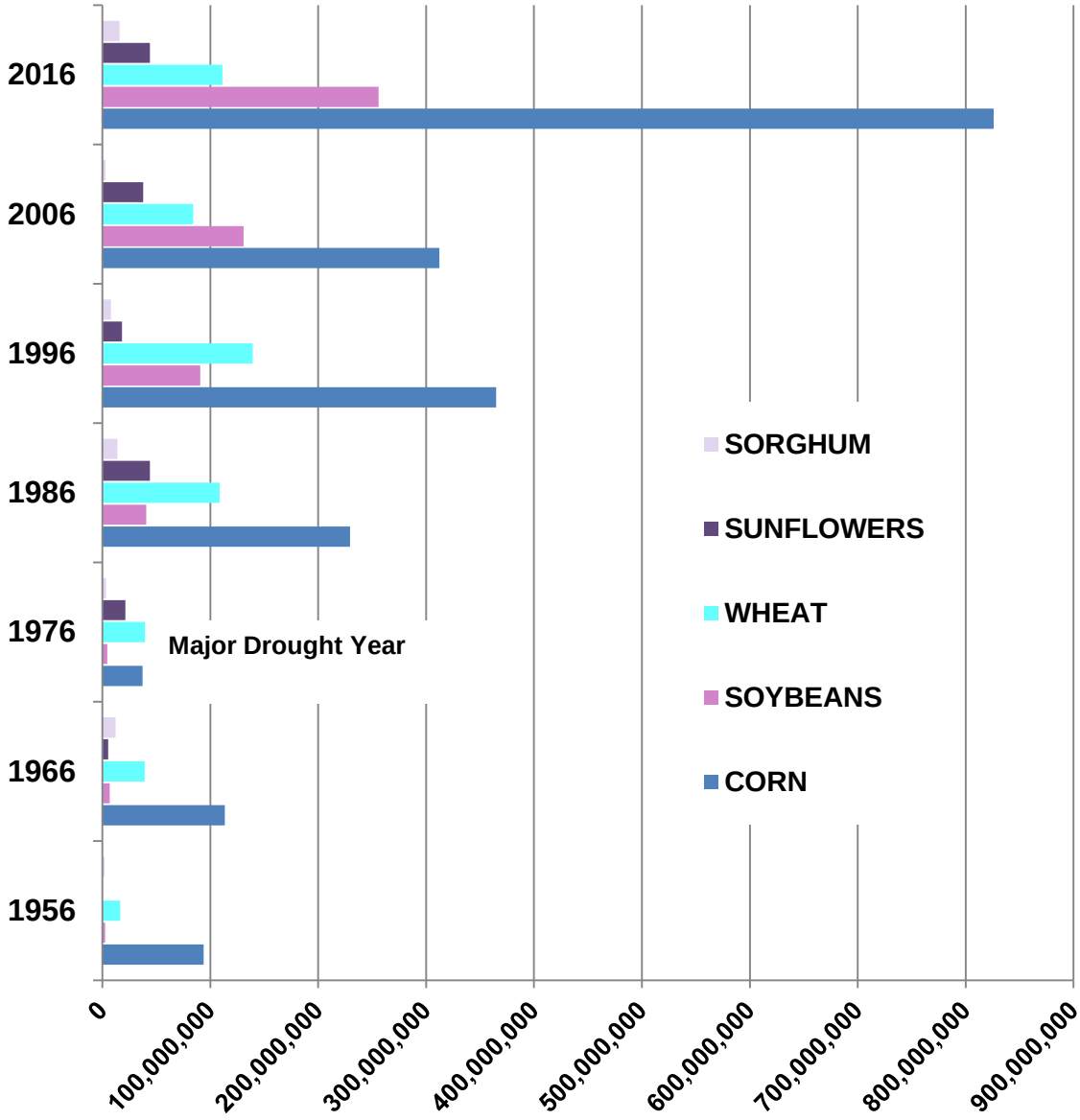
Agricultural land use and commodity movements may determine locations where transportation improvements and asset modifications are needed. Although the highway network has available capacity, grain elevators and agricultural processing facilities like ethanol plants may concentrate truck traffic. During harvest or when a 110-car shuttle train is being loaded some corridors may be busy. Loading one shuttle train may require more than 400, 18 wheel trucks. Also, large dairy operations concentrate traffic as feed, forage, and milk are transported on rural roads in a fashion similar to moving grain to cattle feedlots. From an asset management standpoint, these facilities may increase stress on transportation pavements and bridges which may increase the rate of deterioration. Currently, rural congestion and capacity concerns are not an issue but they could create truck storage issues as commodities are being unloaded at intermodal freight facilities.

Average South Dakota corn crop yields have increased by about 2 percent per year for a couple of decades and the acreages in corn production have increased. Recent growth in corn production is remarkable, growing by over 780 percent since 1956 and more than doubling since 1996. Production of other crops like wheat, soybeans, and sunflowers also has increased. Many experts expect more growth in soybean production.

Agricultural freight movements have increased significantly and illustrate the importance of good highways to move crops to rail terminals, processing facilities, and points of animal feeding or conversion. Farmers have built large grain storage bins at their farms to store commodities. This allows the farmer to move commodities from farm to market at their convenience. They also use field grain tubes to store commodities in the fields and move crops to grain terminals at their convenience. This practice decreases the harvest travel demand on the highway network.

There has been an increase in agricultural commodity prices, acres under cultivation, and improvements in crop genetics and management practices which has created agricultural freight growth and a need for additional intermodal facility capacity. Figure 4-8 shows the crop production from 1956 to 2016 for sorghum, sunflowers, wheat, soybeans, and corn.

