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TABLE OF CONTENTS

Chapter 1: Building a Vision.....	1-1
Vision – Transportation Connection	1-1
Developing Freight Goals	1-1
Alignment with National Freight Policy Goals	1-3
Performance Measures	1-4
Success Factors	1-5
Stakeholder Engagement and Outreach	1-6
Freight Advisory Committee.....	1-6
Director’s Advisory Council.....	1-6
Freight Community Outreach	1-6
Multijurisdictional Coordination	1-7
Chapter 2: State Freight System	2-1
Introduction	2-1
North Dakota Strategic Freight System Index	2-1
Highways and Roads.....	2-2
Highway Designations	2-2
Large Truck Network and Truck Routing	2-7
Annual Average Daily Truck Traffic	2-9
North Dakota Strategic Freight System Corridors.....	2-14
Border Crossings.....	2-15
Railroads.....	2-18
Class I Railroads.....	2-19
Regional and Short Line Railroads.....	2-28
Passenger Trains	2-31
North Dakota Rail Facilities	2-33
Pipelines	2-38
Pipeline Types	2-38
Air Cargo.....	2-46
Integrator Feeder Hub and Gateway Operations.....	2-47
Integrator Feeder Operations	2-49
Passenger Airline Cargo.....	2-50
Ad Hoc Cargo Movements	2-51
Strategic Freight System Airport Designations.....	2-51
Military Facilities and Installations.....	2-51
Chapter 3: Goods Movement Data and Current/Forecast Demand	3-1
Introduction	3-1
Overview of Goods Movement Data Sources.....	3-1
Types of Data.....	3-1
Freight Analysis Framework Multimodal Data and Forecasts.....	3-2
Introduction.....	3-2
Current Demand	3-4
Forecast Demand	3-20
FAF “Dashboard” Analysis.....	3-26
Transearch Truck Data Analysis.....	3-26
Introduction.....	3-26
Truck Tons and Value	3-27
StreetLight Truck Data Analysis.....	3-47

Introduction.....	3-47
County-Level Analysis	3-49
Cross-Border Truck Travel Patterns.....	3-53
Special Interest Areas Top Route Analysis.....	3-54
Rail Data Analysis	3-58
Introduction.....	3-58
Rail Flow Analysis	3-58
Trends of Primary Commodities that Move to, from, and within North Dakota	3-64
Origin-Destination Desire Lines for Rail	3-72
Conclusion	3-72
Chapter 4: Existing Assets, Conditions, and Performance	4-1
Introduction	4-1
Conditions and Performance	4-1
Highways.....	4-1
Rail.....	4-40
Pipelines	4-58
Airports.....	4-64
SWOT Analysis	4-65
Strengths.....	4-66
Weaknesses	4-66
Opportunities	4-67
Threats	4-67
Chapter 5: Freight and Rail Mobility Issues and Needs.....	5-1
Introduction	5-1
Freight Issues and Needs.....	5-1
Friction Points and Livability Impacts.....	5-13
Introduction.....	5-13
Principles of Livable Communities	5-13
Tensions Between Community Livability and Freight Operations	5-14
Livability and Freight Tensions in North Dakota.....	5-15
Documentation of Freight-Related Livability Issues	5-16
Impacts on Environmental Justice Communities.....	5-20
Tribal Nations.....	5-28
MHA Nation.....	5-29
Sisseton-Wahpeton Oyate Tribe	5-32
Spirit Lake Nation	5-34
Standing Rock Sioux Tribe	5-36
Turtle Mountain Band	5-38
Tribal Traffic Safety and Crash-Related Issues	5-40
Livability Issues Caused by Commercial and Freight Issues on Tribal Lands	5-42
Mapping of Environmental Justice / Minority Population, per Nation.....	5-42
Freight Movement and Wildlife Habitat Loss.....	5-48
Chapter 6: Demographic and Economic Growth Factors.....	6-1
Introduction	6-1
Population Growth Projections to 2045.....	6-1
Employment Growth Projections to 2045	6-3
Industrial Outlook.....	6-5
Recent Fuel Cost Trends.....	6-7
Passenger Travel Demand and Growth.....	6-8
Growth Rate Development.....	6-8

Existing 2019 Traffic	6-10
2045 Traffic Forecasts.....	6-11
Scenario Planning Workshop Exercise	6-12
Chapter 7: Policies, Programs, and Institutions.....	7-1
Introduction	7-1
Freight Policies and Strategies	7-1
Federal Transportation Policy.....	7-1
North Dakota Freight Policy.....	7-3
Freight-Related Institutions and Policy-Making Roles.....	7-3
Federal Institutions.....	7-3
State Institutions.....	7-5
North Dakota Department of Emergency Services	7-9
Regional and Multistate Freight and Rail Planning Activities	7-10
Regional Rail Planning Coalitions.....	7-10
Cross Border Groups	7-10
Chapter 8: Project Identification, Selection and Prioritization	8-1
Introduction	8-1
Project Identification	8-2
Use of Quantitative Data.....	8-2
Use of Qualitative Data.....	8-3
Project Selection.....	8-3
Project Prioritization.....	8-4
Project Implementation	8-5
Funding	8-5
Performance Monitoring.....	8-5
Chapter 9: Investments, Financing, and Funding.....	9-1
Introduction	9-1
Infrastructure Investment and Jobs Act Funding	9-2
Summary	9-2
Bridge Investment Program	9-3
Competitive Tribal Programs	9-4
Congestion Mitigation and Air Quality Improvement (CMAQ)	9-6
Consolidated Rail Infrastructure and Safety Improvements (CRISI)	9-7
Federal Lands Access Program	9-8
Federal Lands Transportation Program.....	9-10
Highway Safety Improvement Program	9-10
National Highway Freight Program	9-11
National Highway Performance Program.....	9-12
Nationally Significant Multimodal Freight and Highway Projects: INFRA	9-12
National Infrastructure Project Assistance: MEGA	9-14
Railroad Crossing Elimination Program	9-15
Rebuilding American Infrastructure with Sustainability and Equity (RAISE)	9-16
Rural Surface Transportation Grant Program	9-17
Surface Transportation Block Grant Program	9-18
Tribal Transportation Program	9-19
Other Federal Funding	9-20
Summary	9-20
Airport Improvement Program (AIP).....	9-20
EPA Diesel Emission Reduction Act (DERA) National Funding Assistance Program.....	9-22
U.S. Department of Commerce Economic Adjustment Grants.....	9-23

Metropolitan Planning Program (MPP)	9-24
Motor Carrier Safety Assistance Program (MCSAP)	9-25
High Priority (HP) Program	9-26
Railroad Rehabilitation & Improvement Financing (RRIF)	9-27
Surface Transportation System Funding Alternatives Program (STFSA)	9-28
Transportation Infrastructure Finance and Innovation Program (TIFIA)	9-29
State Funding Programs	9-30
Freight Rail Improvement Program and Local Freight Rail Assistance.....	9-31
Bank of North Dakota Funding Opportunities	9-31
Federal and State Highway Funds	9-32
Schedule of Known/Planned Funding Opportunities.....	9-34
Funding Application Strategy	9-42
Project Prioritization – Identifying the Best Candidate Projects for Grant Funding.....	9-42
Grant Application Development	9-44
Chapter 10: Recommendations and Implementation	10-1
Introduction	10-1
Recommendations	10-1
Implementation of Highway Projects	10-6
Rail Service Investment Program	10-7
Rail Transportation Goals.....	10-7
Proposed North Dakota Rail Improvements.....	10-8
Funding	10-10
Rail Agencies.....	10-12

Appendices

- Appendix A Stakeholder and Public Engagement
- Appendix B North Dakota’s Passenger Rail System
- Appendix C FAF, Transearch, and StreetLight Analyses
- Appendix D Rail Projects
- Appendix E North Dakota Freight Investment Plan
- Appendix F IJIA and FRA Rail Plan Checklists

Figures

Figure 1-1: Family of Plans	1-1
Figure 2-1: NHS in North Dakota	2-3
Figure 2-2: Congressional High-Priority Corridors	2-4
Figure 2-3: PHFS in North Dakota	2-5
Figure 2-4: Weight Restrictions	2-8
Figure 2-5: Permitted Weight Limits	2-9
Figure 2-6: North Dakota Corridors AADT (2019)	2-10
Figure 2-7: Truck Average Annual Daily Traffic (TTADT) (2019).....	2-12
Figure 2-8: Truck Percentage of AADT (2019).....	2-13
Figure 2-9: Strategic Freight System Highway Classification and Corridor Miles.....	2-15

Figure 2-10: North Dakota Rail System 2-19

Figure 2-11: BNSF Network 2-20

Figure 2-12: BNSF Twin Cities Division Subdivisions 2-21

Figure 2-13: BNSF Montana Division Subdivisions 2-22

Figure 2-14: Current CP Rail System 2-24

Figure 2-15: CP Proposed Expanded System 2-25

Figure 2-16: CP Rail Subdivisions 2-26

Figure 2-17: Dakota, Missouri Valley & Western Railroad 2-28

Figure 2-18: Dakota Northern Railroad 2-29

Figure 2-19: Northern Plains Railroad (NPR) 2-30

Figure 2-20: Red River Valley & Western Railroad (RRVW) 2-31

Figure 2-21: Amtrak Route in North Dakota 2-32

Figure 2-22: Comparative Distribution of North Dakota Grain Elevators by Track Capacity and Service 2-37

Figure 2-23: Modal Shipments of Grain and Oilseeds by Elevator Type 2-37

Figure 2-24: New Gathering Pipelines Constructed 2-39

Figure 2-25: North Dakota Crude Oil Production and Crude Oil Pipeline Capacity 2-40

Figure 2-26: Crude Oil Pipelines 2-41

Figure 2-27: North Dakota Annual Natural Gas Gross Withdrawals 2-42

Figure 2-28: Natural Gas Pipelines 2-43

Figure 2-29: Refined Product Pipelines 2-45

Figure 2-30: NGL Pipelines 2-46

Figure 2-31: Air Cargo Volumes at Hector International Airport 2-48

Figure 2-32: All-cargo Landed Weight at Hector International Airport 2-48

Figure 2-33: Locations of FedEx and UPS Air Cargo Facilities at Hector International Airport 2-49

Figure 2-34: FedEx and UPS Air Cargo Networks in North Dakota 2-50

Figure 2-35: STRAHNET and STRACNET Systems in North Dakota 2-52

Figure 3-1: North Dakota-associated Tons (Million) by Origin State (2017) 3-11

Figure 3-2: North Dakota-associated Value (\$Billion) by Origin State (2017) 3-12

Figure 3-3: North Dakota-associated Tons (Million) by Destination State (2017) 3-13

Figure 3-4: North Dakota-associated Value (\$Billion) by Destination State (2017) 3-14

Figure 3-5: Transearch Truck Tonnage Network Assignments, All Commodities (2019) 3-28

Figure 3-6: Transearch Truck Tonnage Network Assignments, Pass-through (2019) 3-29

Figure 3-7: Transearch Truck Tonnage Network Assignments, Farm Products (2019) 3-30

Figure 3-8: Transearch Truck Tonnage Network Assignments, Food or Kindred Products (2019) 3-31

Figure 3-9: Transearch Truck Tonnage Network Assignments, Nonmetallic Minerals (2019) 3-32

Figure 3-10: Transearch Truck Tonnage Network Assignments, Secondary Traffic (2019) 3-33

Figure 3-11: Transearch Truck Tonnage Network Assignments, Chemicals (2019) 3-34

Figure 3-12: Transearch Truck Tonnage Network Assignments, Waste or Scrap (2019) 3-35

Figure 3-13: Transearch Truck Tonnage Network Assignments, Clay Concrete Glass Stone (2019) 3-36

Figure 3-14: Transearch Truck Tonnage Network Assignments, Crude Petroleum or Natural Gas (2019) 3-37

Figure 3-15: Transearch Truck Tonnage Network Assignments, Coal (2019) 3-38

Figure 3-16: Transearch Truck Value Network Assignments, Machinery (2019) 3-39

Figure 3-17: Transearch Truck Value Network Assignments, Transportation Equipment (2019) 3-40

Figure 3-18: Transearch Truck Value Network Assignments, Petroleum or Coal Products (2019) 3-41

Figure 3-19: Transearch Estimate of Originated Truck Tons (Million) by North Dakota County (2019) 3-45

Figure 3-20: Transearch Estimate of Terminated Truck Tons (Million) by North Dakota County (2019) 3-46

Figure 3-21: North Dakota Average Daily Truck Count Point Locations 3-48

Figure 3-22: North Dakota Average Daily Truck Counts vs. Adjusted StreetLight Index Values 3-49

Figure 3-23: County-level Estimated Daily Truck Activity (Trip Starts and Ends) 3-50

Figure 3-24: County Top Route Analysis Results – Cass County 3-51

Figure 3-25: County Top Route Analysis Results – Ward County 3-52

Figure 3-26: Composite Statewide Top Route Analysis Results 3-53

Figure 3-27: Border Crossing Top Route Analysis 3-54

Figure 3-28: Bismarck-Mandan MPO Top Route Analysis 3-55

Figure 3-29: Minot Intermodal Terminal Top Route Analysis 3-56

Figure 3-30: Spiritwood Soybean Crushing Facility Top Route Analysis 3-57

Figure 3-31: North Dakota Freight Rail Tonnage by Direction (2019) 3-58

Figure 3-32: North Dakota Freight Rail Outbound Tonnage by Commodity (2019) 3-59

Figure 3-33: North Dakota Freight Rail Inbound Tonnage by Commodity (2019) 3-59

Figure 3-34: North Dakota Freight Rail Intrastate Tonnage by Commodity (2019) 3-60

Figure 3-35: North Dakota Freight Rail Overhead Tonnage by Commodity (2019)..... 3-60

Figure 3-36: BEA Destinations of Freight that Originates in North Dakota (2019) 3-61

Figure 3-37: BEA Origins of Freight that Terminates in North Dakota (2019) 3-62

Figure 3-38: Comparison of 2014 and 2019 North Dakota Originating Tons by Commodity (Millions) 3-63

Figure 3-39: Comparison of 2014 and 2019 North Dakota Terminating Tons by Commodity (Millions)..... 3-63

Figure 3-40: Barrels per Day of Crude Oil Shipped by Rail from North Dakota 3-64

Figure 3-41: Thousands of Barrels of Crude Oil Produced in North Dakota per Month 3-65

Figure 3-42: Thousands of Barrels Shipped from PADD 2 (Midwest) to Other Areas of North America by Rail... 3-66

Figure 3-43: North Dakota Natural Gas Plant Liquids Production (MCF) 3-67

Figure 3-44: Grains/Oilseeds Shipped from North Dakota Elevators by Commodity (Tons) 3-68

Figure 3-45: Grains/Oilseeds Shipped from North Dakota Elevators by Destination (Tons)..... 3-68

Figure 3-46: Rail Modal Share in North Dakota Compared to Overall U.S. Rail Modal Share for Shipping
 Grains/Oilseeds..... 3-69

Figure 3-47: Rail Modal Share for Shipping Grains/Oilseeds from North Dakota Elevators by Destination 3-70

Figure 3-48: Forecast Percentage Change in Bushels between 2020/2021 and 2031/2032 Crop Years..... 3-70

Figure 3-49: Percentage Change in Coal Production 2001 – 2019 3-71

Figure 4-1: IRI Pavement Condition Rating 4-1

Figure 4-2: All Freight Corridor Pavement Condition (2020) 4-2

Figure 4-3: Level One Freight Corridor Pavement Condition (2020) 4-2

Figure 4-4: Level Two Freight Corridor Pavement Condition (2020)..... 4-2

Figure 4-5: Level Three Freight Corridor Pavement Condition (2020) 4-2

Figure 4-6: Pavement Conditions on All North Dakota State Highways (2020) 4-3

Figure 4-7: Pavement Conditions on Level One Freight Corridors (2020)..... 4-4

Figure 4-8: Pavement Conditions on Level Two Freight Corridors (2020) 4-5

Figure 4-9: Pavement Conditions on Level Three Freight Corridors (2020) 4-6

Figure 4-10: Bridge Locations 4-7

Figure 4-11: Bridges and Culverts in Poor Condition..... 4-8

Figure 4-12: Maximum Level of TTTR (2020) 4-10

Figure 4-13: Frequency of Crash Closures (2017–2021) 4-13

Figure 4-14: Duration of Crash-related Closures (2017–2021) 4-14

Figure 4-15: Weather Closure Frequency (2017–2021)..... 4-15

Figure 4-16: Duration of Weather-related Closures (2017–2021) 4-16

Figure 4-17: Highway Closures Associated with Flooding (2017–2021)..... 4-17

Figure 4-18: Highway Flooding Closure Duration (2017–2021)..... 4-18

Figure 4-19: Locations of Crashes Involving Freight Vehicles (2017–2020) 4-19

Figure 4-20: Heat Map of Freight Vehicle Crashes (2017–2020)..... 4-20

Figure 4-21: Heat Map of Fatal Crashes Involving Freight Vehicles (2017–2020) 4-21

Figure 4-22: Heat Map of Injury-related Crashes Involving Freight Vehicles (2017–2020) 4-22

Figure 4-23: Heat Map of PDO Crashes Involving Freight Vehicles (2017–2020) 4-23

Figure 4-24: Truck Crash Trends (2017–2020)..... 4-24

Figure 4-25: Locations of Bridge Strikes (2011-2021) 4-25

Figure 4-26: Long X Bridge and New Replacement Bridge..... 4-26

Figure 4-27: Locations of Highway Infrastructure Constraints (2021) 4-27

Figure 4-28: Counties and Cities Participating in the LoadPass Permit System 4-28

Figure 4-29: Typical Seasonal Weight Restrictions 4-31

Figure 4-30: North Dakota Public and Private Truck Parking Facilities..... 4-34

Figure 4-31: Long-haul Truck Parking Activity by County 4-35

Figure 4-32: Long-haul Truck Parking Activity by Day of Week 4-35

Figure 4-33: Ratio of Truck Parking Activity to Total Truck Parking Spaces by County 4-36

Figure 4-34: Truck Parking Activity in Counties Without Truck Parking Facilities 4-37

Figure 4-35: Locations of FRA Blocked Crossings Complaint Records 4-38

Figure 4-36: North Dakota NHS Functional Class Truck CO2 Emissions/Mile 4-39

Figure 4-37: North Dakota MPO All NHS Highways Truck CO2 Emissions/Mile 4-39

Figure 4-38: BNSF Network Utilization – Tonnage 4-41

Figure 4-39: BNSF Network Utilization – Trains 4-42

Figure 4-40: Distribution of Crossing Maximum Train Speeds (Miles per Hour)..... 4-54

Figure 4-41: Injury and Fatal Crashes by Month (2011–2020)..... 4-56

Figure 4-42: Injury and Fatal Crashes by County (2011–2020)..... 4-57

Figure 4-43: National Accident Rate for Crude Oil and Refined Petroleum Products and Biofuel Pipeline Networks
 4-59

Figure 4-44: Barrels Spilled per Billion Barrel-miles..... 4-59

Figure 4-45: Causes of Incidents on National Crude Oil and Refined Petroleum Products Pipeline Networks (2010–
 2020)..... 4-62

Figure 4-46: Causes of Incidents on North Dakota Crude Oil and Refined Petroleum Products Pipeline Networks
 (2010–2020) 4-63

Figure 4-47: Pavement Condition Index 4-64

Figure 5-1: How a Truck Parking Information Management System Works 5-11

Figure 5-2: Typical Livability Concerns Encountered in Communities 5-15

Figure 5-3: Main Street..... 5-17

Figure 5-4: K-12 School Children Walking to School..... 5-18

Figure 5-5: K-12 Schools in Close Proximity to Freight Corridors..... 5-19

Figure 5-6: Typical Five-Minute Walk Radius to Schools in Bismarck-Mandan..... 5-19

Figure 5-7: Proximity of Minority Populations to Freight Corridors 5-22

Figure 5-8: Fargo and West Fargo Minority Populations and Proximity to Freight Influence Corridors 5-24

Figure 5-9: Bismarck and Mandan Minority Populations and Proximity to Freight Influence Corridors..... 5-25

Figure 5-10: Grand Forks Minority Populations and Proximity to Freight Influence Corridors 5-26

Figure 5-11: Minot (Population 48,377)..... 5-27

Figure 5-12: Tribal Lands and Freight Corridors 5-28

Figure 5-13: Highways within Tribal Lands 5-29

Figure 5-14: MHA Nation Transportation Network and Crashes (2015-2020)..... 5-31

Figure 5-15: Sisseton Wahpeton Oyate Transportation Network and Crashes (2015-2020) 5-33

Figure 5-16: Spirit Lake Nation Transportation Network and Crashes (2015-2020)..... 5-35

Figure 5-17: Standing Rock Sioux Tribe Transportation Network and Crashes (2015-2020) 5-37

Figure 5-18: Turtle Mountain Band Transportation Network and Crashes (2015-2020) 5-39

Figure 5-19: Freight-related Crashes on Tribal Lands (2015-2020)..... 5-41

Figure 5-20: Minority Population and Freight Corridors – MHA Nation..... 5-43

Figure 5-21: Minority Population and Freight Corridors – Sisseton Wahpeton Oyate..... 5-44

Figure 5-22: Minority Population and Freight Corridors – Spirit Lake Nation 5-45

Figure 5-23: Minority Population and Freight Corridors – Standing Rock Sioux Tribe..... 5-46

Figure 5-24: Minority Population and Freight Corridors – Turtle Mountain Band of Chippewa 5-47

Figure 5-25: US-85 Wildlife Crossing 5-48

Figure 6-1: North Dakota Population Growth 2020 to 2045..... 6-3

Figure 6-2: Total Gasoline Wholesale/Resale Price by Refiners 2012 to 2021 6-7

Figure 6-3: North Dakota Transportation Regions..... 6-8

Figure 6-4: North Dakota 2019 to 2045 Traffic Growth Rates 6-9

Figure 6-5: North Dakota 2019 AADT Estimates..... 6-10

Figure 6-6: North Dakota 2019 Truck AADT Estimates 6-10

Figure 6-7: North Dakota 2045 AADT Forecasts..... 6-11

Figure 6-8: North Dakota 2045 Truck AADT Forecasts 6-11

Figure 8-1: North Dakota Project Identification Process for Freight Projects 8-1
 Figure 10-1: Location of Projects in the 2023-2026 Draft STIP 10-7
 Figure 10-2: Public Involvement in Freight Rail Projects 10-11

Tables

Table 1-1: Alignment of North Dakota’s Freight and Rail Plan Goals with National Freight Goals..... 1-4
 Table 1-2: Performance Measures 1-5
 Table 1-3: Multijurisdictional Coordination..... 1-7
 Table 2-1: North Dakota Strategic Freight System Index 2-1
 Table 2-2: North Dakota Intermodal Connectors 2-2
 Table 2-3: PHFS in North Dakota 2-5
 Table 2-4: Strategic Freight System Level One Corridors..... 2-14
 Table 2-5: North Dakota–Canada Border Crossing Truck Volumes 2-16
 Table 2-6: Border Crossing Opening Times and Facilities..... 2-17
 Table 2-7: Strategic Freight System Border Crossing Designations 2-18
 Table 2-8: North Dakota Rail Mileage 2-18
 Table 2-9: BNSF Twin Cities Division 2-20
 Table 2-10: BNSF Montana Division 2-22
 Table 2-11: North Dakota BNSF Train Operations..... 2-23
 Table 2-12: CP Rail North Dakota Subdivisions 2-26
 Table 2-13: North Dakota CP Rail Operations..... 2-27
 Table 2-14: Top Five Commodities for DMVW (2020) 2-28
 Table 2-15: Top Five Commodities for DNR (2020) 2-29
 Table 2-16: Top Five Commodities for NPR (2020) 2-30
 Table 2-17: Distribution of Rail-served Grain Elevators..... 2-35
 Table 2-18: North Dakota Rail Border Crossing Statistics (2019) 2-38
 Table 2-19: Air Cargo Carried on Passenger Flights (pounds) (2019) 2-50
 Table 2-20: Strategic Freight System Airport Classification 2-51
 Table 3-1: Inventory of State Freight and Rail Plan Data Resources 3-1
 Table 3-2: Tons (Million) by Flow Type and Trade (2017) 3-5
 Table 3-3: Value (\$B) by Flow Type and Trade (2017) 3-5
 Table 3-4: Tons (M) by Flow Type and Domestic Mode (2017) 3-5
 Table 3-5: Share of Tons (Million) by Flow Type and Domestic Mode (2017) 3-6
 Table 3-6: Value (\$Billion) by Flow Type and Domestic Mode (2017)..... 3-7
 Table 3-7: Share of Value (\$Billion) by Flow Type and Domestic Mode (2017) 3-8
 Table 3-8: Tons (Million) by Flow Type and Commodity Group (2017) 3-8
 Table 3-9: Share of Tons (Million) by Flow Type and Commodity Group (2017) 3-9
 Table 3-10: Value (\$Billion) by Flow Type and Commodity Group (2017) 3-9
 Table 3-11: Share of Value (\$Billion) by Flow Type and Commodity Group (2017)..... 3-10
 Table 3-12: North Dakota-associated Tons (Million) by Top Ten Origin States (2017) 3-10
 Table 3-13: North Dakota-associated Value (\$Billion) by Origin State (2017)..... 3-11
 Table 3-14: North Dakota-associated Tons (Million) by Destination State (2017) 3-12
 Table 3-15: North Dakota-associated Value (\$Billion) by Destination State (2017)..... 3-13
 Table 3-16: Tons (Million) by Commodity and Trade Type (2017) 3-14
 Table 3-17: Share of Tons (Million) by Commodity and Trade Type (2017) 3-15
 Table 3-18: Value (\$Billion) by Commodity and Trade Type (2017)..... 3-15
 Table 3-19: Share of Value (\$Billion) by Commodity and Trade Type (2017)..... 3-16
 Table 3-20: Tons (Million) by Commodity and Domestic Mode (2017)..... 3-16
 Table 3-21: Share of Tons (Million) by Commodity and Domestic Mode (2017) 3-16

Table 3-22: Value (\$Billion) by Commodity and Domestic Mode (2017) 3-17

Table 3-23: Share of Value (\$Billion) by Commodity and Domestic Mode (2017) 3-18

Table 3-24: Tons (Million) by Foreign Origin and Foreign Mode for Imports (2017) 3-18

Table 3-25: Value (\$Billion) by Foreign Origin and Foreign Mode for Imports (2017) 3-19

Table 3-26: Tons (Million) by Foreign Destination and Foreign Mode for Exports (2017) 3-19

Table 3-27: Tons (Million) by Foreign Destination and Foreign Mode for Exports (2017) 3-19

Table 3-28: Tons (Million) by Flow Type and Trade (Change from 2017-2030)..... 3-20

Table 3-29: Value (\$Billion) by Flow Type and Trade (Change from 2017-2030) 3-21

Table 3-30: Tons (Million) by Flow Type and Domestic Mode (Change from 2017-2030) 3-21

Table 3-31: Value (\$Billion) by Flow Type and Domestic Mode (Change from 2017-2030) 3-21

Table 3-32: Tons (Million) by Flow Type and Commodity Group (Change from 2017-2030)..... 3-22

Table 3-33: Value (\$Billion) by Flow Type and Commodity Group (Change from 2017-2030) 3-22

Table 3-34: Tons (Million) by Flow Type and Trade (Change from 2017-2045)..... 3-23

Table 3-35: Value (\$Billion) by Flow Type and Trade (Change from 2017-2045) 3-23

Table 3-36: Tons (Million) by Flow Type and Domestic Mode (Change from 2017-2045) 3-24

Table 3-37: Value (\$Billion) by Flow Type and Domestic Mode (Change from 2017-2045) 3-24

Table 3-38: Tons (Million) by Flow Type and Commodity Group (Change from 2017-2045)..... 3-25

Table 3-39: Value (\$Billion) by Flow Type and Commodity Group (Change from 2017-2045) 3-25

Table 3-40: Truck Tons (Million) Originated in North Dakota by Commodity Type (2019) 3-42

Table 3-41: Truck Tons (Million) Terminated in North Dakota by Commodity Type (2019) 3-43

Table 3-42: Truck Tons (Million) Originated in North Dakota, Top Ten Counties (2019) 3-44

Table 3-43: Truck Tons (Million) Terminated in North Dakota, Top Ten Counties (2019) 3-44

Table 4-1: Bridges and Freight Highway System Classification 4-7

Table 4-2: Bridge and Culvert Conditions 4-8

Table 4-3: Segments with Low TTTR (2020) 4-9

Table 4-4: Truck Freight Reliability – Time Bands (2020)..... 4-11

Table 4-5: Truck Freight Reliability – Highway Sections (2020) 4-11

Table 4-6: Categories of North Dakota Highway Constraints 4-26

Table 4-7: NDHP Permits Issued by Gross Vehicle Weight Band 4-29

Table 4-8: NDHP Permits Issued by Vehicle Height Band 4-29

Table 4-9: Spring Load Restrictions..... 4-30

Table 4-10: BNSF– Twin Cities Division Infrastructure Profile 4-43

Table 4-11: BNSF – Montana Division Infrastructure Profile 4-45

Table 4-12: CP Rail North Dakota Operating Territories – Infrastructure Profile 4-46

Table 4-13: DMVW Railroad Infrastructure and Operating Profile 4-47

Table 4-14: DNR Infrastructure and Operating Profile 4-48

Table 4-15: NPR Infrastructure and Operating Profile..... 4-48

Table 4-16: RRWV Infrastructure and Operating Profile 4-49

Table 4-17: North Dakota Rail Mileage Not Meeting 286,000 Pound Car Weight Standard 4-52

Table 4-18: 2020 North Dakota Public Crossing Control Device Profile 4-53

Table 4-19: Railroad Distribution of Public Grade Crossings 4-53

Table 4-20: North Dakota Quiet Zones..... 4-55

Table 4-21: Number of Rail-related Crossing Crashes in North Dakota (2011–2020)..... 4-55

Table 4-22: Fatality and Injury by Collision Type (2011–2020) 4-56

Table 4-23: Annual Average of Injury and Fatality by Vehicle Type (2011–2020)..... 4-58

Table 4-24: Pipeline Incidents in North Dakota 4-60

Table 4-25: Crude Oil Pipeline Incidents..... 4-60

Table 4-26: Refined Petroleum Products 4-61

Table 4-27: Hazardous Volatile Liquids, Flammable and Toxic Liquid Pipelines 4-61

Table 4-28: Gas Transmission Pipelines 4-61

Table 4-29: Current and Forecasted PCI 4-65

Table 5-1: Truck Parking Spaces in North Dakota 5-2

Table 5-2: Route-Miles for Short Line Railroads by FRA Track Class 5-7

Table 5-3: Freight Vehicle Configuration Involved in Crashes on Tribal Lands	5-40
Table 5-4: Freight-related Serious Crashes	5-40
Table 6-1: North Dakota 2020 to 2045 Population Projections	6-1
Table 6-2: North Dakota 2020 to 2045 Total Employment Projections	6-4
Table 6-3: North Dakota Industrial Outlook by Sector - 2020 to 2045	6-5
Table 6-4: Trends Driving Future Freight Movement in North Dakota	6-12
Table 6-5: Potential Future Scenarios	6-13
Table 9-1: Summary of IIJA Funding Programs	9-2
Table 9-2: Summary of Non-IIJA Federal Funding	9-20
Table 9-3: Summary of North Dakota Freight and Rail Funding Programs	9-30
Table 9-4: Schedule of Funding Opportunities, 2022	9-34
Table 9-5: Summary of IIJA Funding Programs	9-35
Table 9-6: Non-IIJA Federal Funding Programs	9-37
Table 9-7: Summary of State Funding Programs	9-40
Table 9-8: Summary of Funding, 2023-2026	9-41
Table 10-1: 2023-2026 Draft STIP Projects Funding Assigned across Highway Freight Levels	10-7
Table 10-2: Proposed Class I Railroad Projects	10-8
Table 10-3: Proposed Projects on North Dakota Short Line Railroads-DMVW	10-9
Table 10-4: Proposed Projects on North Dakota Short Line Railroads-RRVW.....	10-9
Table 10-5: Section 130 Crossing Funding: Hazard Elimination Projects FY2022	10-9
Table 10-6: Section 130 Crossing Funding: Signal Projects FY2022	10-10

ACRONYMS AND ABBREVIATIONS

AADT	Annual Average Daily Traffic
AAR	Association of American Railroads
AASHTO	American Association of State Highway Transportation Officials
ABS	Automatic Block Signaling
ADT	Average Daily Traffic
AFB	Air Force Base
AIP	Airport Improvement Program
BCA	Benefit-Cost Analysis
BCFD	Billion Cubic Feet per Day
BEA	Business Economic Area
BEP	Border Enforcement Program
BIA	Bureau of Indian Affairs
BIL	Bipartisan Infrastructure Law
BIP	Bridge Investment Program
BIS	Bismarck Airport
BLM	Bureau of Land Management
BND	Bank of North Dakota
BNSF	BNSF Railway
BOR	Bureau of Reclamation
BPD	Barrels Per Day
BTS	Bureau of Transportation Statistics
BTU	British Thermal Unit
BVLOS	Beyond Visual Line Of Sight
CBP	U.S. Customs and Border Protection
CBSA	Canada Border Services Agency
CDL	Commercial Driver’s License
CFR	Code of Federal Regulations
CMAQ	Congestion Mitigation and Air Quality Improvement Program
CMV	commercial motor vehicles
CP Rail	Canadian Pacific Railway
CRFC	Critical Rural Freight Corridor
CRISI	Consolidated Rail Infrastructure and Safety Improvements
CSX	CSX Corporation
CTC	Centralized Traffic Control
CUFC	Critical Urban Freight Corridor
CVSP	Commercial Vehicle Safety Plan
DAC	Director’s Advisory Council
DERA	Diesel Emission Reduction Act
DHS	U.S. Department of Homeland Security
DIK	Dickinson–Theodore Roosevelt Regional Airport
DMVW	Dakota Missouri Valley & Western Railroad
DNR	Dakota Northern Railroad
DOT	Departments of Transportation
DVL	Devils Lake Regional Airport
EDA	Economic Development Administration
EPA	U.S. Environmental Protection Agency
ERFO	Emergency Relief for Federally Owned Roads
FAA	Federal Aviation Administration
FAC	North Dakota Freight Advisory Committee
FAF	Freight Analysis Framework

FAST Act	Fixing America’s Surface Transportation Act
FAST	Free and Secure Trade
FBIR	Fort Berthold Indian Reservation
FDI	Foreign Direct Investment
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FLATF	Federal Land Access Transportation Facility
FLMA	Federal Land Management Agency
FLTP	Federal Lands Transportation Program
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FRIP	Freight Rail Improvement Program
FT	Feet
FTA	Federal Transit Administration
GIS	Geographic Information Systems
GSA	U.S. General Services Administration
GVW	Gross Vehicle Weight
HCA	High-Consequence Area
HP	High Priority
HPCS	Highway Performance Classification System
HPMS	Highway Performance Monitoring System
HSIP	Highway Safety Improvement Program
HUD	U.S. Department of Housing and Urban Development
ICBM	Intercontinental Ballistic Nuclear Missiles
ICC	Interstate Commerce Commission
IJA	Infrastructure Investment and Jobs Act
INFRA	Infrastructure for Rebuilding America
IRI	International Roughness Index
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITS	Intelligent Transportation Systems
JMS	Jamestown Regional Airport
KCS	Kansas City Southern Railroad
LBS	Pounds
LCV	Longer Combination Vehicle
LETA	Law Enforcement Training Academy
LMI	Labor Market Information
LNG	Liquefied Natural Gas
LRFA	Local Rail Freight Assistance
L RTP	Long-Range Transportation Plan
MAP-21	Moving Ahead for Progress in the 21st Century Act
MCF	Million Cubic Feet
MCSAP	Motor Carrier Safety Assistance Program
MDU	Montana Dakota Utilities
MHA	Mandan, Hidatsa, and Arikara
MHC	Mohall Central Railroad, Inc.
MIPRC	Midwest Interstate Passenger Rail Commission
MMCFD	Million Cubic Feet Per Day
MnDOT	Minnesota Department of Transportation
MOA	Memorandum Of Agreement
MOT	Minot International Airport
MOU	Memorandum of Understanding
MP	Milepost
MPO	Metropolitan Planning Organization

MRI	Mohall Railroad, Inc.
MTOW	Maximum Takeoff Weight
MVMT	Million Vehicle-Miles Traveled
MWRRP	Midwest Regional Rail Plan
NBI	National Bridge Inventory
NDCC	North Dakota Century Code
NDDDES	North Dakota Department of Emergency Services
NDDOT	North Dakota Department of Transportation
NDHP	North Dakota Highway Patrol
NDPSC	North Dakota Public Service Commission
NDSC	North Dakota Safety Council
NDSU	North Dakota State University
NEPA	National Environmental Policy Act
NFSP	National Freight Strategic Plan
NGL	Natural Gas Liquids
NHFN	National Highway Freight Network
NHFP	National Highway Freight Program
NHPP	National Highway Performance Program
NHS	National Highway System
NII	Non-Intrusive Inspection
NMFN	National Multimodal Freight Network
NOFO	Notice of Funding Opportunity
NPIAS	National Plan of Integrated Airport Systems
NPMRDS	National Performance Measurement Research Data Set
NPR	Northern Plains Railroad
NPS	National Park Service
NS	Norfolk Southern
NTAD	National Transportation Atlas Database
OSOW	Oversize and Overweight
OTT	Office of Tribal Transportation
PA	North Dakota Pipeline Authority
PCI	Pavement Condition Index
PDC	Program Decision Committee
PDO	Property Damage Only
PHFS	Primary Highway Freight System
PHMSA	Pipeline and Hazardous Materials Safety Administration
PRIIA	Passenger Rail Investment and Improvement Act of 2008
PS&E	Plans, Specifications, and Estimate
QoL	Quality of Life
R/ECAP	Racially or Ethnically Concentrated Area of Poverty
RAISE	Rebuilding American Infrastructure with Sustainability and Equity
RMG	Rail Modal Group
RRIF	Railroad Rehabilitation & Improvement Financing
RRVW	Red River Valley & Western Railroad
RSIP	Rail Service Investment Program
S&O	Stewardship and Oversight
SCTG	Standard Classification of Transported Goods
SFS	Strategic Freight System
SMT	Safety Management Team
SQ FT	Square Feet
SRP	State Rail Plan
STB	Surface Transportation Board
STBG	Surface Transportation Block Grant

STCC	Standard Transportation Commodity Code
STIP	Statewide Transportation Improvement Program
STRACNET	Strategic Rail Corridor Network
STRAHNET	Strategic Highway Network
TAADT	Truck Annual Average Daily Traffic
TAC	Technical Advisory Committee
TAMP	Transportation Asset Management Plan
TBWG	Trans Border Working Group
THPP	Tribal High Priority Projects Program
TIFIA	Transportation Infrastructure Finance and Innovation Program
TIP	Transportation Improvement Program
TPIMS	Truck Parking Information Management Systems
TSA	Transportation Security Administration
TTAM	Tribal Transportation Allocation Methodology
TTAP	Tribal Technical Assistance Program
TTC	Transportation Technical Committee
TTFP	Tribal Transportation Facility Bridge Program
TTP	Tribal Transportation Program
TTPS	Tribal Transportation Program Safety Fund
TTRI	Transportation Technology Research Initiative
TTR	Truck Travel Time Reliability
TWC	Track Warrant Control
U.S.C.	United States Code
UAS	Unmanned Aerial Systems
UAV	Unmanned Aerial Vehicles
UGPTI	Upper Great Plains Transportation Institute
ULD	Unit Load Device
UND	University of North Dakota
UP	Union Pacific Railroad
UPWP	Unified Planning Work Program
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
VMT	Vehicle Miles Traveled
WisDOT	Wisconsin Department of Transportation
XWA	Williston Basin International Airport

CHAPTER 1: BUILDING A VISION

VISION – TRANSPORTATION CONNECTION

This North Dakota Freight and Rail Plan serves as an important modal plan designed to support *Transportation Connection*, the North Dakota Department of Transportation’s (NDDOT) Long-Range Transportation Plan (LRTP). *Transportation Connection* defines a vision for North Dakota’s transportation future, focusing the State of North Dakota’s efforts on **“DELIVERING A SAFE, INNOVATIVE, AND CONNECTED FUTURE.”**

To support this vision, *Transportation Connection* includes five overarching transportation goals:

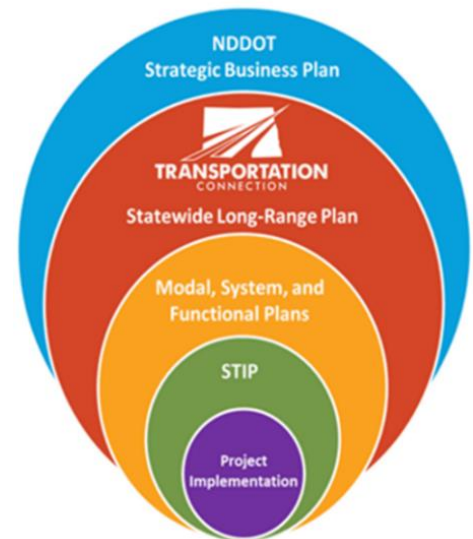
- **Keeping You Safe** – Safety Is Reflected in Everything We Do: We are continually innovating and improving what we do to make sure you are safe and secure whether driving, biking, or walking.
- **Caring for What We Have** – Fixing What We Have Is Our Priority: We are maintaining our existing infrastructure in good condition to save money down the road, and we’re addressing risks to keep that system working for you.
- **Connecting North Dakota** – Transportation Matters: We are leveraging transportation investments to enhance economic competitiveness and improve the quality of life in communities across the state.
- **Helping You Get There** – Transportation Should Be Easy: We are helping make it more convenient for you to get where you want to go by improving data and information, travel choices and options, and operations and maintenance.
- **Investing for The Future** – We Work for You: We are making smart investments in how we deliver services and are looking for responsible ways to fund our transportation system well into the future.

DEVELOPING FREIGHT GOALS

This Freight and Rail Plan is part of NDDOT’s “family of plans,” a group of transportation-related documents that work together to identify transportation needs in the state and recommendations to address those needs. The overall relationship between these plans is shown in Figure 1-1. These plans include:

- NDDOT’s **Strategic Business Plan** is an internal document used to establish NDDOT’s overall direction, philosophy, and purpose.
- *Transportation Connection*, the **LRTP** provides the overall policy guiding future transportation improvements. It serves as the umbrella plan and informs the plans underneath it.
- **Modal, system, and functional plans** are plans that provide policy direction and investment strategies for a specific mode, system, or function. These plans go deeper into the specific needs of each. This Freight and Rail Plan is an example of a modal plan.
- The **Statewide Transportation Improvement Program (STIP)** is the state’s four-year program of transportation improvements to be funded with federal highway and transit

Figure 1-1: Family of Plans



funds. Improvements include improvements to state and county highways, improvements to urban streets, roadway safety features, bikeways, and busing programs.

- **Project implementation** moves the recommended projects and policies into practice.

Freight movement is an essential part of North Dakota’s economy. For this reason, this Freight and Rail Plan focuses on integrating freight into the state’s long-term transportation vision. To achieve this, the Freight and Rail Plan’s goals were deliberately designed to support and be easily integrated into the *Transportation Connection* vision and goals.



**KEEPING
YOU SAFE**

*Safety is reflected in
everything we do.*

Goal 1 – Keeping You Safe

We are continually innovating and improving what we do to make sure you are safe and secure whether you are moving people or freight.

- Partner with railroads and aligned agencies and initiatives to improve hazmat safety
- Implement data-driven safety improvements on major freight corridors
- Continue to partner with Operation Lifesaver and other entities to promote safety educational programs
- Encourage adopting and implementing safety technologies by NDDOT and private industry
- Support long-term efforts to improve the availability of truck parking
- Continue to support programs such as the Wildlife Carcass Collection Program, to monitor and inform mitigation solutions to reduce the number of collisions involving wildlife and freight vehicles



**CARING FOR
WHAT WE HAVE**

*Fixing what we have
is our priority.*

Goal 2 – Caring for What We Have

We are maintaining existing freight and rail infrastructure in good condition to save money down the road, address risks to improve the resiliency of the freight system and reduce the adverse environmental impacts of freight movement.

- Preserve short line rail corridors
- Partner with aligned agencies to create a resilient multimodal freight system and decrease the severity of impacts of extreme weather and natural disasters on freight mobility
- Preserve major freight corridors and rural last-mile connections
- Enhance construction and maintenance activities, such as connected and automated trucking, that support future technology deployment
- Partner with public sector agencies and the freight industry to scope projects and seek funding to decrease the impacts of freight movement on local air pollution



**CONNECTING
NORTH DAKOTA**

*Transportation
matters.*

Goal 3 – Connecting North Dakota

We are leveraging transportation investments to enhance economic competitiveness and improve the quality of life in communities across the state.

- Upgrade short line facilities to support economic opportunities
- Work with U.S. Customs and Border Protection (CBP), the Canada Border Services Agency (CBSA), Manitoba, and Saskatchewan to enhance border crossing opportunities
- Expand opportunities for international air cargo

- Partner with bi-state and bi-national organizations to coordinate investment and freight-related growth in key economic centers



HELPING YOU
GET THERE

Transportation
should be easy.

Goal 4 – Helping You Get There

We are helping make it more convenient for you to get where you want to go by improving data and information, multimodal connectivity, and operations and maintenance.

- Provide consistent travel reliability on the freight network
- Improve seasonal maintenance and response times
- Expand multimodal freight opportunities
- Improve the availability of freight-related traveler information
- Collaborate with transportation planning partners at the bi-national, tribal, federal, state, regional, and local levels
- Improve workforce mobility for the state’s freight businesses (transit access)
- Promote access to the state’s passenger rail facilities
- Work with partners to assess the severity of impacts and develop strategies to reduce the impacts of extreme weather and natural disasters on freight mobility



INVESTING FOR
THE FUTURE

We work
for you.

Goal 5 – Investing for the Future

We are making smart investments in how we deliver services and are looking for responsible ways to fund our transportation system well into the future.

- Focus on freight and passenger rail customers by modernizing services and data
- Evaluate collaborative grant and partnership opportunities to advance freight and rail mobility
- Communicate investment success stories with freight and passenger rail customers
- Ensure that construction and maintenance-of-traffic plans consider freight mobility
- Make strategic highway and rail investments to increase efficiency, capacity, and performance
- Ensure freight-related infrastructure projects evaluate measures to reduce flooding and stormwater runoff and reduce the impact upon wildlife habitats

ALIGNMENT WITH NATIONAL FREIGHT POLICY GOALS

In line with the requirements of the Infrastructure Investment and Jobs Act, Public Law 117-58 (Nov. 15, 2021) (IIJA), the goals of this Freight and Rail Plan reflect the goals of the National Multimodal Freight Policy and the National Highway Freight Program (NHFP). Table 1-1 shows how the Plan’s goals align with the goals of the National Multimodal Freight Policy and the NHFP.

Table 1-1: Alignment of North Dakota’s Freight and Rail Plan Goals with National Freight Goals

		National Multimodal Freight Policy										National Highway Freight Program						
		Identify Infrastructure Improvements, Policies, and Innovations	Improve Safety, Security, and Resiliency	Achieve and Maintain a State of Good Repair	Use Innovation and Advanced Technology	Improve Economic Efficiency and Productivity	Improve Reliability	Connected Freight Network	Multi-State Planning and Partnerships	Reduce Environmental Impacts	Not Burdensome to State and Local Government	Invest in Infrastructure and Operations Improvements	Improve Safety, Security, and Resiliency	Improve State of Good Repair	Use Innovation and Advanced Technology	Improve Network Efficiency and Productivity	Improve Multi-State Coordination	Reduce Environmental Impacts
NDDOT Freight and Rail Plan Goals	Keeping you safe	X	X	X	X		X					X	X	X	X			
	Caring for what we have	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	Connecting North Dakota	X	X		X	X		X	X		X	X	X		X	X	X	
	Helping you get there	X	X	X	X		X		X		X	X	X		X		X	
	Investing for the future	X			X	X		X	X		X	X			X	X	X	

PERFORMANCE MEASURES

This Freight and Rail Plan builds on NDDOT’s performance-measurement process to help guide decision-making on maintenance and future investments. Performance measures track the progress North Dakota is making toward federal and organizational goals. Overall, performance measures can serve three primary purposes:

- **Planning:** Performance measures can help evaluate proposed projects and policies to determine how helpful they’ll be in achieving the Plan’s goals.
- **Implementation:** Performance measures can be used to incorporate the Plan’s goals into the policy development, budgeting, programming, and project selection processes.

- **Accountability:** Performance measures can be used to track and report progress in meeting the Plan’s goals.

SUCCESS FACTORS

Success factors refer to those key elements that are required to develop meaningful performance measures. NDDOT has identified the following success factors:

- **Data availability:** A performance measure needs to be based on accurate, reliable data. The availability of data determines the type of performance measures that can be developed. Without data, a jurisdiction might need to rely more on qualitative measures instead of quantitative ones. Ideally, data is available accurately, quickly, and without a need for excessive manual processing.
- **Strategic alignment:** Meaningful performance measures will be aligned with an organization’s goals and objectives. Aligning performance measures with an organization’s strategic goals helps prioritize those actions that best achieve its objectives.
- **Understandable and explainable:** Performance measures can be a valuable communication tool. They’re more powerful when they’re readily understood immediately by a wide variety of stakeholders.
- **Causality (NDDOT span of control, and cause and effect):** The best performance measures are logically related to what’s within a jurisdiction’s control.
- **Decision-making value:** Successful performance measures will inform the decision-making process. They allow stakeholders to observe the effects of the proposed project or policy. They might also help monitor trends over time to determine whether the existing projects and policies are meeting the plan’s goals or whether adjustments are needed. Reporting performance measures can help stakeholders see the connection between the measures and agency decisions. More measures aren’t necessarily better if they don’t result in better decision-making.

Performance measures required by the Federal Highway Administration (FHWA), such as Truck Travel Time Reliability (TTTR), have been incorporated into the Freight and Rail Plan’s potential performance measures (Table 1-2).

Table 1-2: Performance Measures

Category	Performance Measure
Safety	<ul style="list-style-type: none"> • Commercial Vehicle Crash Rate • Commercial Vehicle Fatality Rate • Grade Crossing Crash Rate (statewide)
Preservation	<ul style="list-style-type: none"> • Index of Road and Bridge Condition on the Freight Network • Index of Short Line Rail Conditions (Federal Railroad Administration [FRA] load limits)
Competitiveness/Quality of Life (QoL)	<ul style="list-style-type: none"> • Freight Network Open to Traffic • Cost of Delay • Freight Constraints • Air Cargo Volumes (Indicator)
Connectivity/Ease of Use	<ul style="list-style-type: none"> • TTTR
Smart Investments	<ul style="list-style-type: none"> • Freight Network Construction Detours Index (percentage above a certain threshold)

STAKEHOLDER ENGAGEMENT AND OUTREACH

Stakeholder engagement and outreach was an important component of developing this Freight and Rail Plan. NDDOT understands the need for coordination between the public and private sectors and to engage the organizations that use the freight network daily, on all levels and modes. The success of this Plan depends on its recommendations being based on the most important existing and future industry needs.

Private sector freight carriers are the key freight movers in North Dakota. The private sector operates aircraft that move e-commerce packages to and from the state; railroads own and operate trains on privately-owned railway infrastructure; the pipeline industry owns and operates the pipeline network; and private sector trucking firms transport goods, products, and commodities we consume daily. Ensuring the private sector is engaged in development of the Freight and Rail Plan is vital. They are users of freight infrastructure, and they (and their customers) benefit from the decisions and investments associated with the Freight and Rail plan.

NDDOT provided multiple opportunities for stakeholders to give input about freight transportation issues, needs, challenges, opportunities, and potential recommendations. These are summarized in the following sections.

FREIGHT ADVISORY COMMITTEE

NDDOT met with the North Dakota Freight Advisory Committee (FAC) twice during the development of this Freight and Rail Plan. The primary roles and responsibilities of the FAC during this time included advising NDDOT regarding freight-related priorities, issues, projects, and funding needs; reviewing draft documents and information for accuracy and completeness; and serving as a forum of discussion for freight-related topics. The FAC membership is included in Appendix A Stakeholder and Public Engagement.

DIRECTOR'S ADVISORY COUNCIL

The Director's Advisory Council (DAC) was responsible for providing executive-level feedback, guidance, strategic direction, and reviews at key milestones in the planning process. The DAC's meetings were coordinated with technical and outreach milestones to provide opportunities for the DAC to review the Plan's approach and technical findings as well as reports on the results of outreach and the Plan's direction. The DAC membership is included in Appendix A Stakeholder and Public Engagement.

FREIGHT COMMUNITY OUTREACH

In addition to the FAC and DAC, NDDOT developed several tools to engage the freight community in meaningful discussions that added value to this Freight and Rail Plan. These activities included the following:

- **Project Website:** NDDOT hosted a project-specific website connected with the established *Transportation Connection* webpage.
- **Online Surveys:** NDDOT sent out several online surveys, in 2021 and 2022, to gather information. The surveys were distributed directly to stakeholders and NDDOT-managed social media channels. The purpose of the surveys was to gather input and feedback from key stakeholders within the economic development, shipping and receiving, manufacturing, and distributing areas to better understand what needs, issues, solutions, and recommendations could be addressed.
- **Public Input Events:** Two rounds of stakeholder and public engagement meetings took place during the development of the Freight and Rail Plan. Each round of engagement included the following public engagement events:

- Two one-hour virtual meetings (midday and evening) for round one; one one-hour virtual meeting (afternoon) for round two. Both included a presentation and a question-and-answer session, that were live and recorded.
- Two self-guided virtual meetings.

MULTIJURISDICTIONAL COORDINATION

NDDOT engaged other jurisdictions in the Plan’s development process. Although this Plan focuses on freight and rail needs in North Dakota, much of the freight movement in North Dakota originates in, or is destined for, another state or province. With multijurisdictional coordination, planning and decision-making occurs by multiple entities as an integrated region instead of as individual ones. This coordination allows the region to develop stronger ties with other jurisdictions, thereby enhancing its economic competitiveness.

Coordination with other jurisdictions can improve the planning process by:

- Providing opportunities for the Plan to address broader network needs including intermodal connectivity and first- and last-mile connections.
- Building partnerships for future collaboration.
- Advancing multiple agency initiatives and supporting multijurisdictional investment.

Table 1-3 summarizes the other jurisdictions engaged as part of the planning process.

Table 1-3: Multijurisdictional Coordination

Category	Organization
Border Crossings	<ul style="list-style-type: none"> • U.S. Customs and Border Protection U.S. General Services Administration (GSA) • Canada Border Services Agency Private Railroads (BNSF Railway [BNSF], Canadian Pacific Rail [CP Rail])
Neighboring States and Provinces	<ul style="list-style-type: none"> • Minnesota • Multistate Metropolitan Planning Organizations (MPO) in Grand Forks-East Grand Forks and Fargo-Moorhead FM Metro COG Council of Governments • Montana • South Dakota • Saskatchewan • Manitoba
Tribes	<ul style="list-style-type: none"> • Mandan, Hidatsa, and Arikara (MHA) Nation (Three Affiliated Tribes) • Spirit Lake Nation • Standing Rock Sioux Tribe • Turtle Mountain Band of Chippewa Indians • Sisseton Wahpeton Oyate
Military	<ul style="list-style-type: none"> • United States Air Force (Grand Forks and Minot Air Force Bases)

CHAPTER 2: STATE FREIGHT SYSTEM

INTRODUCTION

This chapter describes the different public and private modal networks, infrastructure, and operations that define the state’s freight-related transportation system. It also identifies military facilities within the state.

NORTH DAKOTA STRATEGIC FREIGHT SYSTEM INDEX

In the 2015 North Dakota State Freight Plan, NDDOT developed a three-tiered network called the North Dakota Strategic Freight System Index. This index was used to classify freight-related transportation infrastructure in the state, as follows:

- **Level One** – Infrastructure that supports international and interstate freight movements and Critical Rural Freight Corridors (CRFC).
- **Level Two** – Infrastructure that supports regional and intrastate freight movements.
- **Level Three** – Infrastructure that facilitates local freight movement.

Table 2-1 identifies the different components of each freight transportation mode and the level to which it is assigned within the Freight System Index.

Table 2-1: North Dakota Strategic Freight System Index

Mode	Level One	Level Two	Level Three
Roads	<ul style="list-style-type: none"> • Interstate and interregional highways • Congressionally designated high-priority corridors • Strategic Highway Network (STRAHNET) • National Truck Network • Energy/agricultural access corridors • High-truck-volume principal arterials • 24-hour border crossings and commercial facilities processing more than 40,000 trucks per year 	<ul style="list-style-type: none"> • State corridors • District corridors • Limited county major collectors • City principal arterials • Border crossings processing between 5,000 and 39,999 trucks per year and with opening hours of at least 12 hours 	<ul style="list-style-type: none"> • District collectors • Some county, city, township, and tribal roads • Border crossings processing fewer than 5,000 truck crossings per year
Rail	<ul style="list-style-type: none"> • Class I mainlines • Strategic Rail Corridor Network (STRACNET) 	<ul style="list-style-type: none"> • Branch lines capable of carrying 286,000-pound rail cars 	<ul style="list-style-type: none"> • Branch lines capable of carrying 268,000-pound rail cars
Air	<ul style="list-style-type: none"> • Integrator hub airports • Airports with cargo carried on passenger services • Air Force Bases 	<ul style="list-style-type: none"> • Integrator feeder airports 	<ul style="list-style-type: none"> • Airports with infrequent air cargo use
Pipeline	<ul style="list-style-type: none"> • Interstate transmission pipelines 	<ul style="list-style-type: none"> • Gathering pipelines 	<ul style="list-style-type: none"> • Distribution pipelines

HIGHWAYS AND ROADS

HIGHWAY DESIGNATIONS

NATIONAL HIGHWAY SYSTEM

The National Highway System (NHS) includes a series of roads that are deemed to be important to the nation’s economy, defense, and mobility. The NHS includes the following subsystems of roads:

- **Interstates:** Highways on the Interstate Highway System established under President Eisenhower.
- **Other Principal Arterials:** Highways in rural and urban areas that provide access between an arterial and a major port, airport, or other public transportation facility.
- **Strategic Highway Network (STRAHNET):** Highways important to the U.S.’s strategic defense policy and that provide defense access, continuity, and emergency capabilities for defense purposes.
- **Major STRAHNET Connectors:** Highways that provide access between major military installations and highways that are part of STRAHNET.
- **Intermodal Connectors:** Highways that provide access between major intermodal facilities and the other four subsystems making up the NHS. Currently, two NHS intermodal connectors are designated in North Dakota.