Figure 4-8: Crop Production in Bushels

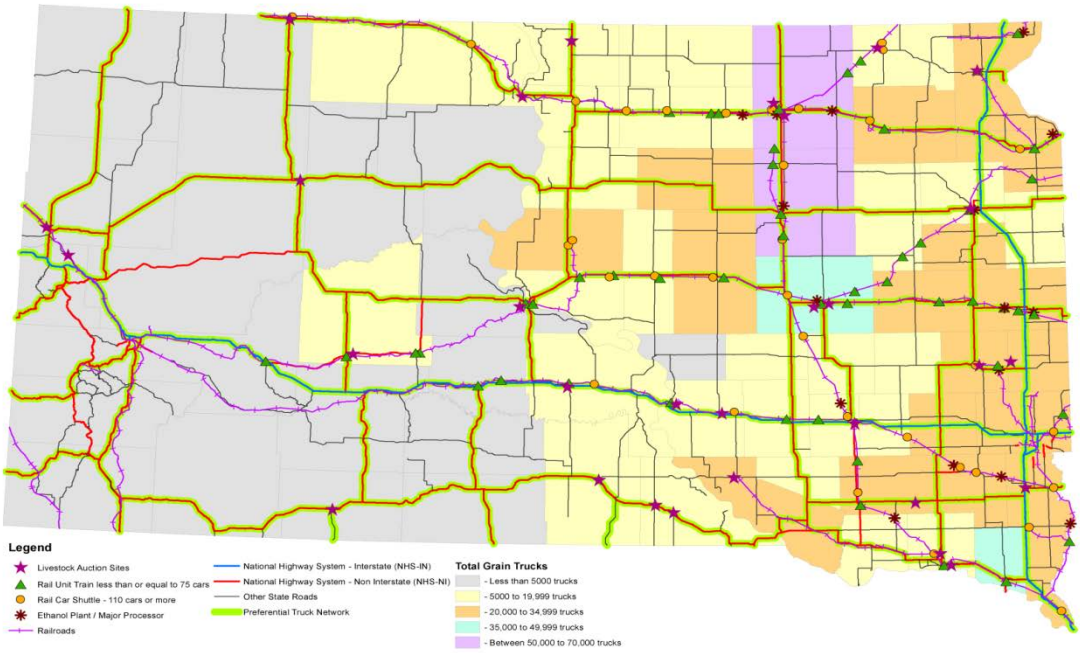


Source: NASS.

Commodity movements for corn, wheat, soybeans, sunflowers and sorghum generate the equivalent of over 1 million 18 wheel truck trips per year on average. Some data could not be disclosed because of confidentiality and so few farmers growing particular crops. This would cause production to be underestimated. Figure 4-9 shows the estimated county commodity movements by trucks based on average annual production levels relative to the locations of processing and shuttle train facilities. The truck movements are estimated based on an 18 wheel configuration at 80,000 pounds using average annual crop production over multiple years. The numbers estimate the movement occurring only

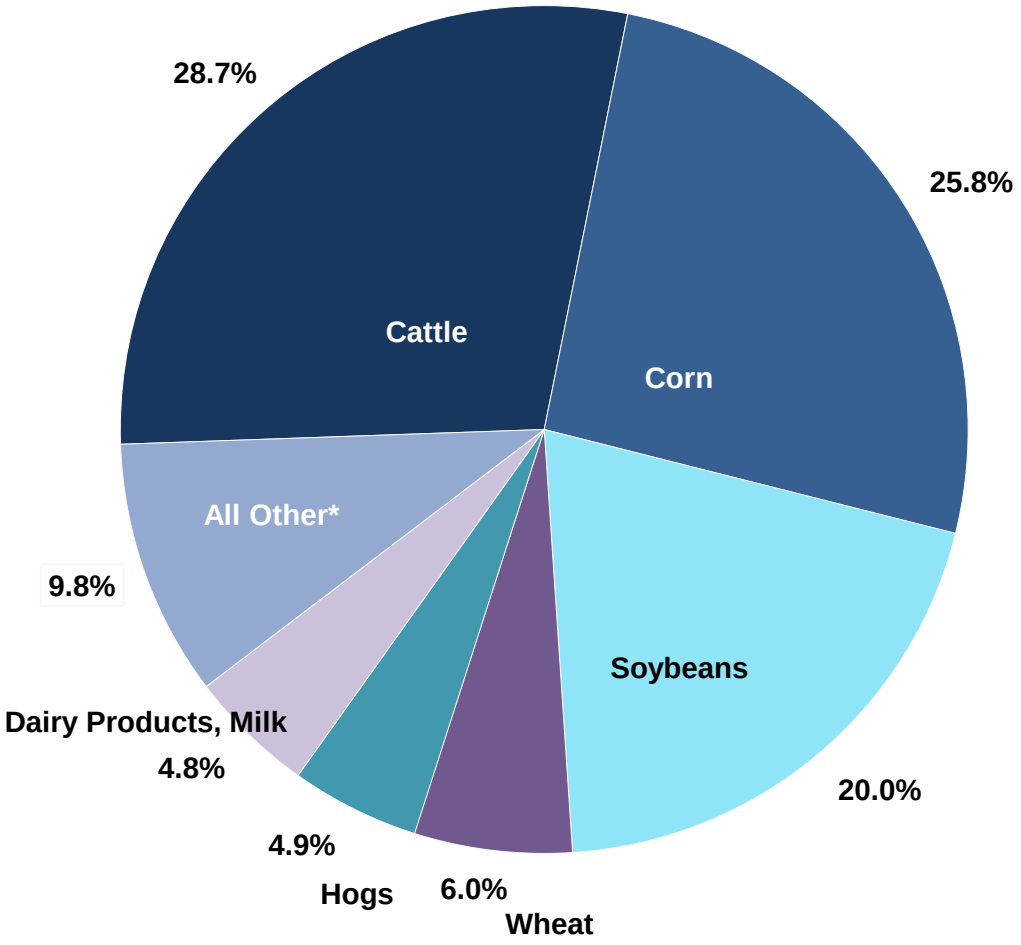
one time but it may occur several times from field, to storage bin, and finally to market. Most of the data is at the county level. Using the Federal Highway Administration's Freight Analysis Framework, there could be about 1.5 million agricultural trucks if all the internal shipments used fully loaded 18 wheel trucks. This is fifty percent over the rough estimate using only agricultural production tonnage to estimate commodity truck volumes.

Figure 4-9: Estimate of Annual Commodity Movement by Trucks



Cattle out number people in South Dakota by about 5 to 1 at 3.95 million. Also, there were approximately 1.2 million hogs and 255,000 sheep. In 2015, total farm cash receipts were about $9.16 billion. Over 90 percent of farm cash receipts came from cattle and calves, corn, soybeans, wheat, hogs, and dairy and milk as shown in Figure 4-10 below. Cattle movements do not generate as many trucks as crop commodities but cattle values exceed most crops. Transportation asset management will need to focus on serving these important freight traffic generators.

Figure 4-10: Percent of Farm Cash Receipts by Commodity



Source: Economic Research Service, USDA. ****All Other*** consists of sunflowers, hay, turkeys, chicken eggs, sorghum, honey, oats, millet, dry beans, rye, barley, wool, flaxseed, mink pelts, mohair, farm chickens, and other products.

Cattle and calf movements may generate over 30,000 truck equivalent trips per year in single movements from points of production. This is a minimum estimate based on truck movements using an 18 wheel configuration. Livestock move using other configurations because pick-up trailer movements are common. Livestock movements are probably much higher because there are often multiple movements per year using many vehicle types. Movements for hogs and sheep are less than cattle.

South Dakota's Rail and Freight Plans identify intermodal freight loading locations adjacent to the highway system affecting asset decisions. In the future, the SDDOT may have to respond to new facility siting as agricultural production and commodity shipments grow with additional land cultivation and increases in crop production per acre.

Oil production has increased in northwest North Dakota in the Bakken oil-bearing formation. The level of production correlates with oil prices. South Dakota roads serve freight traffic on corridors leading to those oil fields, mostly on the preferential truck network. SDDOT will continue to monitor truck traffic to aid decision-making to improve assets if needs grow and funding allows.

Rail

The South Dakota State Rail plan estimated train volumes by rail segment for 2011 and 2040. Figure 4-11 shows the daily train volumes in 2011 and Figure 4-12 shows the projected daily train volumes in 2040. The State is likely to see growth in overall rail volumes from 1 percent to 3 percent depending on the line. The lines with lower volume in 2011, like the RCP&E and DAIR, are expected to increase at a greater rate than the already high volume BNSF lines. The growth is due to projected increases in commodity and merchandise shipments.

Figure 4-11: Daily Train Volumes by Rail Line Segment 2011 (Average Daily Trains)

Source: STB 2011 Confidential Carload Waybill Sample data; Cambridge Systematics' Rail Network Analysis.

Figure 4-12: Daily Train Volumes by Rail Line Segment 2040 (Average Daily Trains)

Source: STB 2011 Confidential Carload Waybill Sample data; FHWA FAF3 2011 Provisional estimates and 2040 Forecasts; Cambridge Systematics' Rail Network Analysis.

Chapter 5: Strategies

Under the FAST Act, the state must identify strategies to support the national and state goals and objectives outlined in Chapter 1. This chapter will show how South Dakota's overall freight improvement strategies align with the national freight goals, state goals, and state objectives.

South Dakota's Freight Improvement Strategies

South Dakota developed strategies to address the national freight goals, South Dakota Long Range Plan goals, and the State Freight Plan objectives identified in Chapter 1. The following strategies represent the primary elements which will aid South Dakota in planning and selecting freight projects.

1. Identify deficiencies that limit connectivity to freight destinations and develop proposed solutions.

South Dakota will monitor growth and locations of freight destinations and their relationship to the transportation system. Examples are new industrial parks and grain elevators. South Dakota will continue to identify deficiencies and mitigate solutions.

2. Monitor freight trends to better support freight decision-making.

South Dakota will continue to monitor freight trends to aid in the decision-making process. Agriculture production continues to increase in South Dakota. The increases of commodity unloading and loading facilities will need to be monitored for transportation issues. The majority of these facilities are being built on the state highway system and rail network.

South Dakota will continue to monitor freight travel through South Dakota to the Bakken oil fields in North Dakota. The amount of freight traffic fluctuates based on oil prices. South Dakota will monitor the freight movement to aid in the decision-making process.

3. Use ITS technology to decrease delay and idle time for freight movers.

ITS technology can be a way to keep freight moving more efficiently. South Dakota will continue to use ITS technology to keep freight moving efficiently and have less idle time. South Dakota will include ITS technology when conducting studies on the Interstate highway system or on the freight network where ITS technology could be used to improve freight movement. South Dakota will explore potential ITS enhancements that could improve freight movement.

Some examples of technologies South Dakota is implementing that can decrease delay and idle time are:

- Electronic screening
- Automated commercial vehicle permitting
- Travel information for commercial vehicle operators

Autonomous freight movement is being tested in the United States. South Dakota will

monitor the progress and identify measures to assist in autonomous freight movement through and within the state.

4. Use FHWA travel time data to monitor freight movements for bottlenecks and develop proposed solutions.

South Dakota's data has no identified bottlenecks on the National Highway System and none are predicted in the 20-year planning horizon. South Dakota will continue to use travel time on the National Highway System to compare expected travel times to observed travel times. South Dakota will monitor mainline, intersection, and interchange capacity and geometrics where bottlenecks could occur. Winter weather events have the greatest impact on travel time and South Dakota will monitor ways to improve travel time during and after events.

5. Conduct necessary freight corridor studies to improve freight movements.

South Dakota will continue to monitor freight corridors and initiate studies where deficiencies are identified. Every 10 years, South Dakota conducts a Decennial Interstate Study to look at the entire Interstate system including interchanges. South Dakota uses this tool to program projects and identify corridors or interchanges for detailed study. SDDOT's next study is to be completed by 2020.

6. Use the Strategic Highway Safety Plan strategies to reduce fatalities and serious injury crashes.

South Dakota has identified performance targets, goals and strategies in the Strategic Highway Safety Plan to decrease serious injury and fatality crashes. The freight plan will follow the goals and strategies identified in the SHSP to reduce fatalities and serious injury crashes to help achieve the performance targets.

7. Identify truck parking deficiencies and improve access to truck parking facilities to reduce fatigue on freight drivers.

South Dakota has completed a study that identified current and future truck parking needs at the Interstate rest areas. Changes in log book monitoring requirements could create truck parking issues. South Dakota will continue to monitor current and future truck parking needs and develop an action plan to address the issues.

8. Use asset management to maintain rest area security cameras and lighting.

South Dakota uses a building management system to manage rest area assets. The state will use this tool to maintain the rest area security cameras and lighting to enhance safety and security at the rest areas.