The NHS is under the jurisdiction of state Departments of Transportation (DOT) with oversight by FHWA. In North Dakota, the NHS comprises the entire Interstate Highway System along with several state highway (designated ND) corridors (3,368 centerline miles). As shown in Table 2-2 these facilities consist of:

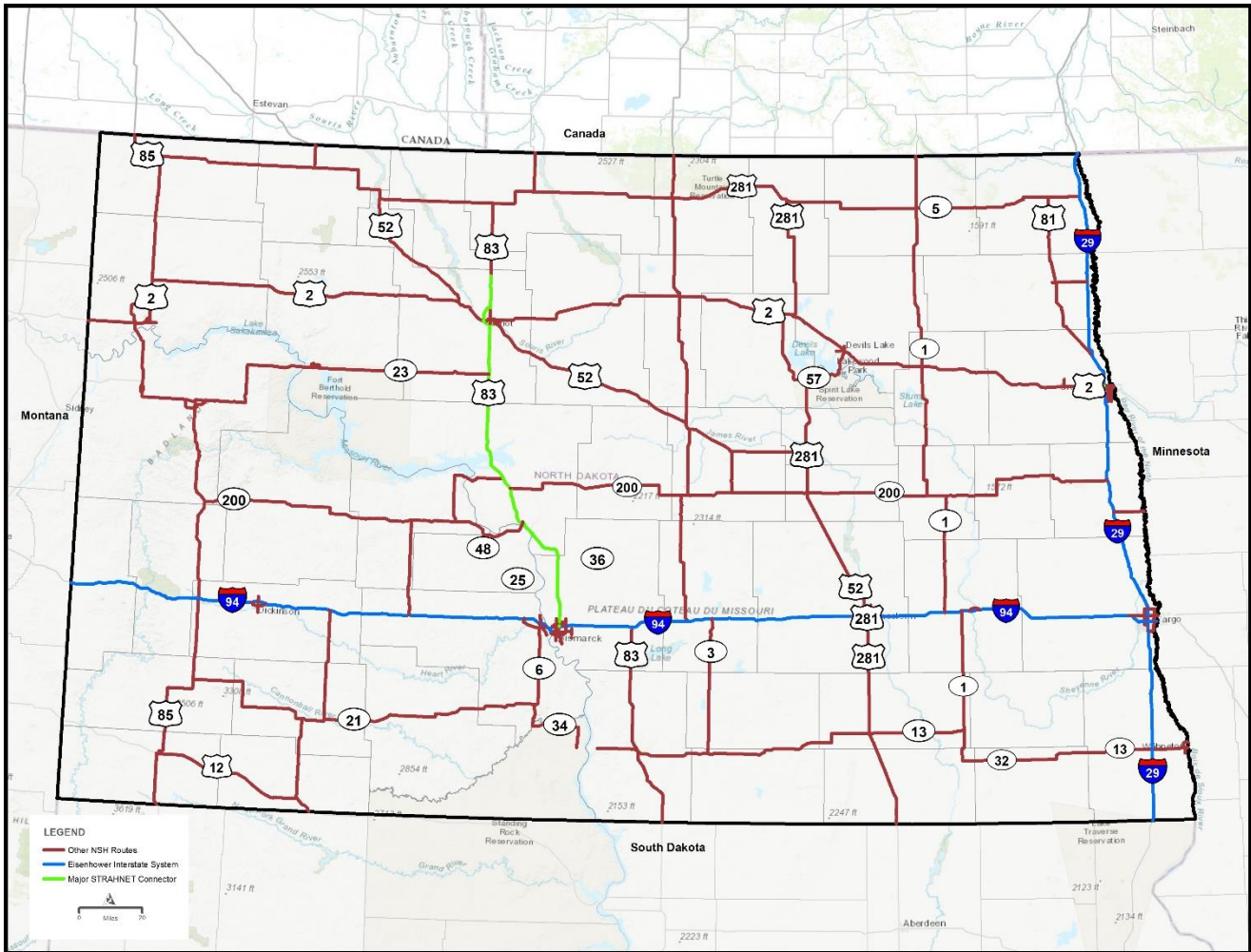
- I-29
- I-94
- I-194
- US-2
- US-10
- US-12
- US-52
- US-81
- US-83
- US-85
- US-281
- ND-1
- ND-3
- ND-5
- ND-6
- ND-8
- ND-13
- ND-15
- ND-17
- ND-18
- ND-20
- ND-21
- ND-22
- ND-23
- ND-24
- ND-30
- ND-32
- ND-49
- ND-57
- ND-200
- ND-297
- ND-810
- ND-1804
- ND-1806

The state’s two intermodal connectors are listed in Table 2-2.

Table 2-2: North Dakota Intermodal Connectors

Facility	Type	Intermodal Connector	Connector Length (miles)	Facility ID
Bismarck Airport	Airport	University Drive	2.1	ND-1A
Fargo Hector International Airport	Airport	From I-29 onto N 19th Ave	0.8	ND-2A

Figure 2-1: NHS in North Dakota



Source: FHWA 2020

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) designated 21 corridors as high-priority corridors on the NHS. Further legislation increased this to 80 corridors by 2005. According to the FHWA website, the only criterion for being a Congressionally designated high-priority corridor is that it is what Congress designates without any further elaboration or significance of this designation.

CONGRESSIONAL HIGH-PRIORITY CORRIDORS

Figure 2-2 illustrates the Congressional High Priority Corridors in North Dakota. The numbers correspond to the Statutory listing Section 1105(c) of ISTEA, as amended.¹ These consist of:

- The I-35 (#23) Corridor, specifically North Dakota’s portion of I-29 between Kansas City, Missouri, and the Canadian border.
- The Theodore Roosevelt Expressway (#58) from Rapid City, South Dakota, north on US-85 to Williston, North Dakota, west on US-2 to Culbertson, Montana, and north on Montana Highway 16 to the international border with Canada at the port of Raymond, Montana.
- The Central North American Trade Corridor (#59) from the border between North Dakota and South Dakota, north on US-83 through Bismarck and Minot, North Dakota, to the international border with Canada.

Figure 2-2: Congressional High-Priority Corridors



Source: FHWA 2020

NATIONAL HIGHWAY FREIGHT NETWORK

The Fixing America’s Surface Transportation Act (FAST Act) designated the National Highway Freight Network (NHFN) to strategically direct federal resources and policies towards improved performance of highway portions of the U.S. freight transportation system. The NHFN consists of the Primary Highway Freight System (PHFS), sections of the interstate subsystem not designated as part of the PHFS, CRFC and Critical Urban Freight Corridors (CUFC).

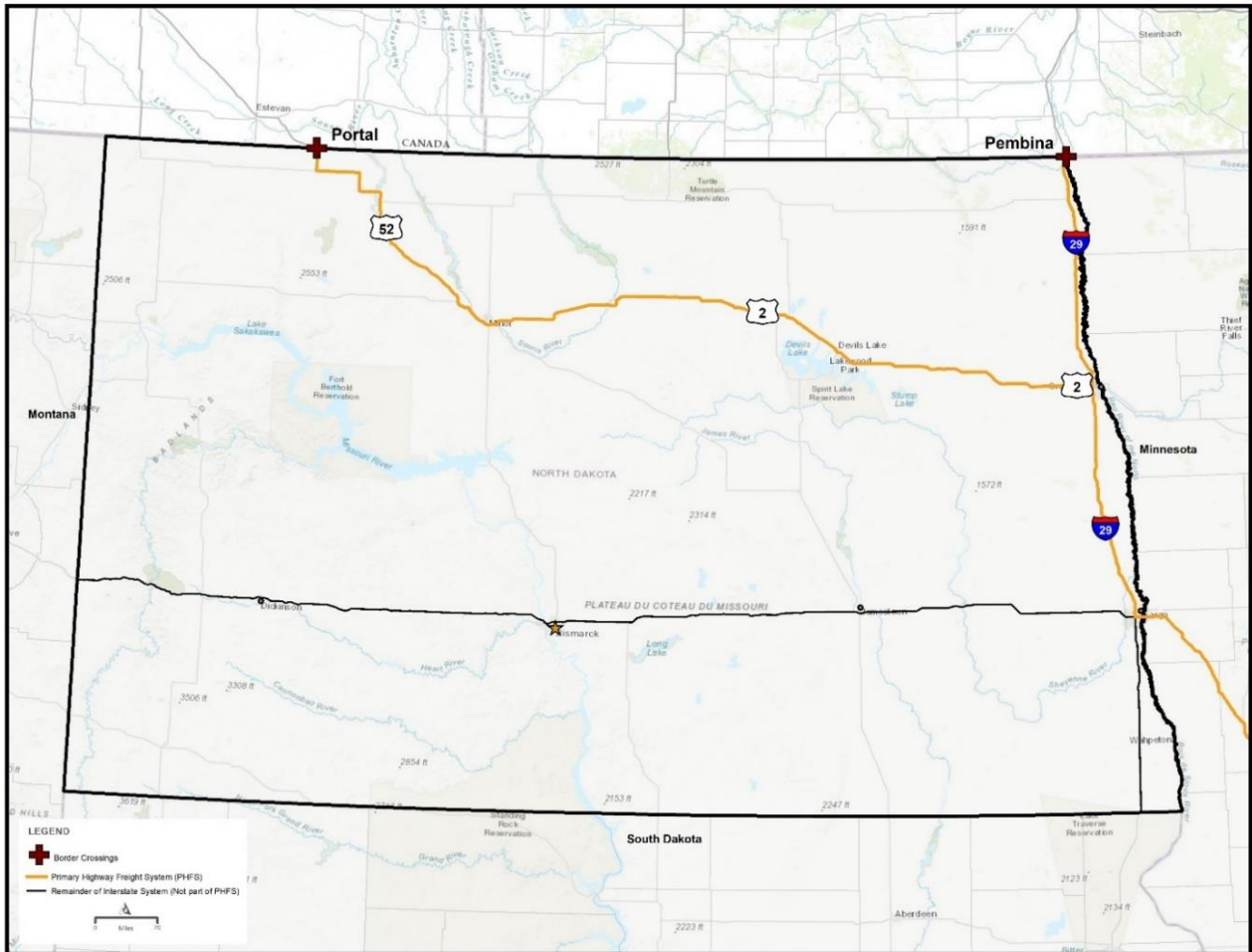
PRIMARY HIGHWAY FREIGHT SYSTEM

The PHFS comprises highways identified as the most critical highway portions of the U.S. freight transportation system determined by measurable and objective national data. Across the nation, the network consists of 41,518 centerline miles,² including 37,436 centerline miles of interstate and 4,082 centerline miles of non-interstate roads. Within North Dakota, the PHFS consists of 461.33 miles, which are shown in Figure 2-3 and listed in Table 2-3.

¹ https://www.fhwa.dot.gov/planning/national_highway_system/high_priority_corridors/

² Centerline miles measure the length of a highway, regardless of how many lanes it has.

Figure 2-3: PHFS in North Dakota



Source: FHWA 2020

Table 2-3: PHFS in North Dakota

Route	Start Point	End Point	Length (miles)
I-29	I-94	North Dakota/Manitoba international border	154.4
I-94	I-29	North Dakota/Minnesota state border	2.9
US-2	US-52	North Dakota/Saskatchewan international border	222.1
US-52	US-2	I-29	81.9

CRITICAL RURAL FREIGHT CORRIDORS AND CRITICAL URBAN FREIGHT CORRIDORS

CRFCs are public roads not in an urbanized area that provide access and connection to the PHFS and the interstate with other important ports, public transportation facilities, or other intermodal freight facilities. Nationwide, 4,412 centerline miles are designated as CRFCs.

CUFCs are public roads in urbanized areas that provide access and connection to the PHFS and the interstate with other ports, public transportation facilities, or other intermodal transportation facilities. Nationwide, 2,213 centerline miles are designated as CUFCs.

By designating these important corridors, states can strategically direct resources toward improved system performance and efficient movement of freight on the NHFN. The designation of CRFCs and CUFCs will increase the state's NHFN, allowing expanded use of FAST Act NHFP formula funds for eligible projects that support national goals.

United States Code (U.S.C.) Title 23, Section 167(f), states that for an urbanized area with a population of less than 500,000 people, the state, in consultation with the metropolitan planning organization (MPO), may designate a CUFC. A CRFC may be designated if it meets one or more of the following seven elements:

- *Is a rural principal arterial roadway and has a minimum of 25% of the annual average daily traffic (AADT) of the road measured in passenger vehicle equivalent units from trucks (FHWA vehicle classes 8 to 13);*
- *Provides access to energy exploration, development, installation, or production areas;*
- *Connects the PHFS or the Interstate System to facilities that handle more than:*
 - *50,000 20-foot equivalent units per year, or*
 - *500,000 tons per year of bulk commodities;*
- *Provides access to:*
 - *a grain elevator,*
 - *an agricultural facility,*
 - *a mining facility,*
 - *a forestry facility, or*
 - *an intermodal facility;*
- *Connects to an international port of entry;*
- *Provides access to significant air, rail, water, or other freight facilities in the State; or*
- *Is determined by the State to be vital to improving the efficient movement of freight of importance to the economy of the state.*³

CUFCs must be in an urbanized area with a minimum population of 50,000 and must fall within the urbanized areas. The following criteria for designating CUFCs are identified in 23 U.S.C. 167(f)(3). The urban roads must meet one or more of the following four elements:

- *Connects an intermodal facility to:*
 - *the PHFS,*
 - *the Interstate System, or*
 - *an intermodal freight facility;*

³ <https://www.law.cornell.edu/uscode/text/23/167>

- *Is located within a corridor of a route on the primary highway freight system and provides an alternative highway option important to goods movement;*
- *Serves a major freight generator, logistic center, or manufacturing and warehouse industrial land; or*
- *Is important to the movement of freight within the region, as determined by the metropolitan planning organization or the State.*⁴

CRFCs and CUFCs are designated by each state and must be certified to the North Dakota FHWA Division Administrator that the designated corridor meets applicable requirements. North Dakota may designate up to 600 miles of highway as a CRFC and 150 miles of highway as a CUFC.

LARGE TRUCK NETWORK AND TRUCK ROUTING

STATE DESIGNATIONS

Freight mobility is subject to regulations related to the size, weight, height, and type of commodity being shipped. Trucks over a certain size are limited or prohibited on some highway routes due to bridge capacity limitations and roadway constraints. NDDOT has identified routes where truck length restrictions might apply, and these include:

- Highways where vehicle combinations may not exceed 75 feet in overall length
- Highways that can accommodate trucks exceeding 75 feet but not exceeding 95 feet in overall length
- Designated highways where vehicle combinations can exceed 75 feet but not 110 feet
- The national network where cargo-carrying length must not exceed 100 feet on a semitrailer and trailer

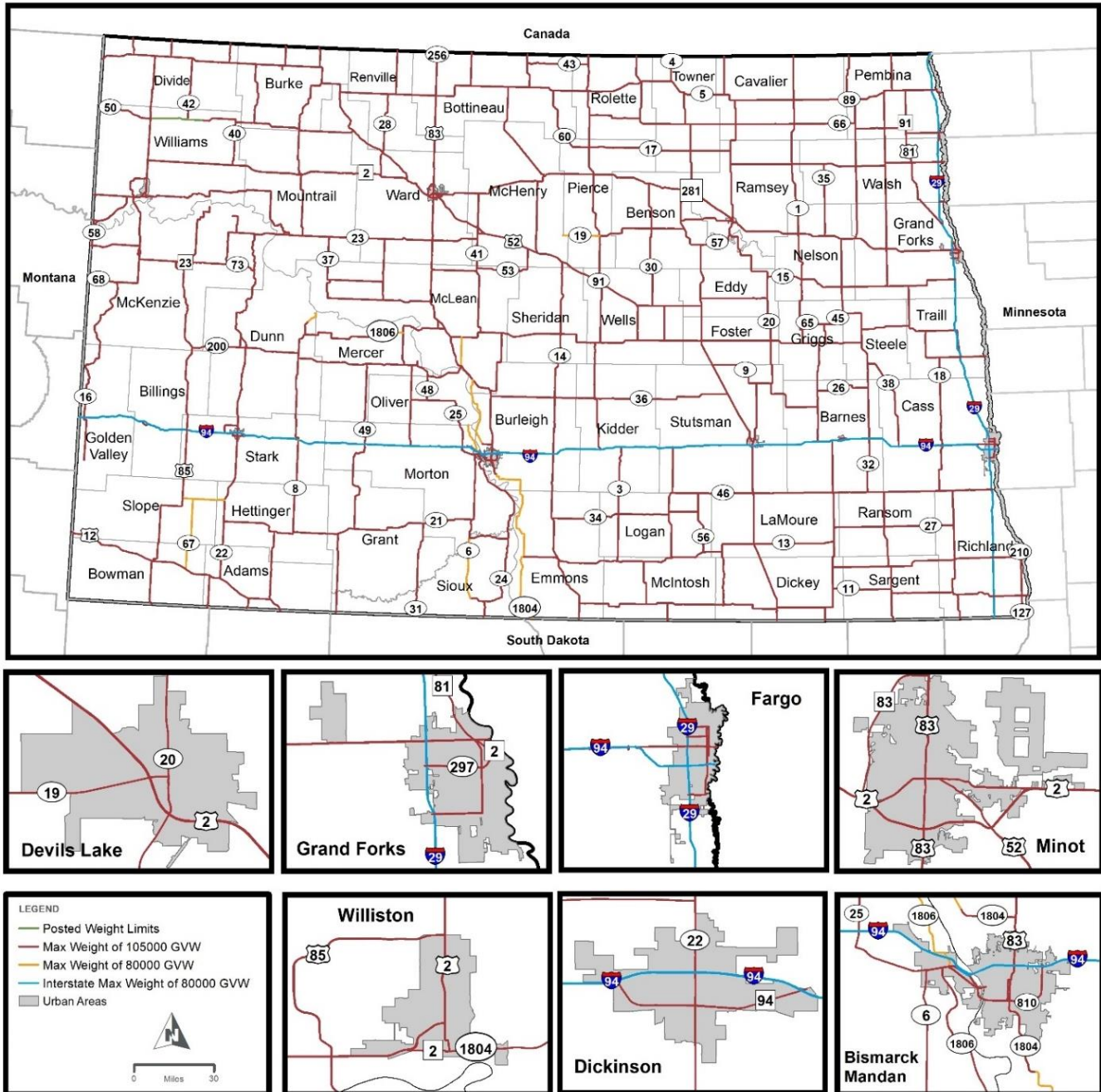
Generally, the maximum gross vehicle weight (GVW) for trucks on North Dakota highways is 105,500 pounds. Some state highways, however, have a GVW limit of 80,000 pounds, as do interstate routes. A permit can be acquired to travel with vehicles exceeding 105,500 pounds up to 250,000 pounds on approved routes. The weight restrictions for vehicles carrying non-divisible loads on state highways are shown in Figure 2-4. Approved routes for vehicles carrying non-divisible loads, up to a GVW of 250,000 pounds, are shown in Figure 2-5. Note that Figure 2-5 is subject to change.

LOCAL DESIGNATIONS

Several municipalities have also designated truck routes within their jurisdiction. These truck route designations vary across the state, but largely exist to restrict trucks to certain highways in urban areas. For example, in Dickinson, trucks are excluded from 3rd Ave W, while the City of West Fargo identifies both routes for truck travel and non-trucking routes. Trucks over 10,000 pounds operating in Bismarck must use designated truck or delivery routes but can still make deliveries to locations not on a designated route by travelling on the shortest undesignated truck route possible. Other cities with designated truck routes include Fargo, Grand Forks, and Devils Lake.

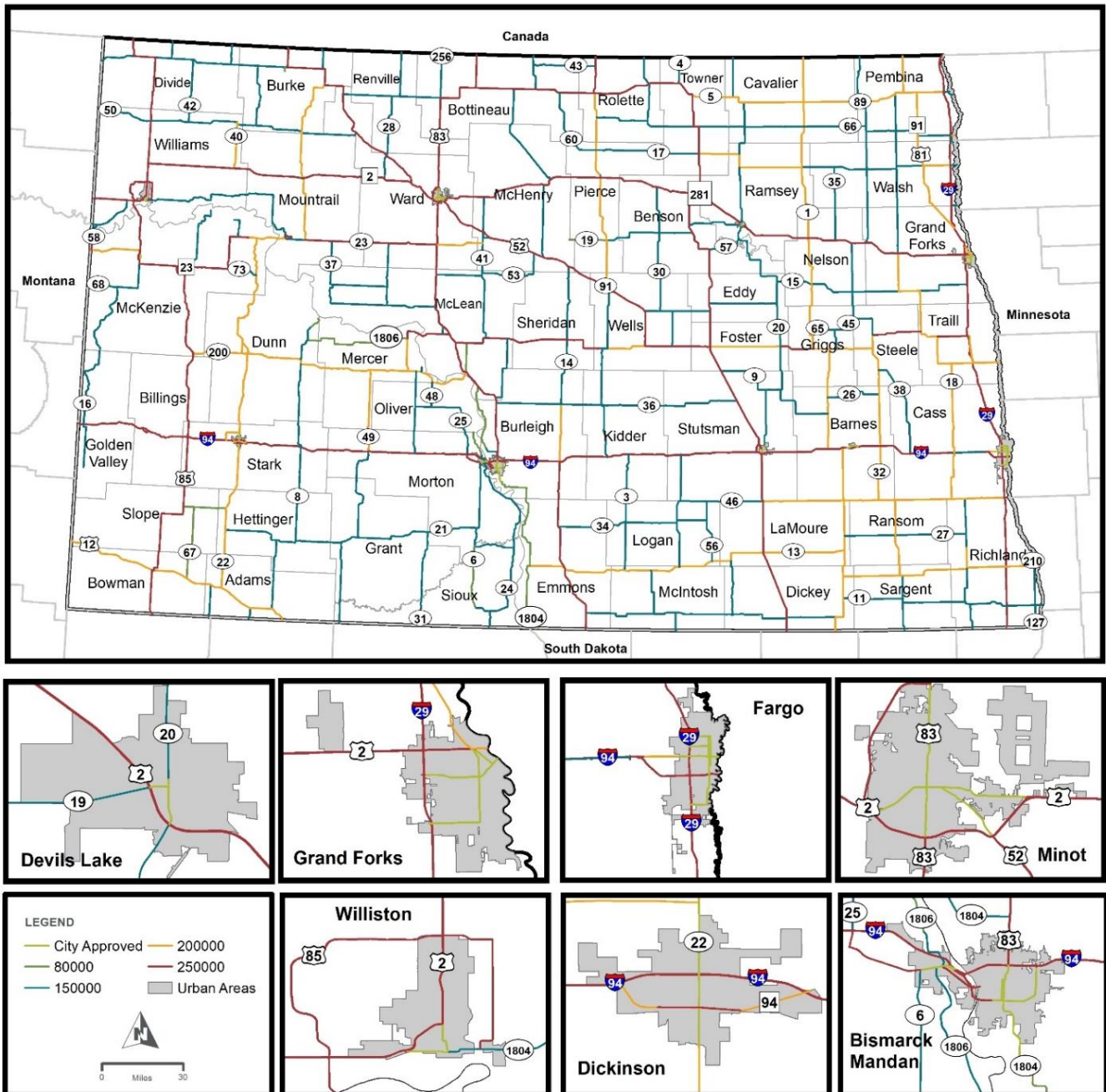
⁴ <https://www.law.cornell.edu/uscode/text/23/167>

Figure 2-4: Weight Restrictions



Source: NDDOT Data

Figure 2-5: Permitted Weight Limits



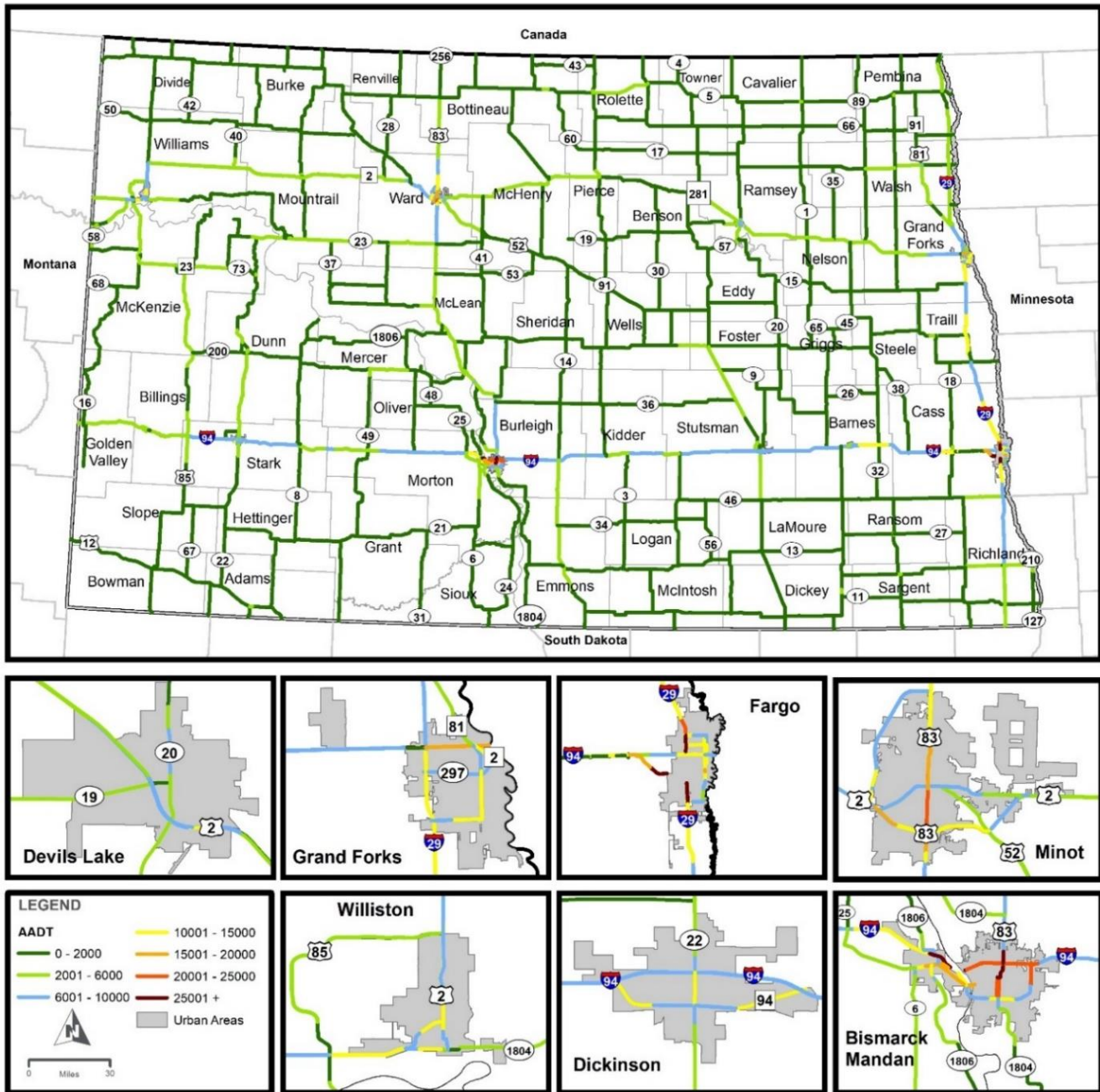
Source: NDDOT Data

ANNUAL AVERAGE DAILY TRUCK TRAFFIC

A corridor having a high truck volume is one of the criteria that designates a Level One freight corridor. For this freight plan, high truck volumes are differentiated into two subcategories: corridors with a truck percentage exceeding 25% and corridors with a truck annual average daily traffic (TAADT) volume exceeding 500 vehicles. In addition to analyzing the TAADT, it is crucial to analyze the existing annual average daily traffic (AADT) of North Dakota’s roads to understand the full picture of the highway system capacity and its traffic conditions.

Figure 2-6 shows the AADT for corridors in North Dakota. Traffic counts are taken each year covering one-third of the state. AADT encompasses both passenger vehicle and truck freight volumes on highways. This is important to highlight since overall AADT volumes affect truck travel, and locations with high volumes could be highly affected by a delay-causing event or traffic congestion. Overall, AADT volumes on corridors average about 6,400 vehicles. A segment of I-29 in Fargo carries the highest volume of daily traffic at about 70,000 vehicles in both directions. Corridors in other metropolitan cities also carry large traffic volumes. I-94 in the metropolitan area of Bismarck between mile markers 155 and 158 carries about 39,000 vehicles.

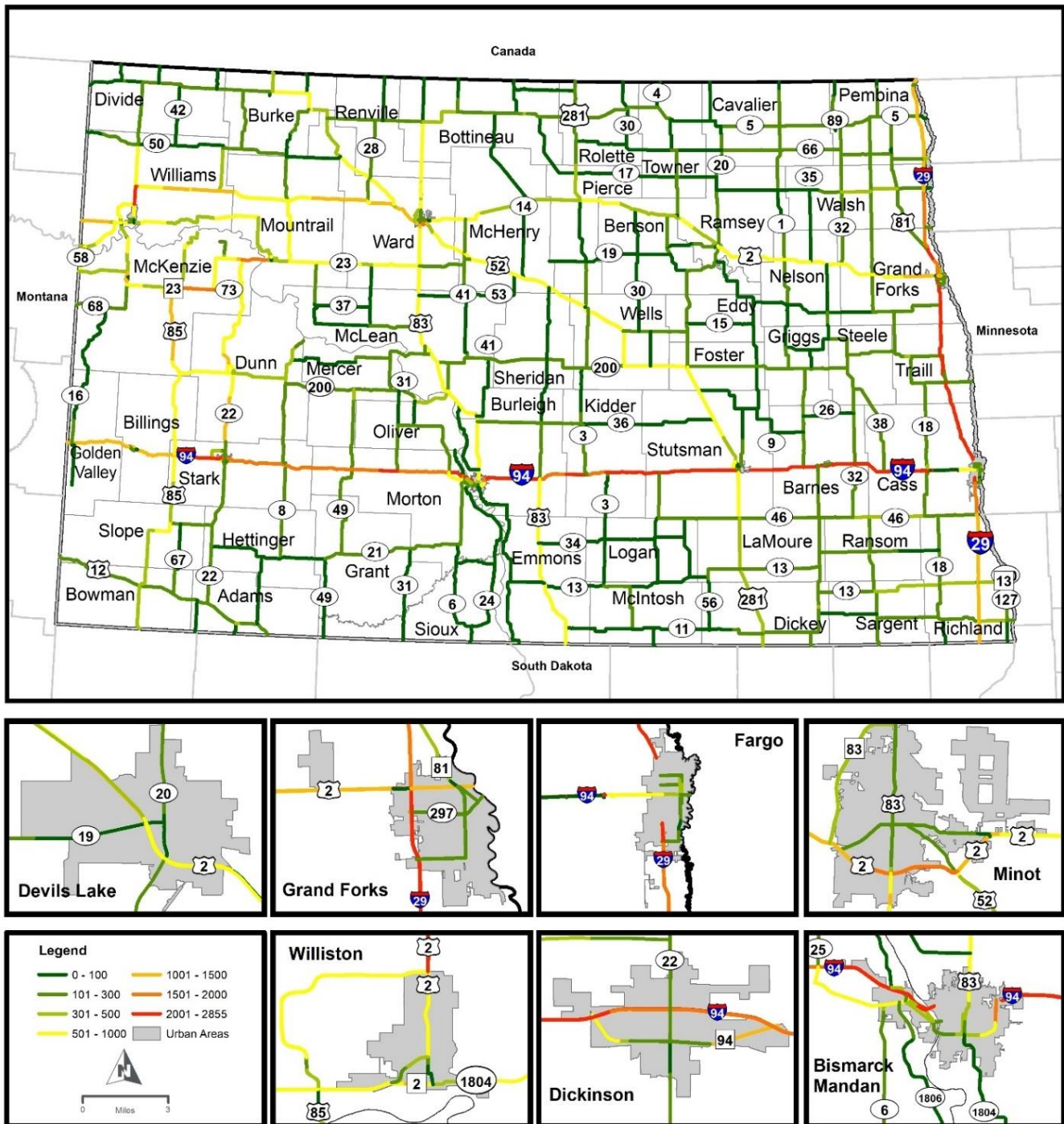
Figure 2-6: North Dakota Corridors AADT (2019)



Source: NDDOT Data

Figure 2-7 shows the TAADT on North Dakota corridors. Truck traffic in North Dakota is quite high compared to total traffic, particularly on I-29, which is a major truck route connecting Canada and local commodity generators with the central region of the U.S. Emphasizing locations with high truck volumes is imperative from a maintenance and investment perspective because high truck volume corridors receive more wear and tear on pavements and structures. TAADT on I-29 reaches up to 6,000 vehicles on a segment in Fargo, which is the highest TAADT on North Dakota highways. I-94 is the other corridor that has a high TAADT volume, going as high as about 5,500 trucks also by Fargo.

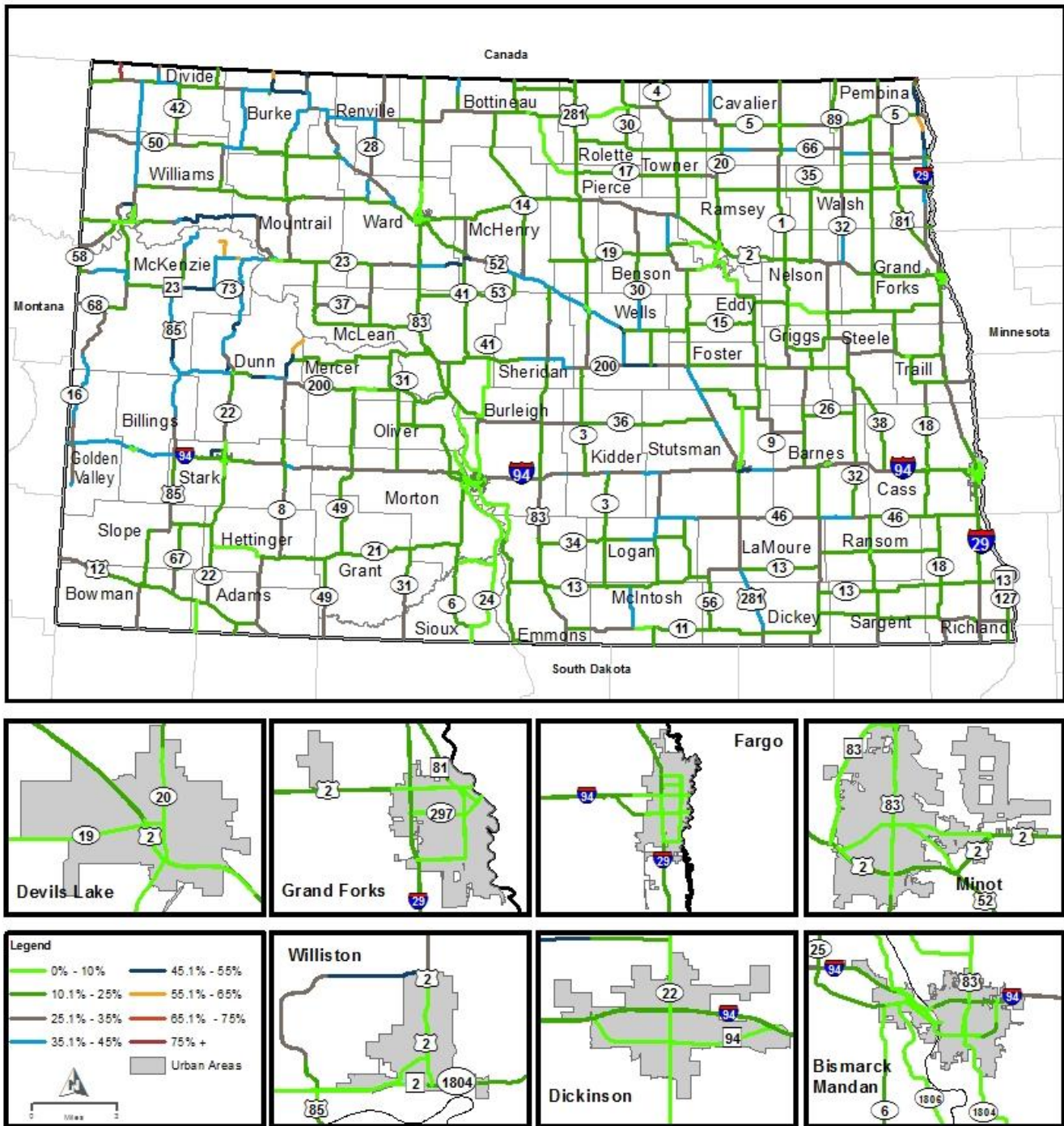
Figure 2-7: Truck Average Annual Daily Traffic (TTADT) (2019)



Source: NDDOT

The segment of I-29 by the Pembina-Emerson border crossing into Canada had the highest truck percentage on North Dakota corridors—up to 80% with a truck volume larger than 500 vehicles. The average North Dakota highway experienced about 19% trucks, whereas interstate highways had about 23% trucks. I-29, the corridor with the highest truck volumes, averages about 26% trucks. This is shown in Figure 2-8.

Figure 2-8: Truck Percentage of AADT (2019)



Source: NDDOT

As previously mentioned, corridors designated as having a high truck volume (a truck percentage of 25% or greater and volumes of trucks greater than 500 vehicles) were a factor in determining corridors that were designated as a Level One freight corridor. The 500 vehicles and/or 25% threshold was determined by NDDOT as a threshold where high volumes of traffic significantly affected roadway condition, congestion, and year-round maintenance.

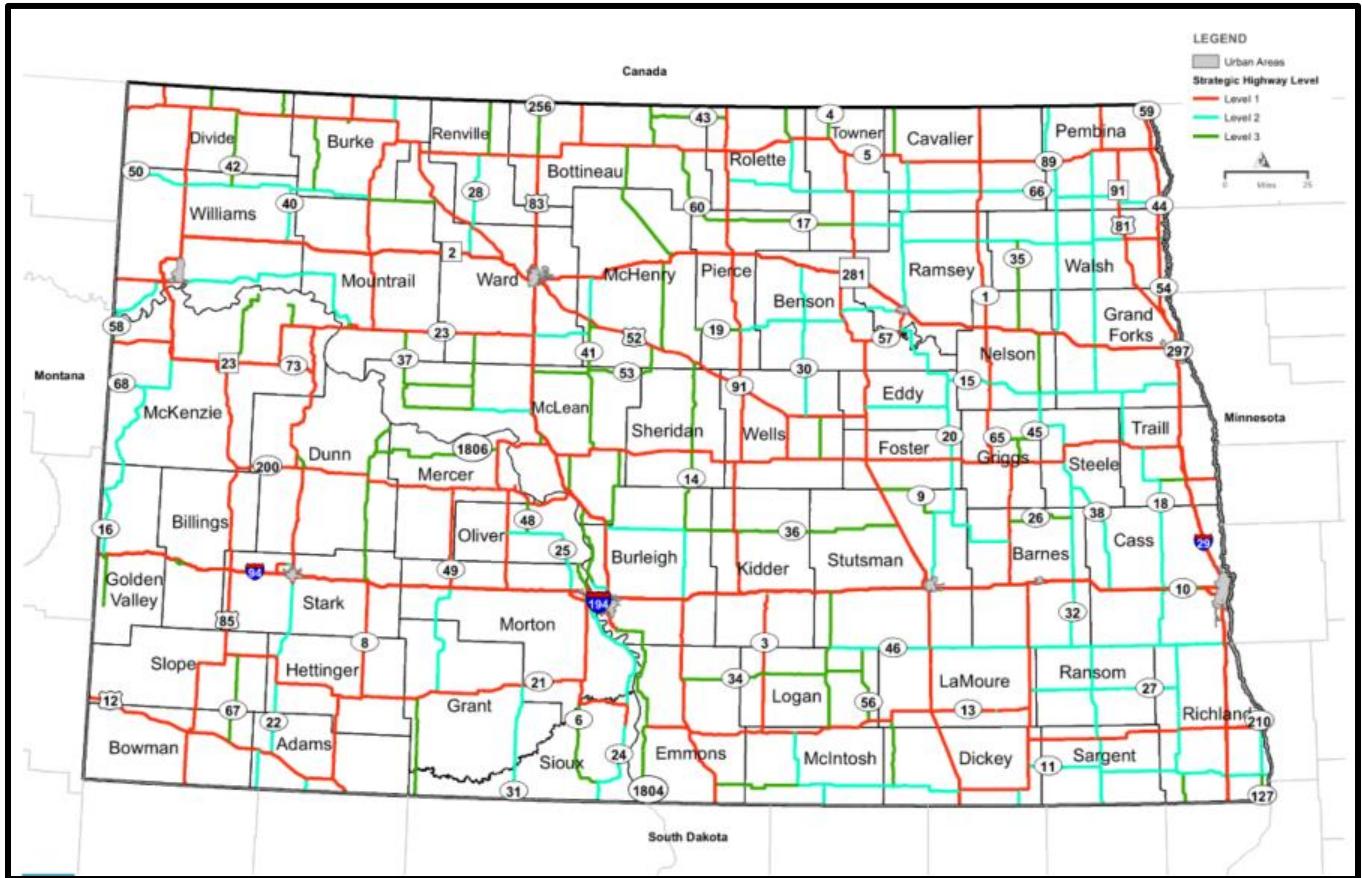
NORTH DAKOTA STRATEGIC FREIGHT SYSTEM CORRIDORS

To facilitate public discussion regarding the designation of a Strategic Freight System (SFS), NDDOT developed an index, called the North Dakota Strategic Freight System Index, consisting of three levels. The index classified freight transportation infrastructure necessary to sustaining the state’s economic growth and competitiveness relative to International/Interstate, Regional/Intrastate, and Local movements of freight. The designated Level One Freight Corridors are determined to be the most critical freight corridors. Level One Freight Corridors are listed in Table 2-4: Strategic Freight System Level One Corridors. The Level One, Two and Three corridors are shown in Figure 2-9 with the mileage associated with each level.

Table 2-4: Strategic Freight System Level One Corridors

Interstates and U.S. Highways	State Highways	
<ul style="list-style-type: none"> I-29 Milepost (MP) 0-MP 218 	<ul style="list-style-type: none"> ND-1 MP 5-MP 71, MP 114-MP 120 	<ul style="list-style-type: none"> ND-23 MP 0-MP 104
<ul style="list-style-type: none"> I-94 MP 0-MP 352 	<ul style="list-style-type: none"> ND-3 MP 134-MP 136, MP 201-MP 234 	<ul style="list-style-type: none"> ND-31 MP 78-MP 112
<ul style="list-style-type: none"> US-2 MP 0-MP 356 	<ul style="list-style-type: none"> ND-5 MP 0-MP 12, MP 20-MP 70, MP 100-MP 136, MP 317-336 	<ul style="list-style-type: none"> ND-32 MP 20-MP 21, MP 112-MP 118
<ul style="list-style-type: none"> US-12 MP 0-MP 88 	<ul style="list-style-type: none"> ND-8 MP 132-MP 196 	<ul style="list-style-type: none"> ND-73 MP 0-MP 11
<ul style="list-style-type: none"> US-52 MP 0-MP 252 	<ul style="list-style-type: none"> ND-10 B MP 933-940 	<ul style="list-style-type: none"> ND-200 MP 0-MP 18, MP 75-MP 415
<ul style="list-style-type: none"> US-81 MP 163-228 	<ul style="list-style-type: none"> ND-11 MP 78-MP 96 	<ul style="list-style-type: none"> ND-294 MP 0-MP 3
<ul style="list-style-type: none"> US-83 MP 0-MP 8, MP 15-MP 199, MP 207-MP 260 	<ul style="list-style-type: none"> ND-13 MP 318-390 	<ul style="list-style-type: none"> ND-810 MP 0-MP 2
<ul style="list-style-type: none"> US-85 MP 0-MP 255 	<ul style="list-style-type: none"> ND-18 MP 122-MP 129, MP 228-MP 242 	<ul style="list-style-type: none"> ND-1804 MP 69-MP 80
<ul style="list-style-type: none"> US-281 MP 0-MP 267 	<ul style="list-style-type: none"> ND-22 MP 66-MP 156 	

Figure 2-9: Strategic Freight System Highway Classification and Corridor Miles



Level One: 4,218.3 Corridor Miles
Level Two: 2,860.1 Corridor Miles
Level Three: 1,518.6 Corridor Miles

Source: NDDOT

BORDER CROSSINGS

There are 18 highway border crossings on the 310-mile North Dakota–Canada border. In 2020, these border crossings accommodated 7% of the total truck moves inbound to the U.S. along the U.S.–Canada border (excluding Alaska). The Pembina crossing alone handled 4% of the inbound trucks and was the sixth-busiest crossing on the U.S.–Canada border in 2020. Other significant border crossings include Portal (the 13th-busiest) and Dunseith (21st-busiest). Table 2-5 identifies truck volumes for these 18 border crossings.

Table 2-5: North Dakota–Canada Border Crossing Truck Volumes⁵

Border Crossing	Trucks Crossing into U.S.			Trucks Crossing into Canada			Total Truck Volumes		
	2018	2019	2020	2018	2019	2020	2018	2019	2020
Fortuna-Oungre	4,150	4,053	2,695	6,773	6,743	2,967	10,923	10,796	5,662
Ambrose-Torquay	231	5	7	105	123	225	336	128	232
Noonan-Estevan	2,671	3,305	3,332	2,683	2,803	2,356	5,354	6,108	5,688
Portal-North Portal	89,912	81,371	80,101	121,654	110,832	103,300	211,566	192,203	183,401
Northgate-Northgate	12,739	10,718	8,041	5,859	5,061	4,657	18,598	15,779	12,698
Sherwood-Carievale	5,522	5,806	4,997	5,618	5,140	4,165	11,140	10,946	9,162
Antler-Lyleton	2,895	1,856	1,656	616	419	347	3,511	2,275	2,003
Westhope-Coulter	8,862	8,362	4,226	10,413	7,444	3,481	19,275	15,806	7,707
Carbury-Goodlands	2,153	1,817	1,057	2,008	2,051	992	4,161	3,868	2,049
Dunseith-Boissevain	27,481	24,515	25,788	21,850	20,509	19,214	49,331	45,024	45,002
St John-Lena	946	984	381	334	457	136	1,280	1,441	517
Hansboro-Cartwright	186	169	278	367	258	237	553	427	515
Sarles-Crystal City	731	472	382	658	503	531	1,389	975	913
Hannah-Snowflake	72	116	61	84	32	15	156	148	76
Maida-Windygates	1,700	849	667	1,772	783	950	3,472	1,632	1,617
Walhalla-Winkler	8,191	8,873	7,095	7,541	6,650	5,051	15,732	15,523	12,146
Neche-Gretna	8,238	7,835	6,228	7,752	8,359	6,657	15,990	16,194	12,885
Pembina-Emerson	223,081	219,927	217,992	208,823	211,124	206,563	431,904	431,051	424,555
Total	399,761	381,033	364,984	404,910	389,291	361,844	804,671	770,324	726,828

Source: Bureau of Transportation Statistics (BTS) and Statistics Canada

Table 2-6 identifies U.S. border facility opening times and the presence of U.S. agricultural and veterinary services and freight-related services at the Canadian border crossings. The three border crossings open 24 hours per day are the most heavily used crossings for trucks. Two border crossings, Portal/North Portal and Pembina/Emerson, have the highest truck volumes on the North Dakota border and host specific services for the clearance and processing of trucks and commercial shipments. One example of specific commercial services is the designation of a Canadian port of entry that provides 24-hour service, 7 days a week, for the reporting and clearing of commercial goods as a Designated Commercial Facility. The decision as to which border crossing is used by the U.S. and Canadian trucking community depends on a combination of factors including the locations of border crossings along trade routes, highway access, and the services and facilities related to freight movement that are available at each border crossing.

⁵ The overall volume of trucks crossing the US-Canadian border in 2020 was impacted by the COVID-19 pandemic, and some Ports of Entry operated with reduced hours and at reduced capacity. However, the border remained opened for the movement of goods.

Table 2-6: Border Crossing Opening Times and Facilities

		U.S. Border Crossings Opening Hours									Canadian Border Services		
U.S. Border Crossing	Canadian Border Crossing	24 Hours	08:00–16:00	09:00–17:00	09:00–19:00	09:00–22:00	11:00–19:00	08:00–22:00	08:00–21:00	U.S. Agricultural and Veterinary	Canadian EXPORT Facility	Designated Commercial Facility	Courier Low Value Shipments
Fortuna	Oungre					X							
Ambrose	Torquay			X									
Noonan	Estevan					X							
Portal	North Portal	X								X	X	X	X
Northgate	Northgate					X							
Sherwood	Carievale					X							
Antler	Lyleton			X							X		
Westhope	Coulter								X		X		
Carbury	Goodlands				X						X		
Dunseith	Boissevain	X								X	X		
St John	Lena								X		X		
Hansboro	Cartwright		X								X		
Sarles	Crystal City						X				X		
Hannah	Snowflake			X							X		
Maida	Windygates					X					X		
Walhalla	Winkler							X			X		
Neché	Gretna							X			X		
Pembina	Emerson	X								X	X	X	X

Source: U.S. Customs and Border Protection and Canada Border Services Agency

Table 2-7 lists the designation of border crossings associated with the North Dakota strategic freight system index.

Table 2-7: Strategic Freight System Border Crossing Designations

Level One	Level Two	Level Three
<ul style="list-style-type: none"> • Portal/North Portal • Dunseith/Boissevain • Pembina/Emerson 	<ul style="list-style-type: none"> • Fortuna/Oungre • Noonan/Estevan • Northgate/Northgate • Sherwood/Carievale • Westhope/Coulter • Walhalla/Winkler • Neche/Gretna 	<ul style="list-style-type: none"> • Ambrose/Torquay • Antler/Lyleton • Carbury/Goodlands • St John/Lena • Hansboro/Cartwright • Sarles/Crystal City • Hannah/Snowflake • Maida/Windygates

RAILROADS

North Dakota is served by two Class I freight railroads, BNSF Railway (BNSF) and Canadian Pacific Railway (CP Rail), and four regional and short line railroads—Dakota, Missouri Valley & Western Railroad (DMVW), Red River Valley & Western Railroad (RRVW), Dakota Northern Railroad (DNR), and Northern Plains Railroad (NPR). Figure 2-10 shows the North Dakota rail system.

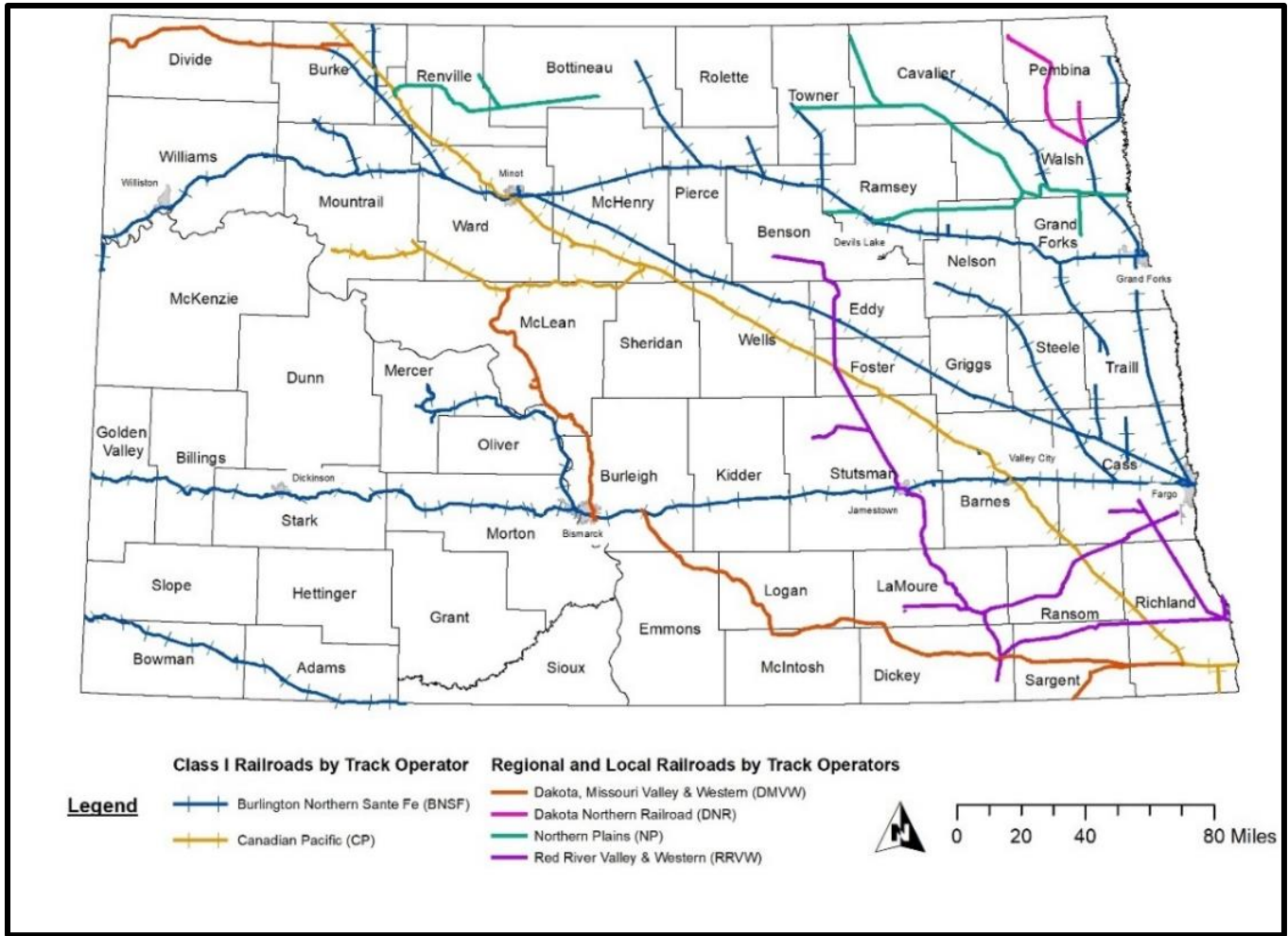
The North Dakota rail network comprises 3,481 route miles summarized by railroad in Table 2-8. The two Class I railroads account for 2,054 miles, 63% of the state’s rail system. BNSF, CP Rail, RRVW, and DMVW also have agreements to operate over selected segments of each other railroads’ lines, extending their systems beyond the lines they own, amounting collectively to an additional 199 miles.

Table 2-8: North Dakota Rail Mileage

Railroad	Miles Owned/Leased	Trackage Rights Miles	Total Miles Operated
BNSF	1,552	80	1,632
CP Rail	501	29	530
RRVW	491	87	578
DMVW	375	14	389
NPR	304	0	304
DNR	48	0	48
Total	3,271	210	3,481

Source: 2019 Railroad Annual Reports submitted to North Dakota PSC; NPR from railroad directly

Figure 2-10: North Dakota Rail System



Source: Data from railroads

CLASS I RAILROADS

BNSF

BNSF is one of the largest railroads in the U.S., with 32,500 route-miles, shown in Figure 2-11. It serves markets in 28 states, principally west of the Mississippi River, and three Canadian provinces. BNSF provides an international gateway with direct access to the Pacific Northwest Ports of Seattle and Tacoma, the Port of Oakland, and the southern California Ports of Long Beach and Los Angeles.

Figure 2-11: BNSF Network



Source: BNSF

BNSF NORTH DAKOTA PROFILE

BNSF operates the most rail miles in North Dakota with a network of 1,632 miles comprising 1,552 miles that it owns and an additional 80 miles it operates over other railroads. BNSF serves the Bakken region, the state’s agricultural areas, and all the major population centers. BNSF’s access to the Pacific Northwest and other West Coast ports provides an international gateway for North Dakota’s exports to Asia. Its connections to the Gulf of Mexico ports link North Dakota to Latin American markets. The railroad’s presence in Texas and other oil-refining states provides an outlet for North Dakota’s oil reserves as an alternative to pipelines.

BNSF NORTH DAKOTA NETWORK

The BNSF North Dakota network consists of two operating divisions and their respective operating subdivisions.

TWIN CITIES DIVISION

The Twin Cities Division centers around the three BNSF main lines in the eastern part of the state. Two main lines connect at the Minnesota border and Minot, one entering North Dakota at Grand Forks and the second crossing the state border in Fargo. The line through Grand Forks provides a link to Duluth; the line through Fargo, part of BNSF’s Northern Transcontinental Corridor (Northern Transcon), between the Pacific Northwest and Chicago, provides a connection to the Twin Cities. The third main line proceeds from Fargo through Bismarck.

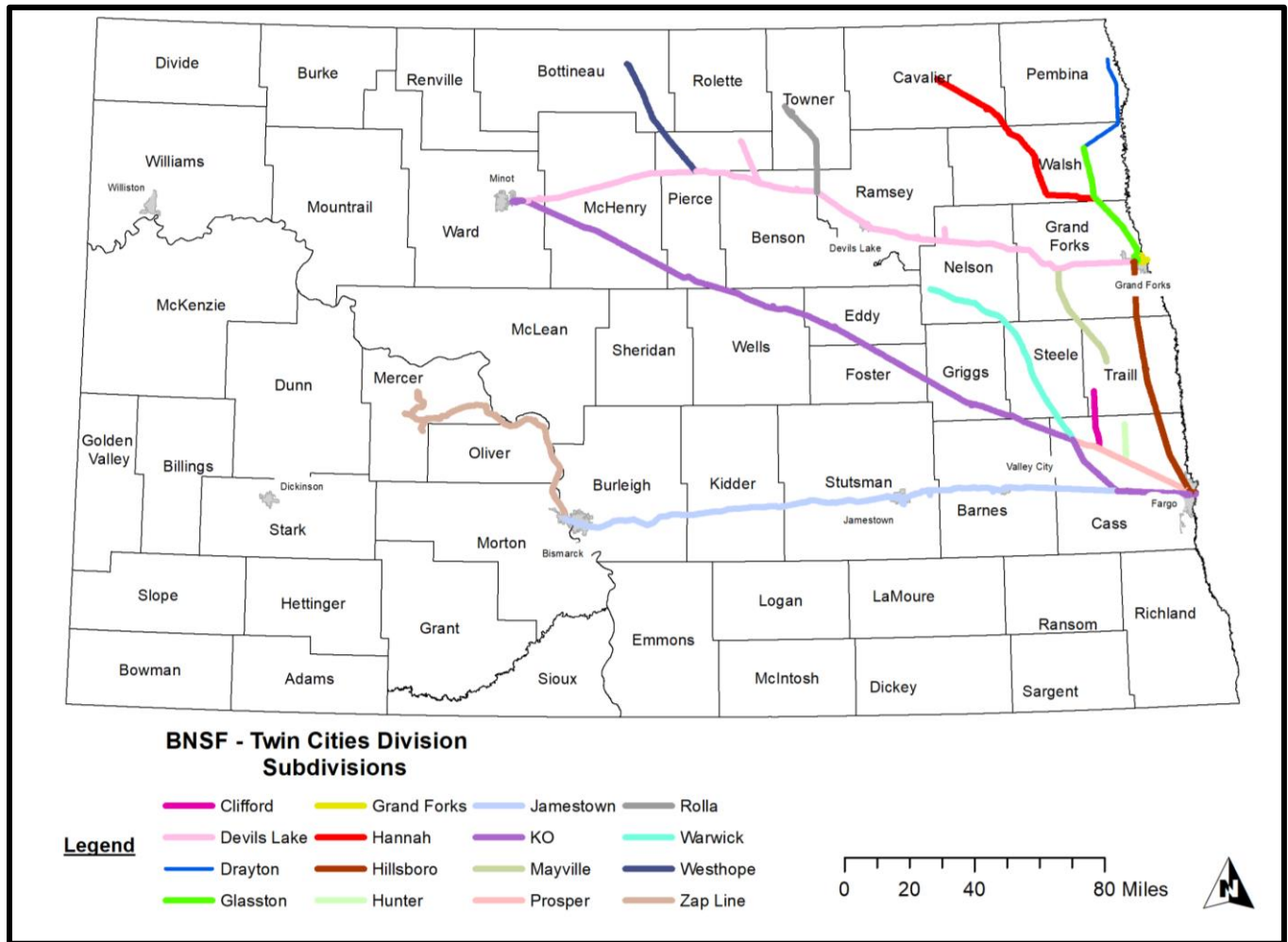
The Twin Cities Division in North Dakota comprises 16 operating subdivisions (Figure 2-12). Maximum train speeds on the main line subdivisions are 50 to 60 mph for freight trains and 70 to 79 mph for passenger trains. Mainline passing sidings range from 6,500 to 11,000 feet. Table 2-9 lists the Twin Cities subdivisions.

Table 2-9: BNSF Twin Cities Division

Subdivision	Type	Subdivision	Type
Devils Lake	Main line	Glasston	Branch line
Grand Forks	Main line	Hannah	Branch line
Hillsboro	Main line	Hunter	Branch line

Subdivision	Type	Subdivision	Type
Jamestown	Main line	Mayville	Branch line
KO	Main line	Rolla	Branch line
Prosper	Main line	Warwick	Branch line
Clifford	Branch line	West Hope	Branch line
Drayton	Branch line	Zap	Branch line

Figure 2-12: BNSF Twin Cities Division Subdivisions



MONTANA DIVISION

The BNSF Montana Division covers western North Dakota. The main line of the Montana Division begins in Minot, North Dakota, and passes through Stanley and Williston before it crosses the Montana border at Fort Union, Montana. The Montana Division is part of BNSF’s Northern Transcon route through North Dakota.

The Montana Division in North Dakota comprises seven subdivisions as shown in Figure 2-13 and Table 2-10. The main line comprises two subdivisions: the Dickinson and Glasgow Subdivisions. Freight trains are permitted to operate at a maximum of 60 mph on the main line; however, the Dickinson Subdivision has a restriction of 50 mph for cars with loads exceeding 100 tons. Mainline passing sidings range between 6,500 feet and more than 15,000 feet, permitting the operation of long trains.

Figure 2-13: BNSF Montana Division Subdivisions

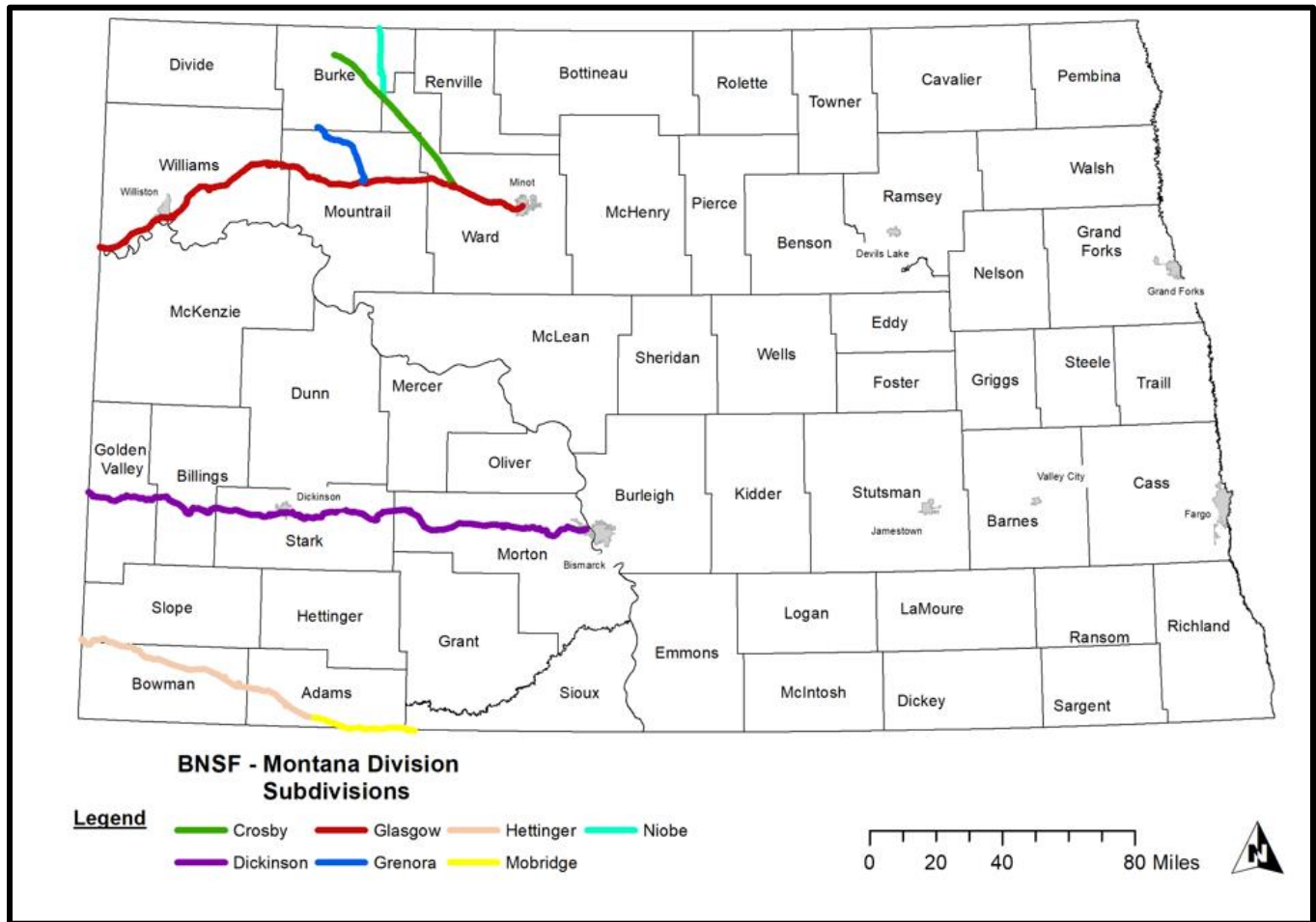


Table 2-10: BNSF Montana Division

Subdivision	Distance (Miles)	Type
Dickinson	175.0	Main line
Glasgow	145.0	Main line
Hettinger	76.0	Main line
Crosby	47.0	Branch line
Grenora	26.0	Branch line
Mobridge	15.0	Branch line
Niobe	23.0	Branch line

BNSF CLASSIFICATION YARDS

BNSF operates five major yards in North Dakota:

- Dickinson
- Minot (Gavin Yard)
- Grand Forks
- Mandan
- Williston

BNSF TRAIN OPERATIONS

The BNSF Northern Transcon passes through North Dakota, transporting containers and general merchandise between the Midwest and the Pacific Northwest. In addition to the through trains, a significant number of trains also serve rail users in the state. Table 2-11 summarizes the BNSF train services serving North Dakota. The train types in this document are defined as:

- **Unit Train:** Trains operating directly between origin and destination transporting a single commodity
- **Intermodal Stack Train:** Unit trains transporting two tiers of containers
- **Manifest Train:** Trains serving multiple locations with a mix of freight car types

The trains operate as needed when traffic volumes warrant. The number of train services are unique origins and destinations.

Table 2-11: North Dakota BNSF Train Operations

Train Type	Direction	Number of Train Services	Representative Origins	Representative Destinations
Unit Grain Train: Loaded	Westbound	33	<ul style="list-style-type: none"> • Mandan, ND • Minot, ND • Various ND elevators 	<ul style="list-style-type: none"> • Interbay, WA • Tacoma, WA • Various
Unit Grain Train: Loaded	Eastbound	3	<ul style="list-style-type: none"> • Various ND 	<ul style="list-style-type: none"> • Superior, WI
Intermodal Stack Train: (Unguaranteed Service)	Westbound	2	<ul style="list-style-type: none"> • Elwood Logistics Park, IL 	<ul style="list-style-type: none"> • Seattle and Tacoma, WA (serves Minot, ND)
Unit Loaded Train: Crude	Westbound	13	<ul style="list-style-type: none"> • Various ND 	<ul style="list-style-type: none"> • Fidalgo, WA • Ferndale, WA
Unit Crude Oil Train: Loaded	Eastbound	7	<ul style="list-style-type: none"> • Various 	<ul style="list-style-type: none"> • New Orleans, LA • Chicago, IL (interchange CSX, NS)
Unit Crude Oil Train: Empty	Eastbound and westbound	19	<ul style="list-style-type: none"> • Fidalgo, WA • Ferndale, WA 	<ul style="list-style-type: none"> • Various ND

Train Type	Direction	Number of Train Services	Representative Origins	Representative Destinations
High Priority Manifest Train: Non-containerized Mixed Freight)	Outbound	6	<ul style="list-style-type: none"> Minot, ND Grand Forks, ND Fargo, ND 	<ul style="list-style-type: none"> Lincoln, NE Chicago, IL Minneapolis, MN Superior, WI
High Priority Manifest Train (Non-containerized Mixed Freight)	Inbound	5	<ul style="list-style-type: none"> Galesburg, IL Havre, MT Lincoln, NE Minneapolis, MN Pasco, WA 	<ul style="list-style-type: none"> Minot, ND Grand Forks, ND Fargo, ND

CSX = CSX Corporation
IL = Illinois
LA = Louisiana

MN = Minnesota
MT = Montana
ND = ND

NE = Nebraska
NS = Norfolk Southern
WA = Washington

Loaded unit grain trains dominate BNSF’s operating mix with 36 unique origin and destination train services, principally moving west and destined for Pacific Northwest ports. A few grain trains move east to the Great Lakes. An equal number of empty trains move through the state. Although their numbers are reduced since the 2013 peak, crude oil trains still account for significant operating activity.

CP RAIL

CP Rail is one of two major Canadian railroads with a system of 14,700 miles of track in six Canadian provinces and 13 U.S. states, shown in Figure 2-14. CP Rail provides North Dakota shippers with access to the Port of Vancouver, the Port of Montreal, and the Ports of New York and New Jersey through trackage rights.

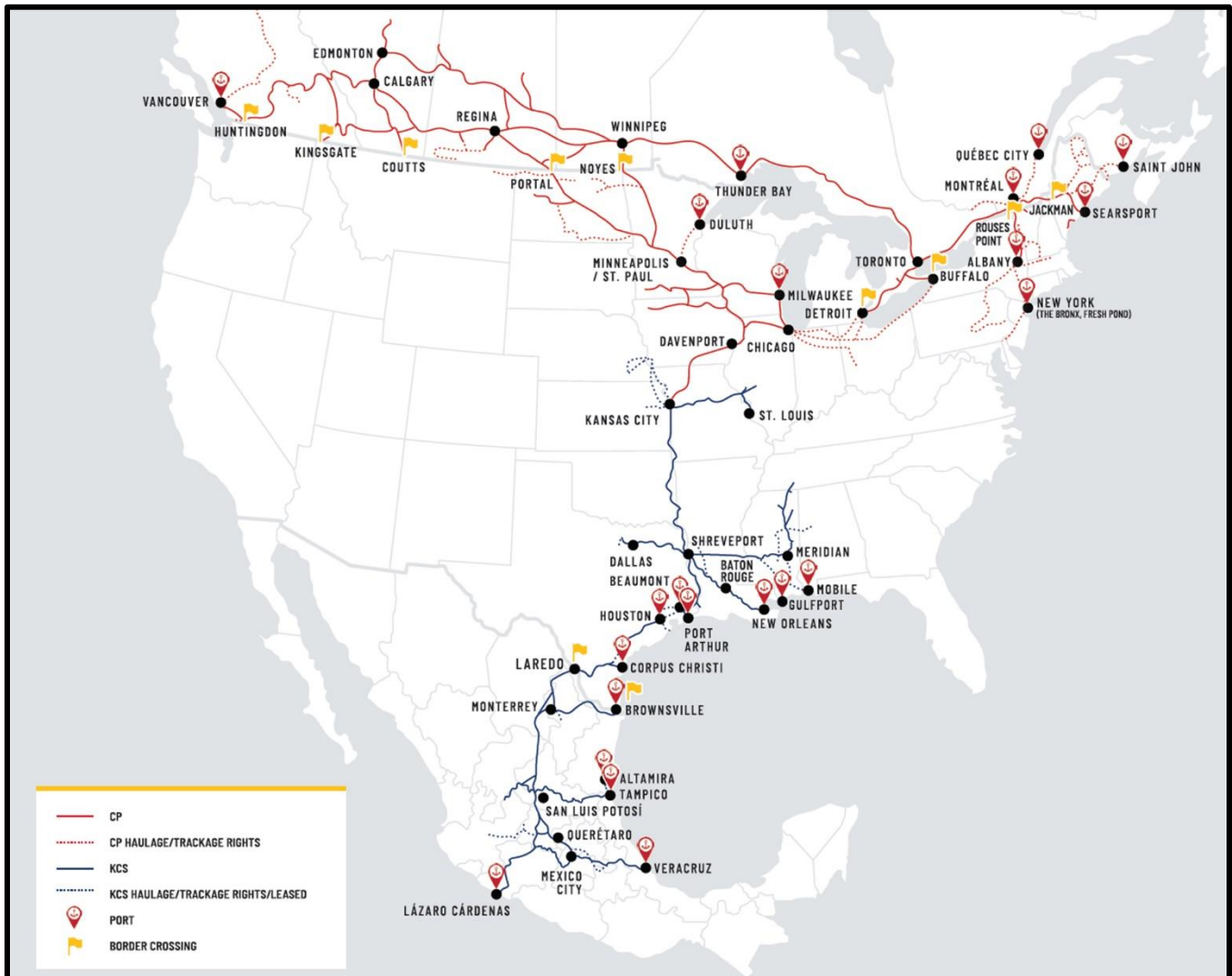
Figure 2-14: Current CP Rail System



Source: CP Rail

CP Rail is currently attempting to expand its network through the acquisition of the Kansas City Southern Railroad (KCS). A successful merger with KCS would provide CP Rail with further expansion into the U.S., including access to the Gulf of Mexico ports. It will also provide CP Rail with direct access to Mexico. If the transaction is approved by the Surface Transportation Board, the merger will result in the first railroad to link Canada, the U.S., and Mexico. Figure 2-15 is a map of the proposed expanded system.

Figure 2-15: CP Proposed Expanded System



CP RAIL NORTH DAKOTA PROFILE

CP Rail operates 530 route-miles in North Dakota. It owns 501 miles and uses 29 miles of other railroads. CP Rail originally operated in North Dakota through its U.S. subsidiary, the Soo Line, which is now fully integrated into the parent company. CP Rail has a single line passing through North Dakota. The line enters the U.S. at Portal, North Dakota, and proceeds southeast across the state. The CP Rail line provides North Dakota shippers with alternative rail access to the Twin Cities and Chicago.

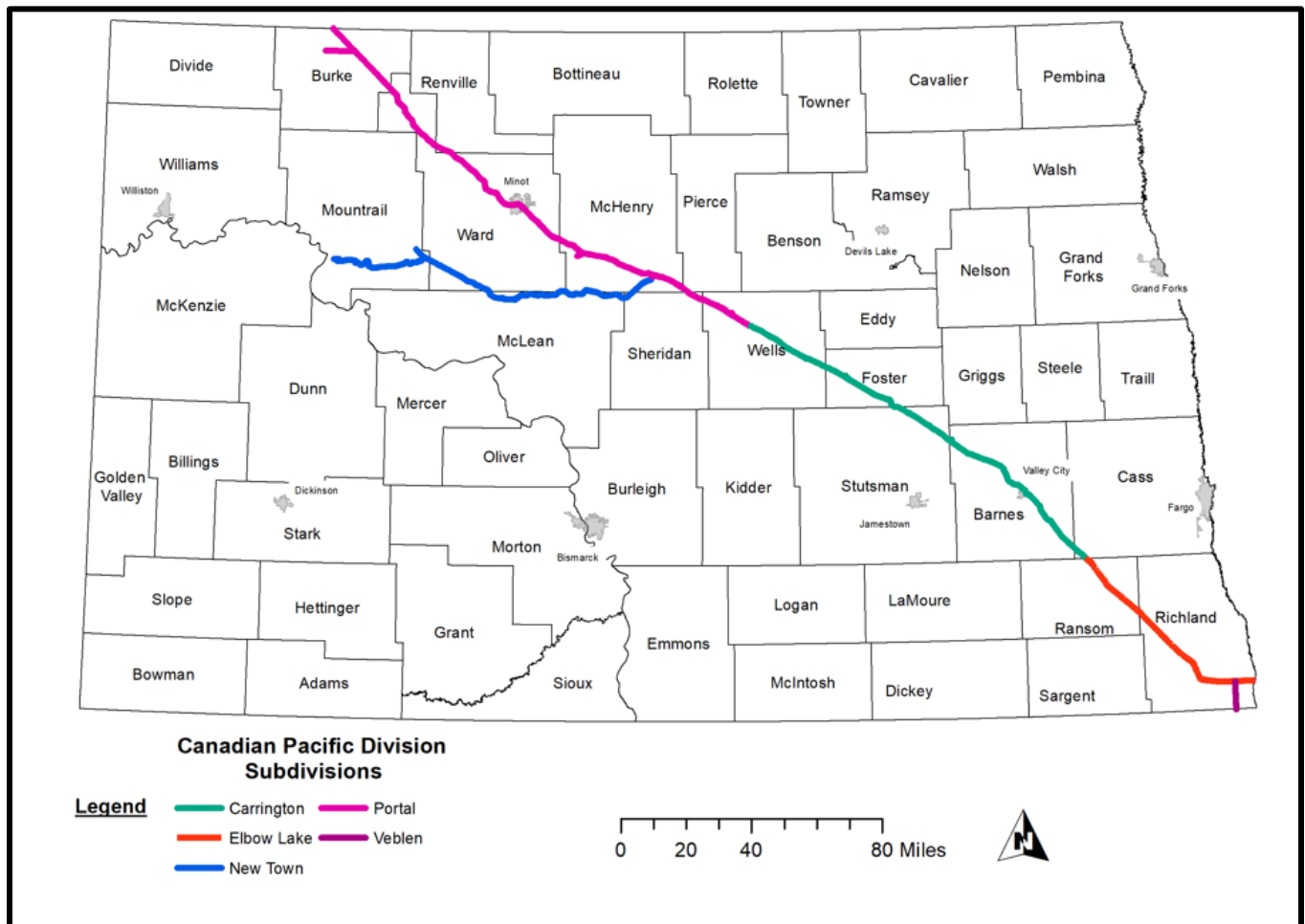
CP RAIL NORTH DAKOTA NETWORK

The CP Rail North Dakota network consists of five subdivisions as listed in Table 2-12 and shown in Figure 2-16.

Table 2-12: CP Rail North Dakota Subdivisions

Subdivision	Length (Miles)	Type
Carrington	112.2	Main line
Elbow Lake	67.0	Main line
Portal	152.5	Main line
New Town	114.7	Branch line
Veblen	18.6	Branch line

Figure 2-16: CP Rail Subdivisions



CP RAIL CLASSIFICATION YARDS

CP Rail has three yards in North Dakota:

- Enderlin

- Minot
- Portal

CP RAIL TRAIN OPERATIONS

Table 2-13 lists the CP Rail train operations in North Dakota. As with BNSF, grain trains predominate. However, CP Rail grain trains principally move eastward destined for CP Rail’s major U.S. transload facility in Bensenville, Illinois, or to the Great Lakes through Superior, Wisconsin; Kansas City, Missouri; and St. Paul, Minnesota.

Table 2-13: North Dakota CP Rail Operations

Train Type	Direction	Number of Train Services	Representative Origins	Representative Destinations
Unit Grain Train: Loaded	Westbound	7	<ul style="list-style-type: none"> • Enderlin, ND • Minot, ND • Portal, ND 	<ul style="list-style-type: none"> • Eastport, ID (UP) • Lethbridge, AB • Sutherland, SK
Unit Grain Train: Loaded	Eastbound	11	<ul style="list-style-type: none"> • Enderlin, ND • Minot, ND • Portal, ND 	<ul style="list-style-type: none"> • Bensenville, IL • Kansas City, MO • St. Paul, MN • Superior, WI
Unit Crude Oil Train: Loaded	Westbound	1	<ul style="list-style-type: none"> • Max, ND 	<ul style="list-style-type: none"> • Eastport, IA (UP)
Unit Crude Train: Loaded	Eastbound	4	<ul style="list-style-type: none"> • Max, ND • Stampede, ND 	<ul style="list-style-type: none"> • Chicago, IL (NS) • Chicago, IL (CSX) • Bensenville, IL
Unit Crude Oil Train: Empty	Eastbound and westbound	5	<ul style="list-style-type: none"> • Eastport, IA (UP) • Chicago, IL (NS) • Chicago, IL (CSX) • Bensenville, IL 	<ul style="list-style-type: none"> • Max, ND • Stampede, ND
Unit Phosphate Train: Loaded	Westbound	1	<ul style="list-style-type: none"> • Bensenville, IL (CSX) 	<ul style="list-style-type: none"> • Portal, ND
Unit Phosphate Train: Empty	Eastbound	1	<ul style="list-style-type: none"> • Portal, ND 	<ul style="list-style-type: none"> • Bensenville, IL (CSX)
Unit Sand Train: Loaded	Westbound	1	<ul style="list-style-type: none"> • Portage, WI 	<ul style="list-style-type: none"> • New Town, ND
Unit Sand Train: Empty	Eastbound	1	<ul style="list-style-type: none"> • New Town, ND 	<ul style="list-style-type: none"> • Portage, WI
Manifest Train	Westbound	1	<ul style="list-style-type: none"> • St. Paul, MN 	<ul style="list-style-type: none"> • Calgary, AB (Serves Minot)
Manifest Train	Eastbound	1	<ul style="list-style-type: none"> • Calgary, AB 	<ul style="list-style-type: none"> • St. Paul, MN (Serves Minot)

AB = Alberta
CSX = CSX Corporation
IA = Iowa
ID = Idaho

IL – Illinois
MN = Minnesota
ND = North Dakota
NS= Norfolk Southern

SK = Saskatoon
UP = Union Pacific
WI = Wisconsin

REGIONAL AND SHORT LINE RAILROADS

North Dakota’s four smaller railroads provide connections to the North American rail network for what could be rail-underserved areas.

DAKOTA, MISSOURI VALLEY & WESTERN RAILROAD (DMVW)



Dakota, Missouri Valley and Western (DMVW) operates a combined 530 miles of track in Montana and North Dakota, with 389 miles in North Dakota (Figure 2-17). It owns 375 miles of track in the state and has 14 miles of trackage rights. The railroad interchanges with CP Rail at Flaxton, Hankinson, and Max. DMVW also has interchange capability with BNSF at Bismarck.

Figure 2-17: Dakota, Missouri Valley & Western Railroad



Corn, wheat, and soybeans are the principal commodities shipped (Table 2-14).

Table 2-14: Top Five Commodities for DMVW (2020)

Commodity	Tons
Corn	582,270
Wheat (except durum)	569,010
Soybeans	569,010
Fly ash	320,190
Ethanol	270,530
All other	651,740
Total	2,962,750

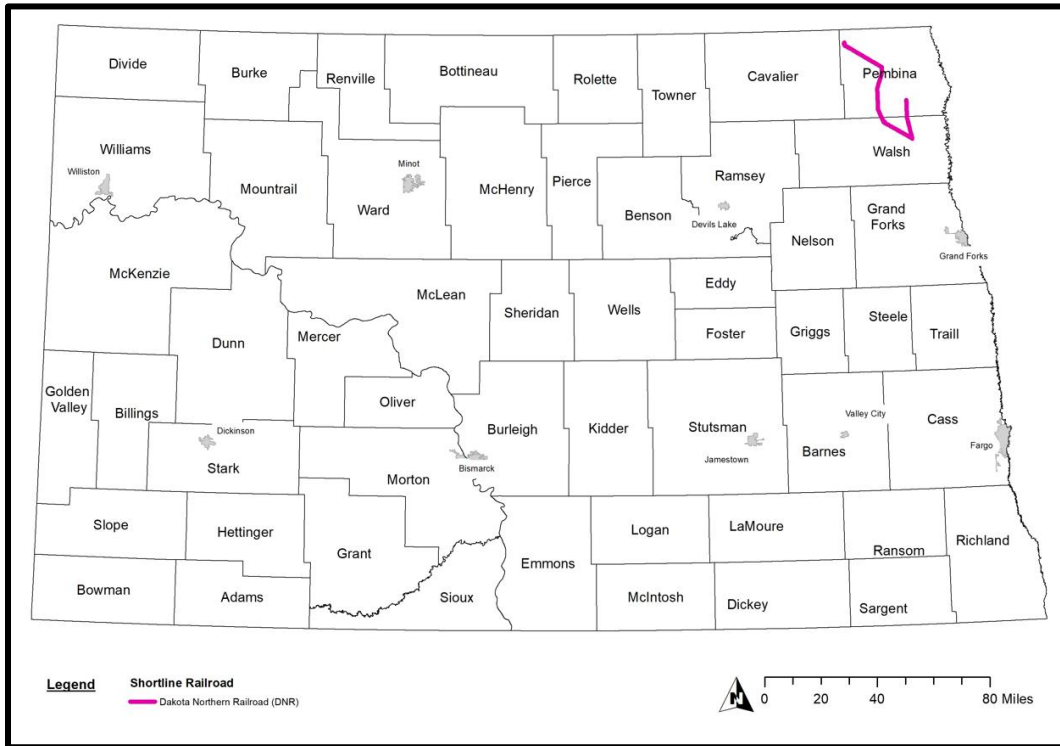
Source: 2019 Annual Report Submitted to North Dakota PSC

DAKOTA NORTHERN RAILROAD (DNR)



Dakota Northern Railroad (DNR) operates 48 miles of track between Grafton and Walhalla, North Dakota as shown in Figure 2-18. Grafton serves as the interchange with BNSF, and Walhalla is the terminus. An additional 23 miles beginning in Grafton are currently under embargo due to minimal freight volumes.

Figure 2-18: Dakota Northern Railroad



Wheat, soybeans, and fertilizer are the leading commodities (Table 2-15).

Table 2-15: Top Five Commodities for DNR (2020)

Commodity	Tons
Wheat (except durum)	170,500
Soybeans	97,500
Fertilizer	60,700
Beans	41,500
Corn	13,300
All other	16,100
Total	399,600

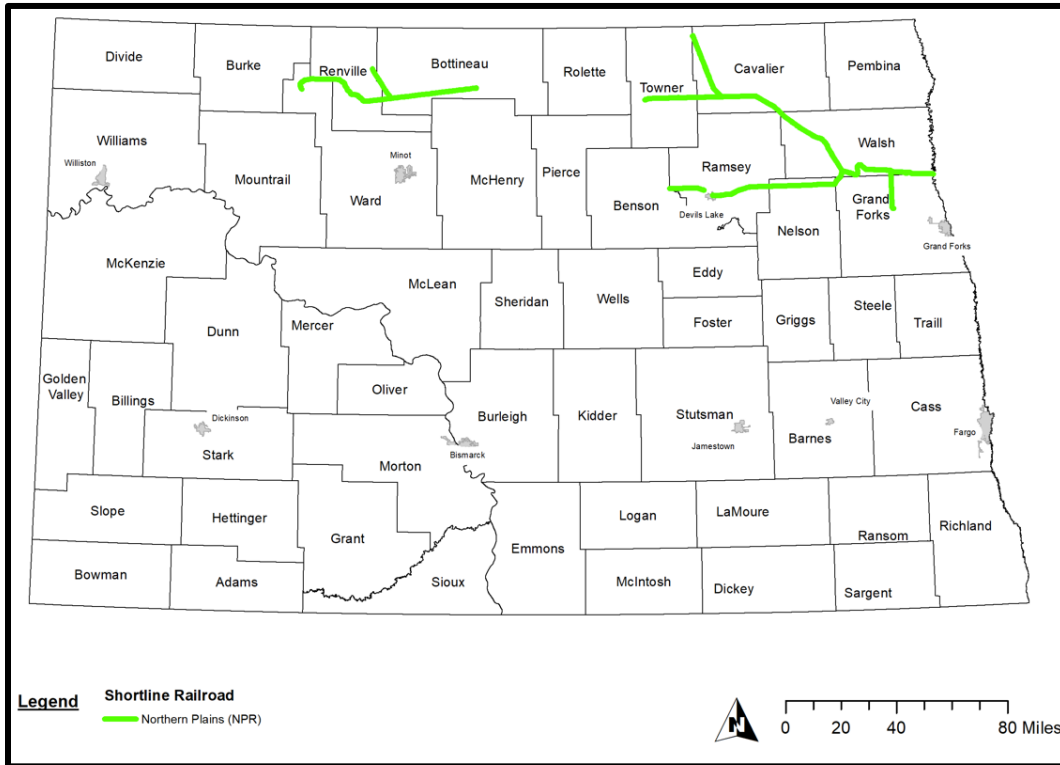
Source: 2019 Annual Reports Submitted to North Dakota PSC

NORTHERN PLAINS RAILROAD (NPR)



Northern Plains Railroad (NPR) leases 307 miles of branch line track in North Dakota and Minnesota from CP Rail, and operates lines owned by Mohall Railroad, Inc. (MRI), and Mohall Central Railroad, Inc. (MHC), which were purchased from BNSF. In North Dakota as illustrated in Figure 2-19: Northern Plains Railroad (NPR), one NPR line connects with CP Rail at Kenmare and connects with BNSF in Conway, Forest River, and Ardoch. Its southern line originates in Devils Lake, connects with its northern line, and terminates in Conway.

Figure 2-19: Northern Plains Railroad (NPR)



NPR primarily serves the North Dakota agricultural community by servicing numerous grain elevator operators and carries mainly wheat and soybeans (Table 2-16).

Table 2-16: Top Five Commodities for NPR (2020)

Commodity	Tons
Wheat (except durum)	1,104,090
Soybeans	624,000
Aggregates	113,490
Corn	111,800
Durum	58,500
All other	188,890
Total	2,200,770

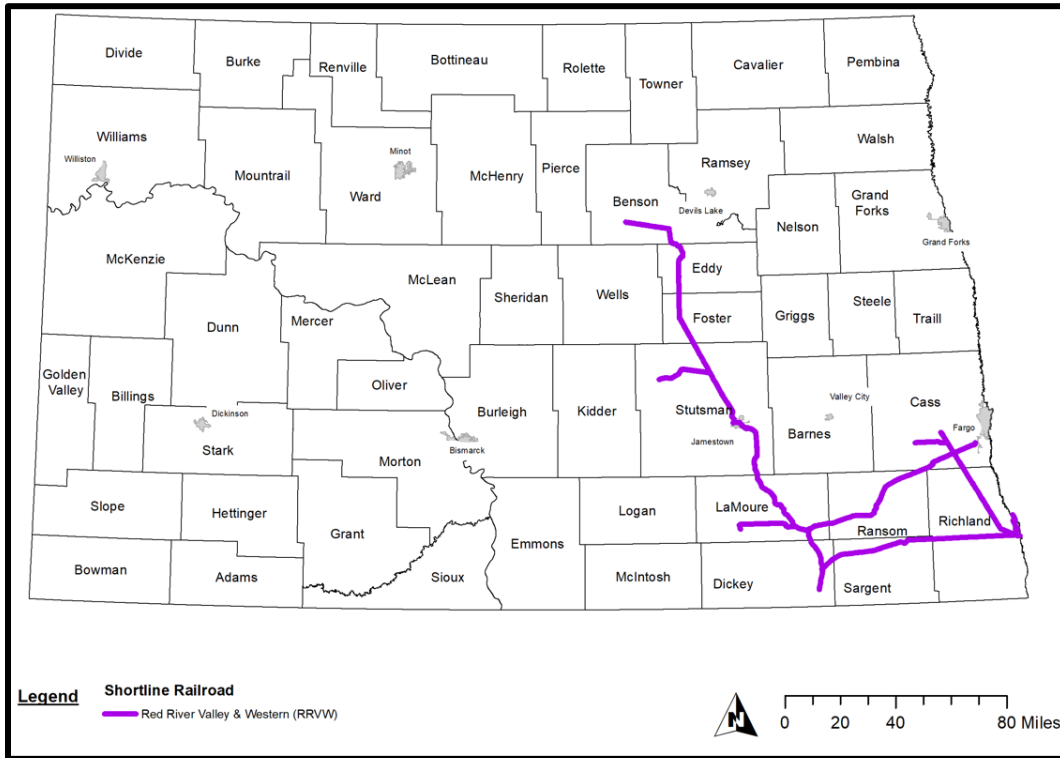
Source: 2019 Annual Reports Submitted to North Dakota PSC

RED RIVER VALLEY & WESTERN RAILROAD



RRVW operates over 578 miles of track in the middle to southeastern corner of North Dakota. It owns 491 miles and includes an additional 87 miles of trackage rights. The RRVW with CP Rail in Carrington, Ransom Junction, and Hankinson. Connections with BNSF are at New Rockford, Jamestown, and Casselton, North Dakota, and Breckenridge, Minnesota. RRVW also connects with DMVW in Oakes.

Figure 2-20: Red River Valley & Western Railroad (RRVW)



PASSENGER TRAINS

Amtrak’s Empire Builder operates a daily train in each direction. The stations in North Dakota are:

- Devils Lake
- Fargo
- Grand Forks
- Minot
- Rugby
- Stanley
- Williston

In addition to passenger operations, Amtrak provides small package and less than truckload freight services, with major stations being able to handle pallets up to 500 pounds. However, in October 2020, it was announced that these shipments had been suspended until further notice.

The North Dakota Amtrak route is shown in Figure 2-21. Further detail associated with passenger rail facilities and operations in the state is described in Appendix B North Dakota’s Passenger Rail System.

Figure 2-21: Amtrak Route in North Dakota



NORTH DAKOTA RAIL FACILITIES

INTERMODAL TERMINALS

In October 2020, North Dakota’s first intermodal terminal, located at the 800-acre Logistics Park of North Dakota in Minot, was leased to a new operator, Rail Modal Group (RMG). The facility serves an agriculture supply chain of small lot size, containerized grain shipments, and markets requiring identity-preserved product. Initially, BNSF will provide service as demand requires. Complementing the intermodal operation is a 386-acre, BNSF-certified logistics site whose purpose is to attract rail-related economic development.

TRANSLOAD FACILITIES

Eleven operators have transload terminals in North Dakota.

Savage Services Corp	
Location	Trenton
Railroad	BNSF
Commodities	Paper waste/scrap, saw logs, oriented strand board, particle board, bricks, railroad ties, insulation/siding, roofing materials, poles and posts, bars, structural, scrap, ingots, pipe, tin plate, sheet, plate, alumina, lead, aluminum, zinc, copper, machinery, government, generators/trans, canned foods, tires, grass seeds, ammonia, urea ammonium nitrates, dry phosphates, sulfur, urea, liquid phosphates, potash, acids, chlorates/peroxide, paints/pigments, caustic soda, industrial gases.
Rail equipment served	Boxcar, flatcar, pneumatic covered hopper, bulkhead flat, gondola, reefer, centerbeam flat, covered gondola, tank, coil car, covered hopper

Red River Oilfield Services	
Location	Williston
Railroad	BNSF
Commodities	Plywood, oriented strand board, gypsum wallboard, bricks, lumber, railroad ties, bars, pipe, acids, caustic soda, alcohols/solvents, fuels, lubes/oils/waxes, bentonite, salt, cement, fly ash, gypsum, lime, insulation/siding, roofing materials, ingots, steel sheet, structural steel, tin plate, aluminum, zinc, machinery, generators/trans, cotton, tires, ammonia, dry phosphates, urea ammonium nitrates, potash, polyethylene, polypropylene, polystyrene, polyvinyl chloride, borates, sand, sodium compounds
Rail equipment served	Gondola, centerbeam flat, coil car

Northwest Transloading Facility	
Location	Minot
Railroad	BNSF
Commodities	Barley, corn products, oats, beans/peas/lentils, lubes/oils/waxes, fuels, sand, pipe, limestone, soybeans
Rail equipment served	Boxcar, hopper, tank

Ceres Northgate Terminal	
Location	Northgate
Railroad	BNSF
Commodities	Paper waste/scrap, plywood, oriented strand board, particle board, lumber, roofing materials, ingots, plate, tin plate, aluminum, copper, zinc, rail equipment, government, ammonia, dry phosphates, liquid phosphates, potash, sulfur, urea, acids, caustic soda, chlorates/peroxide, inhalation hazard, plastics feedstocks, sulfuric acid, alcohols/solvents, asphalt, carbon black, coke-calcined, fuels, lubes/oils/waxes, rubber compounds, ethanol, other liquid petroleum gas, polyvinyl chloride, borates
Rail equipment served	Bulkhead flat, gondola, centerbeam flat, coil car

Tubular Transport & Logistics	
Location	Bismarck
Railroad	BNSF, CP Rail
Commodities	Pipe, plate, plywood, particle board, cement, fly ash
Rail equipment served	Flat, covered hopper

Northern Plains Rail Services	
Location	Grand Forks
Railroad	BNSF
Commodities	Plywood, gypsum wallboard, oriented strand board, particle board, bricks, railroad ties, insulation/siding, roofing materials, poles and posts, machinery, government, generators/trans, cotton, grass seeds, dry phosphates, urea, potash, fuels, ethanol, salt, crushed stone, limestone, sand and gravel, granite, roofing granules, chips misc., corn products, barley, oats, rye, corn, popcorn, soybeans, milo (grain sorghum), rice, canola meal, vegetable oil, soybean oil, sunflower
Rail equipment served	Boxcar, flatcar, bulkhead flat, gondola, centerbeam flat, tank, hopper

Northern Plains Company	
Location	Fordville
Railroad	CP Rail

Commodities	Sand, bulk, machinery, aggregate, roofing, salt
Rail equipment served	Covered hopper, flatcar, open hopper

Lansford Transload Facility	
Location	Lansford
Railroad	CP Rail
Commodities	Lumber, steel, forest products, pipe, frac sand, bulk
Rail equipment served	Centerbeam flatcar, flatcar, covered hopper

BioUrja	
Location	New Town
Railroad	CP Rail
Commodities	Crude oil, lumber, bulk roofing
Rail equipment served	Tank car, centerbeam flat, boxcar, covered hopper

Wildcat Minerals	
Location	New Town
Railroad	CP Rail
Commodities	Frac sand, bulk chemicals/energy
Rail equipment served	Covered hopper, tank

Basin Transload	
Location	Columbus
Railroad	CP Rail
Commodities	Crude oil, frac sand
Rail equipment served	Covered hopper, tank

GRAIN ELEVATORS

North Dakota has 299 rail-served grain elevators. Table 2-17 groups the distribution of elevators by rail carrier. BNSF provides line haul service to the greater number of elevators (218). It directly accesses 157 elevators while connecting with 57 elevators through its smaller railroad partners, DNR and RRW. CP Rail provides line haul service to 81 elevators, 32 that it directly serves and another 49 through connections. Of the small railroads, RRW directly accesses the most grain elevators.

Table 2-17: Distribution of Rail-served Grain Elevators

Serving Carrier	Line Haul Railroad		Total
	BNSF	CP Rail	
BNSF direct	157	0	157
CP Rail direct	0	32	32

Serving Carrier	Line Haul Railroad		Total
	BNSF	CP Rail	
DMVW	0	24	24
DNR	12	0	12
NPR	0	25	25
RRVW	45	0	45
Total	218	81	299

Source: Upper Great Plains Transportation Institute; WSP Analysis

Elevators can be described by their track capacity and the number of cars that can be loaded without switching assistance.

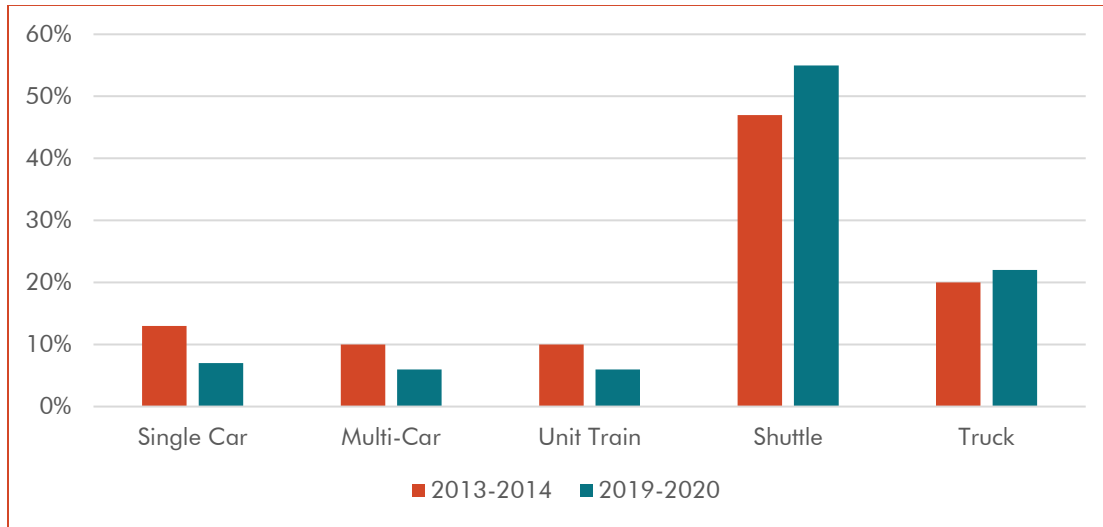
- **Single-car elevator:** Elevator with track space for 1 to 24 cars
- **Multi-car elevator:** Elevator with track space for 25 to 49 cars
- **Unit train elevator:** Elevator with track space for 50 cars to 99 cars
- **Shuttle train elevator:** Elevator with track space for 100 cars or more

Shuttle trains also differ from unit trains because the locomotives stay attached to the train with the former to expedite loading and unloading.

Figure 2-22 demonstrates that shuttle trains are increasing in popularity and replacing other forms of capacity and service. Over the last 6 years, shuttle-loading facilities increased from 47% of the North Dakota grain elevators to 58%. Truck-only elevators also grew as a percentage of all facilities. This was attributable primarily to the reduced number of inefficient, small, rail-served elevators. The consolidation of grain elevators has increased the distance that many producers travel to access rail service.

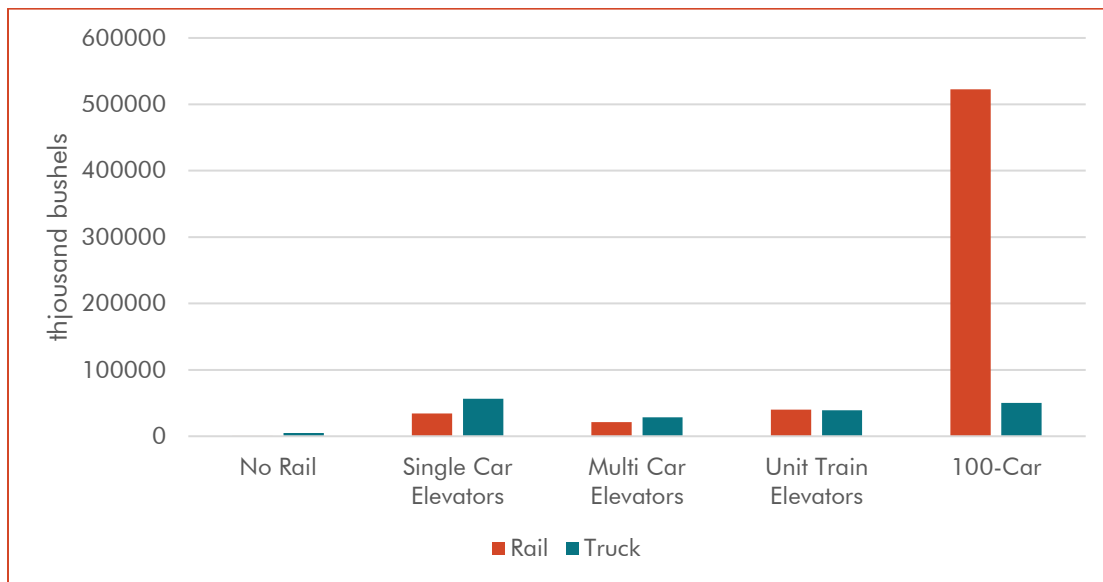
Figure 2-23 shows the volume of grain that was shipped by type of elevator during 2019–2020. The vast majority of North Dakota grain was moved by shuttle trains.

Figure 2-22: Comparative Distribution of North Dakota Grain Elevators by Track Capacity and Service



Source: Upper Great Plains Transportation Institute, Annual North Dakota Elevator Marketing Report 2019–2020, December 2020

Figure 2-23: Modal Shipments of Grain and Oilseeds by Elevator Type



Source: Upper Great Plains Transportation Institute, Annual North Dakota Elevator Marketing Report 2019–2020, December 2020

U.S.–CANADA RAIL BORDER CROSSINGS

There are 30 U.S.–Canada rail border crossings, of which 2 are in North Dakota—at Portal and Northgate. Additionally, the Noyes-Emerson crossing is in Minnesota and is located 1.5 miles east of the Pembina highway crossing. For CBP administrative purposes, it is incorporated into the Pembina port of entry. In 2019, North Dakota’s two crossings accommodated 1,812 trains, 245,122 loaded rail cars, and 87,416 empty railcars—respectively 10%, 13%, and 13% of the totals inbound to the U.S. across the U.S.–Canada border (excluding Alaska). Portal is by far the larger crossing in North Dakota, as shown in Table 2-18.

In May 2021, CBP announced plans to replace aging rail scanning systems at 12 U.S. rail ports of entry, one of which was Portal.

Table 2-18: North Dakota Rail Border Crossing Statistics (2019)

Border Crossing	Trains	Loaded Rail Cars	Empty Rail Cars
Northgate	180	6,557	1,309
Portal	1,575	238,565	88,052

Source: BTS

PIPELINES

Pipelines are a critical component of North Dakota’s multimodal freight transportation system for the movement of energy-related products. They account for 53% of all tons moved to, from, and within North Dakota. Pipelines link crude oil wells to oil refineries, link natural gas producers with gas-powered electrical generating plants and residential consumers, and move refined products to other distribution nodes for storage and eventual movement to end customers. They are typically the cheapest form of transportation for moving bulk liquid and gas commodities. A Congressional Research Service report⁶ identified a cost of \$5 per barrel to transport crude oil by pipeline, whereas rail costs \$10 to \$15 and trucking costs \$20. However, pipelines have high upfront costs and take time to develop and construct.

Pipelines can be categorized according to their function, namely gathering, transmission or distribution of energy products. In 2019, North Dakota had 29,023 miles of gathering and transmission pipelines.

PIPELINE TYPES

GATHERING PIPELINES

These pipelines transport crude oil, natural gas, and other liquids from wellheads or local storage facilities to processing, refining, or intermediate storage facilities. These pipelines are typically small-diameter, low-pressure pipelines. Gathering pipelines might also terminate at a multimodal facility, such as the Tioga Rail terminal and COLT Rail Hub, and interconnections can also be available to the larger transmission pipeline networks. The Arrow gathering network connects with the Dakota Access, Hiland, and Tesoro pipelines. Some gathering pipeline networks also have a truck terminal connected to them. This allows oil to be collected by truck from remote wellheads that cannot be joined to a gathering pipeline network.

Most wells in North Dakota are crude oil wells. These wells also produce a natural gas known as associated gas. Associated gas contains natural gas liquids (NGL), such as propane and ethane, and the gas produced in the Bakken is high in content of these commodities. These products can be used as feedstocks for plastics and other materials.

A growing share of the nation’s natural gas production is from associated gas. In the Bakken region, associated gas accounted for 92% of natural gas produced, whereas it accounts for 12% of total U.S. natural gas production in 2018. Gas-gathering pipeline networks are critical in allowing associated gas to be captured and transported to processing facilities. If associated gas cannot be captured and moved to processing facilities, it would otherwise be flared at the well site. This flaring produces emissions and carbon dioxide and does not capture the economic value

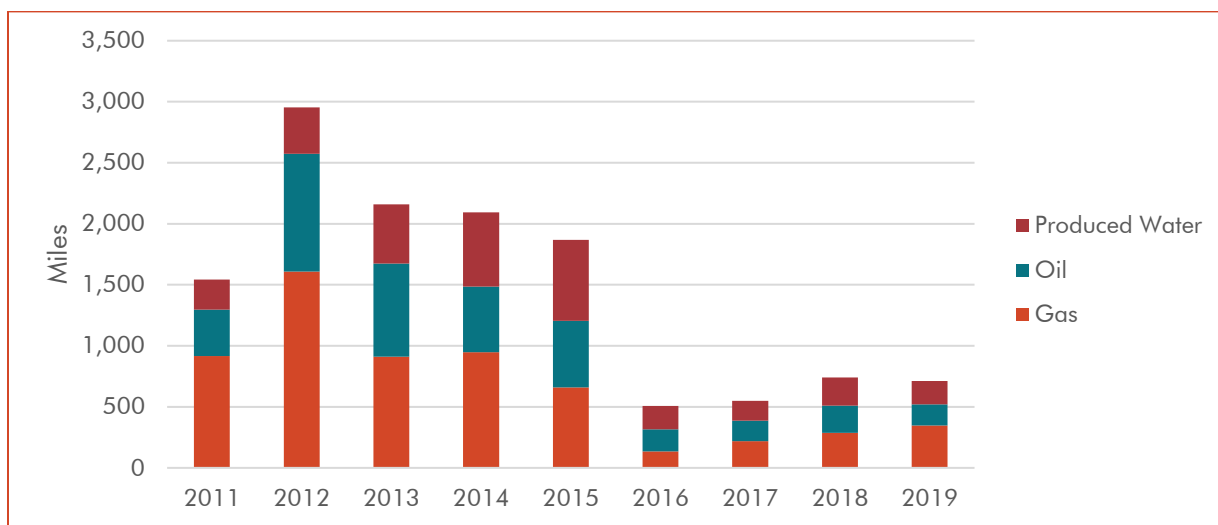
⁶ Congressional Research Service. U.S. Rail Transportation of Crude Oil: Background and Issues for Congress, 2014.

related to associated gas. To reduce the amount of flared natural gas, North Dakota’s Industrial Commission established targets in 2014 to limit flaring. These targets are:

- 74% capture – Q4 2014
- 77% capture – Q1 2015
- 80% capture – Q2 2016
- 85% capture – Q4 2016
- 88% capture – Q4 2018
- 91% capture – Q4 2020

Figure 2-24 illustrates the volume of new gathering pipeline miles for gas, crude oil, and produced water⁷ added to the North Dakota pipeline system between 2011 and 2019.

Figure 2-24: New Gathering Pipelines Constructed



Source: North Dakota Pipeline Authority

TRANSMISSION PIPELINES

Transmission pipelines are larger-diameter, high-pressure pipelines that transport large volumes of commodities over longer distances. They connect refineries, processing facilities, ports (for both imports and exports), and intermediate and large storage facilities. These pipelines also serve large users such as military and civil airports and power-generating plants. Lateral pipelines can branch off the mainlines to serve other users.

DISTRIBUTION PIPELINES

Distribution pipeline networks link storage and transmission pipelines with end users. These networks are used predominantly for delivering natural gas to residential and business communities. In 2020, there were 6,943 miles of natural gas distribution pipelines in North Dakota.

⁷ Produced water is a byproduct of oil and gas extraction. It contains varying amounts of oil residues, sand, or mud, naturally occurring radioactive materials, chemicals from frac fluids, bacteria, and dissolved organic compounds. Produced water is collected at the wellhead and is typically placed in deep injection wells.

COMMODITY PIPELINES

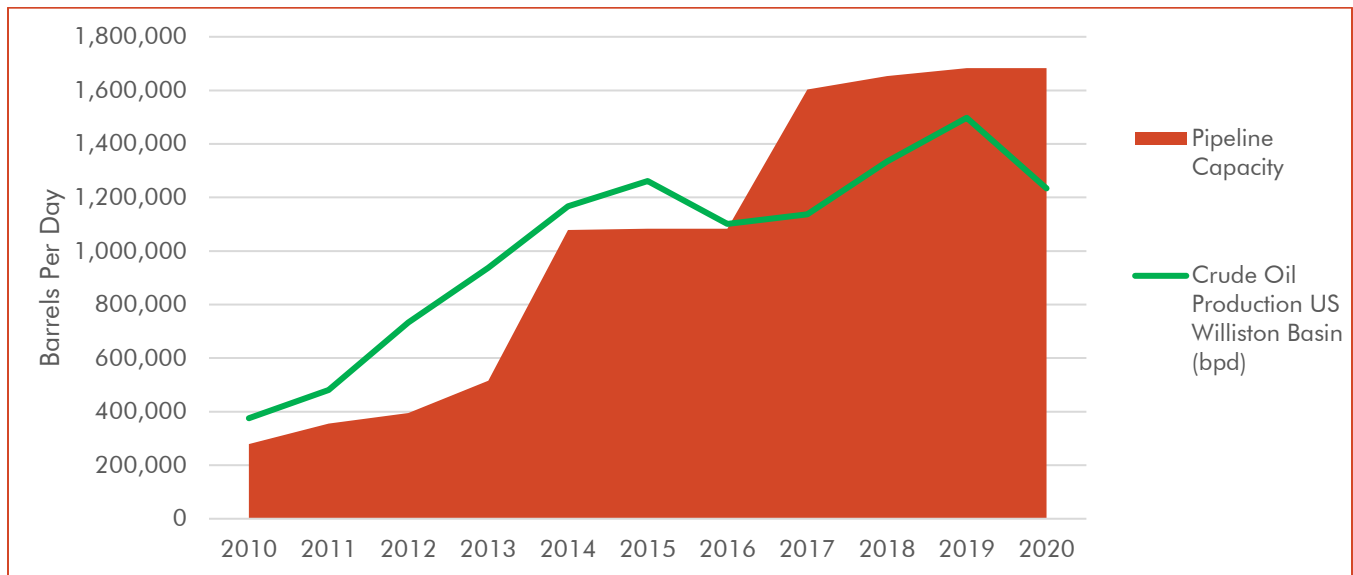
CRUDE OIL PIPELINES

The North Dakota Pipeline Authority estimates that 75% of the crude oil produced in the Williston Basin (including eastern Montana, western North Dakota, South Dakota, and southern Saskatchewan) is exported by pipeline.

Through the early 2000s, North Dakota was typically producing 80,000 to 90,000 barrels per day (bpd) of crude oil. In 2006, production began to increase gradually, driven largely by new oil extraction techniques such as hydraulic fracturing (fracking) and horizontal drilling. By the end of 2010, production had reached 343,000 bpd. Two years later, production had more than doubled to 770,000 bpd. In 2019, that number had peaked at 1.5 million bpd.

As Figure 2-25 illustrates, in the early years of the Bakken crude oil growth, pipeline capacity lagged production, and any excess production that could be exported outside the state was transported by train.

Figure 2-25: North Dakota Crude Oil Production and Crude Oil Pipeline Capacity



Source: Energy Information Administration

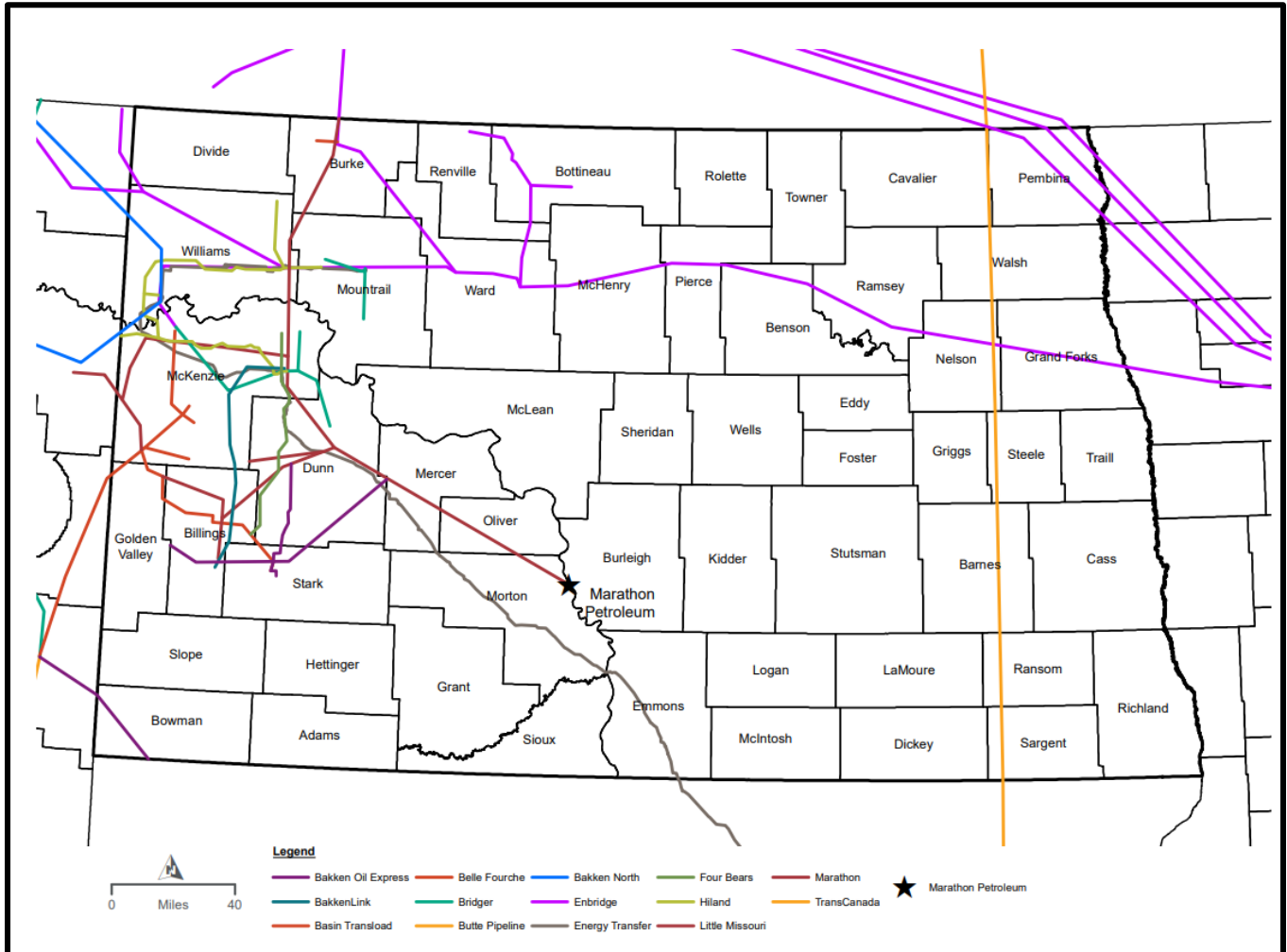
Examples of key crude oil transmission pipelines exporting products out of North Dakota and linking oil fields with rail terminals are described below⁸ and illustrated in Figure 2-26. Other crude oil pipelines cross the state but are not used to transport North Dakota crude oil.