9. Use ITS technology to improve freight efficiency, safety and security.

South Dakota will continue to use Intelligent Transportation Systems (ITS) technology help freight move more efficiently, safely, and securely. South Dakota will consider ITS technology in all transportation studies, include those on the Interstate highway

system or freight network.

South Dakota will continue to deploy and operate systems and engage in activities with significant, demonstrated benefits to freight movement:

- Commercial Vehicle Information Systems and Networks (CVISN)—South Dakota will continue to participate fully in the Federal Motor Carrier Safety Administration's CVISN program, which links state and federal information systems to help ensure safe and efficient commercial vehicle operation. South Dakota is CVISN Core Compliant and will invest effort and expense needed to remain compliant.
- Performance Registration Information Systems Management (PRISM)—South Dakota will also continue to participate in the Federal Motor Carrier Safety Administration's PRISM program, which ties interstate vehicle registration to motor carriers' safety performance. South Dakota is a Level 8 PRISM state, which is the highest defined level of capability.
- Commercial Vehicle Electronic Screening—South Dakota has deployed five electronic screening systems, beginning with the Jefferson Port of Entry on I-29 in 2004 and extending through the most recent installation at the junction of US14 and US83 in 2017. The systems identify and weigh approaching commercial vehicles and check the motor carrier's credential and safety status. Compliant vehicles are allowed to bypass the port of entry about 90% of the time, allowing enforcement staff to focus attention on high-risk carriers and vehicles. The benefit to motor carriers is an estimated $2 per minute in avoided delay. South Dakota's next planned electronic screening location is on I-90 at the Minnesota border in 2018. That system will include innovative hardware to check tire inflation and brake function of trucks entering the port of entry. South Dakota commits to continued maintenance and operation of existing systems and to ongoing evaluation of possible new electronic screening locations.
- Automated Commercial Vehicle Permitting—Since 2002, the South Dakota Automated Permitting System has been used to issue all commercial vehicle permits. The system allows motor carriers and permitting agencies to apply and self-issue permits online and to pay permit fees by credit card. Most significantly, the system automatically routes oversize/overweight vehicles on all South Dakota highways by analyzing bridge capacity, roadway geometrics, and permanent and temporary restrictions on size and weight. The system not only provides greater convenience and reduced costs for motor carriers, but also ensures that critical highway infrastructure is not damaged. South Dakota will complete a major upgrade of the permitting system by the end of calendar year 2017 to expand functionality and to improve the cybersecurity of the system.
- Travel Information for Commercial Vehicle Operators—South Dakota operates a robust traveler information system that includes 511 phone information, a full-featured statewide website and Android and iOS mobile phone apps, and free subscription notices by text, e-mail, and Twitter of road conditions that affect highway passenger and freight movement. South Dakota

recently became the first state to provide road condition forecasts for the next 24 hours, and is currently working to link to the South Dakota Highway Patrol's computer-aided dispatch system so real-time information related to highway incidents can be provided to commercial carriers.

- Variable Speed Limits—South Dakota will deploy and evaluate variable speed limits at two locations on the Interstate Highway System—one on I-90 east of Sturgis and one on I-29 south of Brookings—in calendar year 2018. Speed limits will be set primarily in consideration of adverse weather and road conditions, but also in response to traffic conditions—such as incidents and congestion—whether or not they are weather-related. This first deployment of variable speed limits in South Dakota will demonstrate its effectiveness and provide impetus for further deployment. The variable speed limits will allow traffic—and in particular, commercial vehicles—to continue to move in winter road conditions, but at lower, more uniform speeds. Based on Wyoming's experience, South Dakota expects the variable speed limit system to provide up to a 50% reduction of crashes and fatalities with fewer road closures. If the results of the two-year evaluation period are favorable, South Dakota will pursue authority to established variable speed limits more extensively.
- Rest Area Security—In 2017, South Dakota will initiate replacement of the video surveillance system at Interstate rest areas to promote personal and national security.
- Connected and Autonomous Vehicles—Autonomous freight movement is being piloted and tested in various locations in the United States. To stay abreast of development, South Dakota will continue to actively participate in the National Cooperative Highway Research Program Project 20-102, *Impacts of Connected and Autonomous Vehicles on State and Local Transportation Agencies*. South Dakota will seek to implement products of this research, which include guidance on regulation

  South Dakota will also continue to actively participate in collaborative efforts of the North/West Passage, a Transportation Pooled Fund Study involving the states lying on the I-90/I-94 corridor from Washington to Minnesota. A key component of the North/West Passage is its Freight Task Force, which focuses on a variety of freight-related ITS topics, including truck platooning and deployment of connected vehicle technology in rural corridors.

SDDOT's Research Program Manager is a member of the NCHRP 20-102 project panel and chairs the North/West Passage Steering Committee.

10. Use pavement and bridge management systems and Transportation Asset Management Plan to prioritize improvements on the freight network.

South Dakota will continue to use its pavement management system and bridge management system to program projects. The pavement management system determines the best treatment for pavements to maximize the efficient use of highway funds. The bridge management system manages bridge improvements to

maximize the efficient use of highway funds. South Dakota is developing performance measures and targets for pavements and bridges and will publish them in the Transportation Asset Management Plan. The performance measures identified in TAMP will support the freight plan and continue to use the pavement and bridge management systems to prioritize infrastructure improvements in the Statewide Transportation Improvement Program.

11. Support the Aviation and Rail Plans.

The South Dakota Freight plan supports the aviation systems plan and rail plan goals and strategies. The National Highway System provides a connection to the air and rail intermodal which connects freight to the world. South Dakota manage the transportation system using freight strategies and asset management tools to ensure the connections to the intermodal facilities are maintained.

12. Improve data at critical freight links.

With the implementation of performance based planning, South Dakota will review data needs and continue to improve collection, analysis, and dissemination of the data to aid in the decision-making process. The use of automated traffic recorders, National Performance Management Research Data Set (NPMRDS), and crash data analysis are continuing to be improved. ITS infrastructure improvements aid in improving data collection.

13. Participate in multistate freight planning.

The surrounding states generate freight affecting South Dakota. North Dakota has the Bakken oil fields and Minnesota has ports and rail terminals. South Dakota will monitor the freight movement through the state. Freight planning which includes freight which passes through to destinations outside of South Dakota will require coordination with other states. South Dakota will participate and promote multistate freight planning to help in short- and long- range freight planning.