- **Plains All American Pipeline/Bakken North:** In 2014, Plains All American Pipeline (Plains) opened a new 103-mile, 12-inch pipeline from Trenton, North Dakota, to an interconnect with the existing Wascana Pipeline at the U.S.–Canada border in northeast Montana. The line has an initial capacity of 40,000 bpd, expandable to 75,000 bpd.
- **Bridger, Belle Fourche, and Butte Pipelines:** The Bridger and Belle Fourche Pipelines operate as intraregional pipeline systems moving oil to several pipeline interconnects or rail facilities in the Williston Basin. One such pipeline interconnect is with the Butte Pipeline near Baker, Montana. The Butte Pipeline

⁸ North Dakota Pipeline Authority, 2019 Annual Report

currently has the capacity to move 260,000 bpd to Guernsey, Wyoming. In Guernsey, the oil is transported to Wood River, Illinois, on the Platte Pipeline; transported to Cushing, Oklahoma, on the White Cliffs Pipeline; or loaded into rail cars for further transport.

Figure 2-26: Crude Oil Pipelines



Source: North Dakota Pipeline Authority

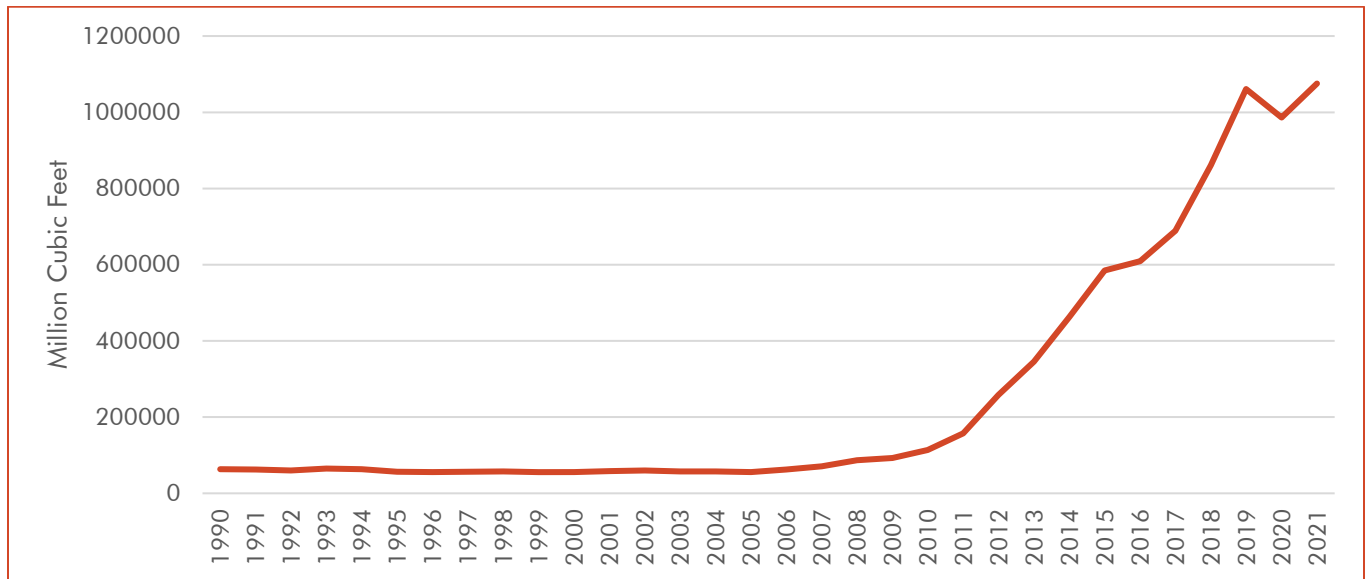
- **Enbridge/North Dakota Pipeline Company:** Having completed several expansion projects, Enbridge now has the capacity to move 355,000 bpd on its pipeline system to Clearbrook, Minnesota. Enbridge completed its work to expand northbound capacity of 145,000 bpd in early 2013 for the larger-scale Bakken Expansion Project. Oil using the northbound route navigates the Enbridge Saskatchewan system to an interconnect with the Enbridge mainline at Cromer, Manitoba. Once on the mainline system, the Williston Basin oil quickly re-enters the U.S. and meets eastbound Enbridge oil at Clearbrook, Minnesota.
- **BakkenLink:** This system collects crude oil from various locations along its route south of Lake Sakakawea and delivers the oil to a unit train rail facility near Fryburg, North Dakota.
- **Energy Transfer Partners:** The Dakota Access Pipeline collects oil north and south of Lake Sakakawea and can transport up to 520,000 bpd. The project was placed into commercial service in June 2017. In 2018,

two successful open seasons were held for additional service on the Dakota Access Pipeline. With additional shipper commitments, the pipeline was expanded to carry up to 750,000 bpd.

NATURAL GAS PIPELINES

Once the gas-gathering pipeline network has delivered natural gas to a gas-processing plant, the natural gas is cleaned to produce pipeline-quality natural gas. As the amount of natural gas produced in North Dakota has increased (Figure 2-27), so has the number of processing facilities. In 2008, there were 12 plants with a capacity to process 355 million cubic feet (mcf) of natural gas per day. By 2021, this had increased to 33 plants with the ability to process a total of 4 billion mcf per day.

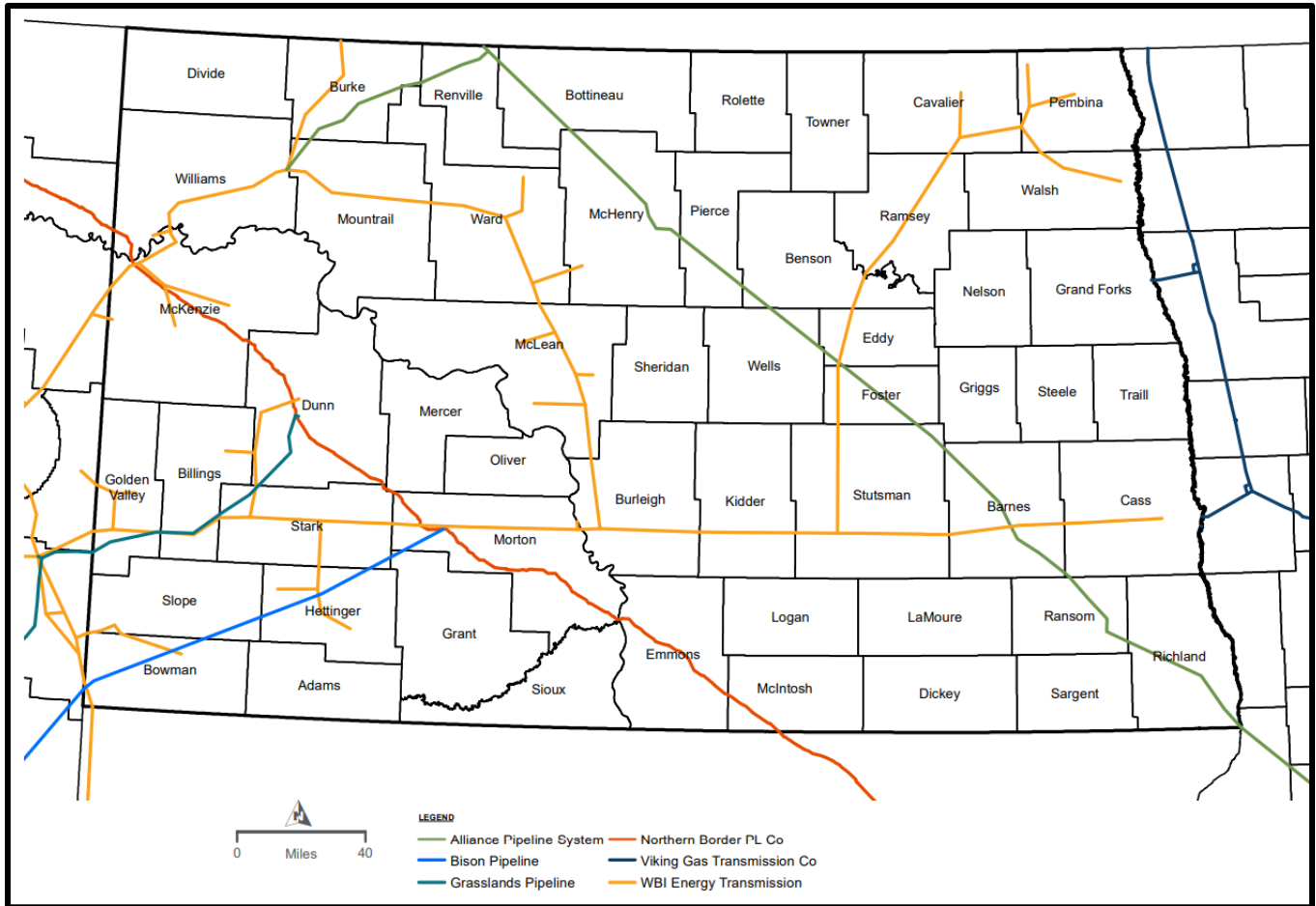
Figure 2-27: North Dakota Annual Natural Gas Gross Withdrawals



Source: Energy Information Administration

Once cleaned, natural gas is fed into transmission pipelines. Natural gas transmission pipelines are wide-diameter and high-pressure pipelines that connect processing plants with storage and distribution facilities. Several transmission pipelines also transport uncleaned natural gas to processing centers located outside the state. As the amount of natural gas produced in the Bakken region has increased, so has the capacity of its pipeline network. Examples of natural gas pipelines in the state are illustrated in Figure 2-28 and described below.

Figure 2-28: Natural Gas Pipelines



Source: North Dakota Pipeline Authority

- Alliance Pipeline:** The Alliance Pipeline is a high-pressure, large-diameter natural gas pipeline that originates in British Columbia and terminates at the Aux Sable gas processing plant near Chicago, Illinois. The Alliance Pipeline transports “dense gas” or gas that still contains high-BTU (British thermal unit) NGLs, such as propane and butane. In February 2010, the Alliance Pipeline began transporting rich natural gas from North Dakota via a new interconnect with the Prairie Rose Pipeline near Bantry, North Dakota (see the paragraph for Aux Sable below). The 36-inch diameter U.S. portion of the pipeline has a certified capacity of 1.513 billion cubic feet per day (bcfd). The Alliance Pipeline has one direct North Dakota delivery point in Hankinson and one interconnect with Montana Dakota Utilities (MDU) to serve industrial manufacturing in Gwinner. Commissioned in late 2013, the Tioga Lateral Pipeline can deliver liquids-rich, high-BTU natural gas to Chicago for further processing and transportation. The Tioga Lateral Pipeline has the capacity to transport up to 126 million cubic feet per day (mmcf).
- Northern Border:** The Northern Border Pipeline, owned by TC Pipelines and ONEOK Partners, is a 1,249-mile pipeline originating at the Port of Morgan in Montana and terminating near North Hayden, Indiana. The pipeline has a system receipt capacity of 2.37 bcfd, with less than half of the gas supply in 2019 originating in Canada through a receipt point with the Foothills Pipeline at the Port of Morgan. The 42-inch diameter Northern Border Pipeline receives gas deliveries at a total of 17 receipt points in the Williston Basin, with 14 of those points for North Dakota gas supply.

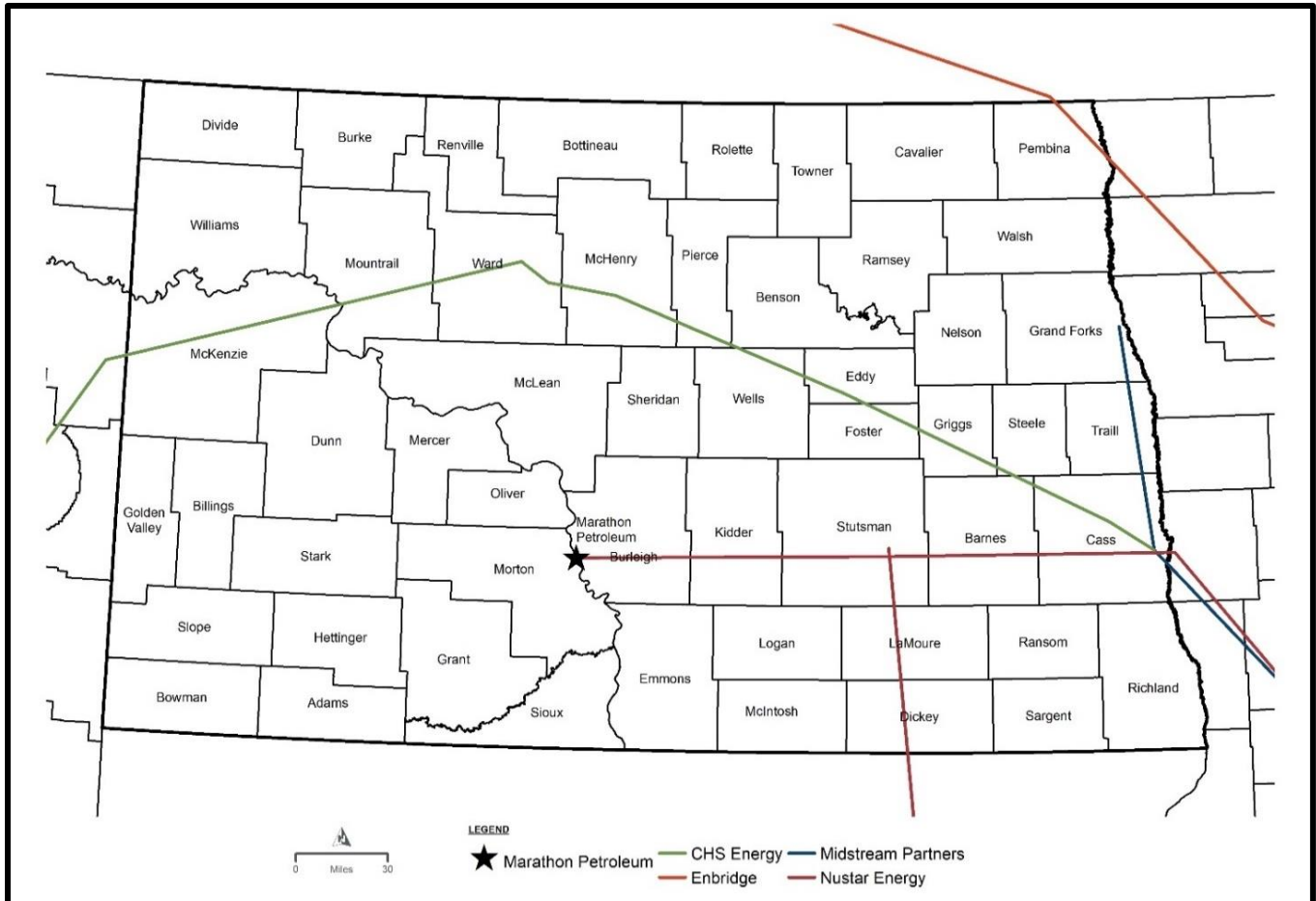
- **WBI Energy Transmission:** Formerly known as Williston Basin Interstate Pipeline Co., WBI Energy Transmission operates more than 3,700 miles of natural gas transmission pipelines throughout North Dakota, Montana, Wyoming, and South Dakota. This network of pipelines contains 12 interconnecting points with other regional pipelines and can also deliver natural gas to local distribution companies or natural gas storage fields. In early 2019, WBI Energy announced plans to construct a new gas pipeline system called the North Bakken Expansion Project. The system would consist of 60 miles of 24-inch pipe and 30 miles of 12-inch pipe. The project’s objective is to provide at least 250 mmcf of capacity from Tiogato an interconnect with the Northern Border Pipeline in McKenzie County.
- **Grasslands Pipeline:** Operational since 2003, the Grasslands Pipeline runs 253 miles from the Powder River Basin in Wyoming to western North Dakota, where it connects with the Northern Border Pipeline.
- **Bison Pipeline:** TransCanada placed the 302-mile, 30-inch Bison Pipeline into service in early 2011. The pipeline was built to connect natural gas production in the Powder River Basin of Wyoming to the Northern Border Pipeline in Morton County. The pipeline has an initial capacity of 407 mmcf and could be expanded to 1 bcf. From 2018 to the first half of 2020, the Bison Pipeline was idle. Limited and sporadic natural gas transportation resumed in May 2020.

REFINED PRODUCT PIPELINES

Several refined product pipelines cross the state. Refined product pipelines take refined products, such as gasoline, jet fuel, and diesel from refineries to storage locations near end users, or directly to large-volume end users such as airports. Examples of refined product pipelines in the state are illustrated in Figure 2-29 and include the following:

- **Cenex Pipeline, LLC (CHS).** CPL transports an average of 43,000 barrels of refined products a day. This pipeline spans more than 680 miles across part of Montana and North Dakota. CPL transports refined petroleum products from refineries in the Laurel and Billings, Montana, area to terminals in Glendive, Montana, as well as Minot and Fargo.
- **NuStar Energy.** This pipeline comprises two components. The first component is a 440-mile pipeline connecting the Marathon refinery in Mandan, North Dakota, to outlets at Jamestown; and Moorhead, Sauk Centre, and Roseville, Minnesota. Products carried include gasoline, jet fuel, and distillates. The second component is a 1,900-mile pipeline with connections to refining centers in Kansas and terminating at locations in Iowa, South Dakota, and North Dakota.
- **Magellan Midstream Partners, LP.** Refined products flow into the state, carried by this pipeline, and terminate at two distribution facilities in Fargo and Grand Forks.
- **Enbridge.** These product pipelines pass through the northeast corner of the state.

Figure 2-29: Refined Product Pipelines



Source: North Dakota Pipeline Authority

NATURAL GAS LIQUIDS PIPELINES

NGLs are a group of hydrocarbons, including ethane and propane, that are contained in natural gas. This group of hydrocarbons is extracted from the natural gas production stream at natural gas processing plants. Further fractionation of NGLs is required to produce “purity products,” in which at least 90% of the liquid stream contains one type of molecule. NGLs can be fractionated in state, whereupon the pure products can be transported by pipelines to end users or piped to out-of-state fractionation facilities in Bushton or Conway, Kansas.

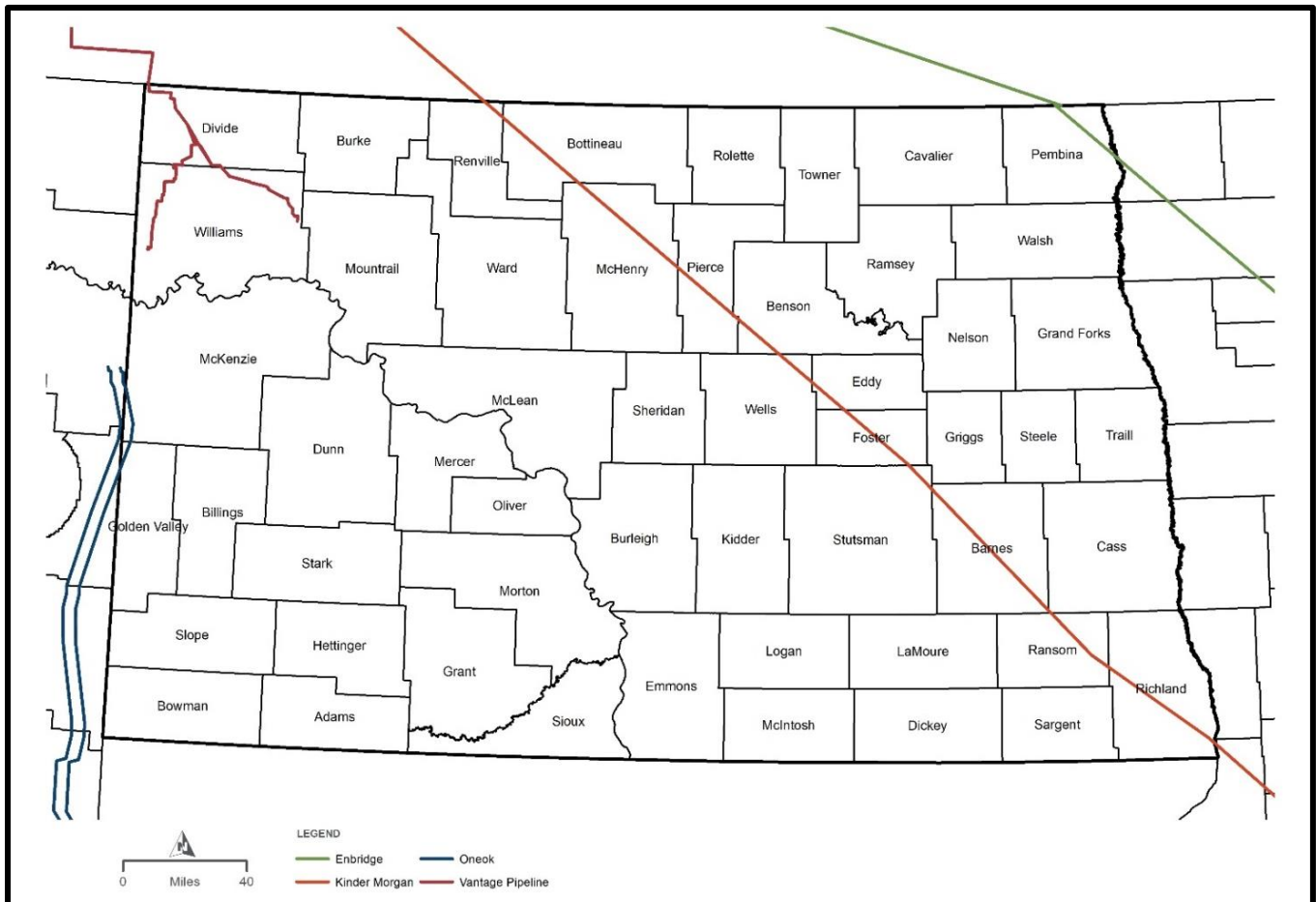
Examples of North Dakota NGL pipelines are illustrated in Figure 2-30 and include the following:

- **ONEOK Bakken NGL Pipeline:** This pipeline is a 12-inch NGL pipeline capable of moving 135,000 bpd from facilities in the Williston Basin to an interconnect with the Overland Pass Pipeline near Cheyenne, Wyoming.
- **Vantage Pipeline:** This is a 430-mile liquid ethane pipeline from Tiogato Empress, Alberta. With an initial capacity of 40,000 bpd, the new Vantage Pipeline was built to address the high concentration of ethane found in North Dakota’s natural gas. Placed into service Q2 2014 in conjunction with the Hess Tioga Gas Plant Expansion, the pipeline was constructed of 10-inch pipe. In September 2014, Pembina Pipeline Corporation purchased the Vantage Pipeline from Mistral Midstream. In 2017, Pembina Pipeline opened

an expansion to serve ONEOK’s Stateline plants with an 8-inch pipeline. The \$85-million system expansion also included taking the existing mainline capacity from 40,000 bpd to 65,000 bpd.

- **Kinder Morgan Cochin Condensate:** This pipeline was in eastward propane service between Ft. Saskatchewan and Windsor, IL until March 2014, when it was reversed to transport condensate westbound from its connection point with the Explorer pipeline in Kankakee County, IL to Alberta.

Figure 2-30: NGL Pipelines



Source: North Dakota Pipeline Authority

AIR CARGO

In North Dakota, there are a total of 281 airports, 89 of which are for public use and 54 of which are included in the Federal Aviation Administration’s National Plan of Integrated Airport Systems (NPIAS). Several of these airports support air cargo services and ensure that shippers and goods receivers across the state can access express and expedited domestic and global products and services.

Air cargo services typically transport time-sensitive, higher-value, low-weight items and are an important transportation mode to support e-commerce. Air cargo is usually the most expensive transportation mode, priced at 4 to 5 times that of road transport and 12 to 16 times that of sea freight.⁹ However, the cost differential might be

⁹ <https://www.worldbank.org/en/topic/transport/publication/air-freight-study>

substantially more in certain sectors such as express shipments. The retail cost of a 5-pound package sent via FedEx from New York City to Williston is \$162.68 for next-day delivery by 2 p.m. If the item is sent via FedEx Ground on a Wednesday, it would be delivered the following Tuesday but would cost \$18.44.¹⁰ Despite these costs, air cargo users are prepared to pay a premium for the speed that air cargo services deliver.

The air cargo sector in North Dakota is categorized as follows:

- Integrator feeder hub and gateway operations at Fargo Hector International Airport.
- FedEx and UPS feeder flights from regional airports to Fargo Hector International Airport.
- Cargo carried on passenger flights.
- Ad hoc cargo movements.
- Military airports.

INTEGRATOR FEEDER HUB AND GATEWAY OPERATIONS

An express integrator is a company that provides vertically integrated, time-definite, door-to-door transport. FedEx and UPS are both integrators and use air transport to move goods both domestically and internationally. These operators employ a hub-and-spoke system. For North Dakota customers located in the Fargo region, the integrators collect packages from customer premises, drop box locations, or service centers and then transport the packages to Hector International Airport. For customers located in other regions of the state, their products might be collected and transported to a regional airport and loaded to a small aircraft that flies to Hector International Airport. Packages from the regional airport flights and those collected in the Fargo area are then loaded to freighter aircraft that depart for either the FedEx main hub in Memphis, Tennessee, or the UPS hub in Louisville, Kentucky. At the Memphis and Louisville hubs, packages are sorted to their destinations and depart on flights to both domestic and international locations. For packages to be delivered in North Dakota, they follow the same process but in reverse.

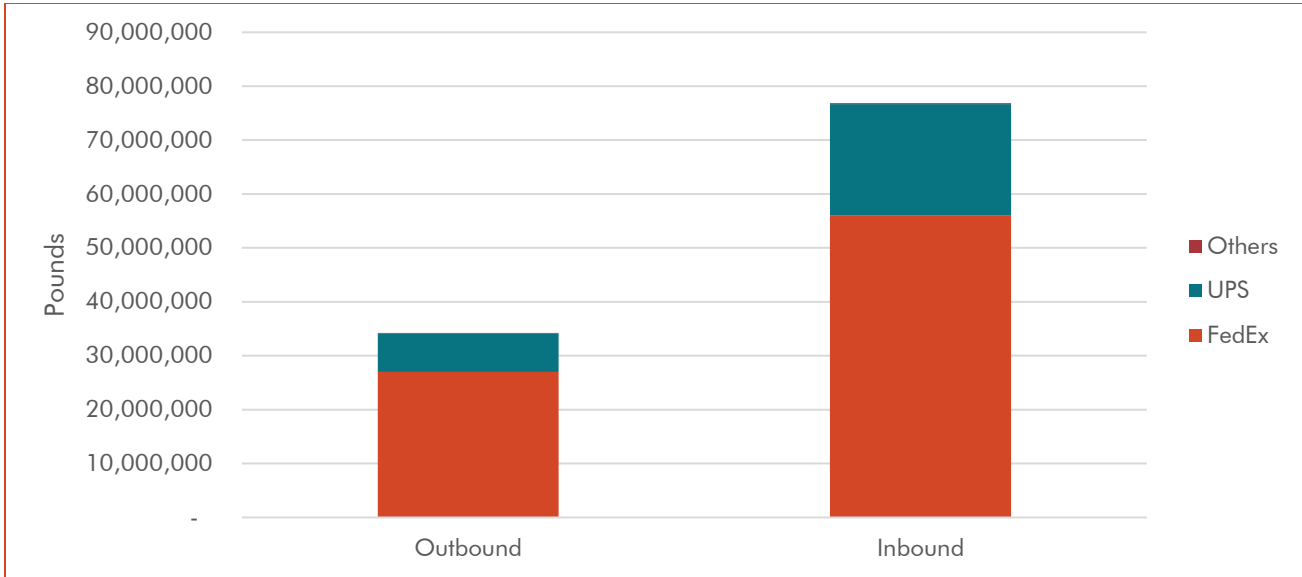
In 2016, FedEx moved its operations from Grand Forks International Airport to Hector International Airport in Fargo. It had operated at Grand Forks since 1984. In 2018, UPS started its gateway and hub operation at Hector International Airport. This was the first domestic gateway that UPS had opened in 17 years. Extensions to the air cargo ramp for hosting the hub operations and a new sorting facility for UPS have been recently constructed.

The Bureau of Transportation Statistics (BTS) aviation database shows that cargo passing through Hector International Airport in 2019 amounted to just over 111 million pounds of cargo. As Figure 2-31 illustrates, nearly 74.8% was associated with FedEx, 25% with UPS, and 0.2% with other airlines. The figure also identifies that most of the cargo, 69%, flowing through the airport is inbound traffic. In 2020, Hector International Airport was ranked 67th in the nation based on landed cargo weight. Figure 2-32 illustrates the growth in air cargo landed weight at Hector International Airport since the start of FedEx operations in 2016.

The aircraft operated by FedEx for Memphis hub flights include A300 and B757 freighters. UPS operates A300, B757, and B767 aircraft for flights transiting their Louisville hub. These aircraft can accommodate between 60,000 and 120,000 pounds of cargo. A typical month sees about 56 inbound flights of these freighters by FedEx and 50 by UPS. This number substantially grows during the Christmas peak period, with FedEx flights increasing by 20%.

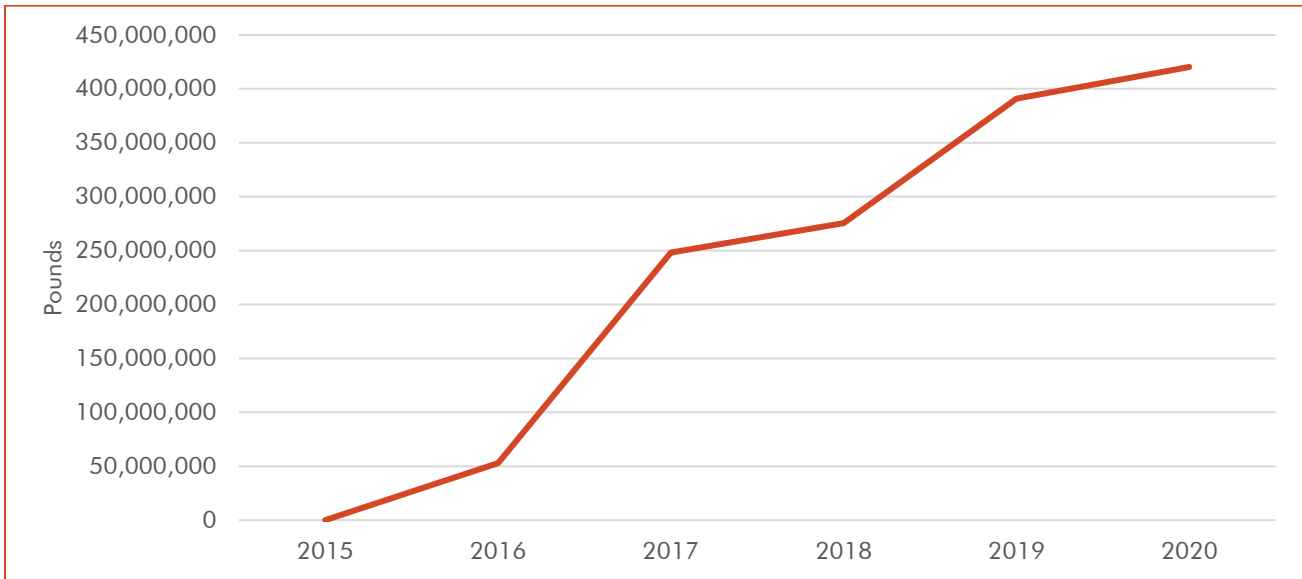
¹⁰ FedEx shipping calculator

Figure 2-31: Air Cargo Volumes at Hector International Airport



Source: BTS

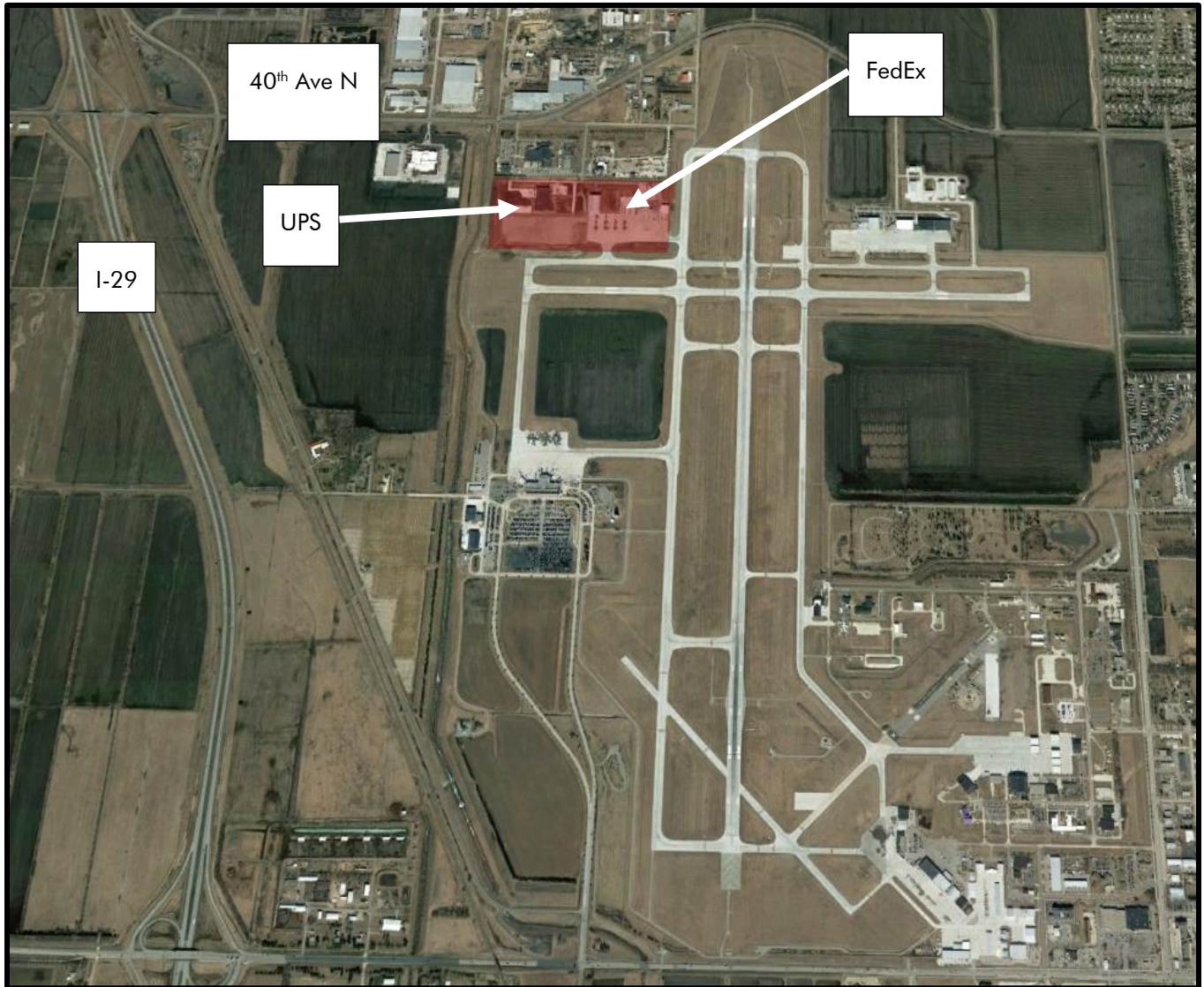
Figure 2-32: All-cargo Landed Weight at Hector International Airport



Source: BTS

Figure 2-33 shows the locations of FedEx and UPS air cargo facilities at Hector International Airport. The key highway access route is 40th Avenue N from I-29.

Figure 2-33: Locations of FedEx and UPS Air Cargo Facilities at Hector International Airport



Source: Google Maps (2022)

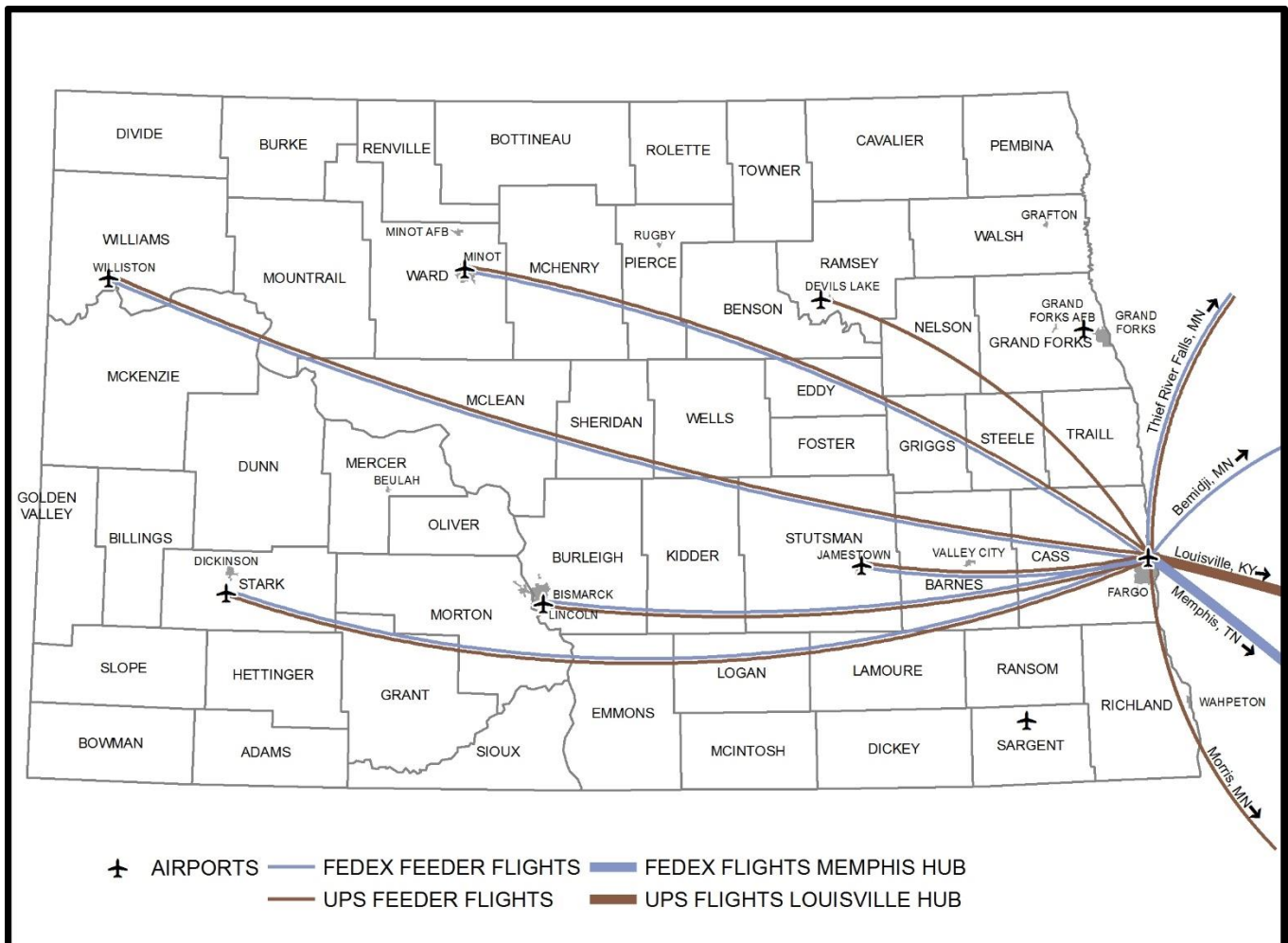
INTEGRATOR FEEDER OPERATIONS

To serve smaller towns and rural communities, the integrators use feeder flights that operate from regional airports and connect to feeder hub airports such as Hector International Airport. Six regional airports in North Dakota, and several regional airports in Minnesota, are part of the FedEx and UPS feeder networks using Hector International Airport. The feeder network is illustrated in Figure 2-34 and includes the following airports:

- Williston Basin International Airport (XWA)
- Minot International Airport (MOT)
- Devils Lake Regional Airport (DVL)
- Dickinson–Theodore Roosevelt Regional Airport (DIK)
- Bismarck Airport (BIS)

- Jamestown Regional Airport (JMS)

Figure 2-34: FedEx and UPS Air Cargo Networks in North Dakota



Depending on cargo volumes, each regional airport could be served by one to three feeder flights per day for each integrator. FedEx and UPS usually contract these feeder operations to airlines such as Corporate Air, Alpine Express, and Bemidji Aviation. These airlines typically operate aircraft such as the Beech 1900D (payload of 4,800 pounds) and Cessna 208 Caravan (payload of 3,070 pounds).

PASSENGER AIRLINE CARGO

Air cargo, including mail, can be carried in the belly holds of passenger aircraft. BTS data for 2019 identified Delta Air Lines as the only scheduled passenger airline carrying air cargo into and out of North Dakota (Table 2-19).

Table 2-19. Air Cargo Carried on Passenger Flights (pounds) (2019)

Direction	Bismarck	Hector International
Outbound	11,072	45,826
Inbound	27,940	81,550

Source: BTS

Even though other passenger airlines operate from North Dakota airports, they might not be transporting freight for several reasons. These include:

- The passenger aircraft that are typically used to serve North Dakota airports have very little cargo space available. Despite regional aircraft having changed from turboprop to jet aircraft in recent years, the aircraft hold space is still small.
- Increasing and more-stringent security practices are associated with transporting cargo on passenger aircraft. The Transportation Security Administration (TSA) requires 100% of cargo transported on a passenger flight to be screened at a level of security commensurate with the level of security for the screening of passenger checked baggage. Many regional airports/small airline facilities do not have this equipment.

AD HOC CARGO MOVEMENTS

The state’s airports occasionally support ad hoc cargo movements. For example, cattle exported to Kazakhstan which used 12 flights to move 2,000 cattle, or one-off flights that might deliver important part of machinery. Aircraft size can range from single propeller aircraft to dedicated B747 freighters, such as those used in the cattle airlift.

STRATEGIC FREIGHT SYSTEM AIRPORT DESIGNATIONS

Table 2-20 identifies the state’s airports classification within the Strategic Freight System according to the designation criteria for airports associated with air cargo in Table 2-1.

Table 2-20: Strategic Freight System Airport Classification

Level One	Level Two	Level Three
<ul style="list-style-type: none"> • Bismarck • Grand Forks Air Force Base (AFB) • Hector International • Minot AFB 	<ul style="list-style-type: none"> • Williston Basin International • Devils Lake Regional • Dickinson–Theodore Roosevelt Regional • Jamestown Regional • Minot International 	None

MILITARY FACILITIES AND INSTALLATIONS

The U.S. military has a significant and strategic presence in North Dakota. The U.S. military depends on the North Dakota freight system to move cargo to not only support the installations, but also to deploy personnel and equipment for national defense purposes.

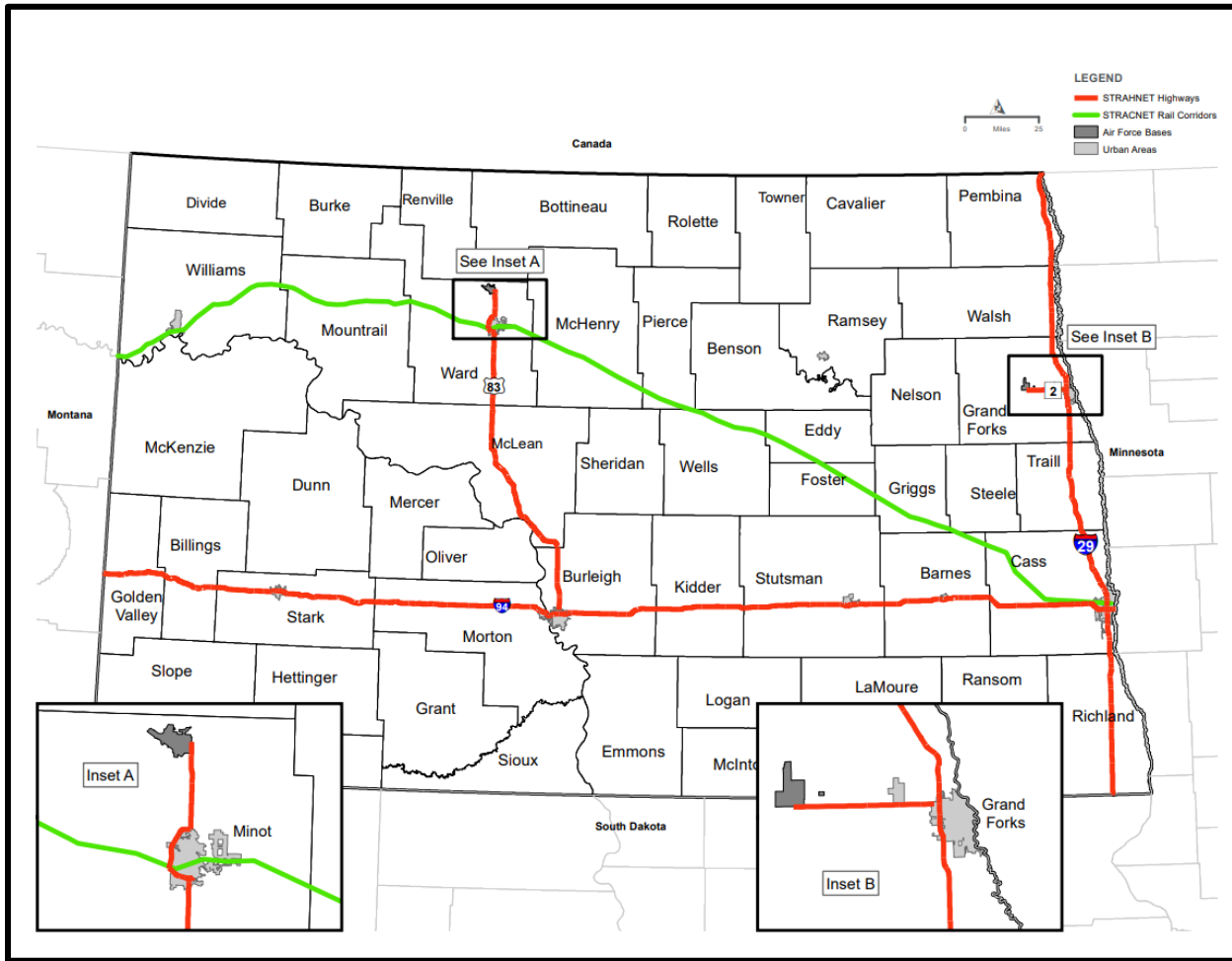
Diverse and complex supply chains are necessary to efficiently and reliably provide logistics support to these military sites. Large amounts of fuel, food, ammunition, maintenance, equipment & materials, and medical supplies are critical to maintaining these units in a combat-ready posture. Transportation infrastructure including highways, rail, and air are critical to supporting these supply chains and to support deployment of units. In addition to providing mainline routes for defense purposes, these lines also provide access to major defense contractors and logistics sites that are critical to national defense activities.

To meet this critical need, the Strategic Highway Network (STRAHNET) and the STRACNET were developed by the U.S. Department of Defense in coordination with FHWA. The STRAHNET and STRACNET are networks of highways

and rail lines, respectively, and supports the U.S. military with access, continuity, and emergency capabilities for defense purposes. The state’s military installations serve as freight generators, consumer markets and rely on connectivity to the freight transportation system.

In North Dakota the STRAHNET system includes two interstate highways and portions of two U.S. highways, while the STRACNET system includes BNSF lines through Williston, Minot, and Fargo as illustrated in Figure 2-35.

Figure 2-35: STRAHNET and STRACNET Systems in North Dakota



Military airports can accommodate large cargo aircraft to support and sustain military exercises and operations at home and abroad. Minot Air Force Base (AFB) is unusual among U.S. Air Force installations as it is one of only three strategic missile bases in the U.S. The base supports and maintains numerous missile silos, containing LGM-30G Minuteman intercontinental ballistic missiles (ICBM), which are in multiple locations throughout North Dakota and adjacent states. The 91st Missile Wing is responsible for the security and deployment of the only land-based ICBMs the U.S. operates. Also located at Minot AFB is the 5th Bomb Wing, which uses B52H bombers.

In North Dakota, a series of Transporter Erector Routes are designated for those roads that are used by missile Transporter-Erector vehicles to transport missiles between facilities. These vehicles can weigh nearly 144,000 pounds and can only travel on approved routes which are designed, constructed, and maintained to very high standards. These routes comprise 900 miles of paved State and County Roads and over 300 miles of gravel County and Township roads.

Grand Forks Air Force Base hosts the 319th Reconnaissance Wing and supporting units and the Grand Sky Business Park and Unmanned Aerial Systems (UAS).

One characteristic of these military airports is that they have longer runways than their civilian counterparts in the state. Minot AFB's runway is 13,000 feet long, Grand Forks AFB's runway is 12,300 feet long, while Hector International Airport has the longest civilian runway at 9,000 feet. Most of the other commercial airports have runways about 7,400 feet long.

The North Dakota Army National Guard consists of various unit types which can support national and state missions. The Camp Grafton Training Center operated by the North Dakota National Guard, near Devils Lake, serves to support training for American fighting forces. The North Dakota Air National Guard includes the 119th Wing based in Fargo.

The North Dakota National Guard Joint Forces Headquarters is located in Bismarck. In addition to command-and-control functions for statewide national guard units, the Joint Forces location includes centralized logistics activities for receiving and distributing freight.

WATERWAYS

While North Dakota has a network of rivers, they are primarily used for drainage and irrigation, even though some rivers have historically been used for goods movement, such as the Red River being used for grain transportation in the early 20th Century, although goods are no longer moved on the state's waterways. Lack of connectivity with the state's waterways to the wider inland navigation system (namely the Mississippi River) and competition from other transportation modes also led to the decline of waterway transportation in the state. Despite North Dakota's landlocked location in the Upper Great Plains, maritime transportation of goods and commodities are important for trade. The Logistics Park of North Dakota and Minot facilitates the movement of international containers destined for overseas markets via Seattle and trains move agricultural products from terminals across the state to ports in the Pacific Northwest for export. Agricultural products also flow east by rail for potential export via the Port of Duluth and south to ports in Louisiana using rail or a combination of barge and rail.

CHAPTER 3: GOODS MOVEMENT DATA AND CURRENT/FORECAST DEMAND

INTRODUCTION

This chapter describes the various data sets used for State Freight and Rail Plan analyses. It presents an inventory of the most important sources, and a detailed summary of key findings from two important multimodal freight datasets – the U.S. Department of Transportation (USDOT) Freight Analysis Framework (FAF version 5.2), and the Transearch Database (a commercial product of IHS Markit). These datasets support the entire plan by providing estimates of current and projected future goods movement demand by mode, commodity, and origin-destination.

OVERVIEW OF GOODS MOVEMENT DATA SOURCES

TYPES OF DATA

Freight Plans and Rail Plans utilize various types of data addressing economic conditions, transportation system utilization, and other factors. As a starting point for the planning process, an inventory of relevant resources was developed. These sources are divided into four general source types (Federal, State, Commercial, and Canadian). In Table 3-1, each source is identified by name and the application or utility of each data source is described.

With respect to the commercial datasets listed in Table 3-1, North Dakota has acquired both Transearch and StreetLight data for the State Freight and Rail Plan. Key findings from both are presented in this Chapter.

Table 3-1: Inventory of State Freight and Rail Plan Data Resources

Type	Name	Utility / Application
Federal	Freight Analysis Framework (FAF version 5.2)	State and Business Economic Area (BEA)-level flows by mode/commodity/ origin-destination - 2017 base year plus forecasts
	Surface Transportation Board (STB) Public Use Waybill Sample	Non-confidential sampled data on rail commodities, car types, carriers, origin-destination moves, etc.
	National Performance Measurement Research Data Set (NPMRDS)	INRIX-sourced travel time data for the NHS, bottleneck analysis, and Travel Time Index
	FHWA Freight Mobility Trends Tool	Processed NPMRDS and Highway Performance Monitoring System (HPMS) data for bottleneck identification
	FHWA HEPGIS web application	Interactive mapping of NHS/federal-aid facilities, travel time data, crash data, pavement condition, Title VI / Environmental Justice communities, air quality, cross border, and FAF data
	National Transportation Atlas Database (NTAD)	Mix of available data for road, rail, water, and air freight facility/network attributes and performance, in Geographic Information Systems (GIS)
	FRA Rail Safety Data with NDDOT Processing	Rail safety databases and publications

Type	Name	Utility / Application
	Office of Pipeline Safety	Pipeline network and safety databases and publications
	BTS Air Cargo data	Air cargo databases and publications
	BTS Transtats	Library of multimodal transportation and economic data and publications across a range of federal agencies
	Commodity Flow Survey and Census Trade Database	Trade by industry type, commodity, and mode, domestic and international
	Quarterly Census of Employment and Wages	Freight employment and wages by state and county
	County Business Patterns	Freight establishments, employment and payroll, by state, county and zip code
	FRA Quarterly Amtrak Report	Amtrak service reporting
	Energy Information Administration	Energy production and transportation data
	Amtrak Information	Ridership, station patronage, station profiles, ADA compliance
	Department of Agriculture	Agricultural production and transportation
State	L RTP (<i>Transportation Connection</i>) and prior freight plan/rail plan	Analyses and findings to be carried forward
	State and regional economic and transportation data programs	Forecasts, condition and performance, truck counts and WIM data, et al
	University resources	Industry data, Geographic Roadway Information Tool
	Rail crossing and safety data	Crossing inventory, crossing crash data
	Stakeholder and public engagement	Operations, challenges, needs, opportunities
	Freight Class I and short line surveys	Rail infrastructure and facility descriptions; short line traffic, rail needs, opportunities
Commercial	Transearch (Acquired)	Most detailed multimodal commodity flow model available – includes public version of rail waybill
	Streetlight (Acquired)	Real-time truck travel data – different sources, population samples, and pre-processing
	Moodys, InfoUSA	Business establishment data
	IMPLAN, REMI	Input-output modeling tools
Canadian	Statistics Canada	Border crossing data

FREIGHT ANALYSIS FRAMEWORK MULTIMODAL DATA AND FORECASTS

INTRODUCTION

The Freight Analysis Framework (FAF) is produced by FHWA. It provides estimates of tonnage and value moving to, from, and within each state and the nation as a whole. Data is tabulated by trade type (domestic or international), domestic mode, foreign mode, origin/destination state or country, and general commodity group. FAF version 5.2

includes data for base year 2017 and base, high, and low forecasts through 2050. The most current documentation is available at: https://ops.fhwa.dot.gov/freight/freight_analysis/faf/.

FAF is an invaluable tool for anyone interested in freight movement and represents the best available single source for describing freight tonnage and value across the entire U.S. transportation system. Its limitations are geographic specificity (it does not report county level activity), commodity specificity (it reports only to the 2-digit commodity level), and data consistency (it may not always agree with other data models or sources). Within these limitations, the best use of FAF is for characterizing North Dakota statewide activity in the context of national and international trade, and to support in-depth investigations of specific modes, commodities, and trading patterns.

For FAF 5.2, the year 2017 was used to evaluate representative base year conditions, recognizing that actual current conditions have been impacted by the COVID-19 pandemic. The analyses are generally organized around the concept of “flow types.” A flow type is the movement of goods defined by direction and function with respect to North Dakota. For this analysis, flows¹¹ are defined as:

- ND origin to ND destination
- ND origin to Other State destination
- Other State origin to ND destination
- Int'l Gateway (calculated as import moves entering the U.S. via North Dakota border crossings (or other gateways) and continuing to other states, and vice-versa)
- Other Estimated Through (a flow type added to FAF data through post-processing, where shares of trade between other states were manually assigned to North Dakota highway and rail networks based on analysis of potential routes and professional judgment about likely volume shares; this estimate is provided for order-of-magnitude comparisons with other flow types).

Four types of summary analyses are presented in this chapter:

- Summaries by **Flow Type** consider flow type in combination with:
 - **Trade Type**, which defines whether the flows are related to U.S. imports, U.S. exports, or domestic moves within and between U.S. states
 - **Domestic Mode**,¹² which defines how freight is moving within or between U.S. states; these include truck, rail (typically bulk commodity railcars), multiple modes (typically intermodal rail), air (including air-truck moves), pipeline, water, and unknown

¹¹ There are twenty different flow types of interest in the FAF data -- four directions (inbound to ND, outbound from ND, within ND, and through ND) times five trades (domestic, import via ND, import via Other State, export via ND, export via Other State). To focus on the most relevant findings, these twenty possible flow types have been compressed to the five listed above, three capturing North Dakota origin and destination volumes and two capturing pass-through volumes. Due to this compression, readers should remember that: (1) freight moving from ND to ND, ND to Other State, and Other State to ND may be purely domestic (with an ultimate U.S. origin or destination) or import/export (where the moves are connecting to land border crossings or airports in North Dakota or land border crossings, seaports, or airports in other states); and (2) summary tabulations of import and export moves will include both International Gateway flows as well as North Dakota origin-destination flows.

¹² Note that FAF associates every international move with a corresponding domestic move (to or from the import/export facility or gateway), except when the ultimate origin or destination is at the import/export facility itself, so nearly all international moves actually have a domestic mode.

- **Commodity Group**, based on up to 45 “2-digit level” level Standard Classification of Transported Goods
 - Summaries by **Origin and Destination State** show the volumes associated with each state trading with North Dakota. Note that ND to ND flows both originate and terminate in North Dakota, and therefore are counted as both originated ND flows and terminated ND flows. However, in the Summaries by Flow Type, the ND-to-ND tonnage is counted only once (as a flow type) to avoid double-counting.
 - Summaries of **Commodities by Trade Type and Domestic Mode** provide additional analysis of the relationships between commodity groups, trade types, and domestic modes.
 - Summaries by **International Commodities by Foreign Mode and Origin-Destination** provide additional analysis of import and export activity. Foreign modes are defined the same way as domestic modes. Foreign origins and destinations are defined in terms of global trading regions and includes Canada; Mexico; Rest of Americas (Central and South America); Africa; Europe; Eastern Asia (China, Japan, Korea); Southeast Asia and Oceania (Vietnam, Cambodia, Thailand, Singapore, Australia, Indonesia, et al); and South, Central, and Western Asia (India, Pakistan, Bangladesh, and the Middle East).