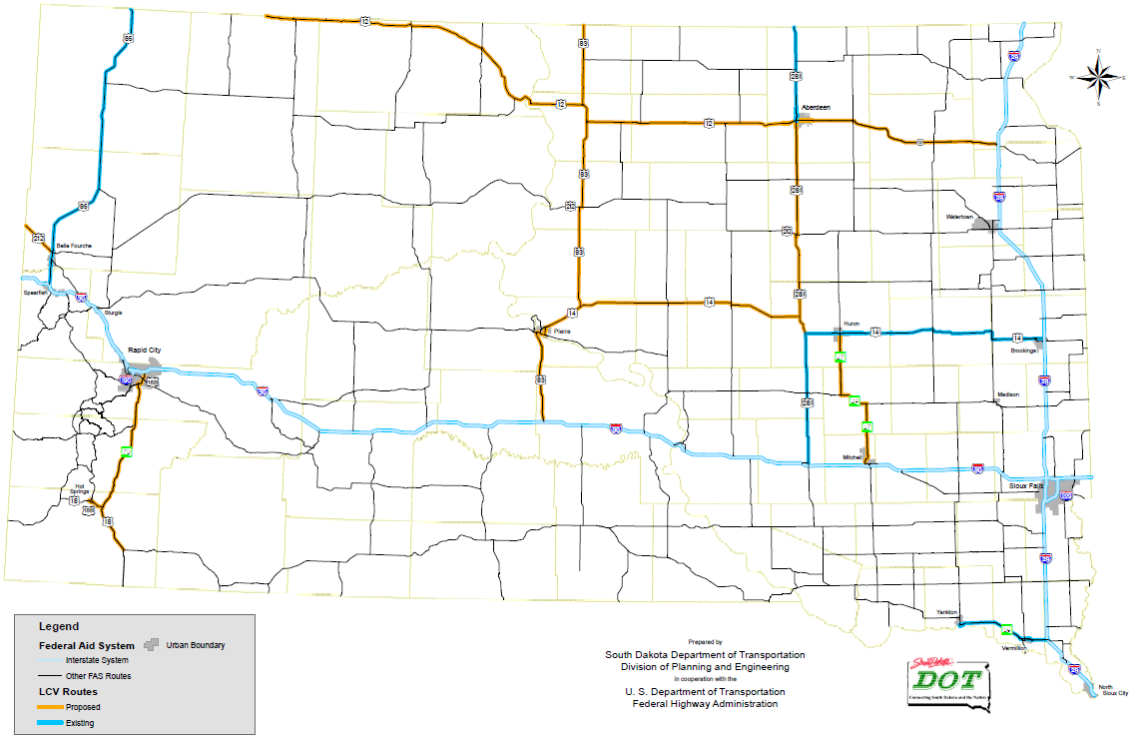
14. Improve understanding of international and Interstate corridor movements.

South Dakota's economy relies heavily on interstate and international freight movement. South Dakota will continue to monitor this movement and could study interstate and international freight movements and how they affect South Dakota's freight transportation system.

15. Expand Long Combination Vehicle Routes

South Dakota will seek a significant expansion of Long Combination Vehicle (LCV) routes, as authorized in the FAST Act. By adding 630 miles of new routes to the existing 989-mile LCV network, see figure 5-1, South Dakota will increase the efficiency of truck freight movement while maintaining safe operation.

Figure 5-1: Current and Proposed Longer Combination Vehicle Routes



The state freight plan is required to support the national freight goals. Table 5-1 shows the correlation between the South Dakota freight plan strategies to the national freight goals.

Table 5-1: Correlation between State Freight Plan Strategies and National Freight Goals

Strategies	National Freight Goals						
	Improve economic efficiency, productivity, and competitiveness	Reduce Congestion, Bottlenecks, and cost of Freight Transportation	Improve Safety, Security, and Resiliency	Improve State of Good Repair	Use Advanced Technology, Innovation, and Competition	Performance Management and Accountability	Reduce Environmental and Community Impacts
Identify deficiencies which limit connectivity to freight destinations and develop proposed solutions	X						
Monitor freight trends to better support freight decision-making	X	X	X			X	

Strategies	National Freight Goals						
	Improve economic efficiency, productivity, and competitiveness	Reduce Congestion, Bottlenecks, and cost of Freight Transportation	Improve Safety, Security, and Resiliency	Improve State of Good Repair	Use Advanced Technology, Innovation, and Competition	Performance Management and Accountability	Reduce Environmental and Community Impacts
Use Intelligent Transportation Systems technology to decrease delay and idle time for freight movers		X			X	X	
Use FHWA travel time data to monitor freight movements for bottlenecks and develop proposed solutions		X				X	
Conduct necessary freight corridor studies to improve freight movements	X	X	X	X	X	X	X
Use the Strategic Highway Safety Plan strategies to reduce fatalities and serious injury crashes			X		X	X	
Identify truck parking deficiencies and improve access to truck parking facilities to reduce fatigue on freight drivers	X		X				
Use asset management to maintain rest area security cameras and lighting			X	X			
Use ITS technology to improve freight efficiency, safety and security			X		X		
Use pavement and bridge management systems and transportation asset management plan to prioritize infrastructure improvements on the freight network	X	X	X	X		X	X
Support the Airport and Rail Plans	X					X	X
Use ITS technology to reduce delay and idle time, and idle time emissions	X	X	X		X	X	X

Strategies	National Freight Goals						
	Improve economic efficiency, productivity, and competitiveness	**Reduce Congestion, Bottlenecks, and cost of Freight Transportation**	**Improve Safety, Security, and Resiliency**	**Improve State of Good Repair**	**Use Advanced Technology, Innovation, and Competition**	**Performance Management and Accountability**	**Reduce Environmental and Community Impacts**
Monitor future freight truck parking needs at rest areas		X	X			X	
Improve data at critical freight links	X	X	X	X	X	X	X
Participate in multistate freight planning	X	X	X		X	X	
Improve understanding of international and interstate corridor movements	X	X	X		X	X	
Expand Long Combination Vehicle Routes	X	X	X		X	X	X

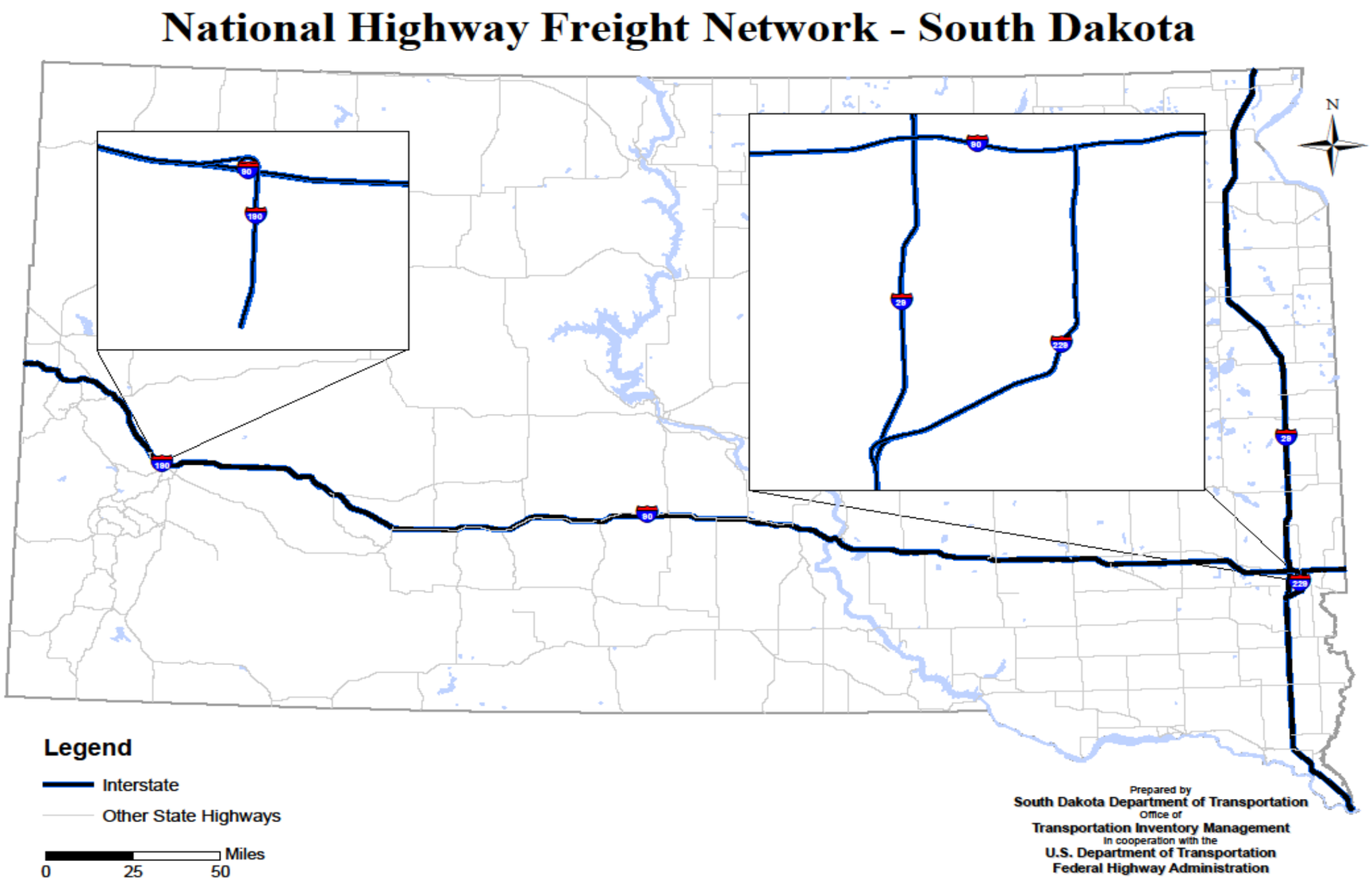
Chapter 6: Projects and Funding

Under the FAST Act, the state must identify freight projects and have a financial plan showing how National Highway Freight Program (NHFP) funds are going to be allocated. NHFP funds can only be used on the following network:

- Primary Highway Freight System (PHFS)
- Critical Rural Freight Corridors
- Critical Urban Freight Corridors
- Portions of the Interstate not designated as part of the PHFS

South Dakota is allowed to identify 150 miles of critical rural corridors and 75 miles of critical urban corridors outside the urbanized areas of Sioux Falls, Rapid City and North Sioux City (Sioux City). South Dakota is in the process of identifying these corridors and will include them in the plan when identified. The network where NHFP funding can be allocated is shown in Figure 6-1.

Figure 6-1: National Highway Freight Network – South Dakota



The National Highway Freight Program funding is one source of federal funding South Dakota receives for highway projects. South Dakota receives approximately $7.7 million dollars a year in NHFP funding. In 2017, SDDOT obligated $15.729 million NHFP funding for an interstate project in the Rapid City area. This was the entire 2016 and 2017 apportionment. After December 2018, federal regulation requires South Dakota to identify and fiscally constrain projects using NHFP funding in a freight plan. Table 6-1 shows the estimated amount of NHFP funds available per year, estimated state match available to apply towards NHFP funding and the NFHP funds and state match expected to be used in the federal fiscal year identified.

Table 6-1: Financial Constraint (Millions)

Year	Available Funding		Programmed Funding		NHFP Carry Over Funding
	Estimated NHFP Funds Available	Estimated State Match Available	NHFP Funds Programmed to be Obligated	State Match Committed	
* 2016	$8.065	$0.000	$0.000	$0.000	$8.065
* 2017	$15.729	$1.561	$15.729	$1.561	$0.000
2018	$7.664	$0.761	$7.664	$0.761	$0.000
2019	$7.664	$0.761	$7.664	$0.761	$0.000
2020	$7.664	$0.761	$7.664	$0.761	$0.000
2021	$7.664	$0.761	$7.664	$0.761	$0.000
2022	$7.664	$0.761	$7.664	$0.761	$0.000
2023	$7.664	$0.761	$7.664	$0.761	$0.000