Next, FAF forecasts for years 2030 and 2045 were compared against base year 2017 volumes. The differences – representing projected changes in tons and value – were tabulated.

To support these analyses and provide a continuing resource for North Dakota, a FAF “dashboard” application was created using a software package called Tableau. The dashboard allows the entire FAF dataset to be filtered for specific variables and then produces corresponding summary tables and graphics. Many thousands of filtering combinations can be explored and some of the most interesting are reproduced in this chapter. These include:

- Year 2017 tons and value for International Gateway flows
- Year 2017 tons and value for pipeline, truck, and rail domestic modes
- Year 2017 tons for the top five tonnage commodities, plus any other top five value commodities

CURRENT DEMAND

SUMMARIES BY FLOW TYPE

North Dakota handled more than 592 million tons of freight in 2017. Of this, 377 million tons (64%) was domestic trade, 170 million tons (29%) was import trade, and 45 million tons (8%) was export trade. Looking at flow types, international gateway moves (flows between Canada and other U.S. states passing through North Dakota) represented 181 million tons (31% of all North Dakota tonnage), which highlights the critical role of North Dakota’s freight transportation infrastructure in supporting international trade for other states. Other flow types were North Dakota to North Dakota moves at 164 million tons (28%); North Dakota to Other State moves at 154 million tons (26%); Other State to North Dakota moves at 45 million tons (8%); and an additional 49 million tons (8%) as Other Estimated Through traffic. This is summarized in Table 3-2.¹³

¹³ Throughout this document, values and percentages in text and tables have been rounded to simplify the presentation and discussion and may not always sum to 100%. Blank cells in tables are true “zero” values; cells with “0.0” or “0.0%” are greater than zero but below the rounding threshold. Percentages are based on full-precision values for tons or dollars.

Table 3-2: Tons (Million) by Flow Type and Trade (2017)

Trade	Int'l Gateway	ND to ND	ND to Other State	Other State to ND	Other Est. Through	Total
Domestic	N/A	148.4	150.5	39.5	38.7	377.1
Import	155.6	5.6	-	5.7	3.1	170.0
Export	25.4	9.4	3.0		7.6	45.4
Total	181.0	163.5	153.5	45.2	49.4	592.4

Source: Analysis of USDOT Freight Analysis Framework 5.2. Note that row or column totals may not sum precisely due to rounding.

As shown in Table 3-3, North Dakota handled an estimated \$296 billion in freight value in 2017. Around \$179 billion (60%) was domestic, \$75 billion (25%) was import, and \$43 billion (14%) was export. The highest value (\$88 billion or 30%) was associated with Other Estimated Through flows, which largely represent higher-value goods moving by long-haul truck and rail between the Pacific Northwest and the Midwest. The next highest value (\$83 billion or 28%) was for International Gateway trade between Canada and other U.S. states. Around 58% of North Dakota freight movement value was associated with domestic and international pass-through moves – again highlighting the importance of North Dakota transportation infrastructure in supporting freight trade and transportation for the nation.

Table 3-3: Value (\$B) by Flow Type and Trade (2017)

Trade	Int'l Gateway	ND to ND	ND to Other State	Other State to ND	Other Est. Through	Total
Domestic	N/A	30.8	56.9	28.1	63.1	178.9
Import	57.7	1.5	-	2.0	13.5	74.8
Export	25.3	4.0	1.7	-	11.4	42.5
Total	83.1	36.2	58.7	30.1	88.1	296.2

Source: Analysis of USDOT Freight Analysis Framework 5.2

As shown in Table 3-4 and Table 3-5, pipelines carried around 47% of North Dakota freight tonnage, and were especially important for international gateway moves and for moves from North Dakota to other states. Trucks handled around 24% of tonnage, with more than half for moves within North Dakota. Rail handled around 20% of tonnage, with around two-thirds for International Gateway and Other Estimated Through moves (“overhead” traffic). “Unknown” modes comprised a substantial 8% of total tonnage and nearly one-third of the within-state tonnage; FAF may have suppressed the mode identity due to confidentiality or sample size limitations. Multiple Modes (intermodal) and Air had small shares of freight tonnage.

Table 3-4: Tons (M) by Flow Type and Domestic Mode (2017)

Domestic Mode	Int'l Gateway	ND to ND	ND to Other State	Other State to ND	Other Est. Through	Total
Pipeline	126.7	29.2	102.4	17.5	-	275.7
Truck	8.7	77.0	16.4	22.0	17.5	141.6
Rail	45.5	7.7	27.4	3.8	31.9	116.3
Unknown	0.1	49.4	-	-	-	49.5
Multiple	-	0.2	7.3	1.8	-	9.3

Air	-	-	-	-	-	-
Total	181.0	163.5	153.5	45.2	49.4	592.4

Source: Analysis of USDOT Freight Analysis Framework 5.2

Table 3-5: Share of Tons (Million) by Flow Type and Domestic Mode (2017)

Domestic Mode	Int'l Gateway	ND to ND	ND to Other State	Other State to ND	Other Est. Through	Total
Pipeline	21.4%	4.9%	17.3%	2.9%	-	46.5%
Truck	1.5%	13.0%	2.8%	3.7%	3.0%	23.9%
Rail	7.7%	1.3%	4.6%	0.6%	5.4%	19.6%
Unknown	0.0%	8.3%	0.0%	-	-	8.4%
Multiple	0.0%	0.0%	1.2%	0.3%	-	1.6%
Air	0.0%	0.0%	0.0%	0.0%	-	0.0%
Total	30.5%	27.6%	25.9%	7.6%	8.3%	100.0%

Source: Analysis of USDOT Freight Analysis Framework 5.2.

As shown in Table 3-6 and

Table 3-7 trucks carried 54% of North Dakota freight value, with the largest share for Other Estimated Through moves. Pipelines handled 27% of value, with more than half associated with International Gateway moves. Rail handled 14% of value, with almost three-fourths associated with International Gateway and Other Estimated Through moves. Multiple Modes, which represented only 2% of tonnage, represented 5% of value. Air represented less than 1% of value.

Table 3-6: Value (\$Billion) by Flow Type and Domestic Mode (2017)

Domestic Mode	Int'l Gateway	ND to ND	ND to Other State	Other State to ND	Other Est. Through	Total
Truck	24.3	25.3	14.1	20.5	76.0	160.3
Pipeline	40.2	7.3	28.6	2.3	-	78.4
Rail	18.6	2.0	8.3	0.9	12.1	41.9
Multiple	-	0.8	7.2	5.8	-	13.8
Unknown	-	0.8	0.2	-	-	1.0
Air	0.1	-	0.2	0.5	-	0.8
Total	83.1	36.2	58.7	30.1	88.1	296.2

Source: Analysis of USDOT Freight Analysis Framework 5.2

Table 3-7: Share of Value (\$Billion) by Flow Type and Domestic Mode (2017)

Domestic Mode	Int'l Gateway	ND to ND	ND to Other State	Other State to ND	Other Est. Through	Total
Truck	8.2%	8.5%	4.8%	6.9%	25.7%	54.1%
Pipeline	13.6%	2.5%	9.7%	0.8%	-	26.5%
Rail	6.3%	0.7%	2.8%	0.3%	4.1%	14.1%
Multiple	0.0%	0.3%	2.4%	2.0%	-	4.7%
Unknown	0.0%	0.3%	0.1%	-	-	0.3%
Air	0.0%	0.0%	0.1%	0.2%	-	0.3%
Total	28.1%	12.2%	19.8%	10.2%	29.7%	100.0%

Source: Analysis of USDOT Freight Analysis Framework 5.2.

As shown in Table 3-8 and Table 3-9, Crude Petroleum accounted for 35% of North Dakota freight tonnage, with more than half for International Gateway trade; most of the remainder was from North Dakota to Other States. Other Coal and Petroleum products represented 13% of tonnage, mostly trade between North Dakota and Other States. Cereal Grains represented 12% of tonnage, with nearly half associated with moves within North Dakota. Coal represented 11% of tonnage, most of which was moving within North Dakota. Agricultural Products represented 7% of tonnage, with around half moving within state. Other important tonnage commodity groups included Fertilizers, Other Prepared Foodstuffs, Fuels (including Ethanol and Aviation Fuel), Wood Products, and Natural Sands.

Table 3-8: Tons (Million) by Flow Type and Commodity Group (2017)

Commodity Group (SCTG2) (Top 10)	Int'l Gateway	ND to ND	ND to Other State	Other State to ND	Other Est. Through	Total
Crude Petroleum	116.1	5.9	82.1	-	-	204.2
Other Coal and Petroleum Products	8.1	19.5	31.0	19.7	0.8	79.1
Cereal Grains (includes seed)	3.0	35.0	14.1	9.4	9.9	71.5
Coal	0.4	50.3	-	1.0	11.7	63.4
Agricultural Products (e.g., Feed, Grain, Forage)	1.0	21.2	9.9	1.9	6.9	40.8
Fertilizers	10.0	1.0	0.0	0.9	0.1	12.1
Other Prepared Foodstuffs, Fats and Oils	2.6	1.0	4.3	0.6	3.6	12.0
Gasoline, Aviation Turbine Fuel, and Ethanol	5.4	4.3	1.9	0.1	0.2	12.0
Wood Products	6.8	0.2	0.1	0.4	3.0	10.5
Natural Sands	7.0	0.3	-	1.8	0.6	9.6

Source: Analysis of USDOT Freight Analysis Framework 5.2

Table 3-9: Share of Tons (Million) by Flow Type and Commodity Group (2017)

Commodity Group (SCTG2) (Top 10)	Int'l Gateway	ND to ND	ND to Other State	Other State to ND	Other Est. Through	Total
Crude Petroleum	19.6%	1.0%	13.9%	0.0%	0.0%	34.5%
Other Coal and Petroleum Products	1.4%	3.3%	5.2%	3.3%	0.1%	13.4%
Cereal Grains (includes seed)	0.5%	5.9%	2.4%	1.6%	1.7%	12.1%
Coal	0.1%	8.5%	0.0%	0.2%	2.0%	10.7%
Agricultural Products (e.g., Feed, Grain, Forage)	0.2%	3.6%	1.7%	0.3%	1.2%	6.9%
Fertilizers	1.7%	0.2%	0.0%	0.2%	0.0%	2.0%
Other Prepared Foodstuffs, Fats and Oils	0.4%	0.2%	0.7%	0.1%	0.6%	2.0%
Gasoline, Aviation Turbine Fuel, and Ethanol	0.9%	0.7%	0.3%	0.0%	0.0%	2.0%
Wood Products	1.1%	0.0%	0.0%	0.1%	0.5%	1.8%
Natural Sands	1.2%	0.0%	0.0%	0.3%	0.1%	1.6%

Source: Analysis of USDOT Freight Analysis Framework 5.2

As shown in Table 3-10 and Table 3-11, Crude Petroleum was also the value leader, with 22% of North Dakota freight value. Many other commodity groups were important based on value, including Machinery (9%); Motorized and Other Vehicles (6%); Agricultural Products (5%); Other Coal and Petroleum Products (5%); Other Prepared Foodstuffs (4%); Electronics (4%); and Cereal Grains (4%).

Table 3-10: Value (\$Billion) by Flow Type and Commodity Group (2017)

Commodity Group (SCTG2) (Top 10)	Int'l Gateway	ND to ND	ND to Other State	Other Est. Through	Other State to ND	Total
Crude Petroleum	37.5	1.9	25.9	-	-	65.2
Machinery	6.8	2.0	4.3	9.7	3.3	26.2
Motorized and Other Vehicles	4.5	1.3	1.5	7.8	3.4	18.4
Agricultural Products (e.g., Feed, Grain, Forage)	0.6	5.1	4.0	4.5	0.8	15.0
Other Coal and Petroleum Products	0.9	3.6	5.9	0.2	3.0	13.5
Other Prepared Foodstuffs, Fats and Oils	2.0	0.6	2.2	7.6	0.9	13.2
Electronic and Other Electrical Equipment and Components	1.4	0.8	1.1	7.6	2.1	13.1
Cereal Grains (includes seed)	0.6	5.0	2.7	1.7	1.5	11.5
Plastics and Rubber	4.6	0.5	0.5	3.5	0.9	9.9
Articles of Base Metal	1.8	0.6	2.1	3.0	1.8	9.4

Source: Analysis of USDOT Freight Analysis Framework 5.2

Table 3-11: Share of Value (\$Billion) by Flow Type and Commodity Group (2017)

Commodity Group (SCTG2) (Top 10)	Int'l Gateway	ND to ND	ND to Other State	Other Est. Through	Other State to ND	Total
Crude Petroleum	12.6%	0.6%	8.7%	0.0%	0.0%	22.0%
Machinery	2.3%	0.7%	1.4%	3.3%	1.1%	8.8%
Motorized and Other Vehicles (includes parts)	1.5%	0.4%	0.5%	2.6%	1.1%	6.2%
Agricultural Products (e.g., Feed, Grain, Forage)	0.2%	1.7%	1.4%	1.5%	0.3%	5.1%
Other Coal and Petroleum Products	0.3%	1.2%	2.0%	0.1%	1.0%	4.6%
Other Prepared Foodstuffs, Fats and Oils	0.7%	0.2%	0.7%	2.6%	0.3%	4.5%
Electronic and Other Electrical Equipment and Components	0.5%	0.3%	0.4%	2.6%	0.7%	4.4%
Cereal Grains (includes seed)	0.2%	1.7%	0.9%	0.6%	0.5%	3.9%
Plastics and Rubber	1.5%	0.2%	0.2%	1.2%	0.3%	3.3%
Articles of Base Metal	0.6%	0.2%	0.7%	1.0%	0.6%	3.2%

Source: Analysis of USDOT Freight Analysis Framework 5.2

ORIGINATING AND TERMINATING TONNAGE

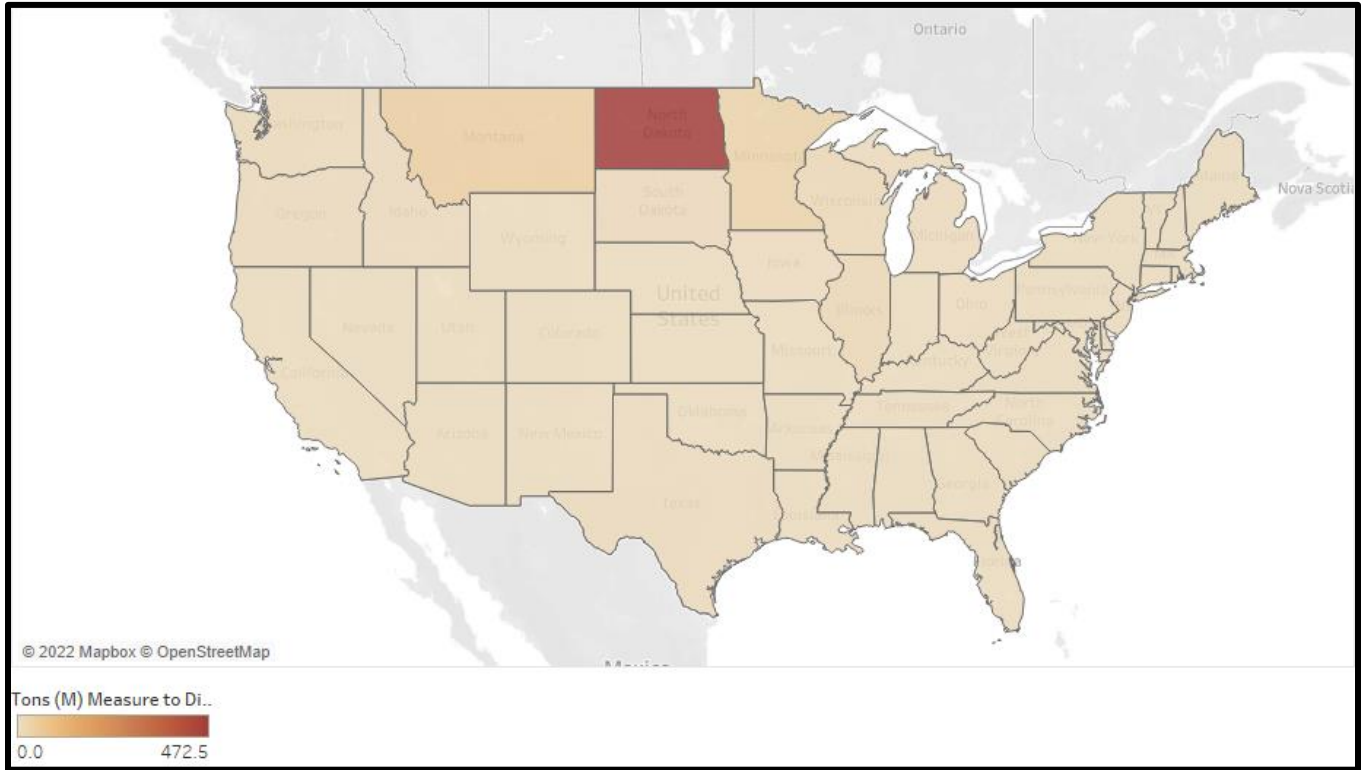
Tonnage associated with North Dakota (all directions, all modes, all types) originated primarily in North Dakota itself (80%), followed by Montana (6%), Minnesota (4%), Illinois (2%), and Wisconsin (2%). See Table 3-12 and Figure 3-1.

Table 3-12: North Dakota-associated Tons (Million) by Top Ten Origin States (2017)

Domestic Origin State	Tons	Share of Total
North Dakota	472.5	79.8%
Montana	34.0	5.7%
Minnesota	24.6	4.1%
Illinois	11.7	2.0%
Wisconsin	9.8	1.7%
South Dakota	5.8	1.0%
Washington	5.4	0.9%
Texas	3.6	0.6%
Idaho	3.3	0.5%
Oregon	3.0	0.5%

Source: Analysis of USDOT Freight Analysis Framework 5.2

Figure 3-1: North Dakota-associated Tons (Million) by Origin State (2017)



Source: Analysis of USDOT Freight Analysis Framework 5.2

The leading state for Originating Value was North Dakota (52%), followed by Washington (8%), Illinois (5%), Minnesota (4%), Oregon (3%), Wisconsin (2%), and Michigan (2%). See

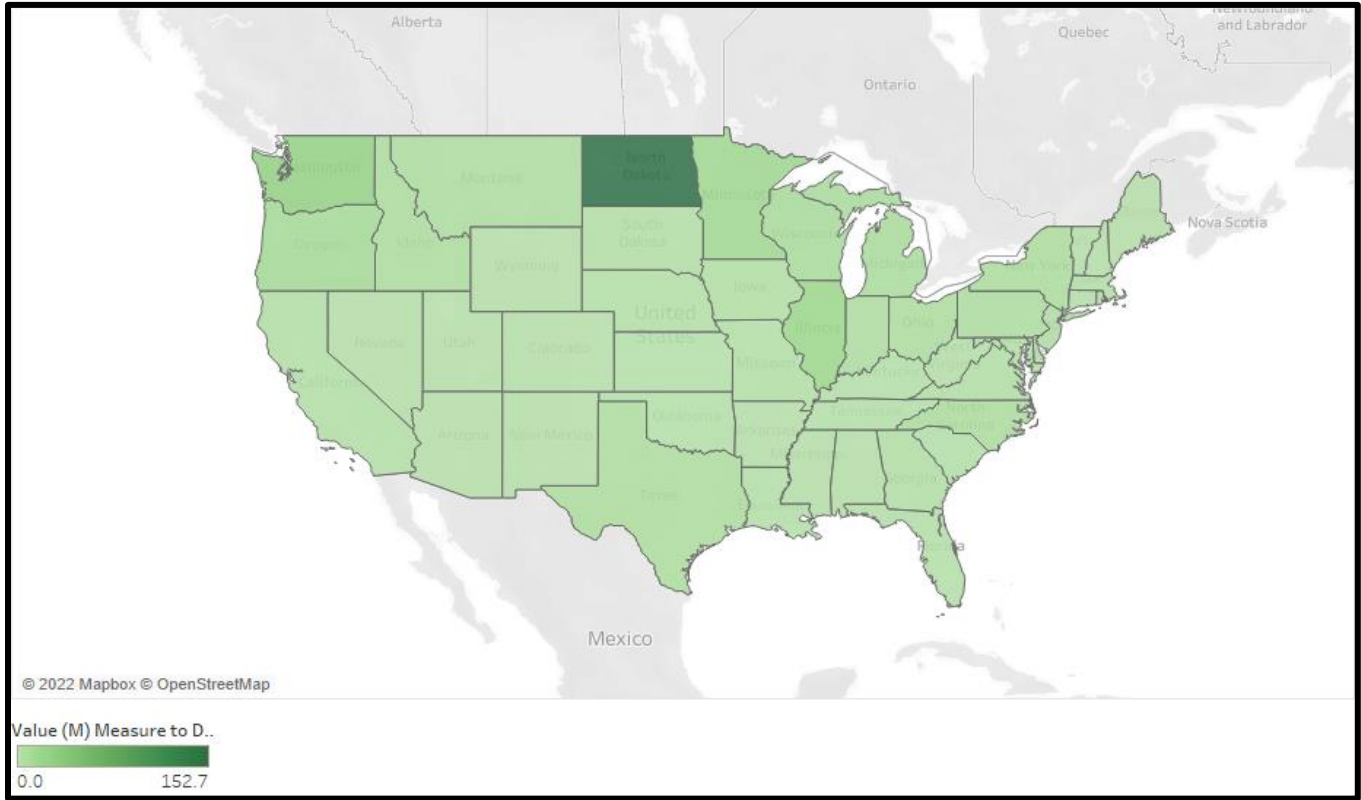
Table 3-13 and Figure 3-2.

Table 3-13: North Dakota-associated Value (\$Billion) by Origin State (2017)

Domestic Origin State (Top Ten)	Value	Share of Total
North Dakota	152.7	51.5%
Washington	22.9	7.7%
Illinois	15.7	5.3%
Minnesota	13.0	4.4%
Oregon	9.4	3.2%
Wisconsin	7.2	2.4%
Michigan	6.4	2.2%
North Carolina	5.8	1.9%
Texas	5.6	1.9%
Ohio	5.4	1.8%

Source: Analysis of USDOT Freight Analysis Framework 5.2

Figure 3-2: North Dakota-associated Value (\$Billion) by Origin State (2017)



Source: Analysis of USDOT Freight Analysis Framework 5.2

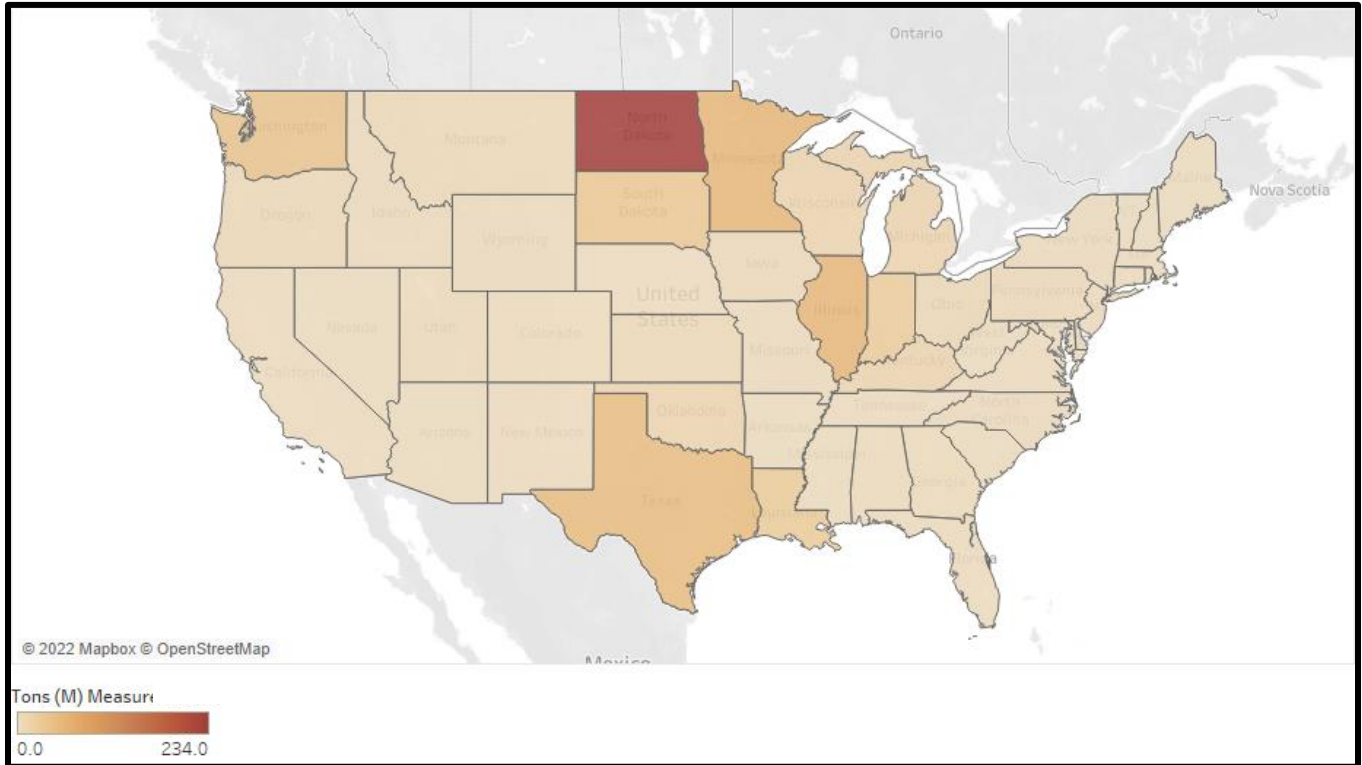
Tonnage originating in North Dakota (all directions, all modes, all types) primarily terminated in North Dakota (40%), followed by Minnesota (9%), Illinois (9%), Texas (8%), Washington (6%), South Dakota (5%), Louisiana (4%), and Indiana (4%). See Table 3-14 and Figure 3-3.

Table 3-14: North Dakota-associated Tons (Million) by Destination State (2017)

Domestic Origin State	Tons	Share of Total
North Dakota	234.0	39.5%
Montana	54.4	9.2%
Illinois	53.2	9.0%
Texas	46.4	7.8%
Washington	34.2	5.8%
South Dakota	28.8	4.9%
Louisiana	22.8	3.8%
Indiana	22.7	3.8%
Michigan	10.0	1.7%
Wisconsin	10.0	1.7%

Source: Analysis of USDOT Freight Analysis Framework 5.2

Figure 3-3: North Dakota-associated Tons (Million) by Destination State (2017)



Source: Analysis of USDOT Freight Analysis Framework 5.2

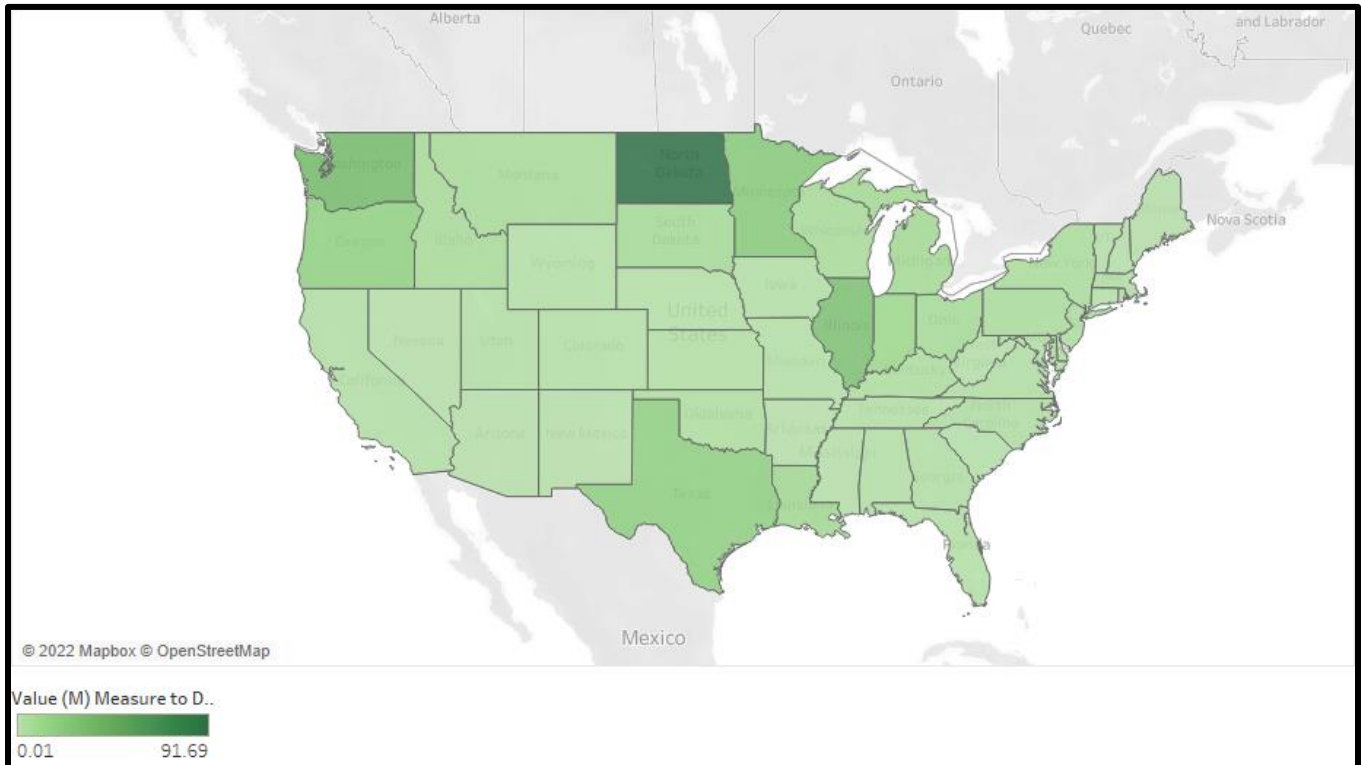
The leading state for Terminating Value was North Dakota (31%), followed by Washington (11%), Illinois (9%), Minnesota (7%), Texas (6%), and Oregon (5%). See Table 3-15 and Figure 3-4.

Table 3-15: North Dakota-associated Value (\$Billion) by Destination State (2017)

Domestic Origin State (Top Ten)	Value	Share of Total
North Dakota	91.7	31.0%
Washington	32.2	10.9%
Illinois	27.4	9.2%
Minnesota	21.7	7.3%
Texas	16.7	5.6%
Oregon	14.9	5.0%
Indiana	9.3	3.1%
Louisiana	7.4	2.5%
Michigan	7.0	2.4%
South Dakota	6.5	2.2%

Source: Analysis of USDOT Freight Analysis Framework 5.2

Figure 3-4: North Dakota-associated Value (\$Billion) by Destination State (2017)



Source: Analysis of USDOT Freight Analysis Framework 5.2

COMMODITIES BY TRADE TYPE AND DOMESTIC MODE

Each of North Dakota’s top ten commodities has a characteristic association with certain trade types. As shown in Table 3-16 and Table 3-17, more than half of Crude Petroleum tonnage was imported (“imports” includes imports to North Dakota destinations plus imports passed through to other states). Almost 80% of Other Coal and Petroleum Products tonnage was domestic, and the rest was import. Cereal Grains and Coal tonnage were primarily domestic. Agricultural Products tonnage were primarily domestic, but with a substantial export component. Fertilizer tonnage was largely imported, Other Prepared Foodstuffs tonnage were primarily domestic, but had both import and export components. Nearly two-thirds of fuels (Aviation and Ethanol) were exported, and the remainder was domestic. Around two-thirds of Wood Products tonnage was imported and most of the remainder was domestic. More than two-thirds of Natural Sands tonnage was exported, and the rest was domestic.

Table 3-16: Tons (Million) by Commodity and Trade Type (2017)

Commodity Group (SCTG2) (Top 10)	Domestic	Import	Export	Total
Crude Petroleum	81.0	115.9	7.3	204.2
Other Coal and Petroleum Products	62.6	16.5		79.1
Cereal Grains (includes seed)	66.5	3.2	1.8	71.5
Coal	62.7	0.6	0.2	63.4
Agricultural Products (e.g., Feed, Grain, Forage)	3.2	1.4	4.2	40.8
Fertilizers	1.3	9.1	1.7	12.1

Commodity Group (SCTG2) (Top 10)	Domestic	Import	Export	Total
Other Prepared Foodstuffs, Fats and Oils	8.6	2.0	1.4	12.0
Gasoline, Aviation Turbine Fuel, and Ethanol	4.1		7.8	12.0
Wood Products	3.0	6.9	0.6	10.5
Natural Sands	2.7		7.0	9.6

Source: Analysis of USDOT Freight Analysis Framework 5.2

Table 3-17: Share of Tons (Million) by Commodity and Trade Type (2017)

Commodity Group (SCTG2) (Top 10)	Domestic	Import	Export	Total
Crude Petroleum	13.7%	19.6%	1.2%	34.5%
Other Coal and Petroleum Products	10.6%	2.8%		13.4%
Cereal Grains (includes seed)	11.2%	0.5%	0.3%	12.0%
Coal	10.6%	0.1%	0.0%	10.7%
Agricultural Products (e.g., Feed, Grain, Forage)	5.9%	0.2%	0.7%	6.8%
Fertilizers	0.2%	1.5%	0.3%	2.0%
Other Prepared Foodstuffs, Fats and Oils	1.5%	0.3%	0.2%	2.0%
Gasoline, Aviation Turbine Fuel, and Ethanol	0.7%		1.3%	2.0%
Wood Products	0.5%	1.2%	0.1%	1.8%
Natural Sands	0.5%		1.2%	1.6%

Source: Analysis of USDOT Freight Analysis Framework 5.2

As shown in Table 3-18 and Table 3-19, domestic value was most significant for Crude Petroleum, Machinery, Agricultural Products, Other Coal and Petroleum Products, Cereal Grains, and Motorized and Other Vehicles. Import value was most significant for Crude Petroleum, Machinery, Plastics and Rubber, Electronics, and Motorized and Other Vehicles. Export value was most significant for Machinery, Motorized and Other Vehicles, Electronics, Plastics and Rubber, and Agricultural Products. Other than Crude Petroleum, where more than half the value was imported, most commodity values were highest for domestic moves.

Table 3-18: Value (\$Billion) by Commodity and Trade Type (2017)

Commodity Group (SCTG2) (Top 10)	Domestic	Import	Export	Total
Crude Petroleum	25.5	37.4	2.3	65.2
Machinery	14.8	3.6	7.8	26.2
Motorized and Other Vehicles (includes parts)	10.1	1.9	6.4	18.4
Agricultural Products (e.g., Feed, Grain, Forage)	12.1	0.8	2.1	15.0
Other Coal and Petroleum Products	11.8	1.8		13.5
Other Prepared Foodstuffs, Fats and Oils	10.3	1.8	1.0	13.2
Electronic and Other Electrical Equipment and Components	8.5	2.1	2.5	13.1
Cereal Grains (includes seed)	10.5	0.7	0.3	11.5
Plastics and Rubber	4.1	3.4	2.3	9.9
Articles of Base Metal	6.5	1.2	1.7	9.4

Source: Analysis of USDOT Freight Analysis Framework 5.2

Table 3-19: Share of Value (\$Billion) by Commodity and Trade Type (2017)

Commodity Group (SCTG2) (Top 10)	Domestic	Import	Export	Total
Crude Petroleum	8.6%	12.6%	0.8%	22.0%
Machinery	5.0%	1.2%	2.6%	8.8%
Motorized and Other Vehicles (includes parts)	3.4%	0.7%	2.2%	6.2%
Agricultural Products (e.g., Feed, Grain, Forage)	4.1%	0.3%	0.7%	5.1%
Other Coal and Petroleum Products	4.0%	0.6%	0.0%	4.6%
Other Prepared Foodstuffs, Fats and Oils	3.5%	0.6%	0.3%	4.5%
Electronic and Other Electrical Equipment and Components	2.9%	0.7%	0.8%	4.4%
Cereal Grains (includes seed)	3.5%	0.2%	0.1%	3.9%
Plastics and Rubber	1.4%	1.2%	0.8%	3.3%
Articles of Base Metal	2.2%	0.4%	0.6%	3.2%

Source: Analysis of USDOT Freight Analysis Framework 5.2

As shown in Table 3-20 and Table 3-21, Pipeline was the dominant domestic mode for Crude Petroleum, Other Coal and Petroleum Products, and Fuels (Gasoline, Aviation Fuel and Ethanol) tonnage. Truck was the dominant domestic mode for Cereal Grains, Agricultural Products, and Other Prepared Foods tonnage. Rail and “Unknown” were the dominant domestic modes for Coal tonnage; Rail was dominant for Fertilizer and Wood Products tonnage and was important for Cereal Grains, Crude Petroleum, and Other Prepared Foodstuffs tonnage.

Table 3-20: Tons (Million) by Commodity and Domestic Mode (2017)

Commodity Group (SCTG2) (Top 10)	Pipeline	Truck	Rail	Unknown	Multiple Modes	Air	Total
Crude Petroleum	188.0	2.2	14.0	-	-	-	204.2
Other Coal and Pet. Products	75.4	2.7	0.9	-	0.1	-	79.1
Cereal Grains (includes seed)	-	45.4	23.8	-	2.2	-	71.5
Coal	-	0.1	13.8	49.5	-	-	63.4
Agricultural Products (e.g., Feed, Grain, Forage)	-	27.7	12.1	-	1.1	-	40.8
Fertilizers	-	1.6	10.3	-	0.1	-	12.1
Other Prepared Foodstuffs, Fats and Oils	-	6.4	4.3	-	1.3	-	12.0
Gasoline, Aviation Turbine Fuel, and Ethanol	9.9	0.3	0.8	-	-	-	12.0
Wood Products	-	3.1	7.3	-	-	-	10.5
Natural Sands	-	0.4	8.4	-	0.8	-	9.2

Source: Analysis of USDOT Freight Analysis Framework 5.2

Table 3-21: Share of Tons (Million) by Commodity and Domestic Mode (2017)

Commodity Group (SCTG2) (Top 10)	Pipeline	Truck	Rail	Unknown	Multiple Modes	Air	Total
Crude Petroleum	31.7%	0.4%	2.4%	-	-	-	34.5%

Commodity Group (SCTG2) (Top 10)	Pipeline	Truck	Rail	Unknown	Multiple Modes	Air	Total
Other Coal and Pet. Products	12.7%	0.5%	0.1%	-	-	-	13.4%
Cereal Grains (includes seed)	-	7.7%	4.0%	-	0.4%	-	12.1%
Coal	-	0.0%	2.3%	8.4%	-	-	10.7%
Agricultural Products (e.g., Feed, Grain, Forage)	-	4.7%	2.0%	-	0.2%	-	6.9%
Fertilizers	-	0.3%	1.7%	-	0.0%	-	2.0%
Other Prepared Foodstuffs, Fats and Oils	-	1.1%	0.7%	-	0.2%	-	2.0%
Gasoline, Aviation Turbine Fuel, and Ethanol	1.7%	0.2%	0.1%	-	-	-	2.0%
Wood Products	-	0.5%	1.2%	-	-	0.0%	1.8%
Natural Sands		0.1%	1.4%		0.1%		1.6%

Source: Analysis of USDOT Freight Analysis Framework 5.2

As shown in Table 3-22 and Table 3-23, Pipeline was the dominant domestic mode for Crude Petroleum and Other Coal and Petroleum Products value. Truck was the dominant domestic mode for Machinery, Motorized and Other Vehicles, Electronic and other Electrical Equipment, Agricultural Products, Other Prepared Foods, Cereal Grains, Plastics and Rubber, and Articles of Base Metal value. Rail was not the dominant domestic mode for any commodity, but was a strong contributor for Cereal Grains, Agricultural Products, Crude Petroleum, Plastics and Rubber and Other Prepared Foods. Multiple Modes contributed for Machinery, Motorized and Other Vehicles, Electronics, and other commodities, while Air contributed for Electronics and Machinery.

Table 3-22: Value (\$Billion) by Commodity and Domestic Mode (2017)

Commodity Group (SCTG2) (Top 10)	Truck	Pipeline	Rail	Unknown	Multiple Modes	Air	Total
Crude Petroleum	0.7	60.1	4.4	-	-	-	65.2
Machinery	22.9	-	1.1	-	2.1	0.1	26.2
Motorized and Other Vehicles (includes parts)	14.6	-	1.9	-	1.9	-	18.4
Agricultural Products (e.g., Feed, Grain, Forage)	10.0	-	4.4	-	0.6	-	15.0
Other Coal & Petro. Products	1.0	12.4	0.2	-	(0.0)	-	13.5
Other Prepared Foodstuffs, Fats and Oils	9.8	-	2.8	-	0.7	-	13.2
Electronic and Other Electrical Equipment and Components	10.6	-	1.0	0.1	1.0	0.4	13.1
Cereal Grains (includes seed)	6.4	-	4.6	-	0.5	-	11.5
Plastics and Rubber	6.1	-	3.7	-	0.2	-	9.9
Articles of Base Metal	6.4	-	0.9	-	2.1	-	9.4

Source: Analysis of USDOT Freight Analysis Framework 5.2

Table 3-23: Share of Value (\$Billion) by Commodity and Domestic Mode (2017)

Commodity Group (SCTG2) (Top 10)	Truck	Pipeline	Rail	Unknown	Multiple Modes	Air	Total
Crude Petroleum	0.2%	20.3%	1.5%	-	-	-	22.0%
Machinery	7.7%	-	0.4%	-	0.7%	0.0%	8.8%
Motorized and Other Vehicles (includes parts)	4.9%	-	0.6%	-	0.7%	-	6.2%
Agricultural Products (e.g., Feed, Grain, Forage)	3.4%	-	1.5%	-	0.2%	-	5.1%
Other Coal & Petro. Products	0.3%	4.2%	0.1%	-	0.0%	-	4.6%
Other Prepared Foodstuffs, Fats and Oils	3.3%	-	0.9%	-	0.2%	-	4.5%
Electronic and Other Electrical Equipment and Components	3.6%	-	0.3%	0.0%	0.3%	0.1%	4.4%
Cereal Grains (includes seed)	2.2%	-	1.6%	-	0.2%	-	3.9%
Plastics and Rubber	2.0%	-	1.2%	-	0.1%	-	3.3%
Articles of Base Metal	2.2%	-	0.3%	-	0.7%	-	3.2%

Source: Analysis of USDOT Freight Analysis Framework 5.2

TRADING PARTNER AND INTERNATIONAL MODE

As shown in Table 3-24, almost all of North Dakota’s import trade by tonnage was with Canada; 77% of Canadian trade tonnage was by Pipeline, with 19% by Rail and 4% by Truck. Just 1% of trade tonnage was with nations other than Canada; this trade (with Eastern Asia, Southeast Asia, Europe, and the Rest of the Americas) moved by water via seaports located outside North Dakota.

As shown in Table 3-25, trade with nations other than Canada was more significant when measured by value. Canadian trade represented 87% of trade value, while other nations combine for 13%. For Canada trade, Pipeline was still the leading mode and handled 59% of value, but Rail and Truck also made strong contributions. Note that while Air tonnage (measured in millions of tons) was negligible, air value represented \$1.7 billion. For trade with nations other than Canada, Water was the principal foreign mode, but Air, Multiple Modes, and Truck (for Mexico trade) also made contributions.

Table 3-24: Tons (Million) by Foreign Origin and Foreign Mode for Imports (2017)

Foreign Origin for Imports	Pipeline	Rail	Truck	Water	Total
Canada	129.7	32.8	6.0	-	168.6
Eastern Asia	-	-	-	1.0	1.0
SE Asia and Oceania	-	-	-	0.1	0.1
Europe	-	-	-	0.1	0.1
Rest of Americas	-	-	-	0.1	0.1
Total	129.7	32.8	6.0	1.4	170.0

Source: Analysis of USDOT Freight Analysis Framework 5.2

Table 3-25: Value (\$Billion) by Foreign Origin and Foreign Mode for Imports (2017)

Foreign Origin for Imports	Pipeline	Rail	Truck	Water	Air	Multiple Modes	Total
Canada	38.3	14.3	12.0	0.0	0.0	0.4	64.9
Eastern Asia	-	-	-	6.1	1.2	-	7.2
SE Asia and Oceania	-	-	-	0.9	0.2	-	1.1
Europe	-	-	-	0.6	0.1	-	0.8
Mexico	-	-	0.1	0.2	0.0	-	0.3
South, Central, Western Asia	-	-	-	0.1	0.1	-	0.2
Rest of Americas	-	-	-	0.1	-	-	0.1
Africa	-	-	-	-	-	-	0.0
Total	38.3	14.3	12.1	8.1	1.7	0.4	74.8

Source: Analysis of USDOT Freight Analysis Framework 5.2. Note that row or column totals may not sum precisely due to rounding.

For export tonnage, Canada was also the leading trade partner, representing 86% of trade tonnage. However, Pipeline had a smaller role than with import tonnage, and Rail was the leading mode. Exports to non-Canada partners were, as with imports, via Water through ports located outside of North Dakota (Table 3-26). For export value, Canada was also the leading trade partner, representing 87% of trade value, with roughly two-thirds moving via truck. Truck and Rail supported export value to Mexico, while Water, Air, and Multiple Modes supported export value to other nations (Table 3-27).

Table 3-26: Tons (Million) by Foreign Destination and Foreign Mode for Exports (2017)

Foreign Destination for Exports	Rail	Pipeline	Truck	Water	Unknown	Air	Multiple Modes	Total
Canada	17.0	13.6	8.1		0.1	0.1	0.1	38.9
Eastern Asia				4.5				4.5
Mexico	0.8			0.1				0.9
SE Asia and Oceania				0.3				0.3
South, Central, Western Asia				0.3				0.3
Rest of Americas				0.3				0.3
Africa				0.2				0.2
Europe				0.1				0.1
Total	17.7	13.6	8.1	5.8	0.1	0.1	0.1	45.4

Source: Analysis of USDOT Freight Analysis Framework 5.2

Table 3-27: Tons (Million) by Foreign Destination and Foreign Mode for Exports (2017)

Foreign Destination for Exports	Rail	Pipeline	Truck	Water	Unknown	Air	Multiple Modes	Total
Canada	6.2	5.7	24.2		0.2	0.4	0.2	36.8
Eastern Asia	-	-	-	4.0	-	0.0	-	4.0
SE Asia and Oceania	-	-	-	0.6	-	0.0	-	0.6

Foreign Destination for Exports	Rail	Pipeline	Truck	Water	Unknown	Air	Multiple Modes	Total
Europe	-	-	-	0.3	-	0.1	-	0.4
Mexico	0.2	-	0.1	0.0	-		-	0.3
South, Central, Western Asia	-	-	-	0.2	-	0.1	-	0.2
Rest of Americas	-	-	-	0.2	-	0.0	-	0.2
Africa	-	-	-	0.1	-	0.0	-	0.1
Total	6.4	5.7	24.2	5.2	0.2	0.6	0.2	42.5

Source: Analysis of USDOT Freight Analysis Framework 5.2. Note that row or column totals may not sum precisely due to rounding.

FORECAST DEMAND

As previously noted, FAF 5.2 included forecasts to the year 2050. For consistency with Federal guidance for State Freight Plans, an eight-year forecast window (to 2030) is considered, along with a long-range horizon (to 2045) consistent with *Transportation Connection*, the state of North Dakota’s Long-Range Transportation Plan. It is important to note these are unconstrained forecasts and are based solely on economic projections. The capacity and performance of different transportation modes, including any transportation improvements that might be needed to accommodate additional demand and many other factors, will determine whether the forecasts are or can be achieved in practice. The FAF forecasts are best used to quantify potential opportunity and/or need, as part of the overall transportation planning process.

CHANGE IN DEMAND BETWEEN 2017 AND 2030

As shown in Table 3-28 and North Dakota is expected to add 103 million tons of freight worth \$79 billion between 2017 and 2030. Nearly three-fourths of the added tonnage and 39% of the added value will be for International Gateway trade. Tonnage from North Dakota to Other States is projected to increase significantly. However, tonnage moving within North Dakota is projected to decrease; this decrease is associated with 25.2 million fewer tons by “Unknown” modes (

Table 3-30) and 25.6 million fewer tons of Coal (Table 3-32) moving within North Dakota.

Table 3-28: Tons (Million) by Flow Type and Trade (Change from 2017-2030)

Trade	Int'l Gateway	ND to ND	ND to Other State	Other State to ND	Other Est. Through	Total
Domestic	-	-21.0	28.1	3.7	-2.1	8.8
Import	64.4	-0.3	-	-2.0	0.2	62.4
Export	11.4	2.9	8.6	-	8.6	31.5
Total	75.8	-18.3	36.7	1.8	6.7	102.7

Source: Analysis of USDOT Freight Analysis Framework 5.2

Table 3-29: Value (\$Billion) by Flow Type and Trade (Change from 2017-2030)

Trade	Int'l Gateway	ND to ND	ND to Other State	Other State to ND	Other Est. Through	Total
Domestic		5.5	13.9	6.9	15.2	41.3
Import	22.9	0.3	-	-0.0	0.7	23.9
Export	7.8	1.5	3.0		1.7	14.0
Total	30.7	7.3	16.9	6.8	17.6	79.2

Source: Analysis of USDOT Freight Analysis Framework 5.2

As shown in Table 3-30 and Table 3-31, by far the largest share of tonnage growth is projected to be for Pipeline, due to growth in International Gateway flows and North Dakota to Other State flows. Rail is also projected to increase substantially, in large part due to growth in International Gateway flows. Truck tonnage is projected to increase moderately. Tonnage allocated to “Unknown” modes is projected to decline; again, this is due to reductions in ND-to-ND coal tonnage, a significant share of which is moving by “Unknown” modes. The largest shares of value growth are projected for Truck (based on growth in all flow types) and Pipeline (due to growth in International Gateway flows and North Dakota to Other State flows). Rail and Multiple Modes are projected for increased value, Air is projected for a very slight increase, and “Unknown” is projected to decline (consistent with the loss of ND-to-ND coal tonnage).

Table 3-30: Tons (Million) by Flow Type and Domestic Mode (Change from 2017-2030)

Domestic Mode	Int'l Gateway	ND to ND	ND to Other State	Other State to ND	Other Est. Through	Total
Pipeline	59.2	4.4	31.7	0.0	-	95.3
Rail	15.3	0.1	2.7	-0.1	4.1	22.1
Truck	1.3	2.5	1.7	1.5	2.6	9.6
Multiple Modes	-	-	0.7	0.3	-	1.0
Air	-	-	-	-	-	0.0
Unknown	-	-25.2	-	-	-	-25.2
Total	75.8	-18.3	36.7	1.8	6.7	102.7

Source: Analysis of USDOT Freight Analysis Framework 5.2

Table 3-31: Value (\$Billion) by Flow Type and Domestic Mode (Change from 2017-2030)

Domestic Mode	Int'l Gateway	ND to ND	ND to Other State	Other State to ND	Other Est. Through	Total
Truck	6.1	5.7	4.3	4.7	15.5	36.3
Pipeline	20.5	1.4	9.3	0.1	-	31.3
Rail	4.0	0.3	1.1	0.1	2.1	7.6
Multiple Modes	-	0.3	2.0	1.7	-	4.1
Unknown	-	-0.4	-	-	-	-0.4
Air	-	-	0.1	0.2	-	0.3
Total	30.7	7.3	16.9	6.8	17.6	79.2

Source: Analysis of USDOT Freight Analysis Framework 5.2

As shown in Table 3-32 and Table 3-33, the largest tonnage increase is for Crude Petroleum, and two-thirds of the gain is for International Gateway traffic. Fertilizers, Natural Sands, Fuels (Aviation Fuel and Ethanol), and Other Coal and Petroleum Products will see tonnage growth. Coal is forecast to see substantial declines in tonnage, particularly for moves entirely within North Dakota. The largest value gains are projected for Crude Petroleum, followed by Motorized and Other Vehicles, Machinery, Manufactured Products, and Electronics. No commodities lose significant value, but those losing the most are Transportation Equipment other than Motor Vehicles, Tobacco Products, Waste and Scrap, Coal, and Pulp and Paper.

Table 3-32: Tons (Million) by Flow Type and Commodity Group (Change from 2017-2030)

Commodity Group (SCTG2) (Top 5 Gain/Loss)	Int'l Gateway	ND to ND	ND to Other State	Other State to ND	Other Est. Through	Total
Crude Petroleum	60.1	1.3	29.8	-	-	91.2
Fertilizers	7.5	0.6	-	0.2	0.1	8.5
Natural Sands	5.7	0.3		0.3	0.1	6.3
Gasoline, Aviation Turbine Fuel, and Ethanol	3.9	1.4	-0.2	-	-0.1	4.9
Other Coal and Petroleum Products	-3.2	2.4	5.5	-0.2	0.2	4.7
Fuel Oils (includes Diesel, Bunker C, and Biodiesel)	0.1	-0.2	-	-	-	-0.2
Waste and Scrap (excludes of agriculture or food)	-0.4	-0.1	0.1	-	-0.1	-0.6
Agricultural Products (e.g., Feed, Grain, Forage)	0.5	-0.8	-0.5	-	-0.1	-0.9
Pulp, Newsprint, Paper, and Paperboard	-1.4	-	-	-	-	-1.4
Coal	-0.1	-25.6		-0.5	-4.8	-31.0

Source: Analysis of USDOT Freight Analysis Framework 5.2

Table 3-33: Value (\$Billion) by Flow Type and Commodity Group (Change from 2017-2030)

Commodity Group (SCTG2) (Top 5 Gain/Loss)	Int'l Gateway	ND to ND	ND to Other State	Other State to ND	Other Est. Through	Total
Crude Petroleum	19.4	0.4	9.4	0.0	0.0	29.2
Motorized and Other Vehicles (includes parts)	3.0	0.6	0.6	1.1	1.2	6.5
Machinery	1.7	0.6	1.4	0.6	1.8	6.2
Miscellaneous Manufactured Products	0.0	0.4	0.3	0.8	2.8	4.3
Electronic and Other Electrical Equipment and Components	0.3	0.5	0.6	0.8	1.6	3.6
Transportation Equipment, not elsewhere classified	0.1	-0.0	0.0	0.1	-0.3	-0.2
Tobacco Products	0.0	-0.0	0.0	0.0	-0.2	-0.2

Commodity Group (SCTG2) (Top 5 Gain/Loss)	Int'l Gateway	ND to ND	ND to Other State	Other State to ND	Other Est. Through	Total
Waste and Scrap (excludes agriculture or food)	-0.2	-0.0	0.0	-0.2	-0.1	-0.5
Coal	0.0	-0.4	0.0	0.0	-0.1	-0.5
Pulp, Newsprint, Paper, and Paperboard	-0.8	0.0	0.0	0.0	0.0	-0.7

Source: Analysis of USDOT Freight Analysis Framework 5.2

CHANGE IN DEMAND BETWEEN 2017 AND 2045

The year 2030 represents a near-term planning horizon, while the year 2045 offers a long-term outlook. As shown in Table 3-34 and Table 3-35, North Dakota is expected to add 240 million tons of freight worth \$200 billion between 2017 and 2045. International Gateway trade represents 81% of the tonnage increase and 41% of the value increase – shares that are even higher than the 2017-2030 period, suggesting an increasing national dependence on North Dakota’s trade and transportation infrastructure. As with the period 2017-2030, tonnage from North Dakota to Other States is projected to increase significantly, while tonnage moving within North Dakota is projected to decrease (due primarily to continued declines in Coal), and all flows are expected to increase in value.

Table 3-34: Tons (Million) by Flow Type and Trade (Change from 2017-2045)

Trade	Int'l Gateway	ND to ND	ND to Other State	Other State to ND	Other Est. Through	Total
Domestic	N/A	-22.9	30.7	13.1	0.3	21.3
Import	166.0	1.6	-	-1.8	1.5	167.3
Export	28.5	2.6	5.7		14.5	51.3
Total	194.5	-18.7	36.4	11.3	16.3	239.9

Source: Analysis of USDOT Freight Analysis Framework 5.2

Table 3-35: Value (\$Billion) by Flow Type and Trade (Change from 2017-2045)

Trade	Int'l Gateway	ND to ND	Other State to ND	ND to Other State	Other Est. Through	Total
Domestic	N/A	15.8	18.2	22.3	40.2	96.5
Import	58.6	1.1	0.7	-	7.1	67.5
Export	23.7	2.1	-	2.6	7.3	35.7
Total	82.3	18.9	18.9	24.9	54.6	199.7

Source: Analysis of USDOT Freight Analysis Framework 5.2

Similar to the trend from 2017-2030, the largest share of tonnage growth is projected to be for Pipeline, due to growth in International Gateway flows and North Dakota to Other State flows. Rail is also projected to increase substantially, in large part due to growth in International Gateway flows. Truck tonnage is projected to increase, while tonnage allocated to “Unknown” (which, again, is primarily associated with movements of Coal within North Dakota) is projected to decline. The largest shares of value growth are projected for Truck (based on growth in all flow types) and Pipeline (due to growth in International Gateway flows and North Dakota to Other State flows). Rail,

Multiple Modes, and Air are projected for increased value, while “Unknown” value is projected to decline. See Table 3-36 and Table 3-37.

Table 3-36: Tons (Million) by Flow Type and Domestic Mode (Change from 2017-2045)

Domestic Mode	Int'l Gateway	ND to ND	ND to Other State	Other State to ND	Other Est. Through	Total
Pipeline	142.5	9.0	28.3	2.0		181.9
Rail	46.3	1.6	2.4	0.1	7.8	58.1
Truck	5.7	13.3	3.6	8.5	8.5	39.6
Multiple			2.1	0.7	-	2.8
Air	-	-	-	-	-	0.0
Unknown	-0.1	-42.6	0.0	-	-	-42.6
Total	194.5	-18.7	36.4	11.3	16.3	239.9

Source: Analysis of USDOT Freight Analysis Framework 5.2

Table 3-37: Value (\$Billion) by Flow Type and Domestic Mode (Change from 2017-2045)

Domestic Mode	Int'l Gateway	ND to ND	ND to Other State	Other State to ND	Other Est. Through	Total
Truck	20.2	15.7	10.9	13.1	47.5	107.4
Pipeline	48.2	2.4	7.4	0.4	-	58.4
Rail	13.9	0.8	1.2	0.4	7.0	23.3
Multiple		0.7	5.1	4.5	-	10.4
Air	0.1	-	0.2	0.6	-	0.8
Unknown	-	-0.7	0.1	-	-	-0.6
Total	82.3	18.9	24.9	18.9	54.6	199.7

Source: Analysis of USDOT Freight Analysis Framework 5.2

Again, continuing the trend from 2017-2030, the largest gain in tonnage is for Crude Petroleum, but an even higher share (89%) is for International Gateway traffic. The mix of other leading tonnage gainers -- Fertilizers, Other Coal and Petroleum Products, Natural Sands, and Cereal Grains – is slightly different compared to 2017-2030. But like 2017-2030, Coal is forecast to see substantial declines in tonnage, particularly for moves entirely within North Dakota; the largest value gains are projected for Crude Petroleum, followed by Machinery, Motorized and Other Vehicles, Miscellaneous Manufactured Products, and Electronics and other Electrical Equipment; no commodities lose significant value.