* 2016 and 2017 NHFP funding obligated in 2017

South Dakota follows multiple steps to scope, design and construct a project. Right of way acquisition, environmental, design, wetland mitigation, and utility coordination are part of the project development process and can create challenges and delays to getting a project constructed. South Dakota strives to ensure the project is let in the year it is programmed but unforeseen delays can occur to cause the project to be moved to another year. In the freight plan, South Dakota is taking the approach of showing two scenarios per year to fiscally constrain NHFP projects. SDDOT decided to use this approach to ensure funding is obligated in each fiscal year in the event one of the projects is delayed. Table 6-2 identifies the amount of funding and funding sources for each scenario. The projects SDDOT has identified to use NHFP funding are shown in Table 6-3.The projects selected will use NHFP and/or National Highway Performance Program (NHPP) funding along with State funds to construct the project. The projects are planned to be constructed regardless of the funding source used. Because South Dakota receives more NHPP funding, we will use all the apportioned NHFP funding for each fiscal year on one interstate project and NHPP funding and state funds to cover the additional funds needed to construct the projects. The majority of state match comes from the state gas tax and motor vehicle excise tax and SDDOT has budgeted $75 to $95 million per year for the Statewide Transportation Improvement Program (STIP) projects. The projects identified

in the freight plan are included in the STIP.

Table 6-2: Project Funding (per scenario)

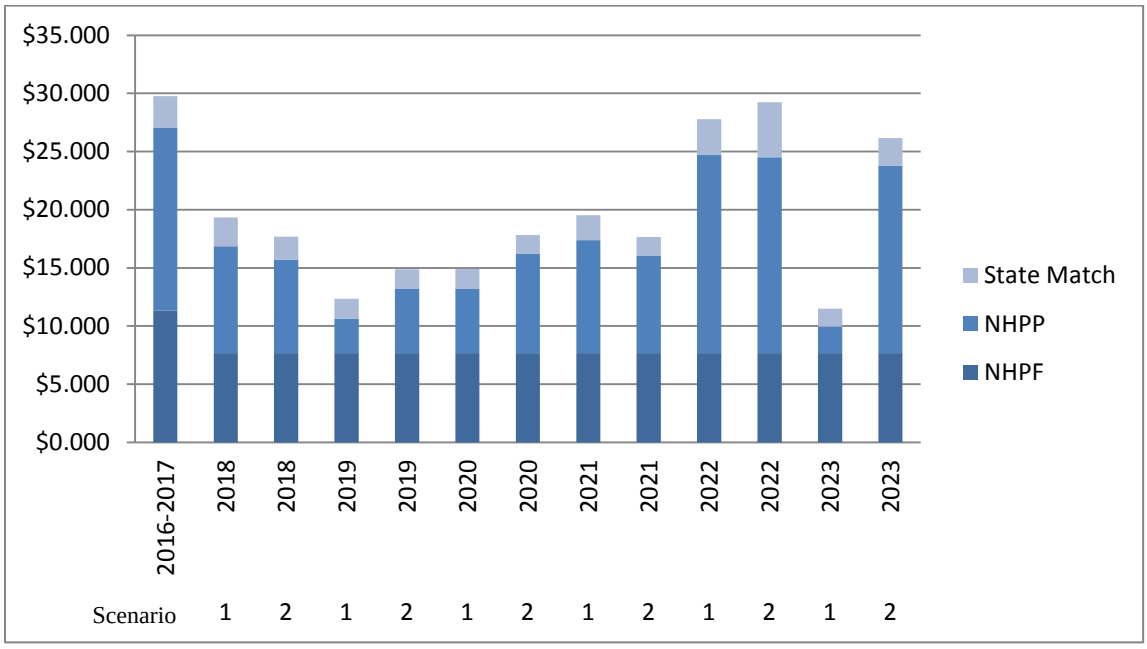
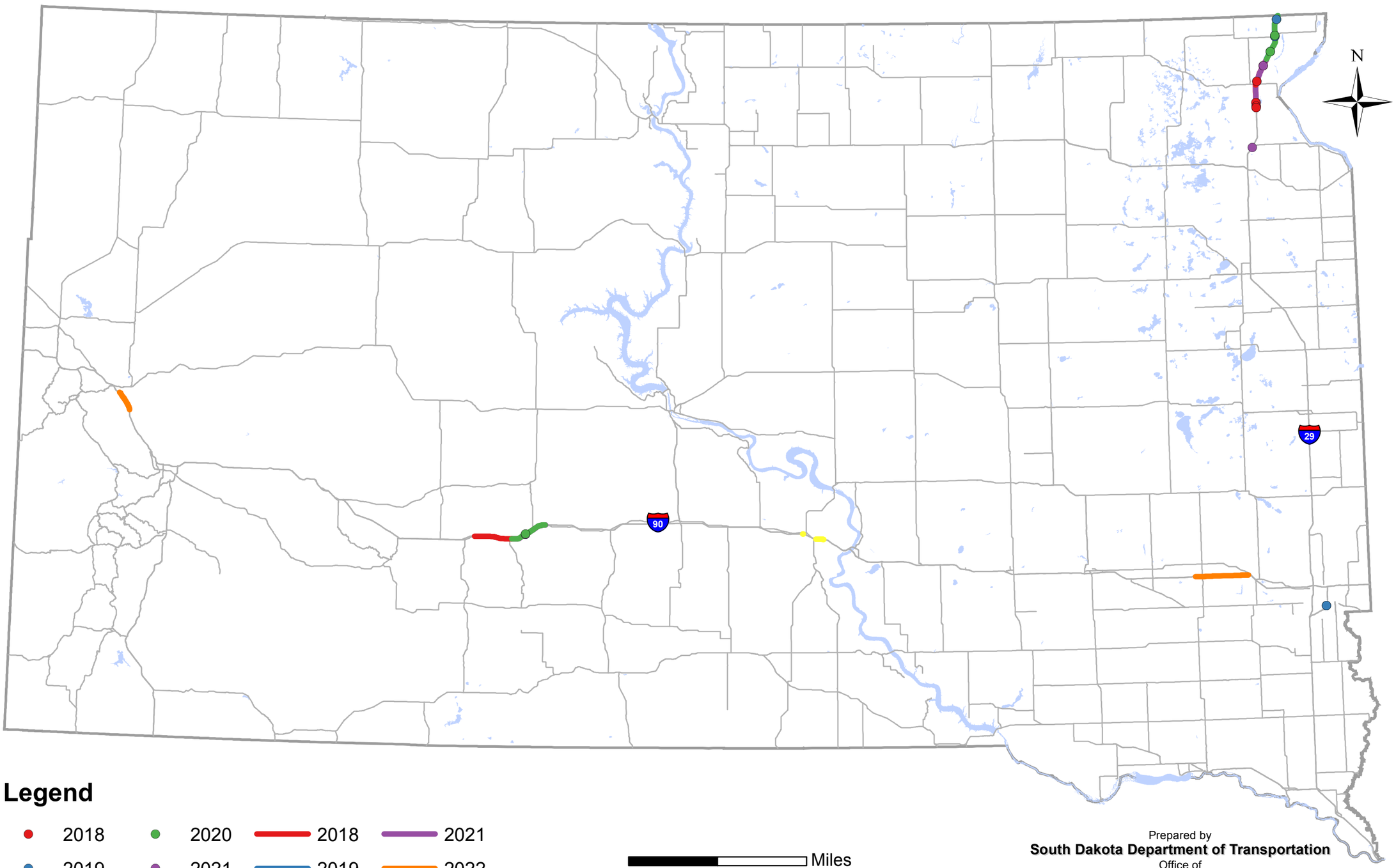


Table 6-3: NHFP Projects and Funding Sources

							Scenario 1			Scenario 2		
Project Number	PCN	Location of Project	Type of Improvement	Fed Funds	FY	Total Cost	NHFP funds	NHPP Funds	State Funds	NHFP funds	NHPP Funds	State Funds
IM 0903(104)153	03W6	I90 - WBL, Fm E of Exit 152 at Kadoka to East of Exit 163 at Belvidere	Remove & Replace PCC Surfacing, Edge Drains, Inslope Flattening, Pipe Work, Extend Culvert	17.374	2018	19.979	7.664	9.710	2.605	0.000	17.374	2.605
IM 0299(72)225	021V	I29 SBL - Fm N of Exit 224 (Peever) N to S of Exit 242; Str.s 1.4 N of the Peever Exit Over Hines Creek; 1.8 N of Peever Exit Over Agency Creek; 5.1 S of the SD10 Exit Over 124th St/Goodwill Creek; 0.8 N of The SD10 Exit Over the Little Minn. River; .5 NE of the SD10 Exit Over a Drainage Ditch	PCC Surfacing; Epoxy Chip Seal	15.713	2018	17.677	0.000	15.323	1.964	7.664	8.049	1.964
IM 2292(06)5	4778	I229 - Exit 5 (26th St. Intch/Yeager Rd) in Sioux Falls	Interchange Improvement	10.621	2019	12.344	7.664	2.957	1.723	0.000	10.621	1.723
IM 0299(71)239	04D6	I29 - SBL, From S of Exit 242 to S of the ND State Line	PCC Surfacing, Epoxy Chip Seal, Approach Slabs, Joint Modifications, Approach Modifications PCC Surfacing	13.225	2019	14.882	0.000	13.232	1.657	7.664	5.561	1.657
IM 0299(65)239	03W5	I29 -NBL, Fm South of Exit 242 to S of the North Dakota State Line	PCC Surfacing; Epoxy Chip Seal, Approach Slabs, Joint Modification, Approaches PCC Surfacing	13.238	2020	14.897	7.664	5.574	1.659	0.000	13.238	1.659
IM 0903(106)163	04D9	I90 - WBL, Fm E of the Belvidere Exit to W of the Jackson/Jones Co. Line; Str. Over I90, 2.5 SW of the SD63 N Exit, Perault Road	Sub Grading Repair, PCC Surfacing, AC Resurfacing of Rest Area, Pipe Work; Remove Bridge AC Overlay & Add Approach Slabs	16.209	2020	17.818	0.000	16.209	1.609	7.664	8.545	1.609
IM 0299(69)213	02PV	I29 NBL - Fm N of Exit 224 (Peever) N to S of Exit 242; Service Rd Near Exit 232 & Exit 232 NB Ramps; Rest Area at Exit 213 on Interstate 29; Strs: 1.4 N of the Peever Exit Over Hines Creek; 1.8 N of the Peever Exit Over Agency Creek; 0.8 N of the SD10 Exit Over the Little Minn. River; 5.5 NE of the SD10 Exit Over a drainage ditch	PCC Surfacing of Mainline; AC Resurfacing of Service Roads & Ramps; Rest Area Lighting; Epoxy Chip Seal	17.376	2021	19.536	7.664	9.712	2.160	0.000	17.376	2.160
IM 0903(108)163	04D7	I90 - EBL, Fm E of the Belvidere Exit to W of the Jackson/Jones Co. Line; Str. Over I90, 2.5 SW of the SD63 N Exit, Perault Road	Sub Grading Repair, PCC Surfacing, AC Resurfacing of Rest Area, Pipe Work; Remove Bridge AC Overlay & Add Approach Slab	16.051	2021	17.644	0.000	16.051	1.593	7.664	8.387	1.593
IM 0908(95)362	05HP	I90 EBL - Fm 2 W of the Salem Interchange to 2 Mi W of Humboldt	Remove and Replace PCCP	24.695	2022	27.790	7.664	17.031	3.095	0.000	24.695	3.095
IM 0901(195)32	021G	I90 - EBL from Exit 32 (Sturgis) to north of Exit 40 (Tilford)	Grading and PCCP Surfacing	24.502	2022	29.239	0.000	24.502	4.737	7.664	16.838	4.737
IM 0905( )247	05J9	I90 EBL & WBL - W of Exit 248 and Fm Exit 251 to W of Oacoma	Spot Improvement, Reconstruction	9.964	2023	11.508	7.664	2.300	1.544	0.000	9.964	1.544
IM 0909( )377	05T3	I90 WBL - Fm 2 Mi W of Humboldt to 2 Mi E of Hartford	Remove and Replace PCCP Surfacing	23.793	2023	26.155	0.000	23.793	2.362	7.664	16.129	2.362

National Highway Freight Program Projects



Legend

2018
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2018
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Prepared by
South Dakota Department of Transportation
Office of
Transportation Inventory Management
In cooperation with the
U.S. Department of Transportation
Federal Highway Administration