Table 3-38: Tons (Million) by Flow Type and Commodity Group (Change from 2017-2045)

Commodity Group (SCTG2) (Top 5 Gain/Loss)	Int'l Gateway	ND to ND	ND to Other State	Other State to ND	Other Est. Through	Total
Crude Petroleum	141.3	-1.6	19.4	-	-	159.2
Fertilizers	20.2	1.8	0.1	0.6	0.2	22.8
Other Coal and Petroleum Products	-3.2	8.6	11.8	1.8	0.3	19.2
Natural Sands	12.7	0.3		0.6	0.2	13.8
Cereal Grains (includes seed)	1.1	-1.7	-2.6	2.5	12.1	11.3
Metallic Ores and Concentrates	-	-	-	-	-	0.0
Waste and Scrap	-0.2		0.2	-	-	0.0
Fuel Oils	0.1	-0.4	-0.2	-	-	-0.4
Pulp, Newsprint, Paper, Paperboard	-1.3	-	-	-	0.3	-1.0
Coal	0.1	-43.3	-	-0.9	-8.4	-52.4

Source: Analysis of USDOT Freight Analysis Framework 5.2

Table 3-39: Value (\$Billion) by Flow Type and Commodity Group (Change from 2017-2045)

Commodity Group (SCTG2) (Top 5 Gain/Loss)	Int'l Gateway	ND to ND	ND to Other State	Other State to ND	Other Est. Through	Total
Crude Petroleum	45.6	-0.5	6.1	-		51.2
Machinery	5.2	1.6	3.5	1.9	5.6	17.9
Motorized and Other Vehicles (includes parts)	8.2	1.4	1.2	2.2	4.2	17.3
Miscellaneous Manufactured Products	0.2	1.0	0.7	1.9	7.0	10.8
Electronic and Other Electrical Equipment and Components	1.0	1.2	1.5	1.9	5.1	10.7
Fuel Oils	0.1	-0.1	-0.1	-	-	-0.1
Tobacco Products		-	-	-	-0.2	-0.2
Waste and Scrap	-0.1	-	-	-0.2	-0.1	-0.4
Pulp, Newsprint, Paper, Paperboard	-0.7	-	-	-	0.3	-0.4
Coal	-	-0.7	-	-	-0.1	-0.8

Source: Analysis of USDOT Freight Analysis Framework 5.2

FAF “DASHBOARD” ANALYSIS

To facilitate analysis of FAF data for the State Freight and Rail Plan, and to support continued freight planning activities, a user-friendly web-based “dashboard” system was created using a commercial software package called Tableau. The dashboard consists of two main screens, plus a “user guide” screen. One main screen includes all tonnage tables and maps and the other includes value tables and maps. On each screen, the user can select a particular timeframe for the data to be analyzed and can ‘filter’ the data to include or exclude specific flow types, trade types, domestic modes, foreign modes, commodities, domestic origins or destinations, or foreign origins or destinations. Thousands of combinations of these factors can be explored, and some of the most interesting are presented in Appendix C FAF, Transearch, and Streetlight Analyses.

TRANSEARCH TRUCK DATA ANALYSIS

INTRODUCTION

Transearch is a commercial freight data model produced by the firm IHS Markit¹⁴. Like FAF, Transearch presents commodity tonnage and value data by mode and origin-destination. In some respects, it is more limited than FAF – it does not include pipeline flows, or foreign modes/origins/destinations except for cross-border trucking or cross-border rail by a single rail carrier. But in other respects, it is more detailed – North Dakota origins and destinations are defined as individual counties or NDDOT Districts, and commodity information is provided at the 4-digit (not 2-digit) level, albeit using a different commodity classification system, the Standard Transportation Commodity Code (STCC), rather than the SCTG, which is used by FAF. With this additional detail, truck tonnage and value flows between North Dakota counties and between North Dakota and external origins and destinations can be assigned to the NHS to generate density flow maps.

Selected data from the full IHS Markit Transearch data was purchased by North Dakota for use in the State Freight and Rail Plan. The purchase consisted of tables summarizing base year 2019 Transearch and Surface Transportation Board (STB) Waybill data aggregated and anonymized to levels that preserve data confidentiality. While Transearch data will not agree exactly with FAF data due to different analysis years and processing methods, Transearch provides information not otherwise available, and is an extremely valuable complement to FAF¹⁵.

This Section presents the following summary analyses derived from Transearch:

- Truck Tons and Value assigned to the highway network
- County-level truck data

¹⁴ IHS Markit also produced the economic forecasts used by FHWA to develop FAF 5.2.

¹⁵ Differences between the two data models are not “errors,” and there is no way to “correct” them. It is possible to conflate the data sources by assuming either data set (or some hybrid) as the control total, and then scaling one or both datasets to the control total. While conflation may be useful for some applications, the resulting model is no longer FAF or Transearch, but a new synthesized data product, with new “error” potential introduced by the conflation process itself. For purposes of the State Freight and Rail Plan, which will – among other things – meet Federal planning requirements, it is appropriate to ground the analysis in Federal data products such as FAF and STB Waybill, supplemented by Transearch and other sources.

TRUCK TONS AND VALUE

HIGHWAY NETWORK ASSIGNMENTS

Figure 3-5 through Figure 3-18 present depictions of Transearch truck tons and value routed over the NHS. Each figure includes: a national-scale route map; a North Dakota route inset map; and a table with the average volume by route over all segments in North Dakota.

In reviewing these figures, the reader should note that:

- The first figure shown addresses truck tonnage by all commodities. The second map addresses truck tonnage bypass-through commodities only (traveling through North Dakota). The next nine figures address the top truck tonnage commodities individually. The final three maps address leading truck value commodities that are not among the leading truck tonnage commodities.
- The route assignments were based on county-to-county centroids (for flows within North Dakota) and county-to-Business Economic Area (BEA) centroids (for flows between North Dakota and other states). This imposes two important limitations.
- First, cross border flows were not continued into Canada; they terminate at the centroids of border counties.
- Second, flows entirely within a single county were not mapped, since the origin and destination centroid are the same location.
- The assignments were made based on best paths as determined by IHS Markit and were “all or nothing” – that is, all traffic between (say) Fargo and Duluth was assigned to a single route, rather than allocated proportionally between plausible routes. This is more of an issue for pass-through traffic – there are many ways to go from (for example) Seattle to Chicago, and North Dakota is one option among them – but for North Dakota flows the route options are more limited, and all-or-nothing assignments are less problematic.
- Volumes were assigned to the NHS, which includes major interstate, state, county, and other roads, but omits many local roads that may be important, particularly for ‘last-mile’ access to freight producers or consumers. A limited number of County and Local roads are mapped by Transearch, but only as connectors between NHS facilities and modeled trip origins and destinations. With respect to County and Local Roads, Transearch assignments should be treated as illustrative only, and other sources (such as local traffic counts or GPS data) will be more authoritative.
- Routes are named as follows:
 - I = Interstates
 - U = U.S. Highways
 - S = State Highways
 - C = County Roads
 - L = Local Roads

Key findings are summarized in text boxes on each figure.

Figure 3-5: Transearch Truck Tonnage Network Assignments, All Commodities (2019)

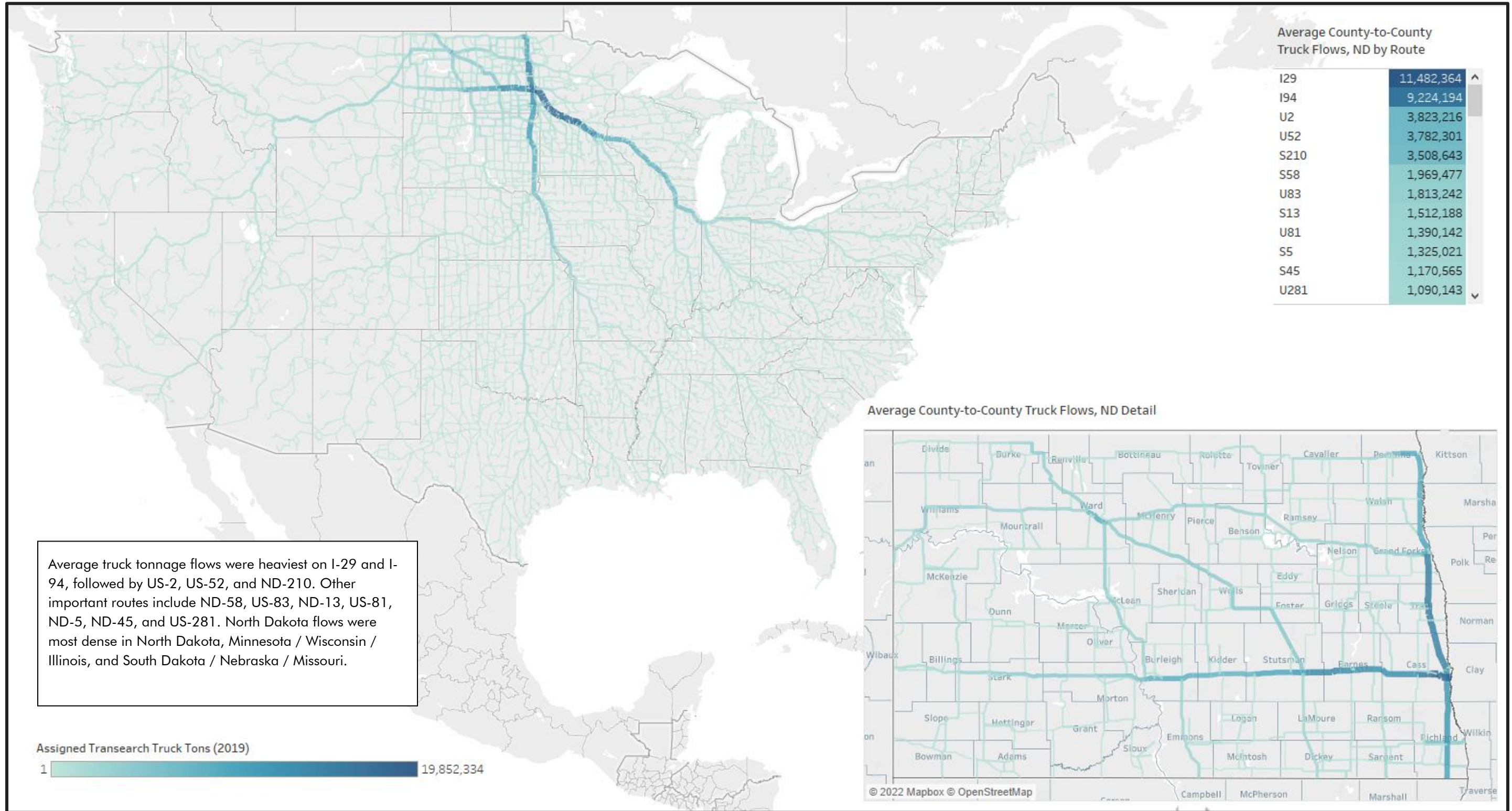


Figure 3-6: Transearch Truck Tonnage Network Assignments, Pass-through (2019)

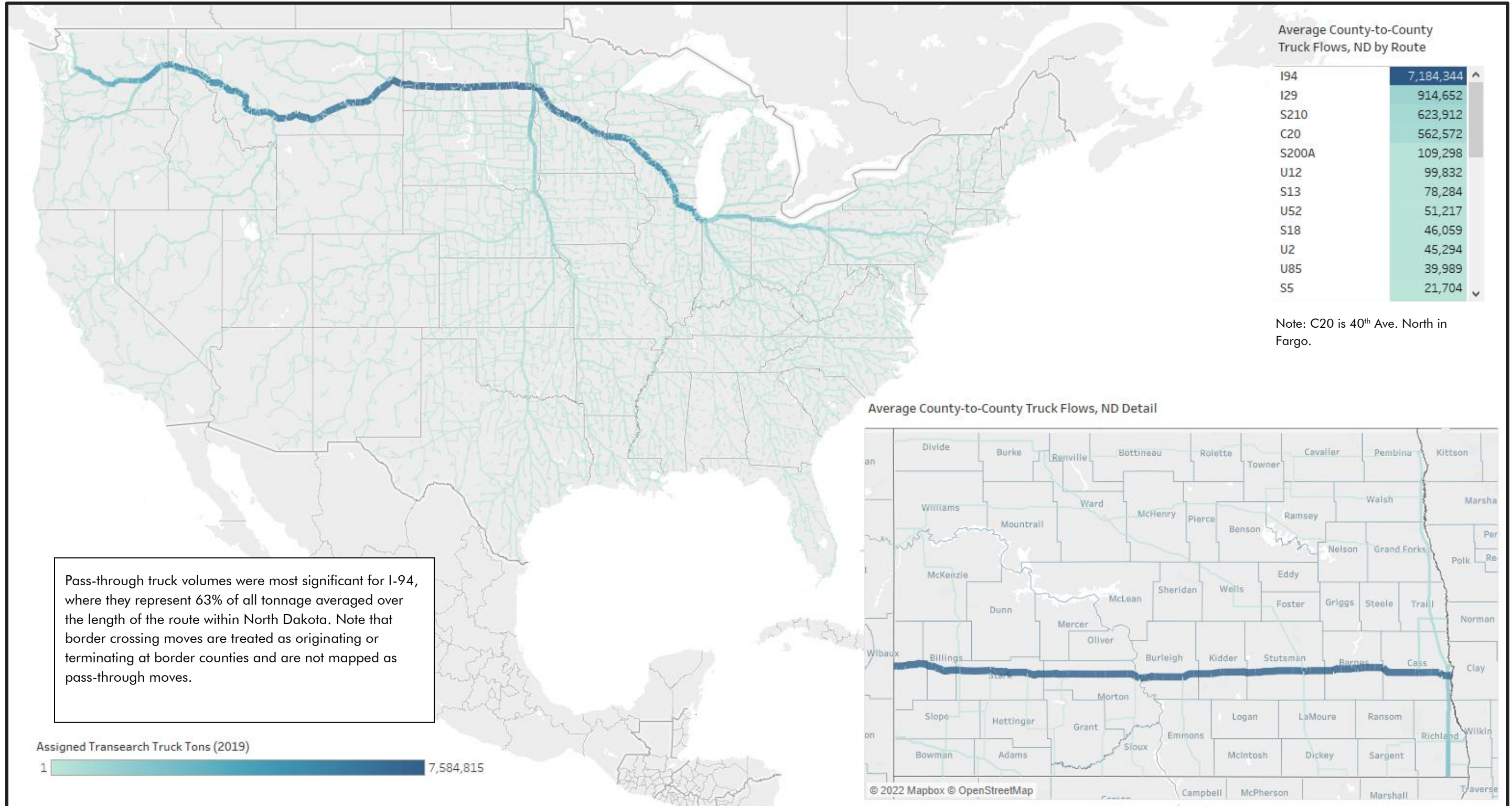


Figure 3-7: Transearch Truck Tonnage Network Assignments, Farm Products (2019)

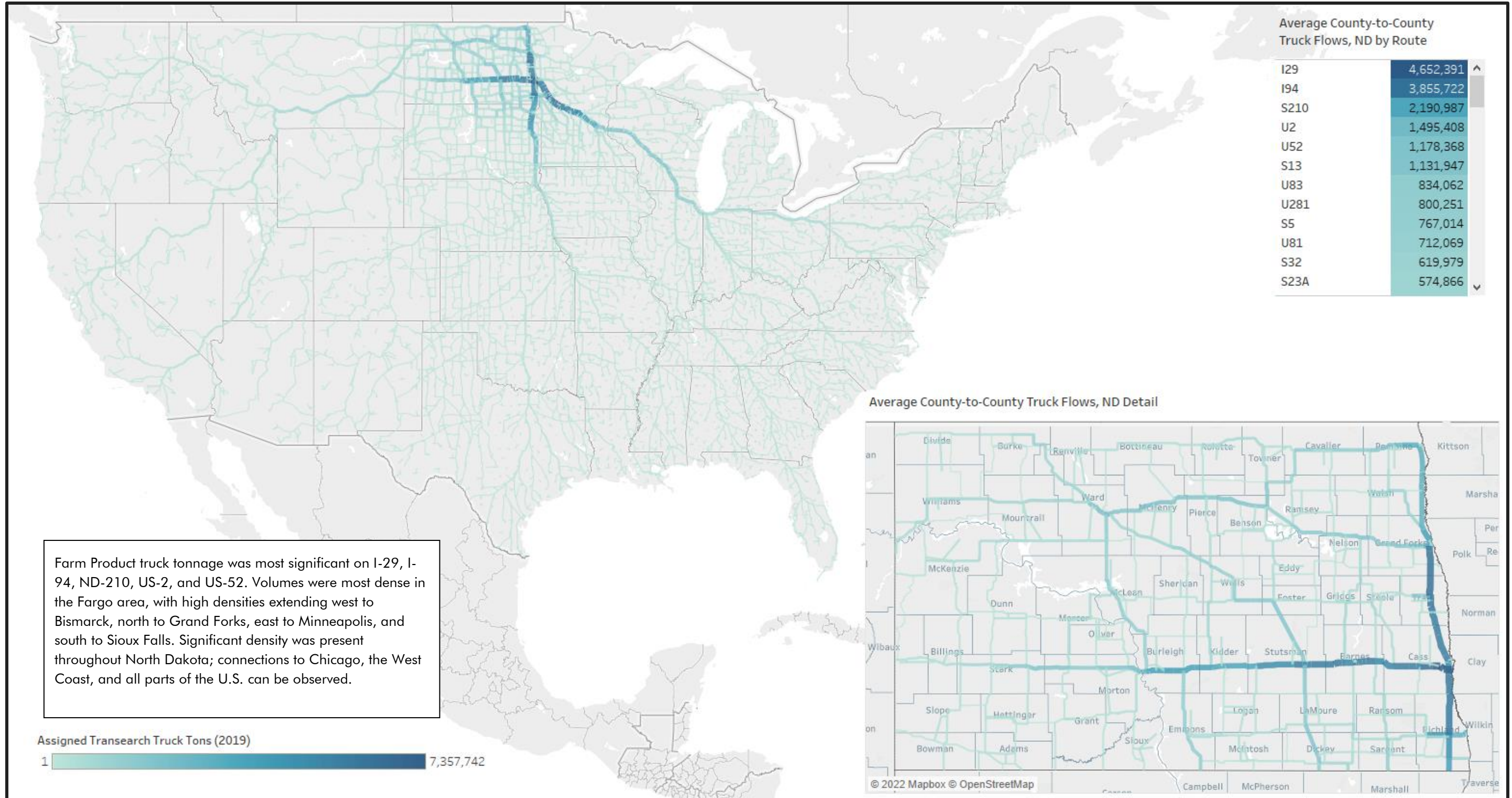


Figure 3-8: Transearch Truck Tonnage Network Assignments, Food or Kindred Products (2019)

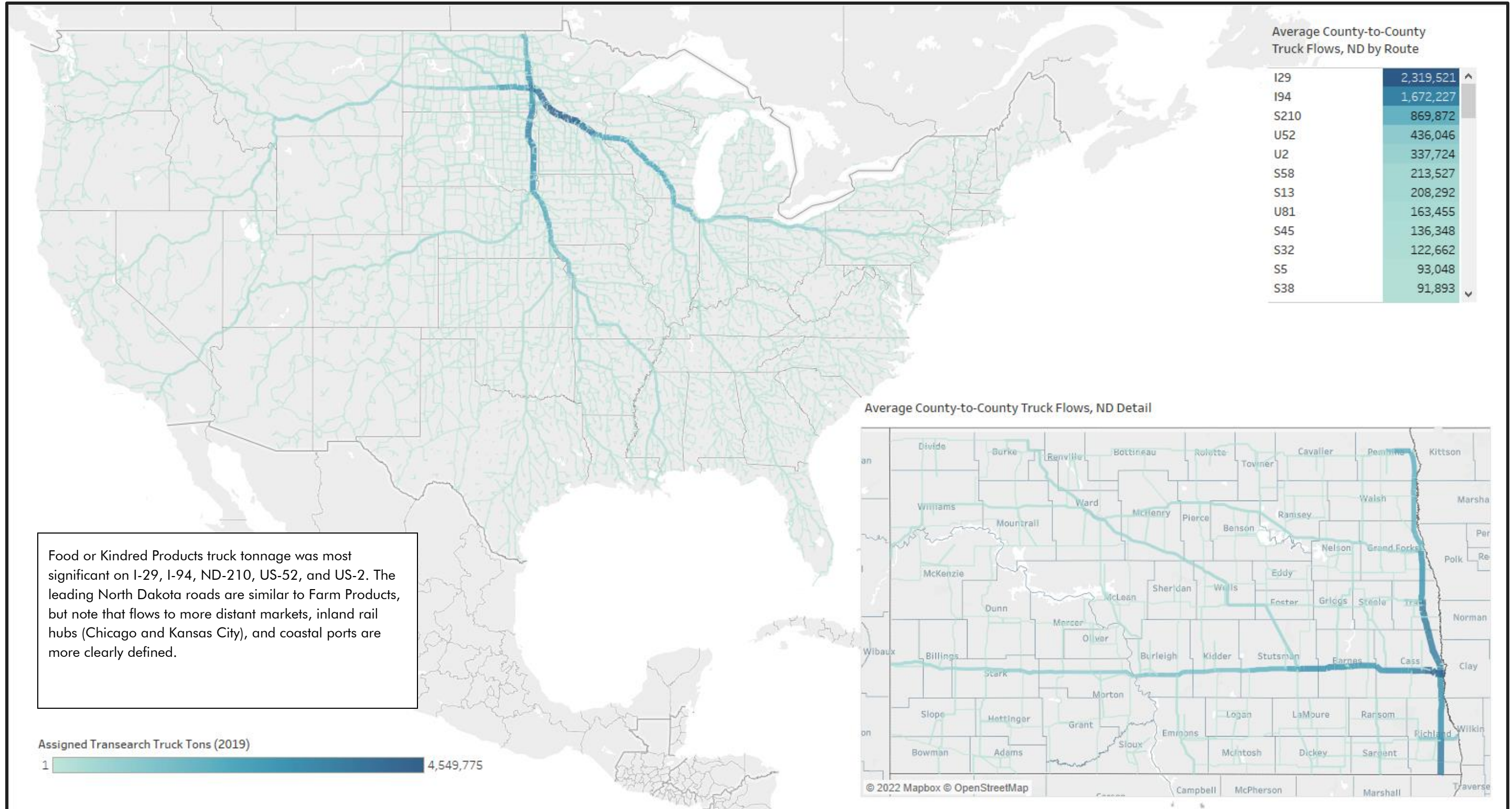


Figure 3-9: Transearch Truck Tonnage Network Assignments, Nonmetallic Minerals (2019)

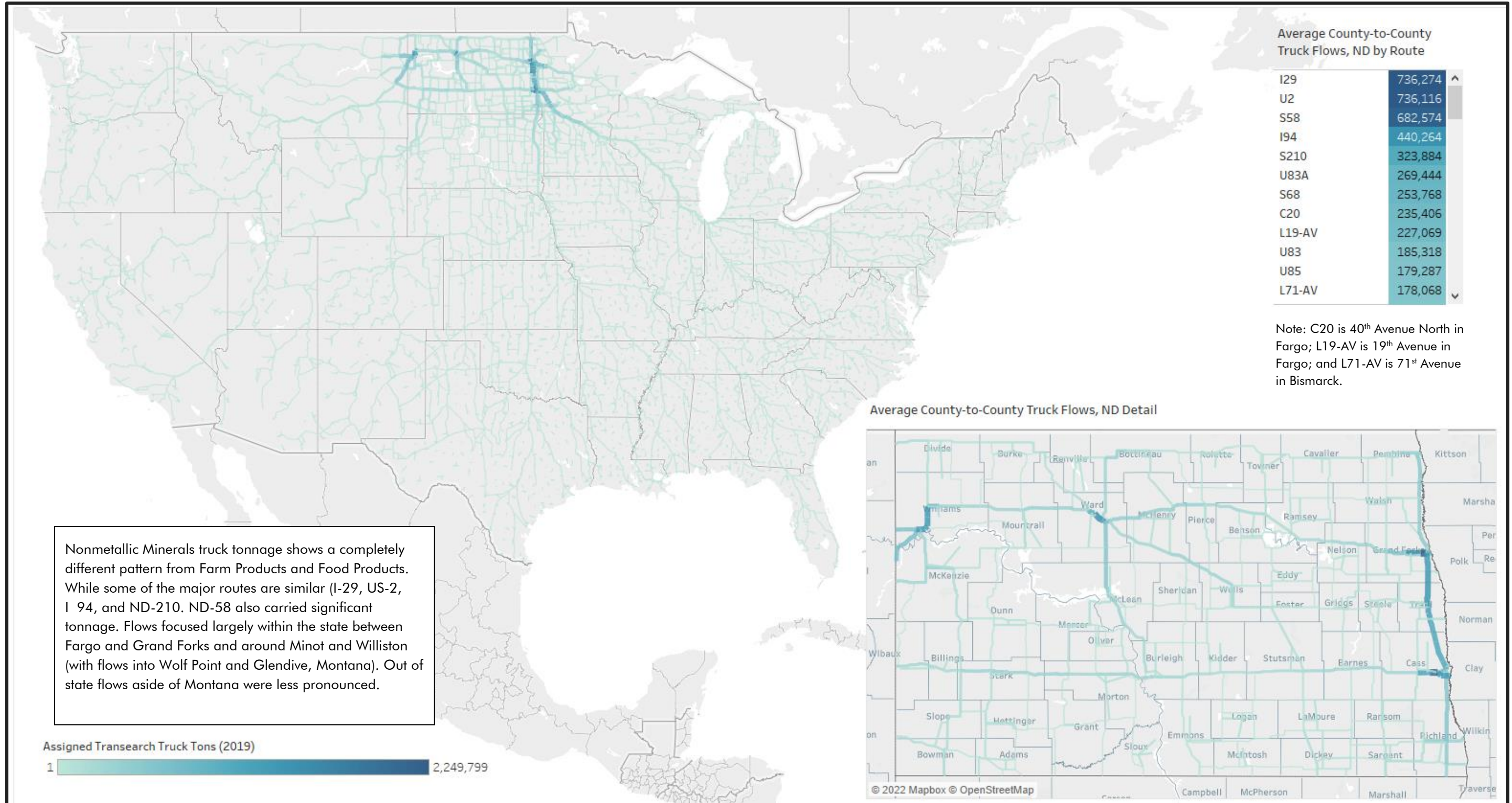


Figure 3-10: Transearch Truck Tonnage Network Assignments, Secondary Traffic (2019)

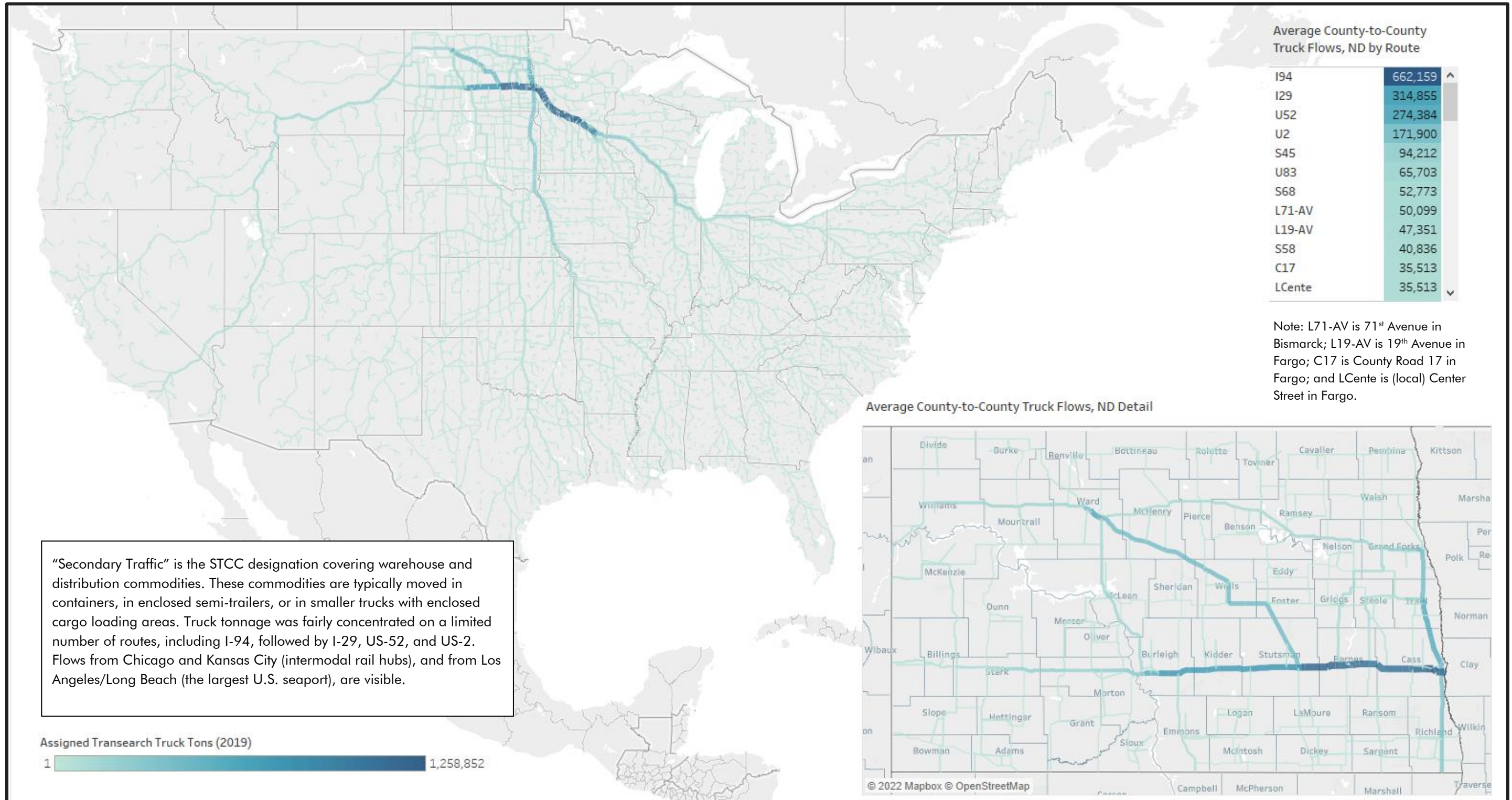


Figure 3-11: Transearch Truck Tonnage Network Assignments, Chemicals (2019)

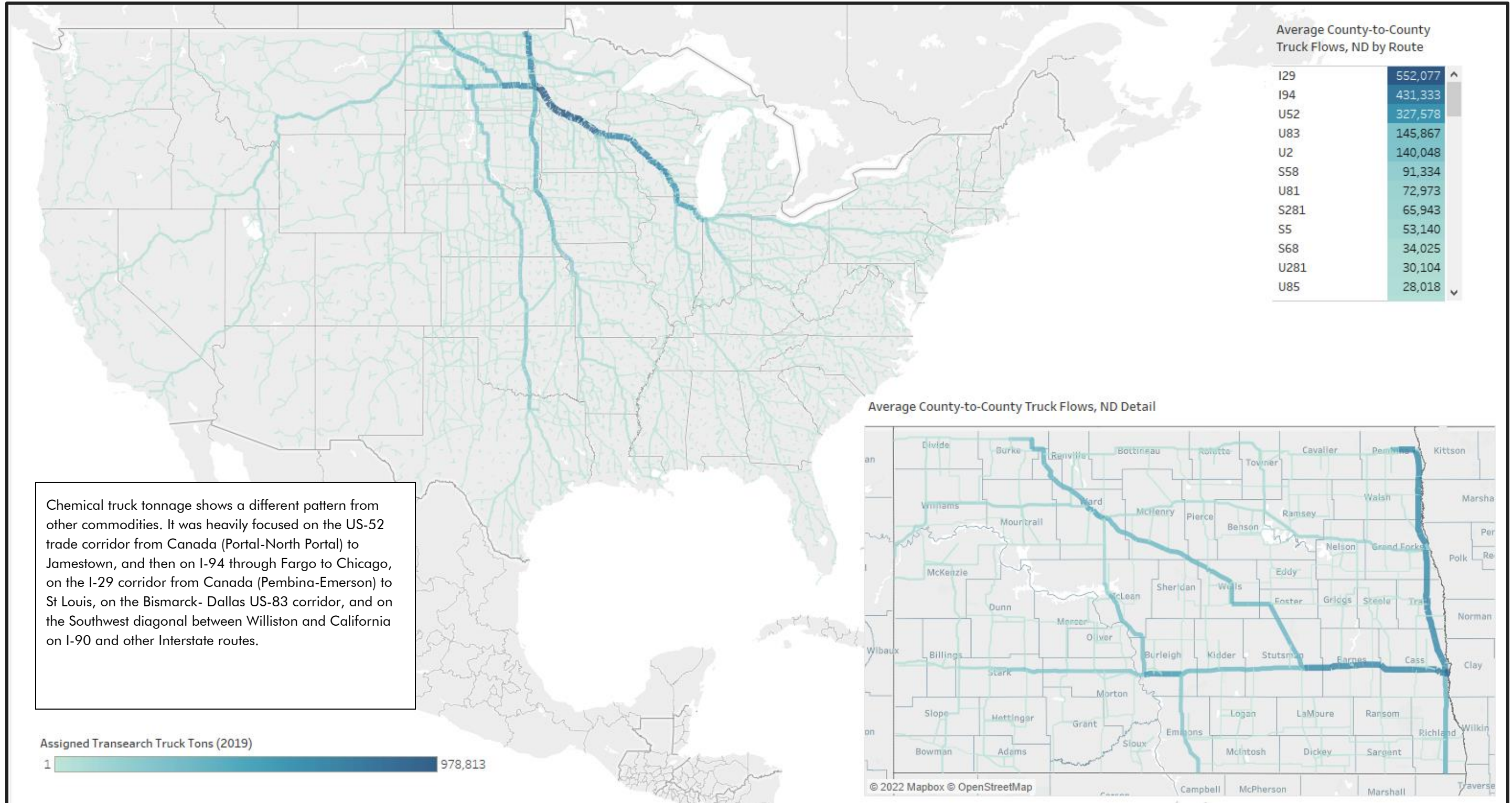


Figure 3-12: Transearch Truck Tonnage Network Assignments, Waste or Scrap (2019)

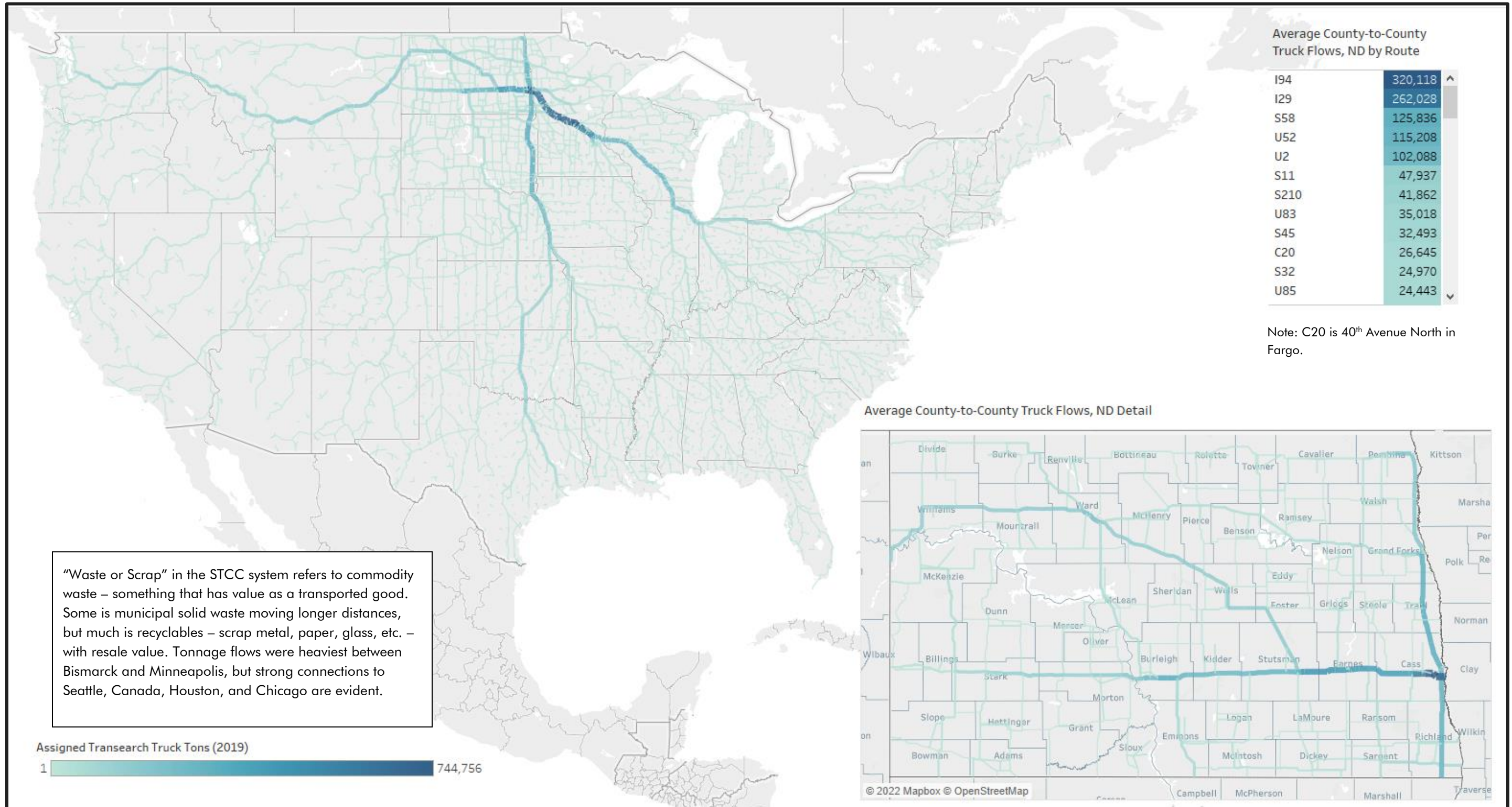


Figure 3-13: Transearch Truck Tonnage Network Assignments, Clay Concrete Glass Stone (2019)

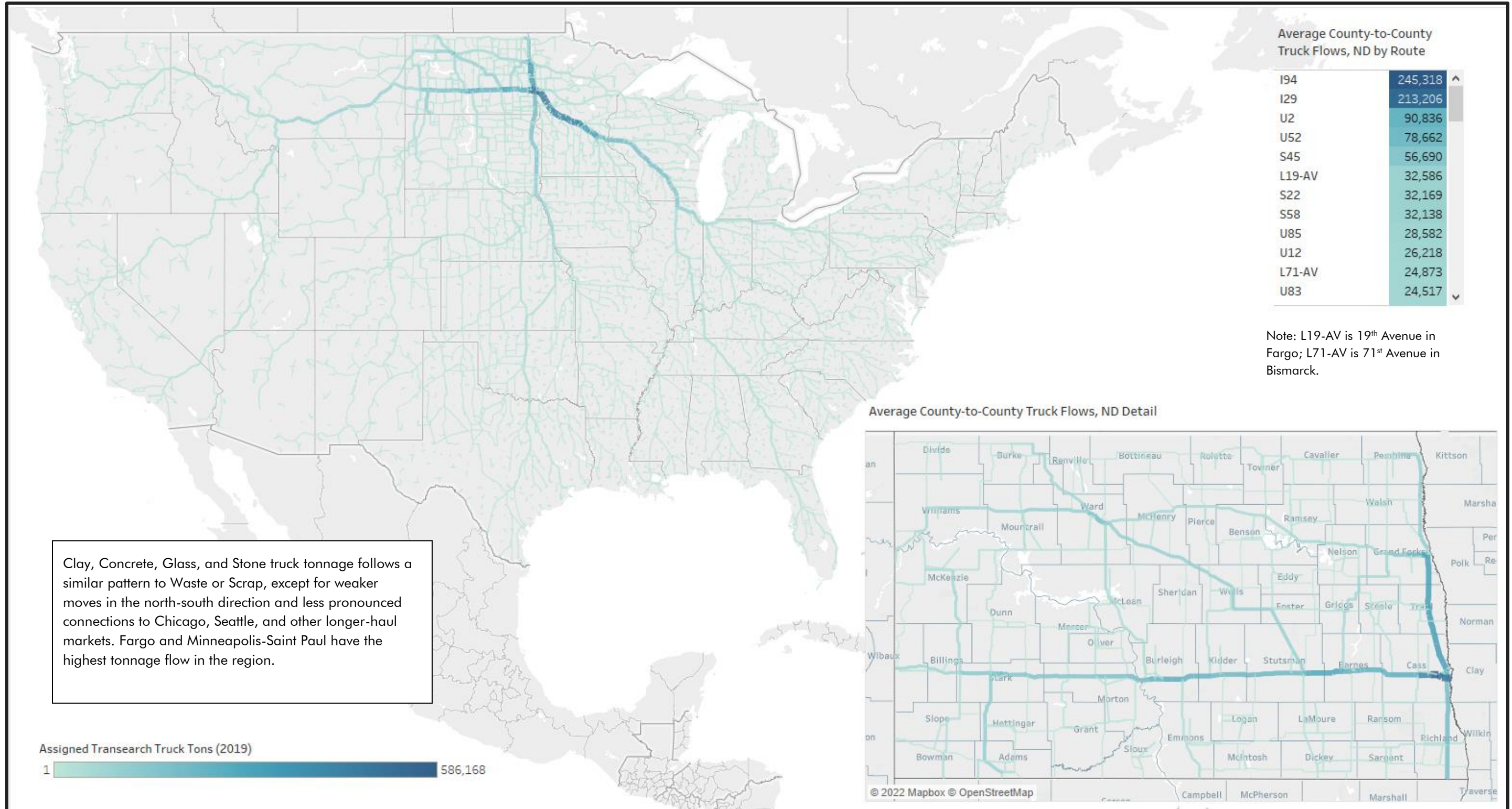


Figure 3-14: Transearch Truck Tonnage Network Assignments, Crude Petroleum or Natural Gas (2019)

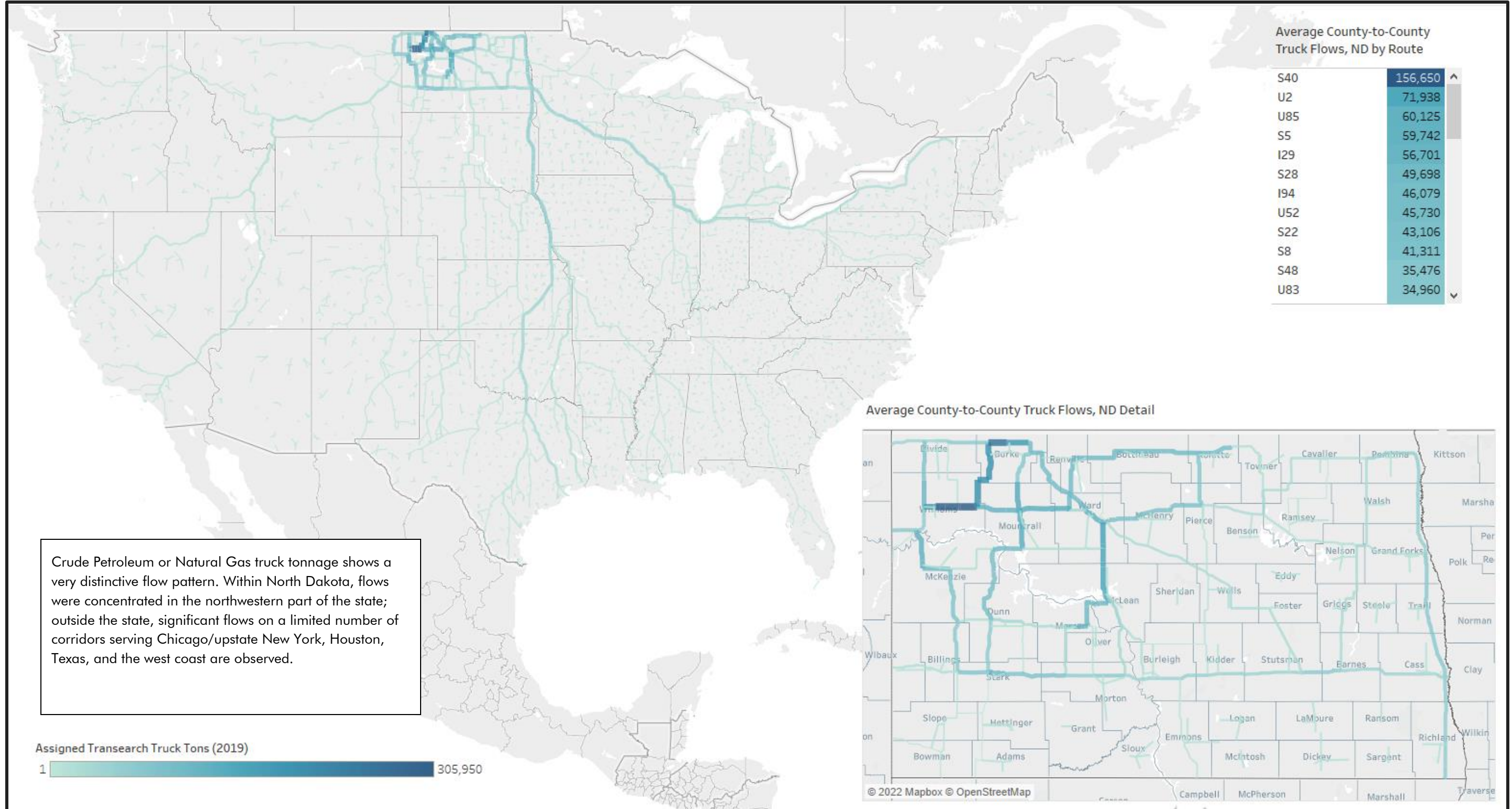


Figure 3-15: Transearch Truck Tonnage Network Assignments, Coal (2019)

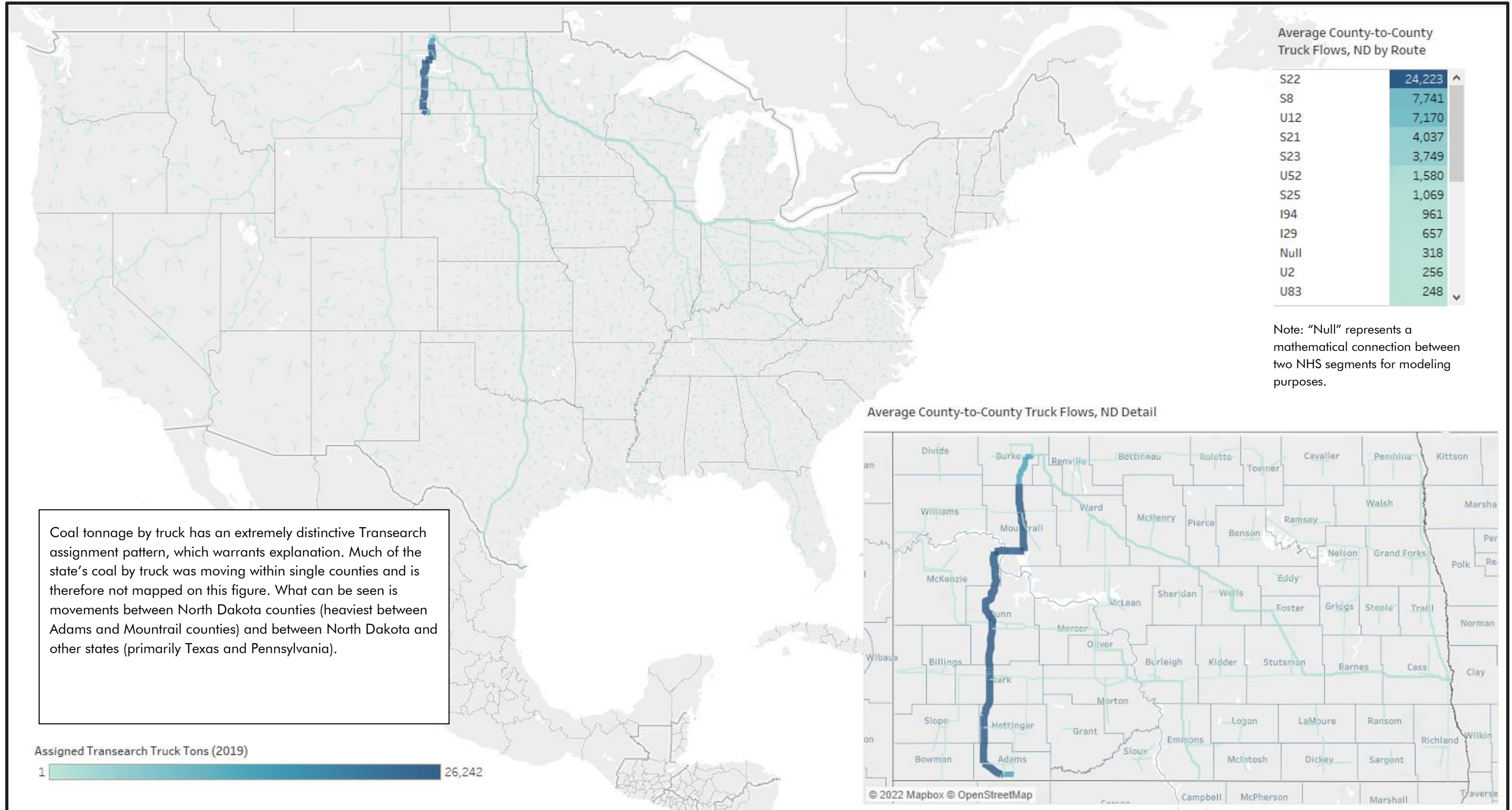
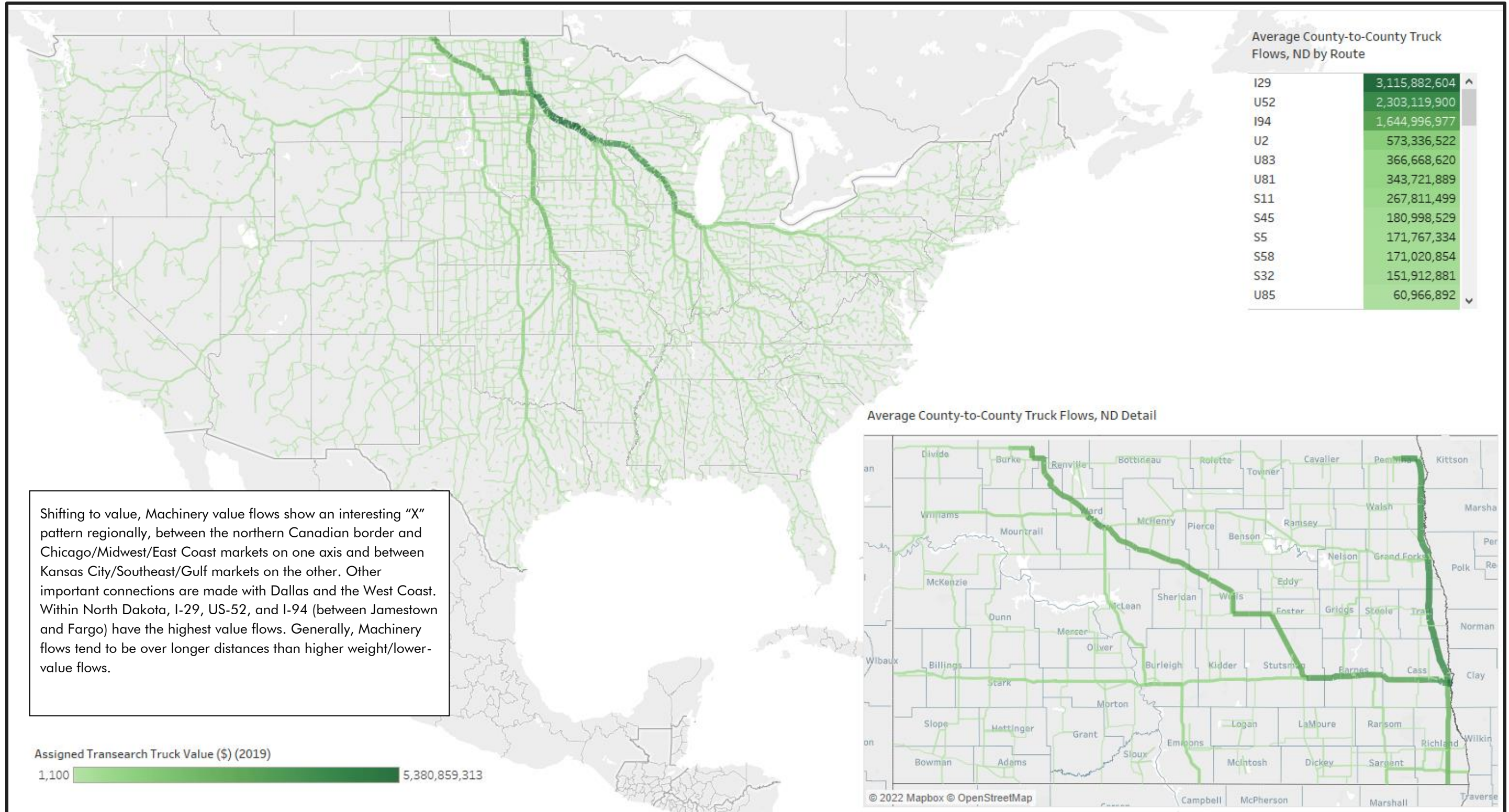


Figure 3-16: Transearch Truck Value Network Assignments, Machinery (2019)



Shifting to value, Machinery value flows show an interesting “X” pattern regionally, between the northern Canadian border and Chicago/Midwest/East Coast markets on one axis and between Kansas City/Southeast/Gulf markets on the other. Other important connections are made with Dallas and the West Coast. Within North Dakota, I-29, US-52, and I-94 (between Jamestown and Fargo) have the highest value flows. Generally, Machinery flows tend to be over longer distances than higher weight/lower-value flows.

Figure 3-17: Transearch Truck Value Network Assignments, Transportation Equipment (2019)

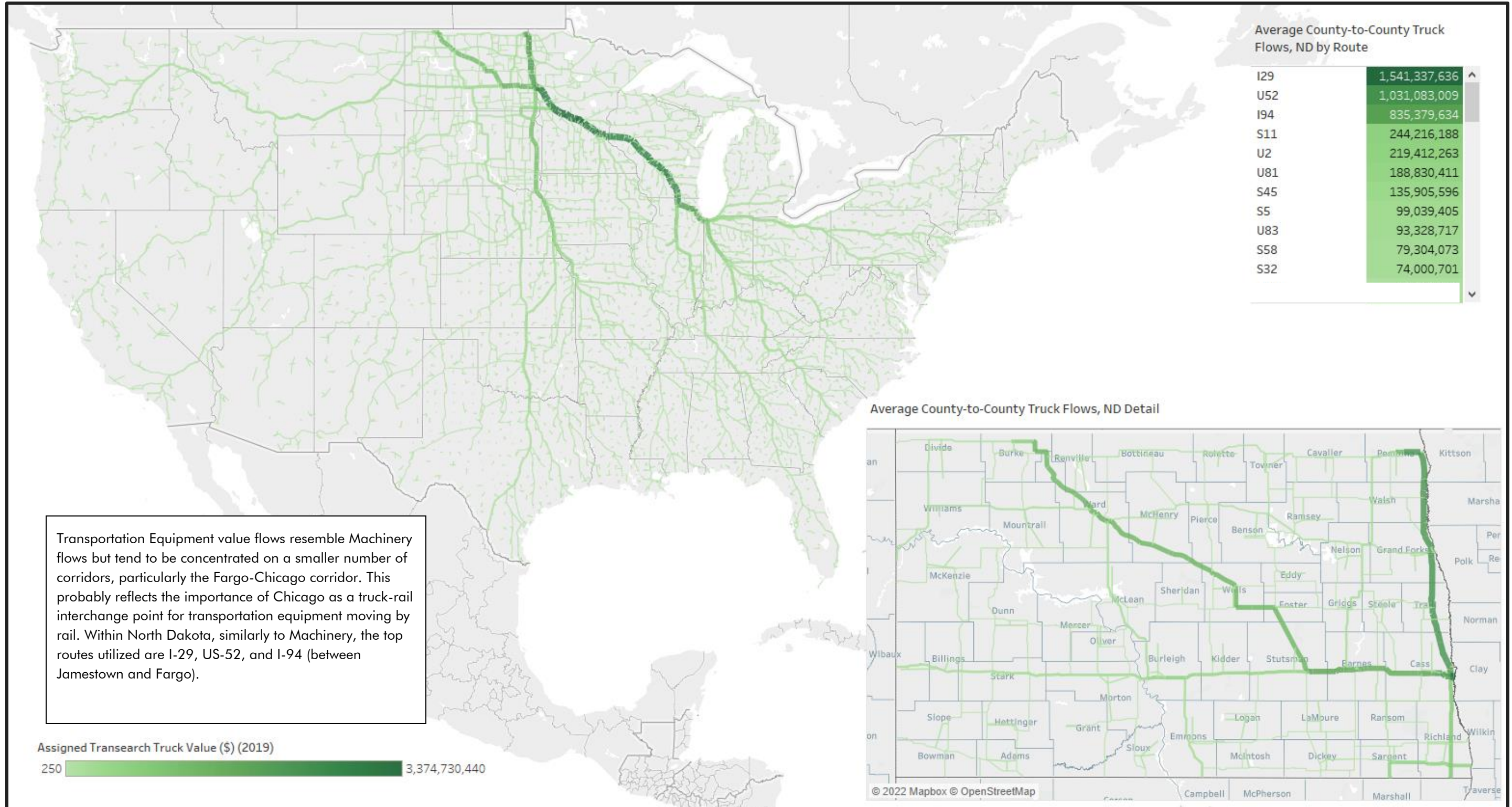
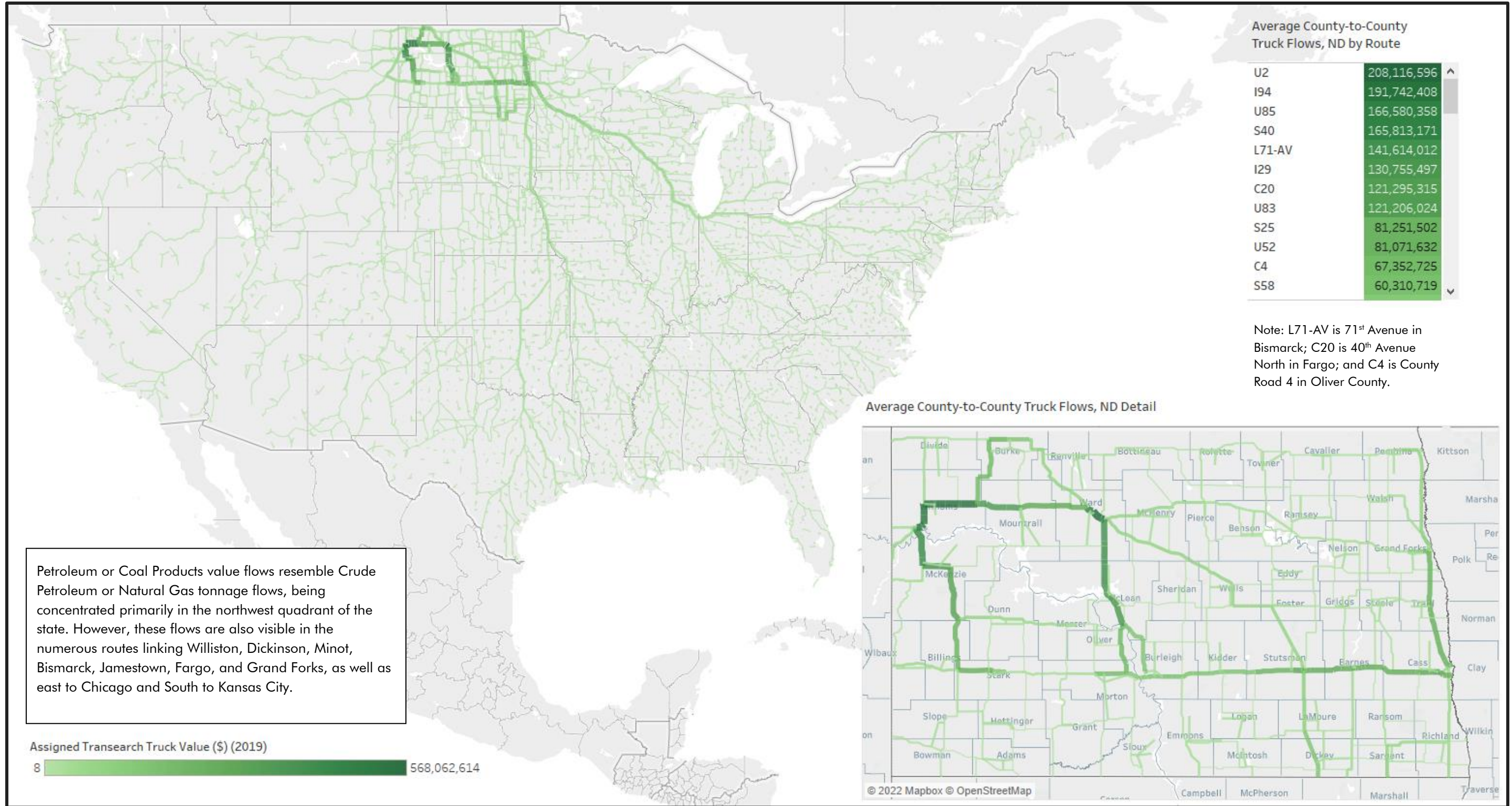


Figure 3-18: Transearch Truck Value Network Assignments, Petroleum or Coal Products (2019)



COUNTY-LEVEL TRUCK DATA

As previously mentioned, Transearch supports county-level analyses of North Dakota truck tonnage using the STCC commodity classification system. Transearch estimates of truck tons originated by all North Dakota counties are presented in Table 3-40, and estimates of truck tons terminated are presented in Table 3-41. The leading originated truck commodities are Farm Products; Nonmetallic Minerals; Food or Kindred Products; Petroleum or Coal Products; Coal; and Secondary Traffic (generally mixed freight carried in containers or dry van and associated with warehouse and distribution activities).

Table 3-40: Truck Tons (Million) Originated in North Dakota by Commodity Type (2019)

STCC Group	2019 Tons
Farm Products	28,625,454
Nonmetallic Minerals	8,449,665
Food Or Kindred Products	7,831,840
Petroleum Or Coal Products	5,883,021
Coal	4,111,778
Secondary Traffic	2,199,456
Clay, Concrete, Glass or Stone	1,594,412
Waste Or Scrap Materials	1,456,663
Crude Petroleum or Natural Gas	619,926
Chemicals Or Allied Products	367,124
Machinery	307,191
Lumber Or Wood Products	283,729
Fabricated Metal Products	61,201
Rubber Or Misc. Plastics	29,114
Transportation Equipment	27,756
Primary Metal Products	26,307
Furniture Or Fixtures	12,813
Pulp, Paper, or Allied Products	8,673
Electrical Equipment	6,439
Misc. Manufacturing Products	5,818
Printed Matter	5,282
Apparel Or Related Products	2,423
Textile Mill Products	1,140
Instruments, Photo Equip, Optical Eq	501
Ordnance Or Accessories	53
Leather Or Leather Products	10
All	61,917,789

Source: Analysis of Transearch Truck Data

Transearch estimates of truck tons terminated by all North Dakota counties are presented in Table 3-41. The leading terminated truck commodities are Farm Products; Nonmetallic Minerals; Petroleum or Coal Products; Coal; Secondary Traffic; and Clay, Concrete, Glass, or Stone.

Table 3-41: Truck Tons (Million) Terminated in North Dakota by Commodity Type (2019)

STCC Group	2019 Tons
Farm Products	26,251,574
Nonmetallic Minerals	12,354,722
Petroleum Or Coal Products	6,216,070
Coal	4,136,118
Secondary Traffic	1,883,237
Clay, Concrete, Glass, or Stone	1,810,920
Food Or Kindred Products	1,626,717
Chemicals Or Allied Products	818,284
Waste Or Scrap Materials	806,781
Lumber Or Wood Products	413,470
Transportation Equipment	338,297
Misc. Mixed Shipments	316,668
Machinery	281,745
Crude Petroleum or Natural Gas	209,325
Fabricated Metal Products	179,160
Primary Metal Products	165,987
Pulp, Paper, or Allied Products	116,159
Rubber Or Misc. Plastics	101,694
Electrical Equipment	37,986
Printed Matter	25,247
Furniture Or Fixtures	22,655
Misc. Manufacturing Products	17,220
Textile Mill Products	9,248
Instruments Photo Equip, Optical Eq	7,566
Apparel Or Related Products	6,501
Tobacco Products	3,718
Fresh Fish or Marine Products	3,320
Leather Or Leather Products	1,674
Metallic Ores	939
Forest Products	854
Ordnance Or Accessories	351
All	58,164,207

Source: Analysis of Transearch Truck Data

The top ten North Dakota counties for originated truck tonnage are listed in Table 3-42; the top ten counties for terminated truck tonnage are listed in Table 3-43.

Table 3-42: Truck Tons (Million) Originated in North Dakota, Top Ten Counties (2019)

STCC Group	2019 Tons
Grand Forks County	6,160,008
Cass County	4,868,708
Ward County	4,611,596
Oliver County	4,293,802
Richland County	4,155,950
Williams County	3,931,446
Pembina County	3,092,751
Stutsman County	2,831,069
Traill County	2,487,168
Burleigh County	2,215,168

Source: Analysis of Transearch Truck Data

Table 3-43: Truck Tons (Million) Terminated in North Dakota, Top Ten Counties (2019)

STCC Group	2019 Tons
Cass County	8,519,883
Richland County	7,115,836
Oliver County	4,212,378
Grand Forks County	3,379,050
Pembina County	3,021,046
Traill County	2,917,684
Ward County	2,878,997
Stutsman County	2,845,730
Williams County	2,740,160
Stark County	2,340,422

Source: Analysis of Transearch Truck Data

Large-format maps showing the originated and terminated truck tonnage for each North Dakota county are presented in Figure 3-19 and Figure 3-20.

Figure 3-19: Transearch Estimate of Originated Truck Tons (Million) by North Dakota County (2019)

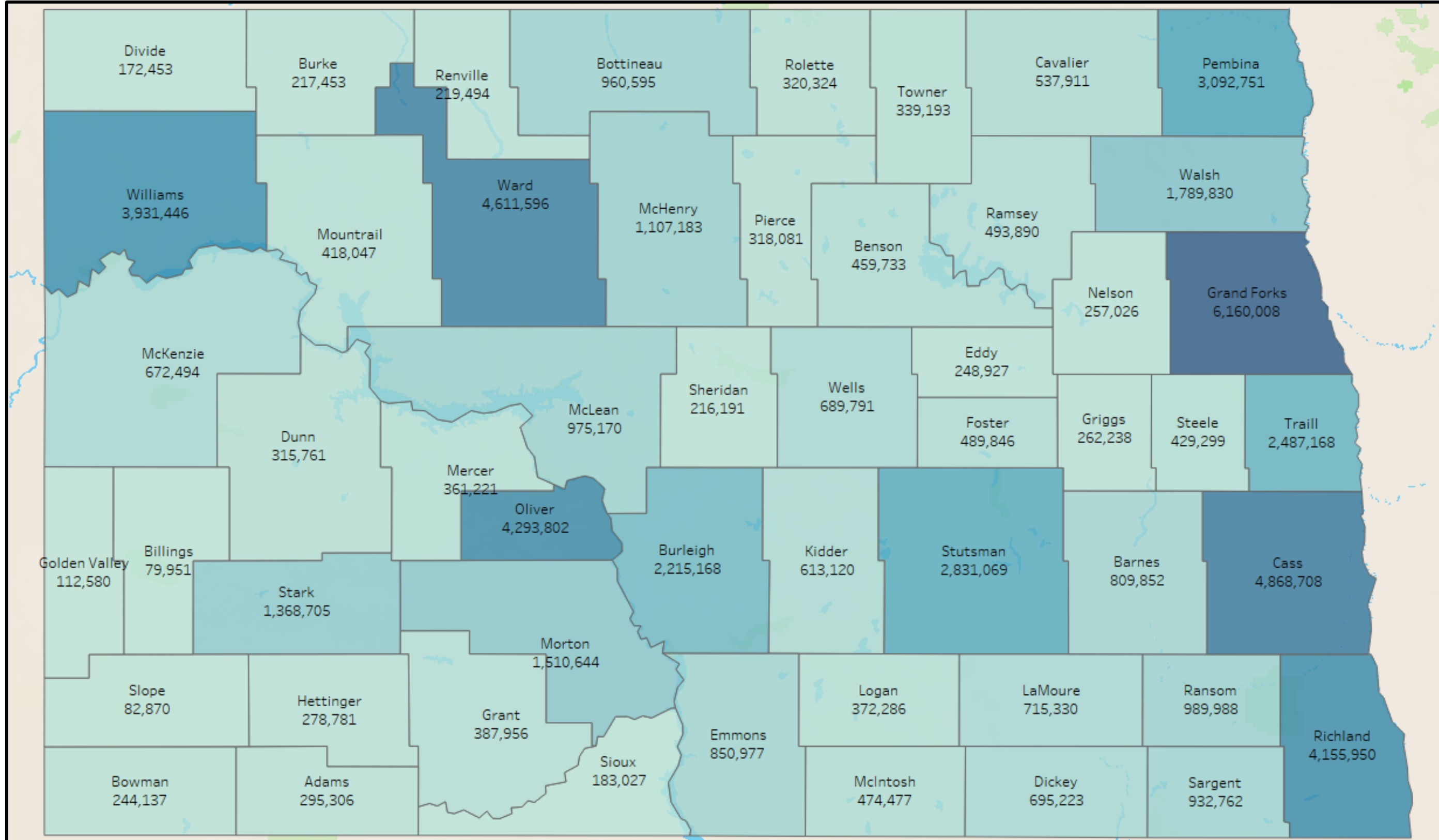
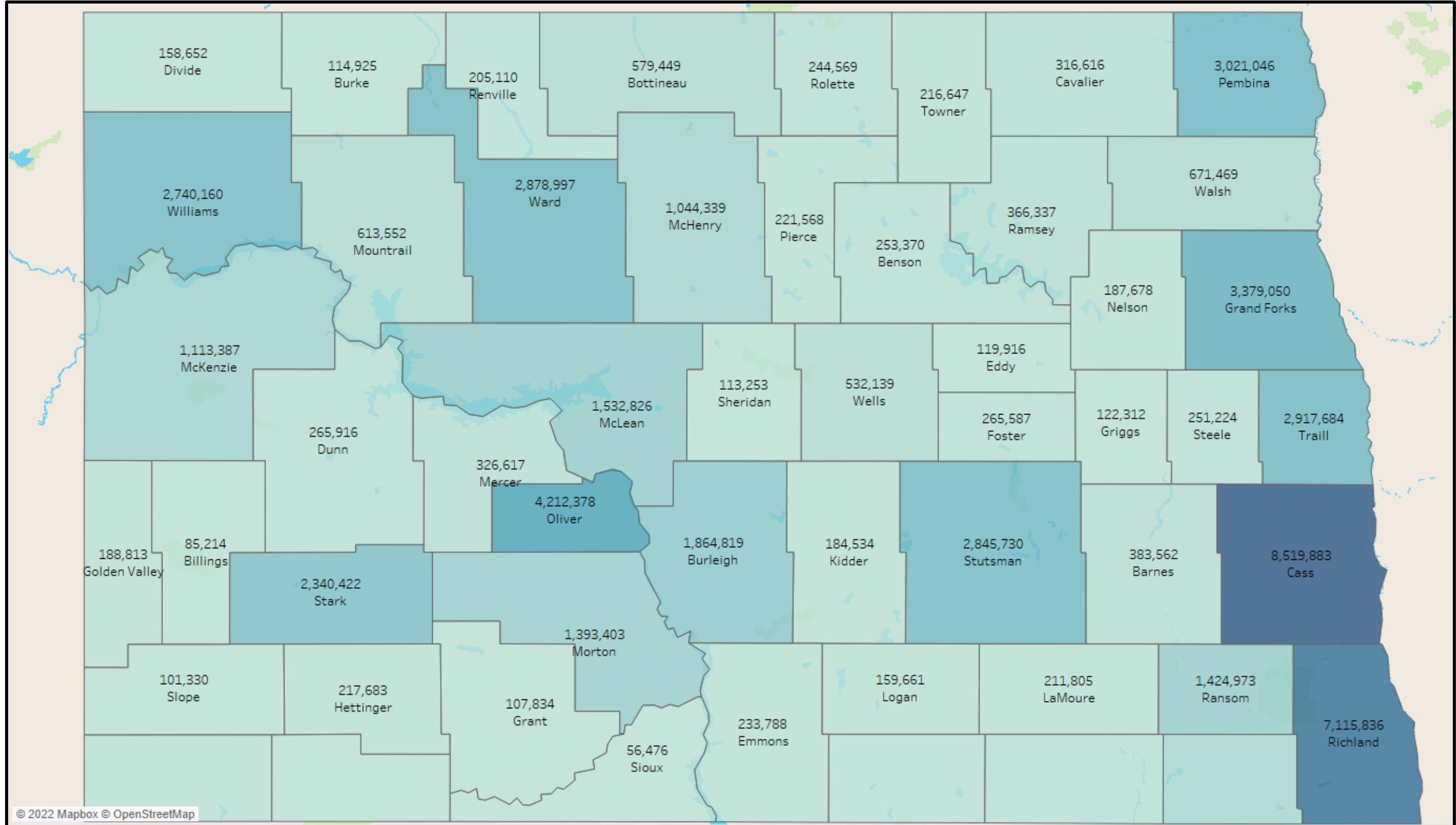


Figure 3-20: Transearch Estimate of Terminated Truck Tons (Million) by North Dakota County (2019)



© 2022 Mapbox © OpenStreetMap

STREETLIGHT TRUCK DATA ANALYSIS

INTRODUCTION

The StreetLight Insight platform was used to assess truck movements throughout the state. StreetLight provides transportation metrics such as origin-destination analysis, identification of key routes, and segment-level speed and performance data by combining and processing a variety of data sources including smartphone and GPS location data. For truck mode analyses, StreetLight relies primarily on INRIX GPS data as a key source. This data is processed by StreetLight using their proprietary Route Science data processing engine.

StreetLight is typically available as either a subscription service or as a project-level service. Subscription services provide the greatest flexibility and scope to run a large number of analyses at many different locations. For the project-level service—such as the one purchased for this plan update—StreetLight’s pricing is based on the number of “zones” available to the user. A zone can be established as either an area in which truck trips begin or end, or as roadway segments through which truck trips pass through. For this project, 100 zones were purchased. The following areas were defined as zones for this statewide analysis:

- One non-pass-through zone for each county
- Two pass-through zones for the top seven U.S.-Canada border crossings
- One non-pass-through zone for each of the five Tribal Nations within the state

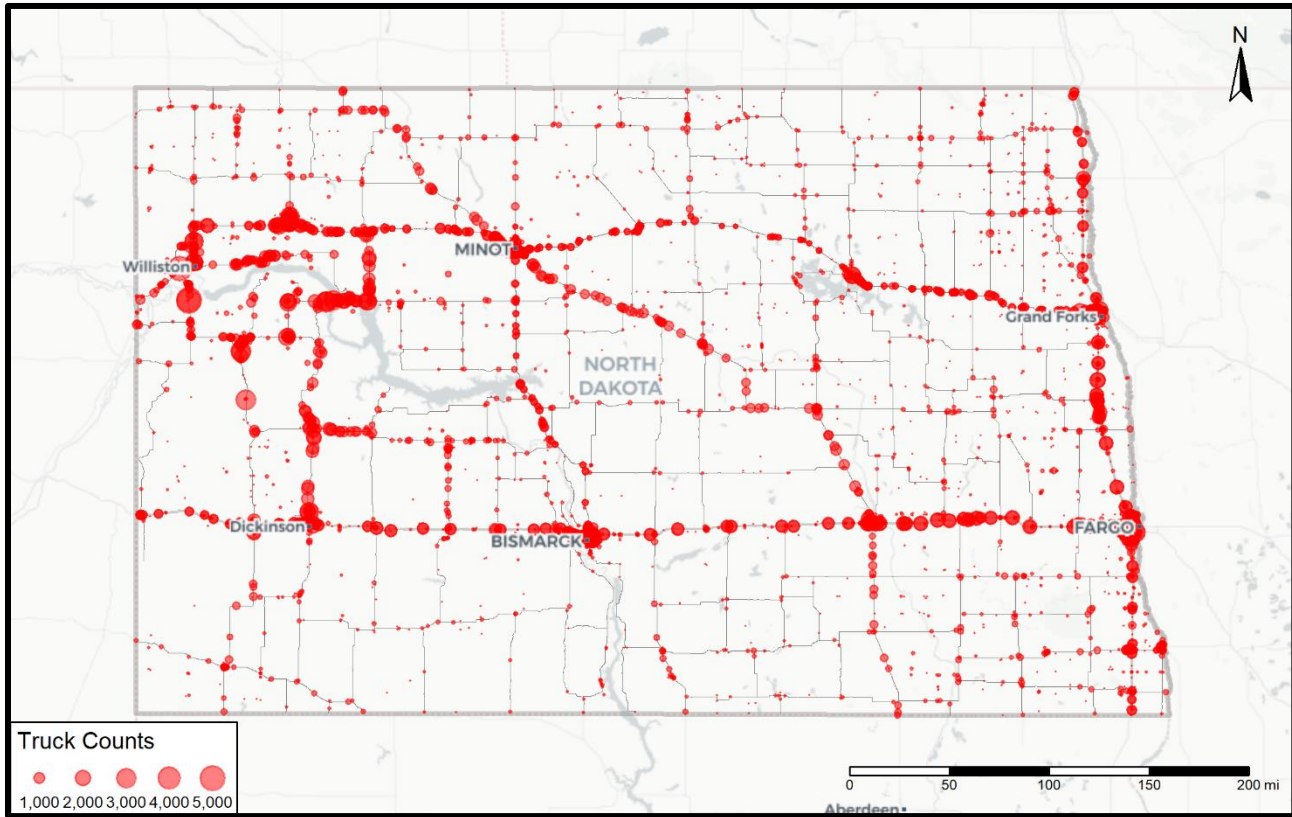
The primary analyses used for this analysis was the Top Route and Truck Activity Analyses. All StreetLight data collected for this study represents a full year of 2019 data.

STREETLIGHT INDEX VALUE ADJUSTMENTS

By default, StreetLight provides an output in units of StreetLight Truck Index. These index values do not translate directly to measures of truck average daily traffic (ADT), but rather represent a baseline measure for comparisons of order of magnitude between locations. That is, a StreetLight zone with an index value twice as high as another zone can be assumed to have approximately twice as much truck volume. To convert the index values into a more meaningful unit of measure, the StreetLight index values were compared to known truck counts to establish an average ratio, or scaling factor, to translate between the two data sources.

Current North Dakota truck traffic counts were downloaded from the NDDOT Geographic Information Systems (GIS) in January 2022. Count locations with a non-zero number for trucks are shown in Figure 3-21. This map highlights the locations of key corridors of truck activity including I-94, I-29, US-52, US-83, US-85, US-281 and multiple roadways in western North Dakota in and around Williston and Dickinson. Traffic count locations collected in 2019 or later were geospatially compared to the StreetLight Index output for the County-Level Top Route Analysis discussed further in the next section. The combined results of the top route analysis represent a segment-level summation of all truck trips starting within a county and ending outside of that county, and vice versa. Notably, the approach used for this analysis does not include truck trips that start and end within the same county. This is a limitation of the county-level approach. An analysis of individual roadway segments would provide a more inclusive result but would require substantially more than 100 zones to conduct.

Figure 3-21: North Dakota Average Daily Truck Count Point Locations

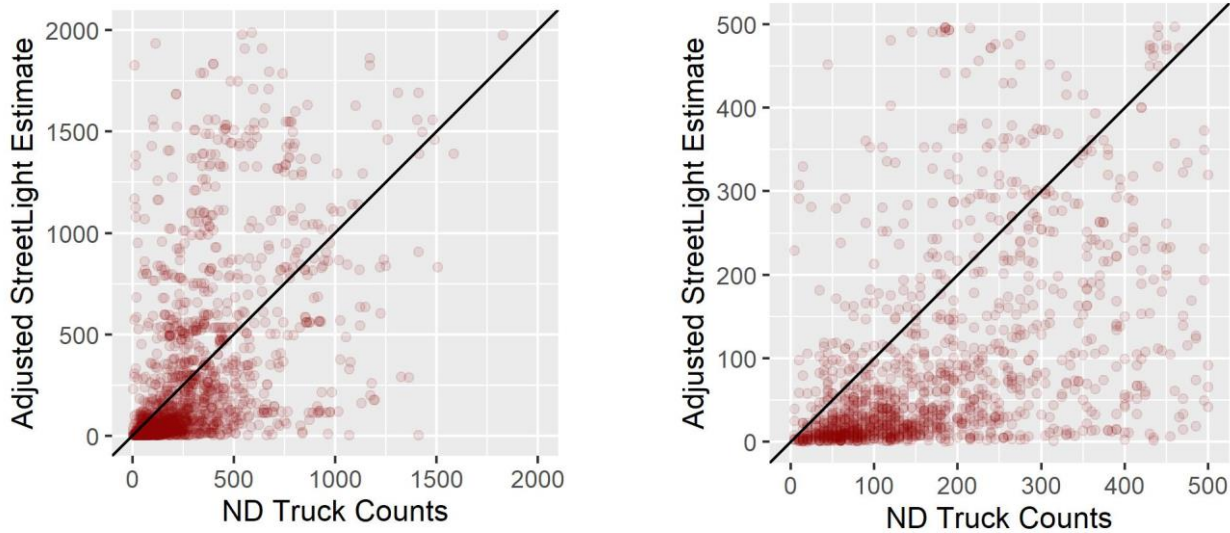


After completing the geospatial comparison between North Dakota truck traffic counts and the StreetLight truck index values, a scaling factor was calculating by taking the average of the ratio between the index values and the actual truck counts. For this calculation, extreme outliers were accounted for by excluding the top and bottom 5% of each ratio. The final average ratio value was 20.1 index value points for each average daily truck.

Adjusted StreetLight values were calculated by dividing each index value by this average ratio value. A comparison of the adjusted StreetLight values and the actual count values is shown in Figure 3-22. The chart on the left shows this information for actual and estimated daily truck counts up to 2,000 per day. The chart on the right shows the same information but provides more detail for actual and estimated daily truck counts up to 500 per day. The results show a relatively imperfect correlation between the two values. In general, StreetLight truck count estimates are somewhat more likely to be higher than the actual truck counts except for locations where the actual truck counts are less than 200 per day. In these cases, the StreetLight truck count estimates are more likely to be lower than the actual counts. This is most likely the result of the exclusion of intracounty trips in the StreetLight data. Intracounty trips are generally more likely to use lower volume roadways on their trips. Also, StreetLight estimates of volume are known to be less accurate on lower volume roadways in general.¹⁶

¹⁶ See [StreetLight AADT 2020 Methodology and Validation](#) for more information

Figure 3-22: North Dakota Average Daily Truck Counts vs. Adjusted StreetLight Index Values



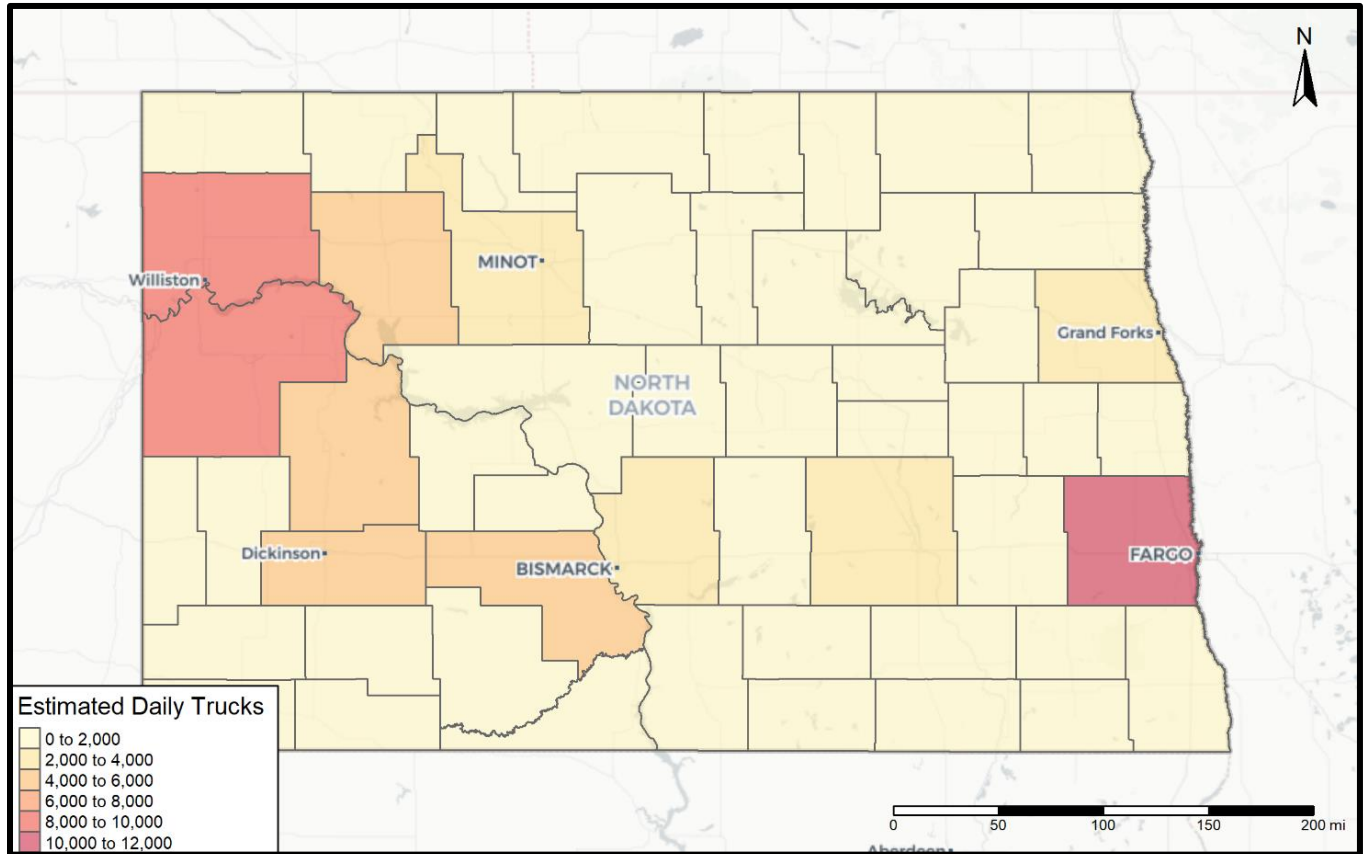
COUNTY-LEVEL ANALYSIS

TRUCK ACTIVITY BY COUNTY

Overall truck activity was measured using the StreetLight Insight platform. Truck activity includes an estimate of all truck trips starting or ending their trip within the target county. The data used for the analysis represents a full year of 2019 data, including all times and days of the week. The results of this analysis are shown in Figure 3-22. The county with the highest truck activity is Cass County with an estimated 10,000 truck trips per day. The second and third highest activity counties are McKenzie and Williams counties near Williston with an estimated 9,500 and 8,300 truck trips per day, respectively.

A comparison between this StreetLight-based truck activity map and the Transearch-based truck activity maps (Figure 3-19 and Figure 3-20) provides an interesting juxtaposition. An important distinction between these two data sources is that the Transearch data represents truck tonnage rather than truck volumes. The Transearch map also shows higher levels of activity along the I-29 corridor to the north and south of Cass County. Similarly, Ward County near Minot and Oliver County north of Bismarck also both show higher levels of activity in the Transearch data than in this StreetLight data. The causes of these discrepancies may be due to the different standard load sizes for various goods categories. It may also be due to the inclusion of service-type truck vehicles in the StreetLight vehicles. Overall, the distribution of truck activity aligns with the current average daily truck count map (Figure 3-21).

Figure 3-23: County-level Estimated Daily Truck Activity (Trip Starts and Ends)



TOP ROUTE ANALYSIS

A StreetLight Top-Route analysis was completed for each of the 53 counties in North Dakota. Through this approach, StreetLight evaluates all truck trips that either start or end their trip within the target county. StreetLight then identifies the roadway segments used by trucks to access or depart from the county. This process therefore identifies the predominant—or “top”—roadway routes used by trucks to access the county. Note that the precise routing of trips within each county is not included in this analysis. To understand this level of detail, additional smaller zones would need to be created within each county. For individual counties, this information can help to highlight the most important roads for truck freight movement and can also highlight key corridor connections to other important freight nodes.

- An example county-level top route map for Cass County is shown in Figure 3-24. The figure highlights the importance of I-94 and I-29 from all directions as the key routes used by trucks with an origin or destination in Cass County.
- An example map for Ward County is shown in Figure 3-25. The figure highlights the importance of US-2 to the west to connect to locations in the Williston area, US-52 and US-83 to the southeast and south, respectively, to connect to I-94.

Maps of county-level top route results for the remaining counties are included in Appendix C FAF, Transearch, and Streetlight Analyses.

Figure 3-24: County Top Route Analysis Results – Cass County

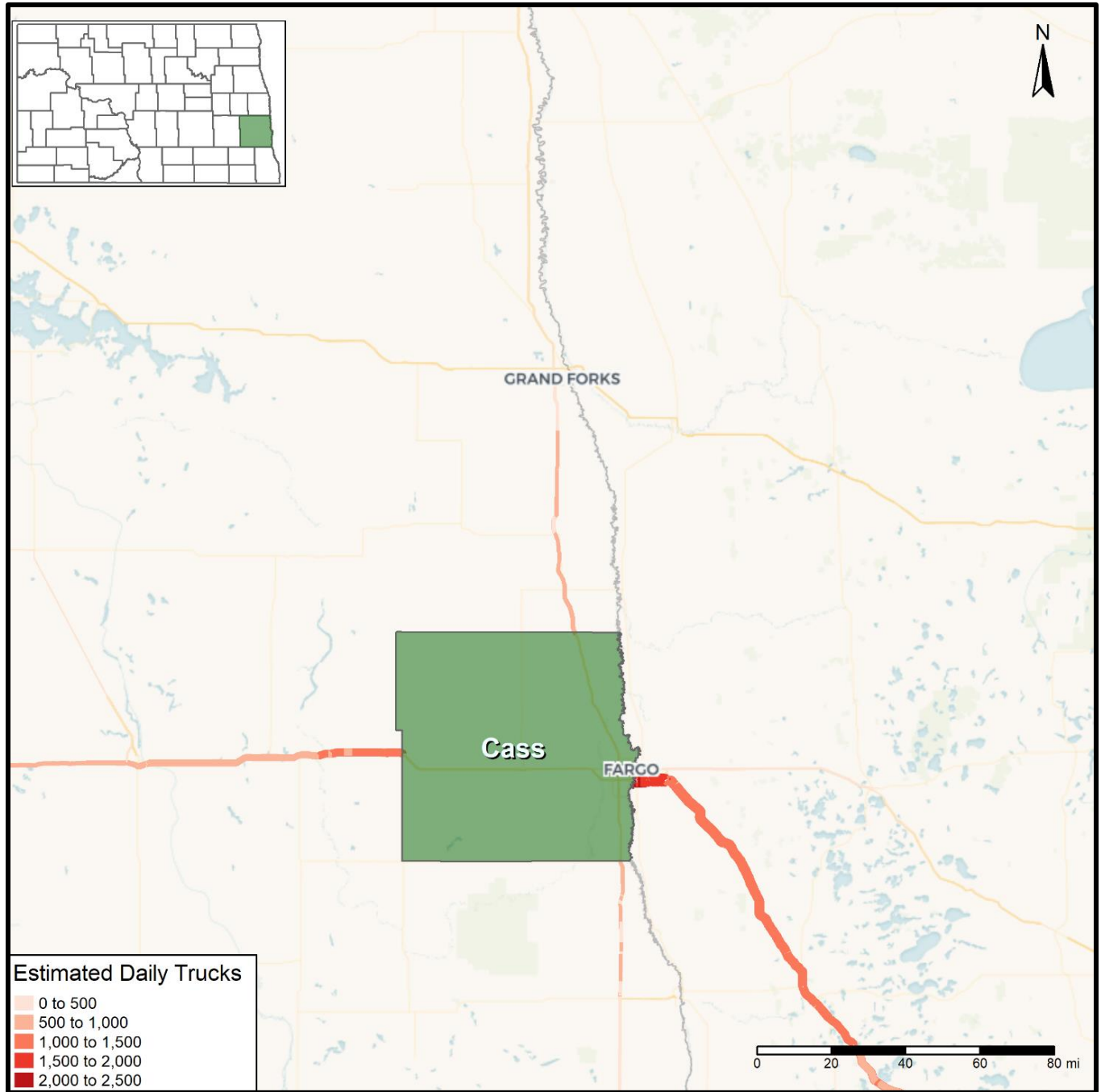
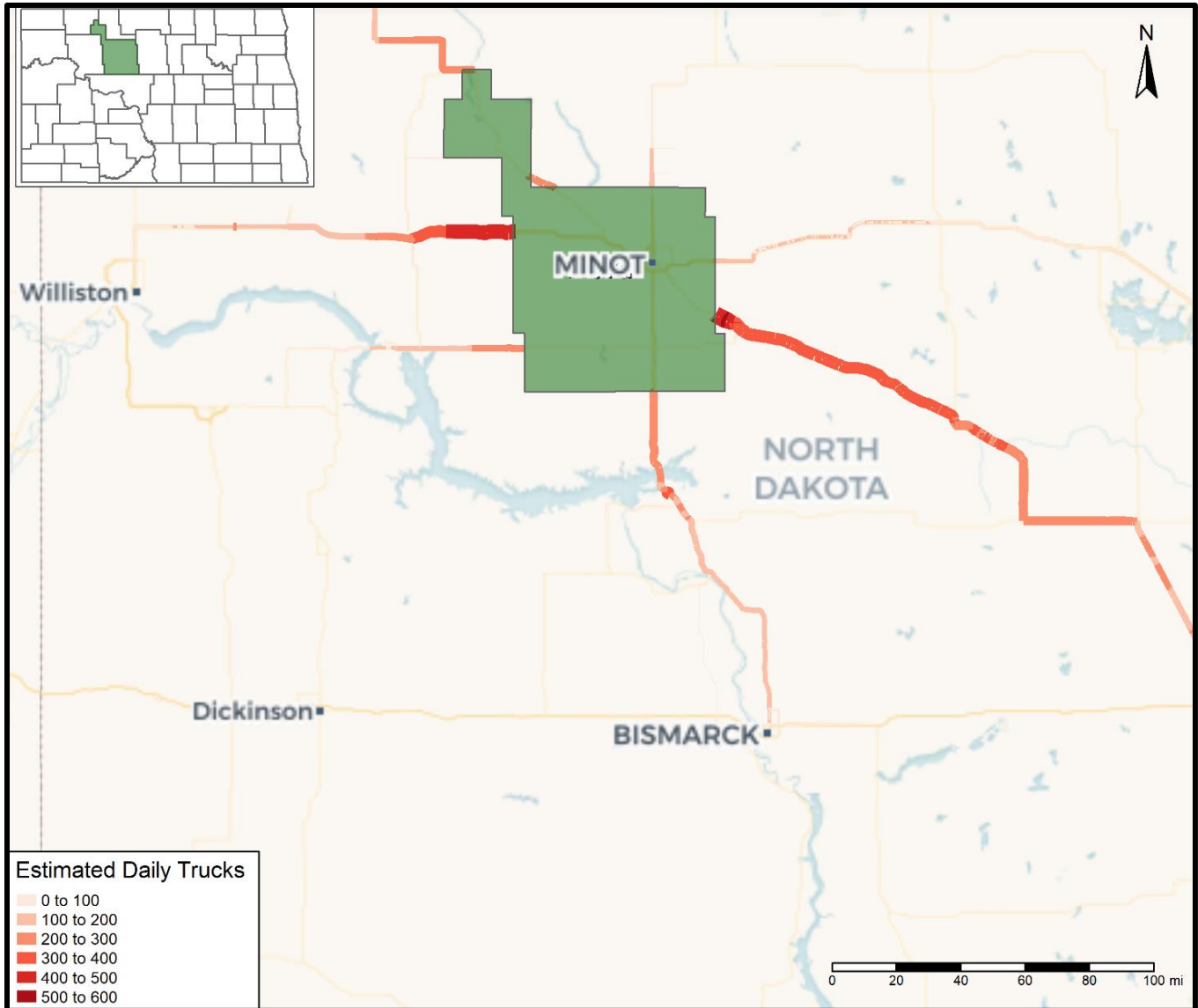
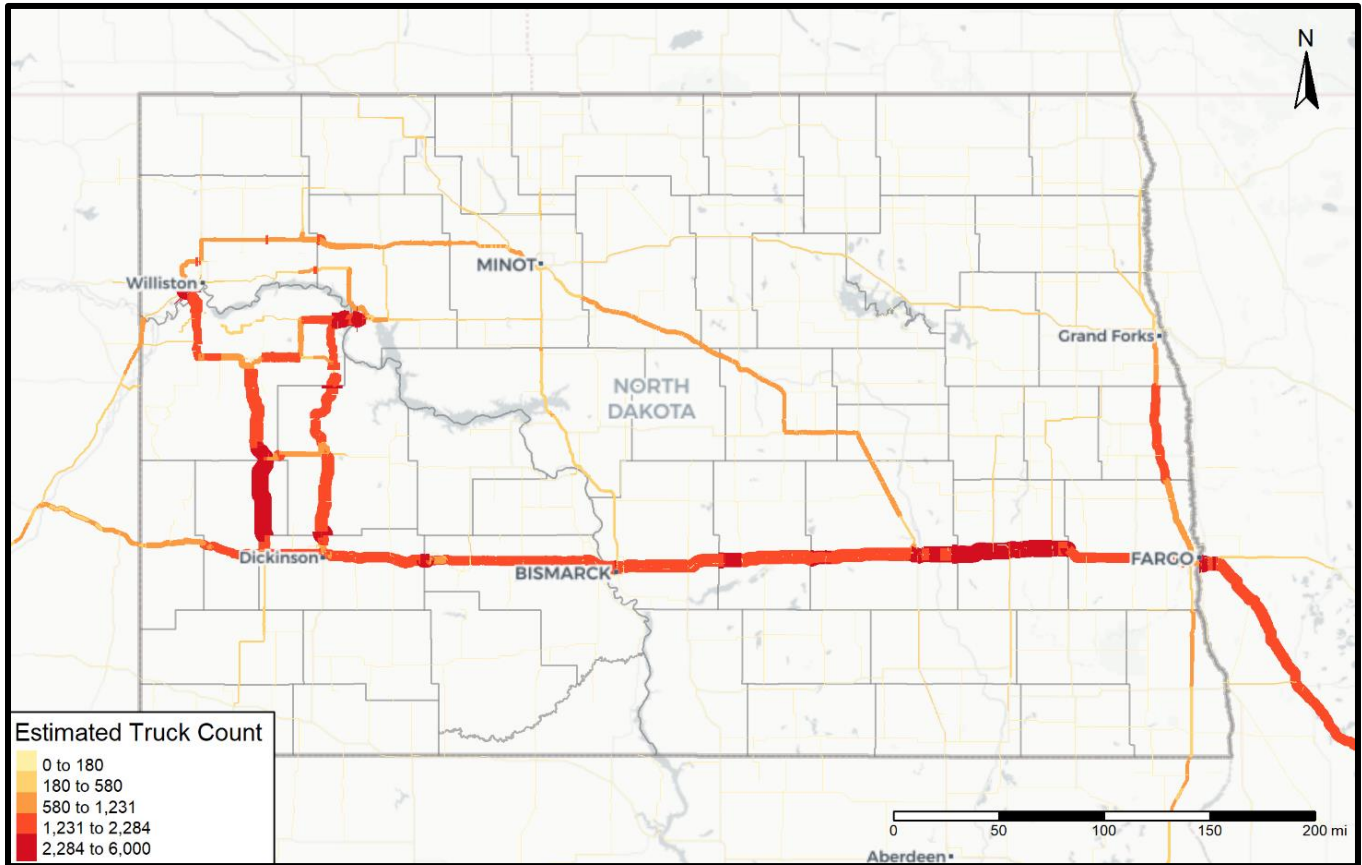


Figure 3-25: County Top Route Analysis Results – Ward County



After completing the analysis for each county, a composite map was generated by cumulatively adding together the results of each individual top route analysis at a segment level. Doing this results in a map of the county-to-county truck flows throughout the state. The result of this approach is shown in Figure 3-26. Note that these truck flows do not include truck trips that both start and end within the same county. Also, the flows do not include any truck trips that did not start or end within one of the counties (i.e., statewide pass-through trips). As noted in the Introduction to this section, these composite truck flows were used to scale the StreetLight index values to more useful average daily truck volume estimates. The figure highlights the importance of many key routes in the state including I-94, I-29 (particularly between Grand Forks and Fargo), US-2, US-52, US-85 between I-94 and Williston, and Highway 22 and 23 between Dickinson and New Town.

Figure 3-26: Composite Statewide Top Route Analysis Results



CROSS-BORDER TRUCK TRAVEL PATTERNS

StreetLight Data was used to conduct top route analyses for the top U.S.-Canada ports of entry within North Dakota. To conduct this analysis, StreetLight zones were defined for the roadways approaching each border crossing. The ports of entry selected for this analysis included:

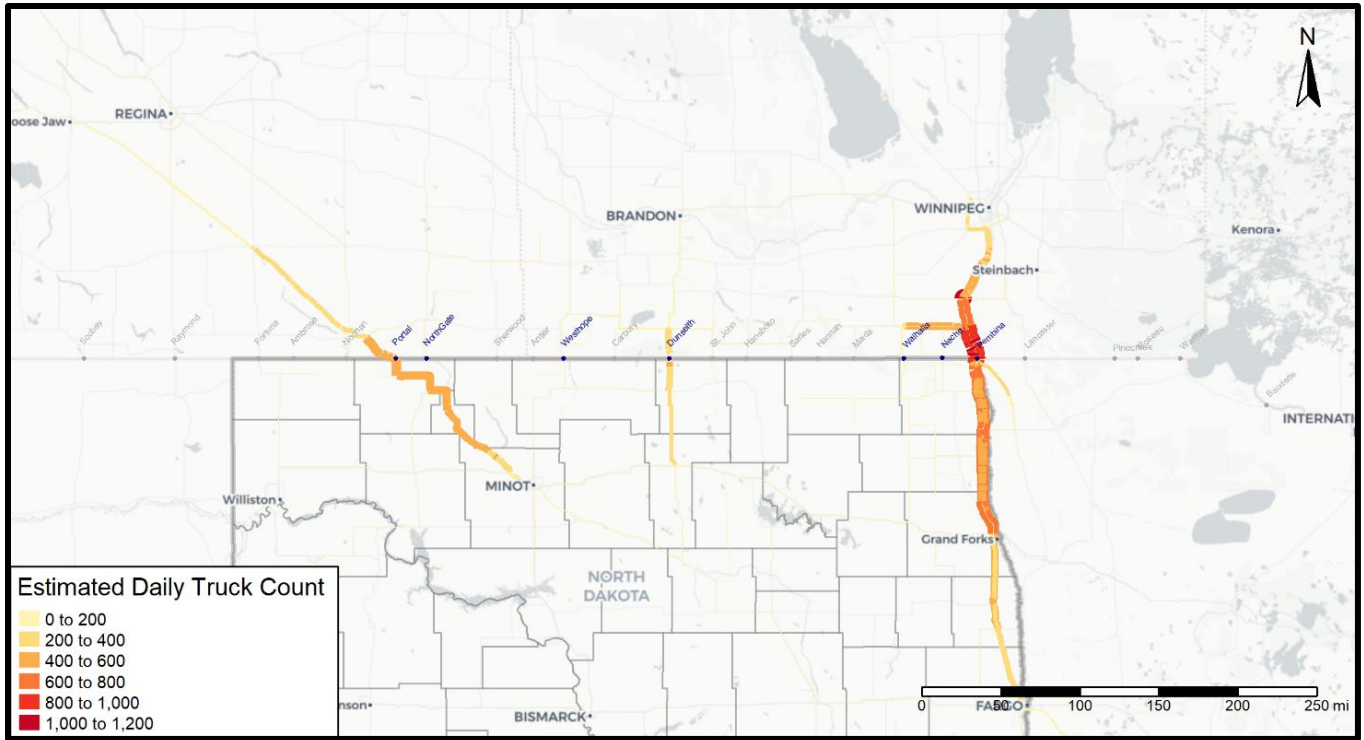
- Pembina-Emerson
- Portal – North Portal
- Dunseith-- Boissevain
- Neche--Gretna
- Northgate
- Walhalla—Winkler
- Westhope—Coulter

Combined, these seven ports of entry account for more than 95% of cross-border truck activity.¹⁷ Due to the differing sources for vehicle GPS information in Canada, the StreetLight index results for Canadian-based trips do not compare directly to the index results for U.S.-based trips. To overcome this issue, scaling factors were developed to adjust the Canadian index values prior to the final truck count estimate conversion. These scaling factors were developed on the principal assumption that the total volume of trucks on each side of the crossing for a given port

¹⁷ Based on Border Crossing/Entry Data available from BTS.

of entry should be approximately equal. The final results of this analysis are summarized in Figure 3-27. The map highlights the magnitude of the Pembina-Emerson and Portal-North Portal ports of entry and the key connecting corridors linking these movements to Winnipeg, MB and the Regina, SK areas in Canada, and the Minot and Grand Forks areas in North Dakota.

Figure 3-27: Border Crossing Top Route Analysis



SPECIAL INTEREST AREAS TOP ROUTE ANALYSIS

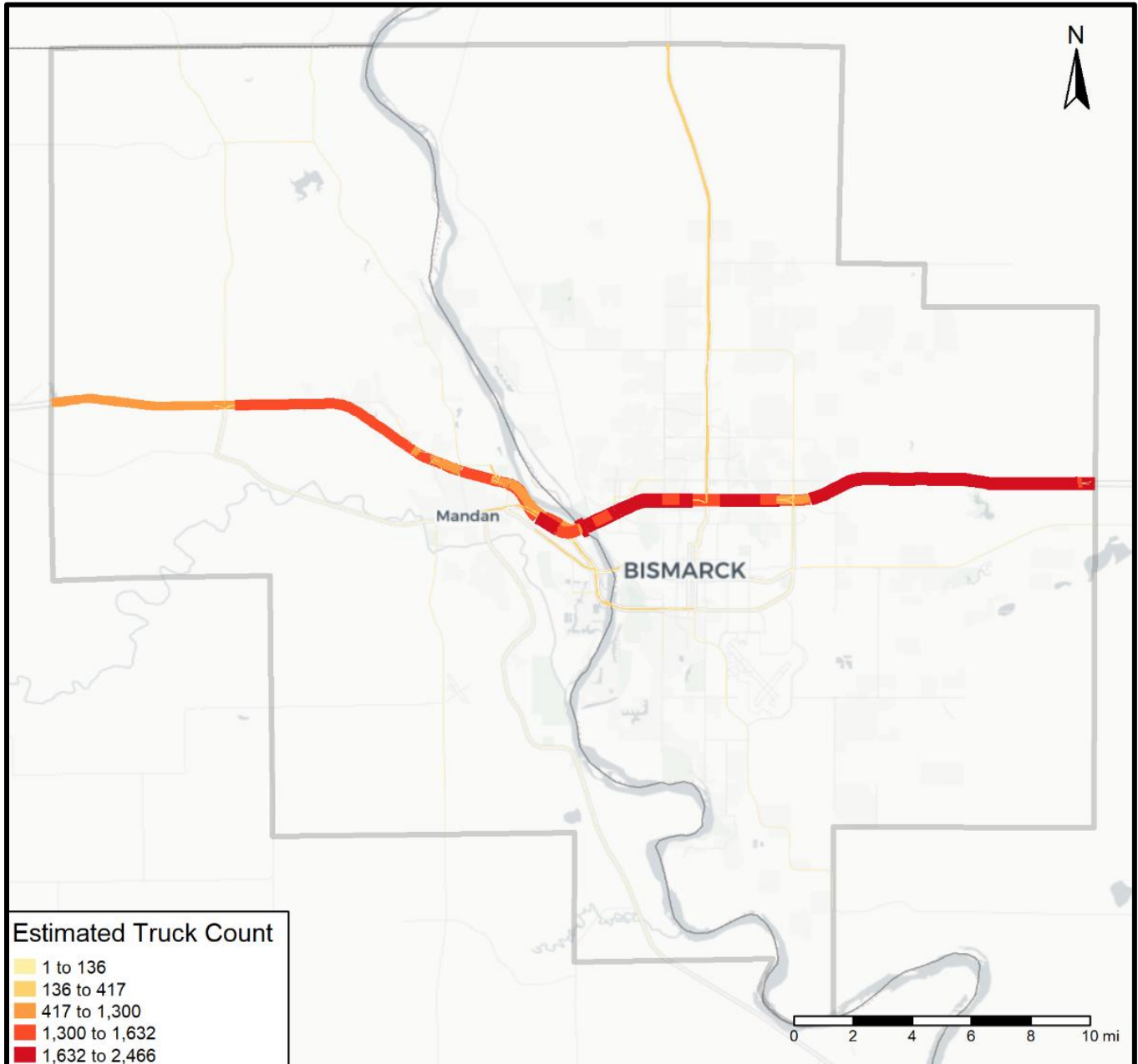
Similar to the composite statewide route analysis, three areas of interest have been identified for a more detailed study of truck volumes. These areas are:

- Bismarck-Mandan Metropolitan Planning Organization
- Minot Intermodal Terminal
- Spiritwood Soybean Crushing Facility

BISMARCK-MANDAN METROPOLITAN PLANNING ORGANIZATION

The Bismarck-Mandan Metropolitan Planning Organization is one of the three MPOs in the state of North Dakota. The area is traversed by I-94, as highlighted with the highest truck volumes in Figure 3-28, particularly on the Bismarck east side of the MPO.

Figure 3-28: Bismarck-Mandan MPO Top Route Analysis



MINOT INTERMODAL TERMINAL

The intermodal terminal in Minot is located at the Logistics Park of North Dakota. Figure 3-29 highlights US-2 serving the terminal and feeding into US-52.

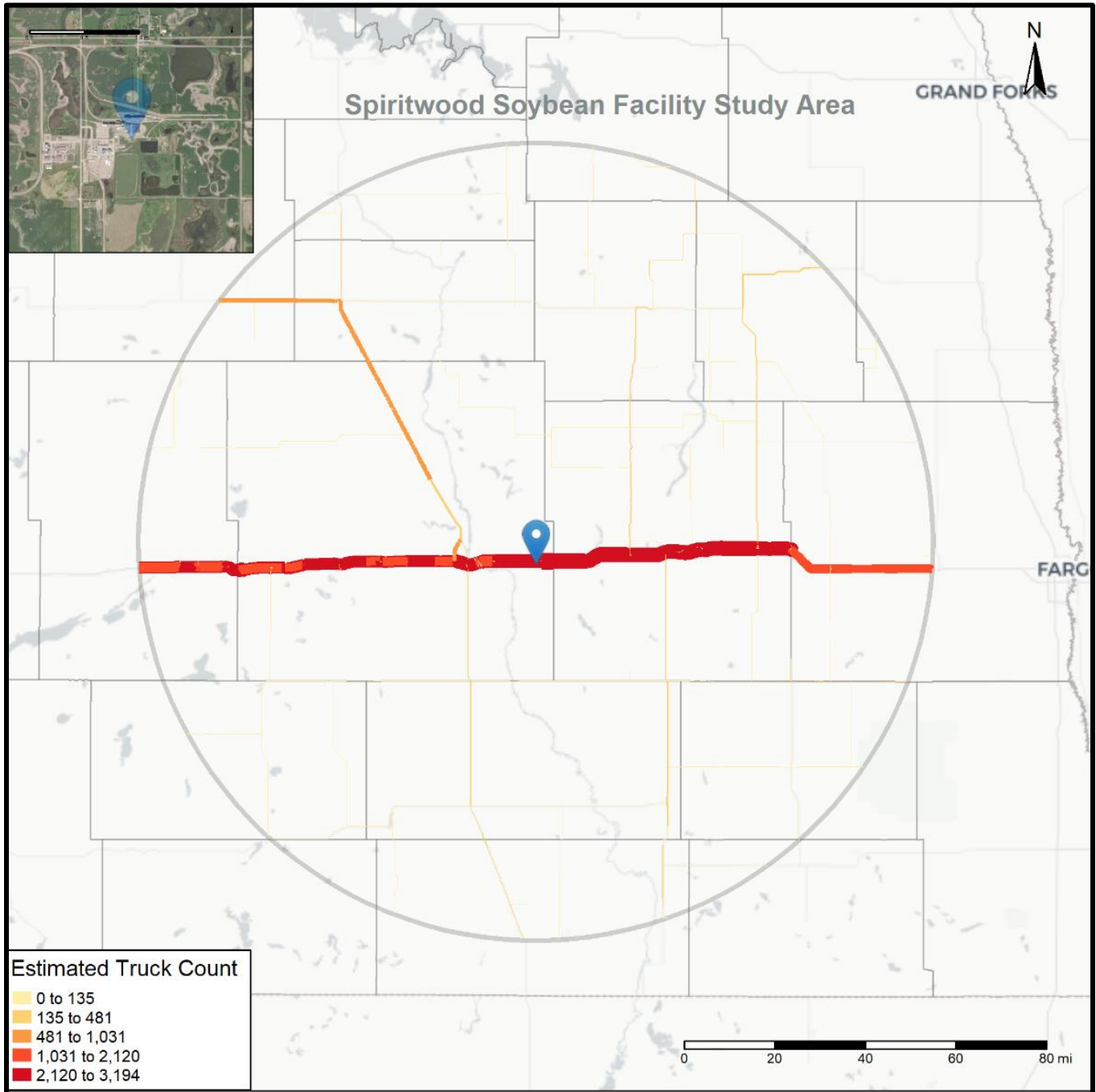
Figure 3-29: Minot Intermodal Terminal Top Route Analysis



SPIRITWOOD SOYBEAN CRUSHING FACILITY

A soybean crushing plant facility is under construction at the site of the former Cargill Malt Plant at Spiritwood, close to Jamestown. The high volumes of soybean required to operate the facility is expected to have a significant impact on roadway traffic in the immediate areas around the facility. NDDOT has identified a potential 60-mile soybean draw study area, as shown in Figure 3-30.

Figure 3-30: Spiritwood Soybean Crushing Facility Top Route Analysis



RAIL DATA ANALYSIS

INTRODUCTION

Rail data is available through several sources, including:

- The Surface Transportation Board Waybill Sample. As previously noted, the Transearch model purchased for the State Freight and Rail Plan included an anonymized and aggregated version of the Waybill that preserves confidentiality, and this version was used to prepare rail analyses.
- Supplemental national data from the U.S. Energy Information Administration and other agencies.
- Supplemental state data from the North Dakota Department of Agriculture and Upper Great Plains Transportation Institute (UGPTI).

This section presents two analyses:

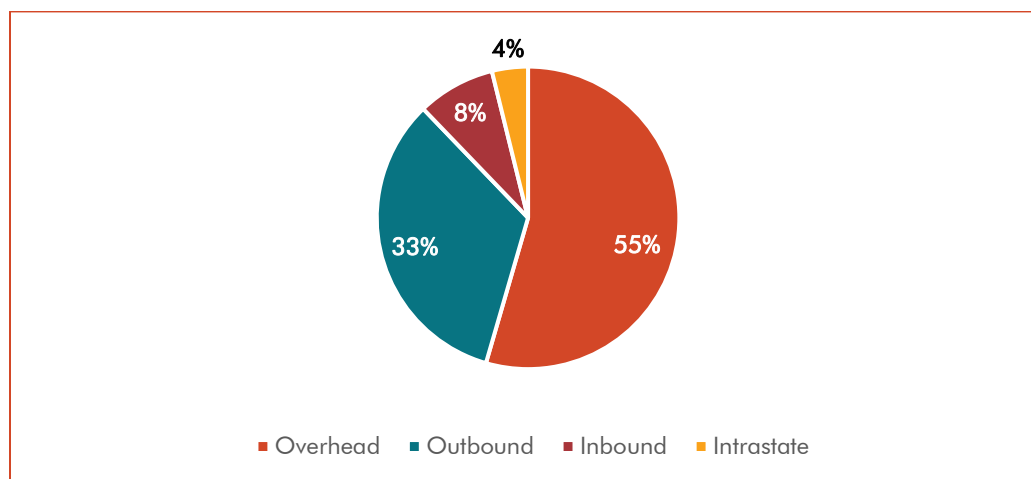
- Rail Flow Analysis from multiple sources
- Additional mapping of Origin-Destination Desire Lines from Transearch rail data

RAIL FLOW ANALYSIS

FREIGHT RAIL TRAFFIC BY DIRECTION

As shown in Figure 3-31, of the 135.3 million tons of freight handled by the North Dakota rail network in 2019, most was either traveling outbound from North Dakota to other states or traveling through North Dakota between other states. Fifty-five percent or 61.5 million tons passed through North Dakota, while 33% or 45.1 million tons originated from North Dakota. Eight percent of tons or 11.3 million tons terminated in North Dakota while 5.2 million tons or 4% traveled within North Dakota.

Figure 3-31: North Dakota Freight Rail Tonnage by Direction (2019)

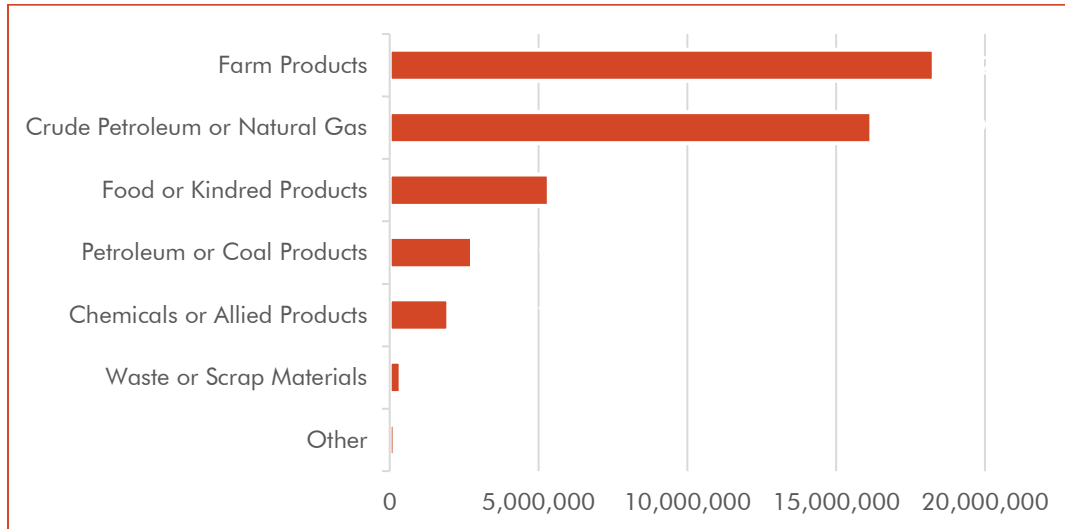


Source: STB Waybill Sample processed by IHS Markit

FREIGHT RAIL TRAFFIC BY COMMODITY

By far the largest commodity types shipped from North Dakota were farm products and petroleum products (Figure 3-32). Farm products consisted primarily of corn, soybean, and wheat shipments. Petroleum products could include crude oil as well as other petroleum products like NGLs.

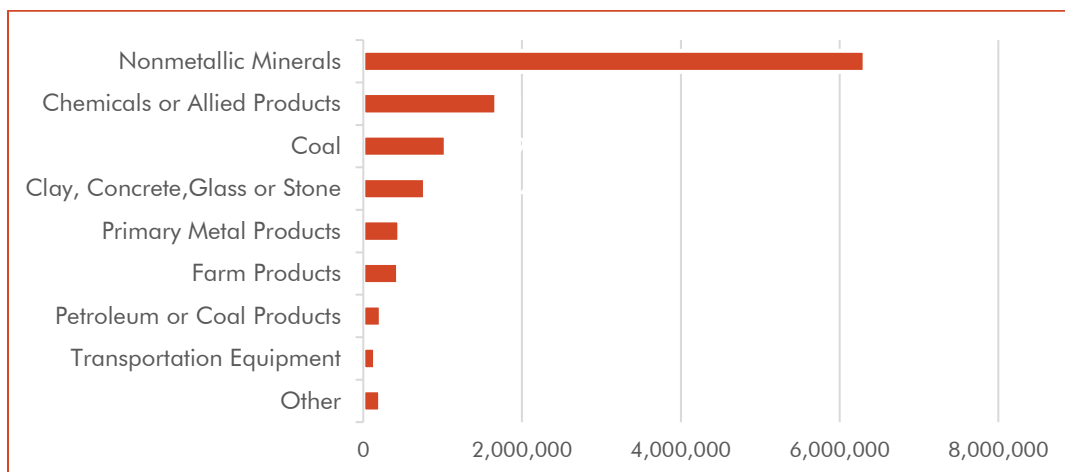
Figure 3-32: North Dakota Freight Rail Outbound Tonnage by Commodity (2019)



Source: STB Waybill Sample processed by IHS Markit

As shown in Figure 3-33, the largest tonnage commodities shipped to North Dakota were nonmetallic minerals. The majority of these were used in energy exploration.

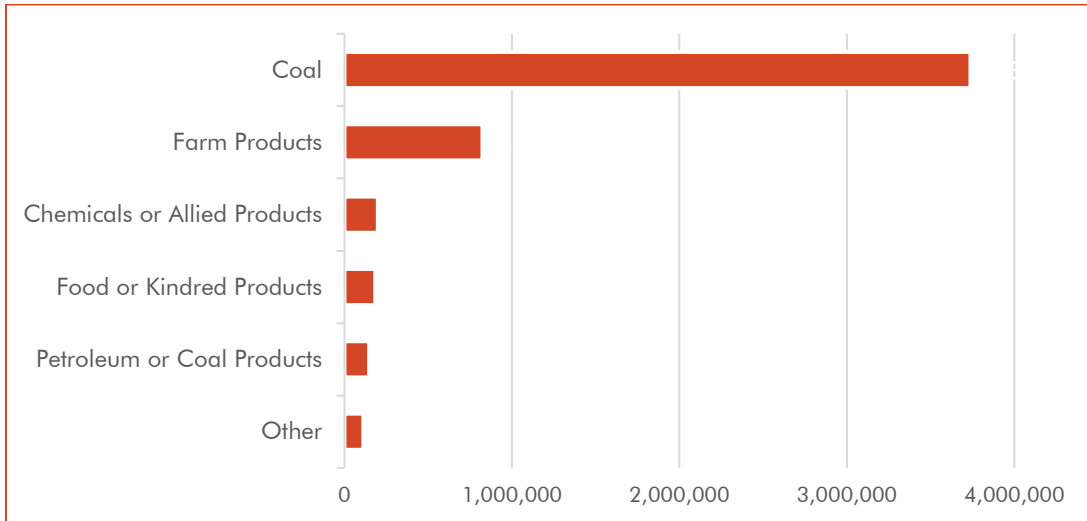
Figure 3-33: North Dakota Freight Rail Inbound Tonnage by Commodity (2019)



Source: STB Waybill Sample processed by IHS Markit

By far the highest volume of intrastate freight traffic was coal, which moved between coal mines in North Dakota and electric generating stations within the state (Figure 3-34).

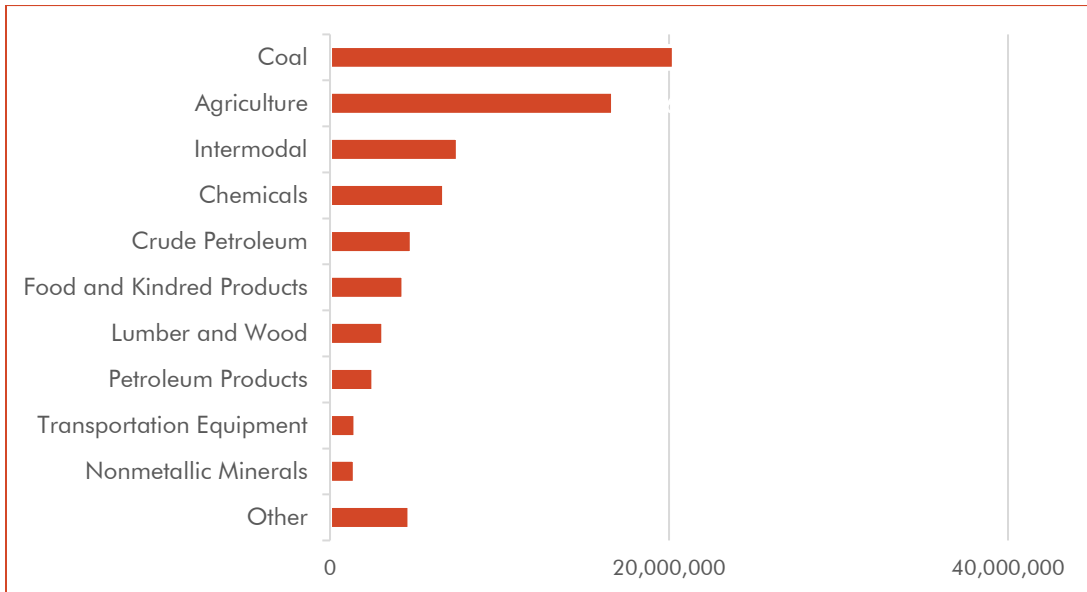
Figure 3-34: North Dakota Freight Rail Intrastate Tonnage by Commodity (2019)



Source: STB Waybill Sample processed by IHS Markit

Coal is the highest volume commodity that passed through North Dakota between other states (overhead). Much of this consisted of coal shipments from Powder River Basin mines in Montana and Wyoming moving to points east. Agricultural products are the second highest commodities, including export grain shipments from the Midwest to the Pacific Northwest.

Figure 3-35: North Dakota Freight Rail Overhead Tonnage by Commodity (2019)



Source: STB Waybill Sample processed by IHS Markit

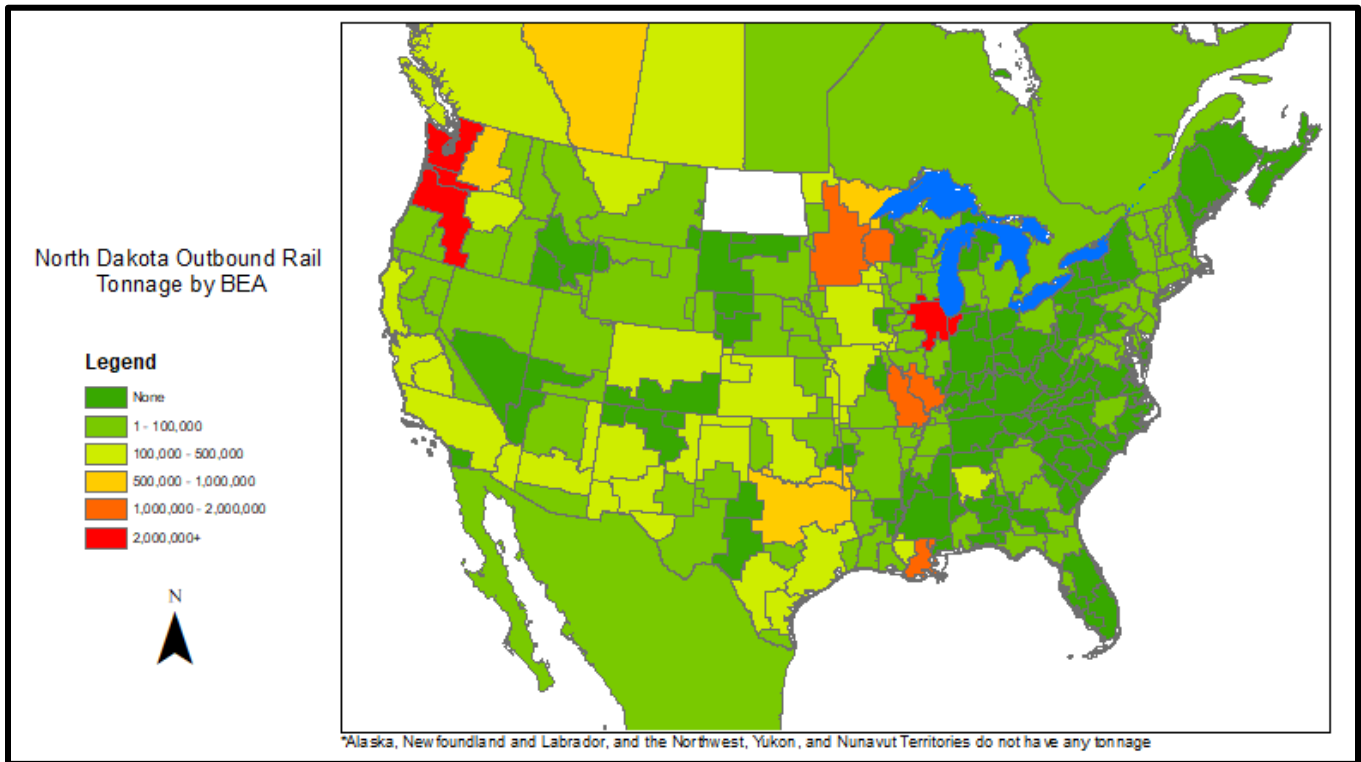
GEOGRAPHY OF NORTH DAKOTA FREIGHT FLOWS

The geography of North Dakota’s freight flows has been assessed by reviewing tonnage between North Dakota and its top trading partners by Business Economic Area (BEA). BEAs are economically connected areas that surround metropolitan or micropolitan statistical areas. Within the U.S. are 170 BEAs plus 11 for Canada and one for Mexico.

As shown in Figure 3-36, a variety of locations receive significant tonnage by freight rail from North Dakota. These areas vary by their usage of North Dakota commodities:

- **Seaports:** Seattle, Washington, and Portland, Oregon, both receive farm products from North Dakota, which are then exported through ports in those areas. Seattle, WA also exports petroleum products from North Dakota. New Orleans, LA receives petroleum products from North Dakota, which are exported or processed at refineries and other facilities within the New Orleans Gulf Coast region.
- **Gateways:** Chicago, Illinois, and St. Louis, Missouri, receive farm products, petroleum products, food products, and other commodities from North Dakota. These locations consume some North Dakota products locally but also serve as gateways where freight is transferred between railroads for furtherance to other areas.
- **Regional Center:** Minneapolis, Minnesota is neither a gateway nor a seaport but receives significant tonnage of freight from North Dakota, particularly food and farm products. Minneapolis is a major regional hub for the Upper Midwest and processes commodities from North Dakota.

Figure 3-36: BEA Destinations of Freight that Originates in North Dakota (2019)



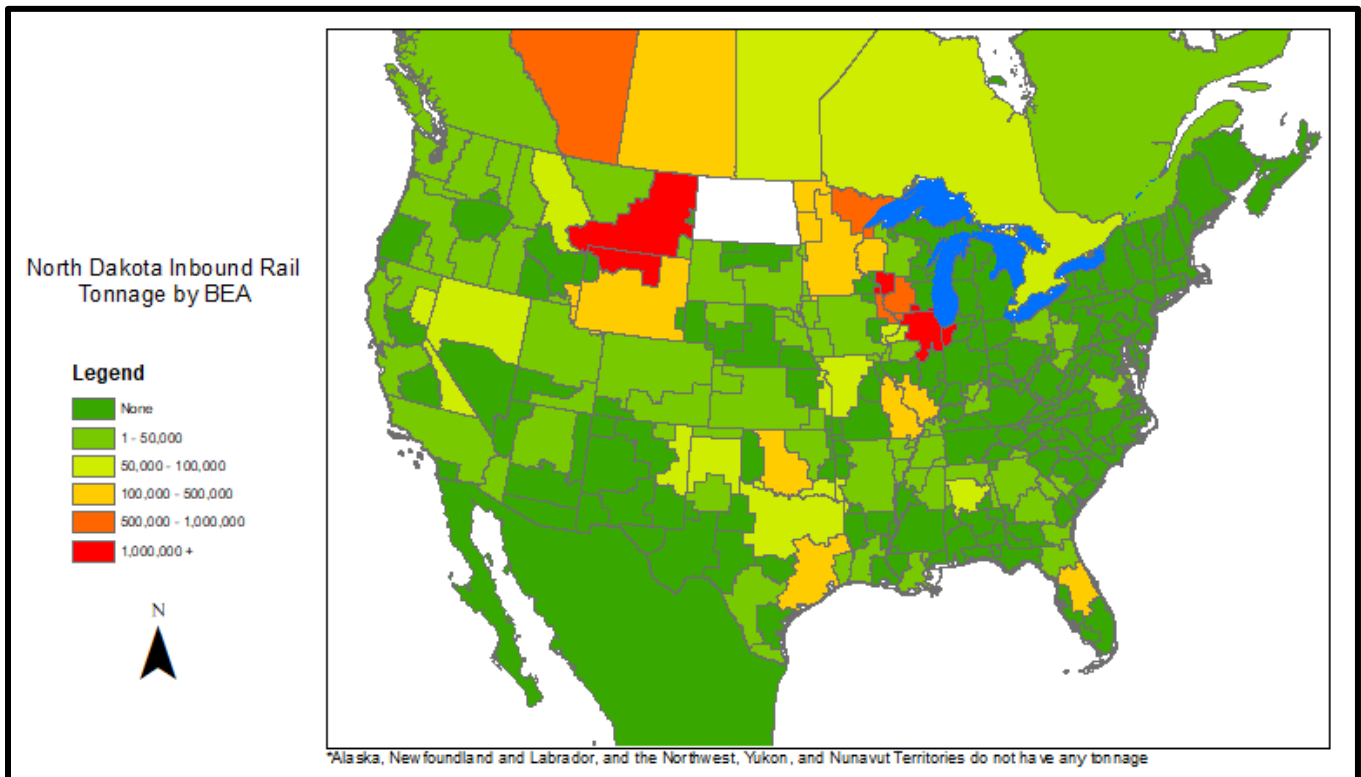
Source: STB Waybill Sample processed by IHS Markit

As shown in Figure 3-37, the highest volume origins of freight that terminates in North Dakota are the Billings, Montana; the Chicago, Illinois; and the La Crosse, Wisconsin, BEAs. The primary commodities from each location are:

- Billings: Coal and secondarily nonmetallic minerals
- Chicago: Nonmetallic minerals
- La Crosse: Nonmetallic minerals

Chicago is a major gateway, so that even if it is listed as a top origin, much of this traffic may in fact originate elsewhere. The freight is transferred in Chicago.

Figure 3-37: BEA Origins of Freight that Terminates in North Dakota (2019)

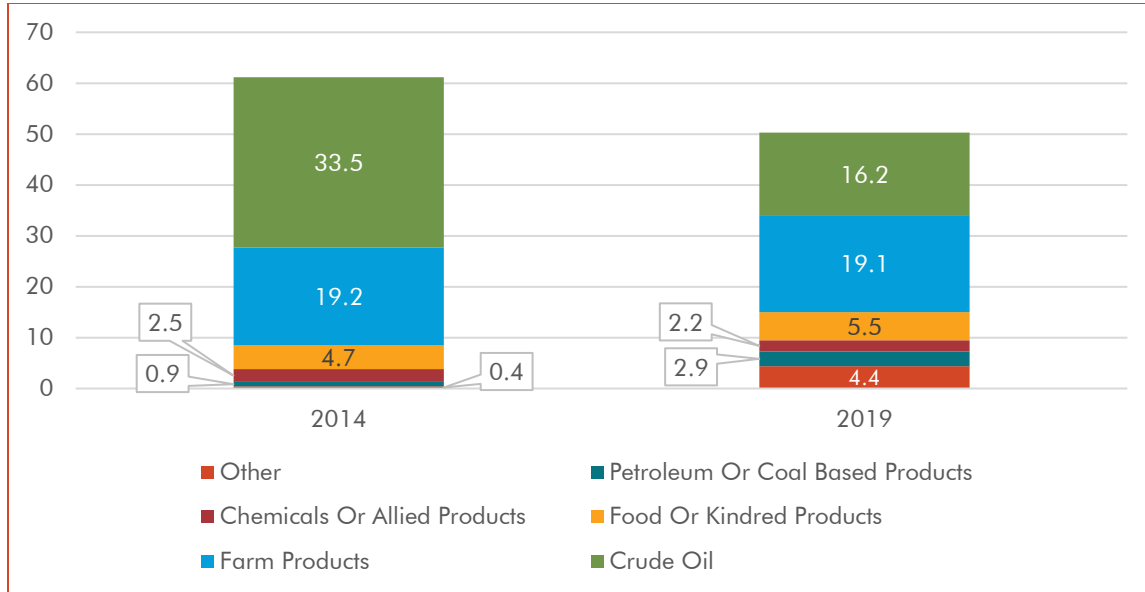


Source: STB Waybill Sample processed by IHS Markit

CHANGES IN NORTH DAKOTA FREIGHT TRAFFIC SINCE PREVIOUS NORTH DAKOTA STATE RAIL PLAN

As shown in Figure 3-38, the volume of freight that originates (rail freight with or from North Dakota to other states) in North Dakota declined between 2014 and 2019 from 61 to 50 million tons. This has been driven by a 17.3 million ton drop in crude by rail shipments and has been partially offset by increases in certain commodities, such as food, which increased from 4.7 to 5.5 million tons. Agricultural shipments were relatively stable at just over 19 million tons originated.

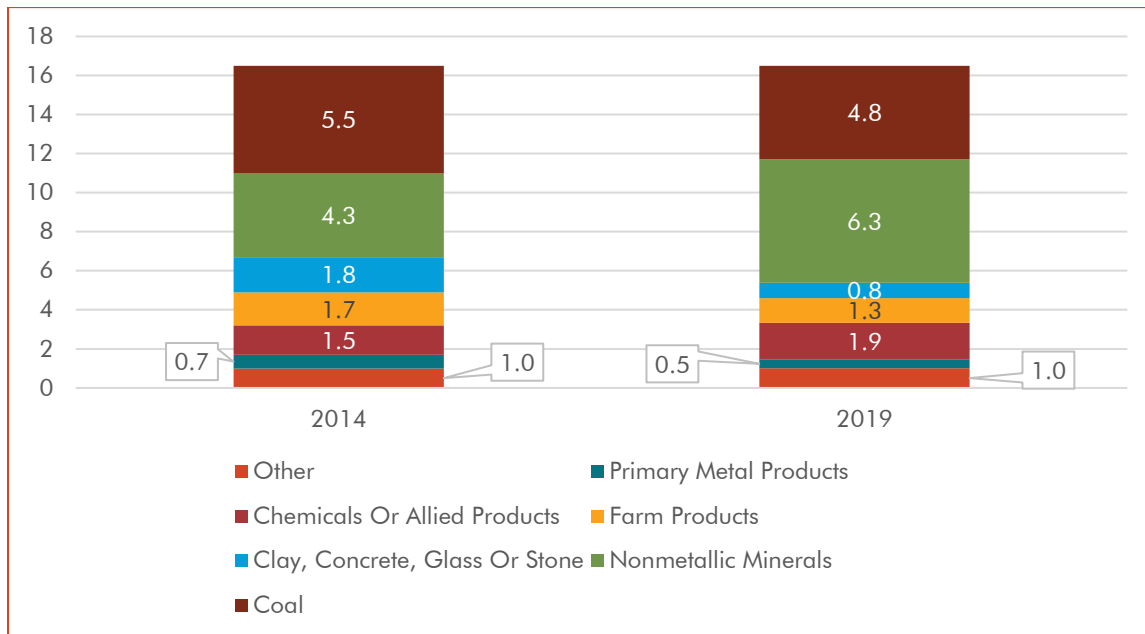
Figure 3-38: Comparison of 2014 and 2019 North Dakota Originating Tons by Commodity (Millions)



Sources: 2014 STB Waybill Sample and 2019 STB Waybill Sample processed by IHS Markit

As shown in Figure 3-39, the terminating tons (inbound from other states and moving within North Dakota) remained relatively consistent between 2014 and 2019. The quantity of coal shipped to North Dakota decreased, but nonmetallic mineral shipments increased.

Figure 3-39: Comparison of 2014 and 2019 North Dakota Terminating Tons by Commodity (Millions)



Sources: 2014 STB Waybill Sample and 2019 STB Waybill Sample processed by IHS Markit

TRENDS OF PRIMARY COMMODITIES THAT MOVE TO, FROM, AND WITHIN NORTH DAKOTA

It is useful to consider some of the trends that impact the primary commodities shipped by rail to, from, and within North Dakota. The intent is not to produce a specific forecast, but to explore some of the factors that have influenced North Dakota freight rail movements in the past and how these could impact the North Dakota rail movements in the future. The commodities selected for this analysis are:

- Petroleum products
- Grain and oilseed
- Coal

PETROLEUM COMMODITY TRENDS WITH POTENTIAL TO IMPACT RAIL

North Dakota petroleum markets have had a major impact on the state’s rail network since hydraulic fracturing technology enabled the large volumes of petroleum products to be recovered from the Bakken Shale play. North Dakota is the third largest oil-producing state within the U.S. behind Texas and New Mexico. North Dakota 2019 oil production was almost 18 times the state’s oil product in 2003.¹⁸

Volumes of crude oil shipped by rail have changed dramatically over the past two decades. As shown in Figure 3-40, crude by rail shipments increased between 2010 and 2013.¹⁹ They then peaked at around 800,000 barrels per day in the 2013 – 2014 timeframe. Crude by rail shipments then fell afterward so that they were around 200,000 barrels per day during 2021.

Figure 3-40: Barrels per Day of Crude Oil Shipped by Rail from North Dakota



Source: North Dakota Pipeline Authority

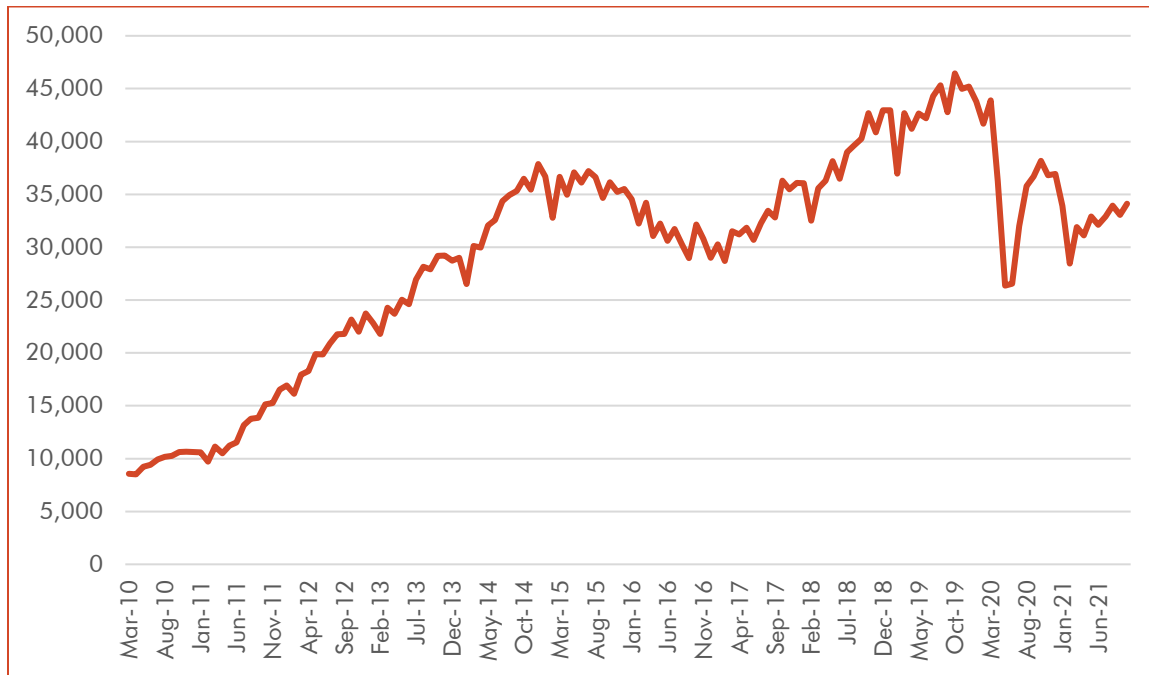
As shown in Figure 3-41, crude oil production in North Dakota is below its peak of 45 million barrels per month, but still exceeds 30 million barrels per month. The large drop off in crude oil rail shipments shown in Figure 3-40 owes less to a drop in oil production and more to pipeline replacing rail transportation. According to the North

¹⁸ <https://www.eia.gov/energyexplained/oil-and-petroleum-products/where-our-oil-comes-from.php>

¹⁹ <https://northdakotapipelines.com/datastatistics/>

Dakota Pipeline Authority, North Dakota pipeline capacity to ship out crude oil increased by 132% between 2014 and 2021.

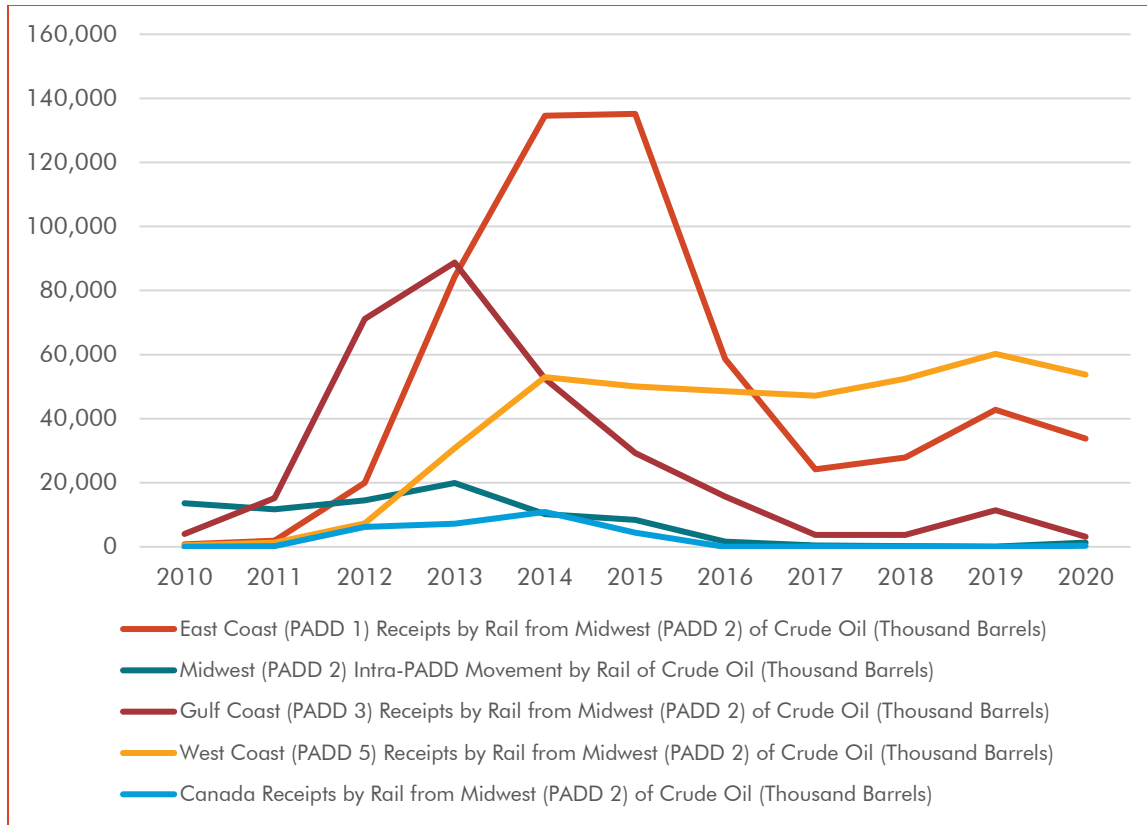
Figure 3-41: Thousands of Barrels of Crude Oil Produced in North Dakota per Month



Source: North Dakota Pipeline Authority

Most crude that is shipped by rail from North Dakota is going to refineries on the East Coast or West Coast that are not connected or not well connected to North Dakota by pipeline. As shown in Figure 3-42, relatively little crude oil is shipped by rail from the Midwest (including North Dakota) to Canada, the Gulf Coast, or the Midwest. For rail to be a viable transportation option, the spreads between prices must be sufficient to justify the rail move, which they are between North Dakota prices and prices on the East Coast and West Coast. By contrast the price spreads between North Dakota and other markets in the Midwest, Gulf Coast, and Canada are low, so the additional cost of shipping by rail is not justified. Crude oil will continue to be shipped by rail from North Dakota in significant quantities, but volumes may be unlikely to return back to the 800,000 barrel per day peaks that occurred in 2013 and 2014.

Figure 3-42: Thousands of Barrels Shipped from PADD 2 (Midwest) to Other Areas of North America by Rail



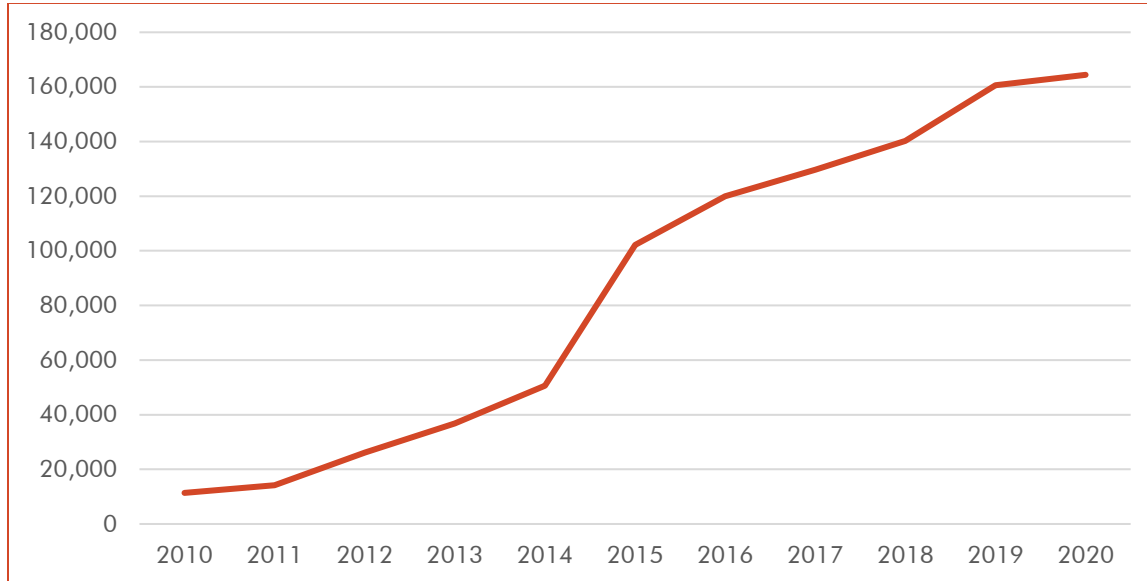
Source: U.S. EIA

North Dakota production of natural gas and NGLs is expected to grow significantly. As oil is pumped from wells, the pressure in those wells declines. Natural gas and NGLs come out of solution and must either be gathered or burned. The cumulative number of new and older wells continues to grow, and the lower pressure in wells increases the amount of gas. Even if crude volumes decrease, natural gas volumes will continue to grow. North Dakota seeks to limit flaring and to capture 91% of natural gas from wells. According to the North Dakota Pipeline Authority, the capacity of natural gas processing plants in North Dakota is expected to increase from 1,444.5 in 2014 to 4,237.0 mmcf in 2023. Rail is not expected to play a significant role in shipping natural gas or methane. This generally moves by pipeline. However, rail is frequently used for shipping NGLs. NGLs include propane, butanes, and natural gasoline (pentanes plus) that are produced along with North Dakota’s natural gas. Of these products, ethane production is the highest, followed by propane, then butanes, and then natural gasoline. Ethane is often mixed with methane and not shipped by rail from North Dakota, but other NGLs are shipped by rail.

As shown in Figure 3-43, North Dakota NGL production has grown dramatically in recent years. The North Dakota Pipeline Authority predicts that NGL production will continue to grow. Production growth will be sufficient that it will exceed current and planned pipeline takeaway capacity.²⁰

²⁰ North Dakota Petroleum Council Annual Meeting, Justin J. Kringstad, Geological Engineer, Director of the North Dakota Pipeline Authority, September 23, 2021.

Figure 3-43: North Dakota Natural Gas Plant Liquids Production (MCF)



Source: U.S. EIA

Rail may have a role, not only to provide transportation to ship NGLs to locations without pipeline access, but also potentially as a transition transportation mode, while pipeline takeaway capacity is either built or repurposed from crude oil pipeline capacity. As of early 2022, five NGL rail loading facilities are currently in operation at Bakken oil production areas compared to 20 crude petroleum by rail facilities. Some crude oil rail loading facilities may shift to NGL or shift to taking both. All of the current NGL rail facilities have the capability of loading unit trains. NGL shipments by rail from North Dakota are a mix of unit and manifest trains.

NORTH DAKOTA AGRICULTURE INDUSTRY TRENDS WITH POTENTIAL TO IMPACT RAIL

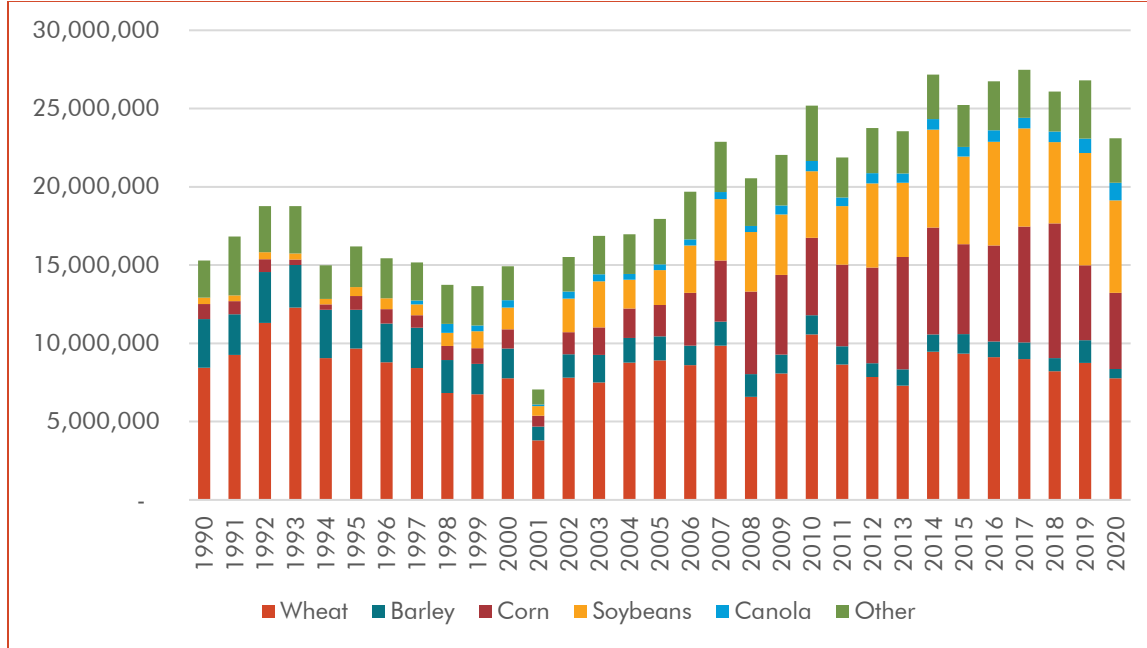
North Dakota is ranked eleventh among U.S. states in terms of total agricultural cash receipts according to data compiled by the U.S. Department of Agriculture (USDA) for 2021.²¹ It is the top producer of wheat, rye, sunflower, flaxseed, and edible beans of all U.S. states. It ranks fourth in the nation for total acreage of principal crops harvested. Wheat is North Dakota's largest crop by tonnage shipped. By value of receipts, North Dakota's top crops are soybeans (\$2.0 billion in 2020), wheat (\$1.6 billion in 2020), and corn (\$1.1 billion in 2020).²² By acreage, the ranking of crops is slightly different with wheat having the most acreage, followed by soybeans and then corn.

Elevators in North Dakota report storage and transportation movements to the North Dakota Department of Agriculture on a crop year basis, which is July to June. In the tables that follow, the 2019/2020 crop year, for example, is shown as 2020. This information is compiled by the UGPTI at North Dakota State University (NDSU). As shown in Figure 3-44, the volume of bushels shipped from North Dakota elevators has generally increased over the last 30 years, rising from 15 million bushels in 1990 to over 25 million in 2019. The growth is primarily attributable to increases in corn and soybean shipments.

²¹ *North Dakota Agricultural Statistics 2021*, USDA National Agricultural Statistics Service.

²² "2020 State Agricultural Overview," USDA National Agricultural Statistics Service.

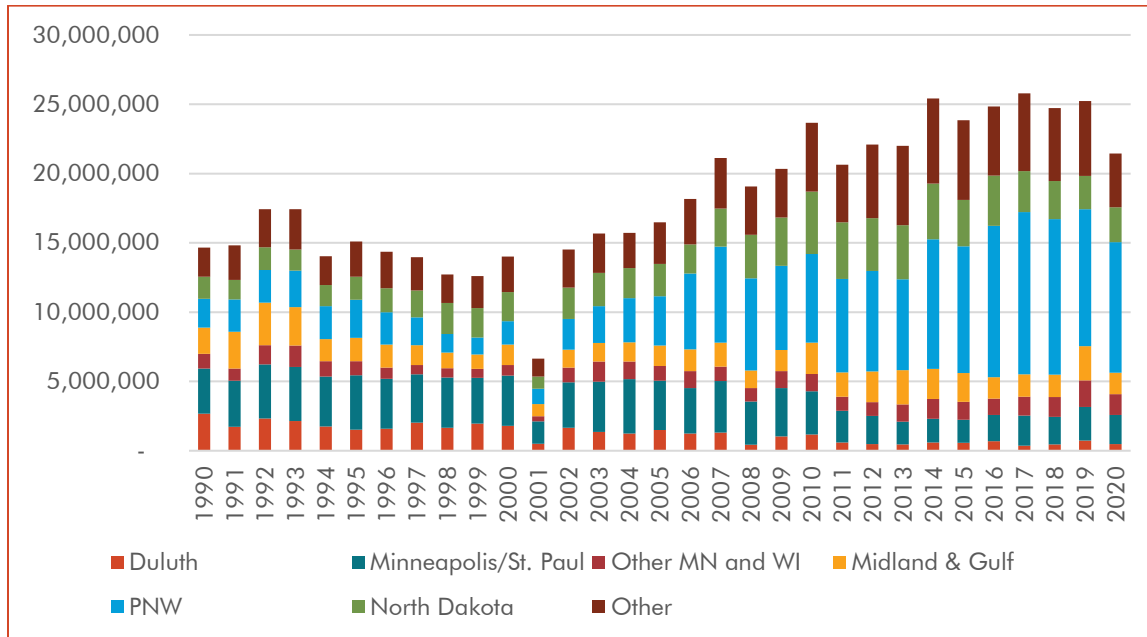
Figure 3-44: Grains/Oilseeds Shipped from North Dakota Elevators by Commodity (Tons)



Sources: North Dakota Department of Agriculture, UGPTI

As shown in Figure 3-45, the Pacific Northwest has grown in importance as a destination for grains/oilseeds from North Dakota, while at the same time local shipments within North Dakota have declined. Much of the volume shipped to the Pacific Northwest consists of corn and soybeans.

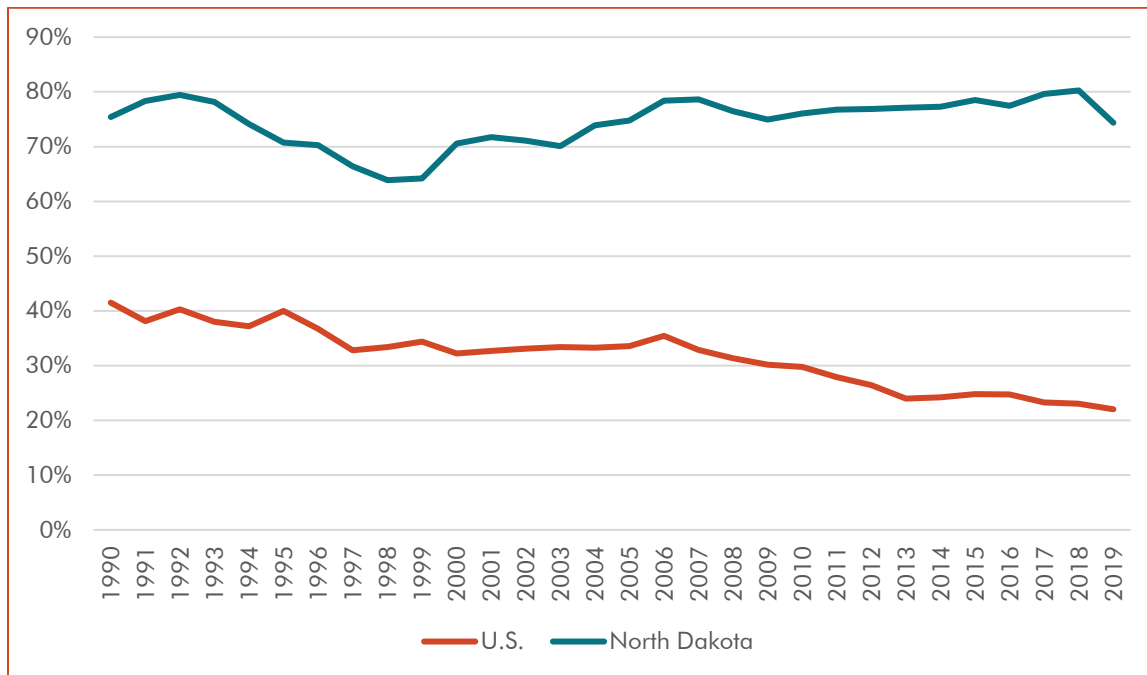
Figure 3-45: Grains/Oilseeds Shipped from North Dakota Elevators by Destination (Tons)



Sources: North Dakota Department of Agriculture, UGPTI

Figure 3-46 compares rail’s modal share for shipping grain/oilseeds from North Dakota to rail’s overall modal share for shipping grain/oilseeds in the U.S. The two statistics are not precisely the same, since the national figures compiled by the USDA cover the transportation of corn, wheat, soybeans, sorghum, and barley, which is a somewhat different mix from that reported by North Dakota elevators. However, these are close enough for a reasonable comparison. As shown in Figure 3-46, North Dakota elevators rely much more heavily on rail for shipping grains/oilseeds than typically do elevators across the U.S. Furthermore, rail’s modal share across the U.S. has declined, so that rail had over a 40% modal share for grain/oilseed shipments in 1990 compared to slightly over 20% in 2019. Rail lost almost half its market share. By contrast, rail’s market share in North Dakota stayed roughly steady between 1990 and 2019, dipping at first and then rising again.

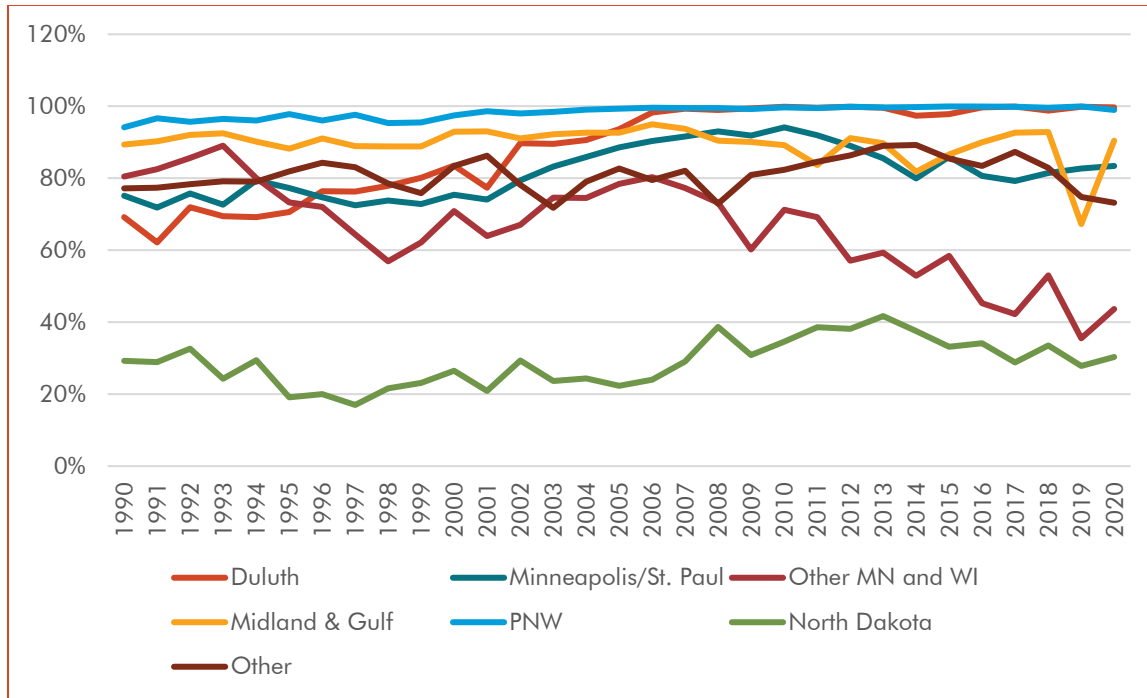
Figure 3-46: Rail Modal Share in North Dakota Compared to Overall U.S. Rail Modal Share for Shipping Grains/Oilseeds



Sources: North Dakota Department of Agriculture, UGPTI

Causes of North Dakota’s heavy reliance on rail are the long distances that North Dakota shippers ship grain/oilseeds, as well as the lack of available barge service. Rail tends to be relatively more cost competitive compared to trucking when used for shipping longer distances. Rail has maintained a large market share for North Dakota grains/oilseeds since the markets that North Dakota serves have become more distant. As shown in Figure 3-45, the Pacific Northwest has become a larger destination for North Dakota grains/oilseeds, while proportionately less is consumed in North Dakota. The Pacific Northwest is far more distant than shipments within North Dakota, so rail is the preferred mode. As shown in Figure 3-47, rail has a higher modal share for shipments to the Pacific Northwest and a lower modal share for shipments within North Dakota.

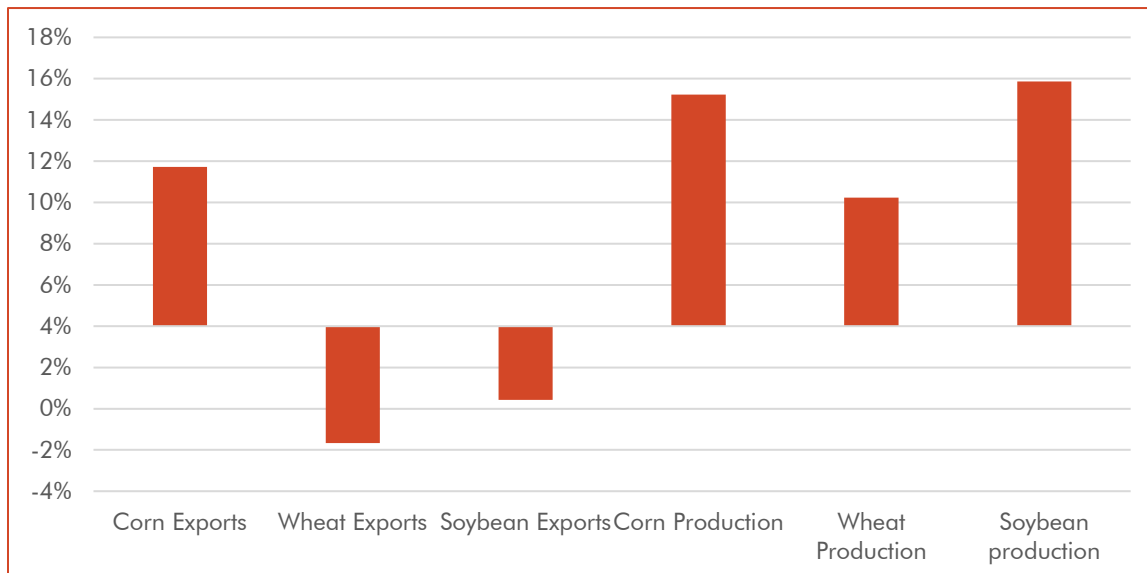
Figure 3-47: Rail Modal Share for Shipping Grains/Oilseeds from North Dakota Elevators by Destination



Sources: North Dakota Department of Agriculture, UGPTI

Projections by the USDA generally forecast faster growth in domestic use of grains and oilseeds compared to exports, and faster growth in corn and soybean production/exports compared to wheat (Figure 3-49).

Figure 3-48: Forecast Percentage Change in Bushels between 2020/2021 and 2031/2032 Crop Years



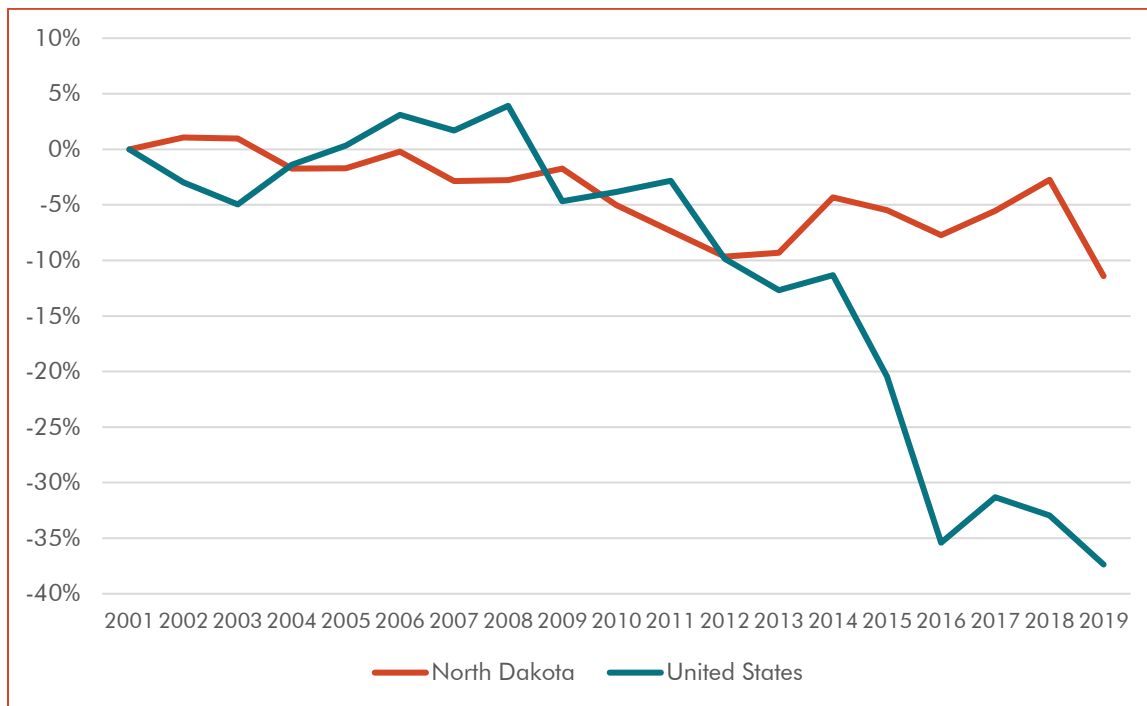
Sources: North Dakota Department of Agriculture, UGPTI

NORTH DAKOTA COAL INDUSTRY TRENDS WITH POTENTIAL TO IMPACT RAIL

Per Figure 3-34 and Figure 3-35, coal is the highest volume commodity shipped within (intrastate) and through North Dakota between other states (overhead). It is also a significant portion of inbound traffic per Figure 3-33. Within North Dakota are six coal fired power plants. Each burns lignite coal that is mined in North Dakota although some receive coal from other locations as well. Lignite is most often shipped to nearby power plants by truck or by conveyor. Only one power plant receives lignite coal by rail. Five of the six power plants have rail access. Beyond the plant that receives lignite by rail, the other plants maintain rail access so that they can receive coal from mines in other states.

Over the past two decades, North Dakota and United States coal production have declined, although North Dakota’s coal product has not declined as much as in other parts of the U.S. As shown in Figure 3-49, United States coal production tonnage fell by 37% between 2001 and 2019, while North Dakota coal production fell by 11%. The relatively consistent coal production in North Dakota likely results from North Dakota mine-mouth power generation where North Dakota mines provide fuel to adjacent power plants.

Figure 3-49: Percentage Change in Coal Production 2001 – 2019



Sources: North Dakota Department of Agriculture, UGPTI

It is likely that coal shipments in North Dakota will decrease further in the future. As of early 2022, one North Dakota power plant is planned for retirement and another to be converted to other power generation. Another power plant is expected to be sold by 2028 and will remain in service if a buyer can be found.

ORIGIN-DESTINATION DESIRE LINES FOR RAIL

It was not possible to develop maps of rail tonnage and value flows assigned to actual physical networks, due to confidentiality requirements associated with the source data. As a proxy for network assignments, this section presents ‘desire line’ maps – straight-line representations of rail tons and rail value between origin-destination points. These maps are based on STB Waybill data for 2019, processed by IHS Markit to confirm to data confidentiality requirements, and are presented in Appendix C FAF, Transearch, and Streetlight Analyses.

CONCLUSION

This chapter has described the various data sets used for State Freight and Rail Plan analyses and presented key findings from several freight data sources – the USDOT FAF aggregated and anonymized Transearch and STB Waybill data, and StreetLight. These findings, along with findings from analysis of other data sources, are used throughout all technical investigations and deliverables for the State Freight and Rail Plan.

CHAPTER 4: EXISTING ASSETS, CONDITIONS, AND PERFORMANCE

INTRODUCTION

This chapter describes the physical condition and performance of North Dakota’s freight system assets across highways, railroads, and pipelines and those airports that support air cargo movements. Maintaining infrastructure and preserving assets is critical to the efficient movement of freight and the safety of truck drivers, train engineers, and aircraft pilots as well as the wider public and the traveling community. Keeping freight moving 24/7 and 365 days of the year is a key requirement to support today’s low-inventory, just-in-time supply chains. Disruptions, such as weather events, crashes, and congestion, affect freight service levels, increase cost, and reduce the reliability of the overall freight system.

CONDITIONS AND PERFORMANCE

HIGHWAYS

The condition and performance of freight-related highways are described in this section, including pavement and bridge conditions, interstate truck travel time delay, the effect of highway closures, and analyses associated with truck-related crashes and bridge strikes, in addition to the effects of spring load restrictions and weather on truck weights.

PAVEMENT CONDITION

The North Dakota state-owned highway network consists of 7,415 miles, including NHS mileage. The County highway system includes 15,642 miles, other rural roads in the state, 60,762 miles and City streets 4,366 miles. The NDDOT manages approximately 8,624 roadway miles. In this chapter, the pavement condition associated with the North Dakota Strategic Freight System Highway classifications (Level One Freight Corridors, Level Two Freight Corridors and Level Three Freight Corridors) is identified. For pavement condition monitoring, NDDOT uses the International Roughness Index (IRI). The IRI is a measure of pavement smoothness that is calculated from the longitudinal profile (or pavement deviations) of the road surface. The higher the IRI, the worse the pavement surface smoothness. The IRI metric is used to assign a pavement condition rating of Excellent, Good, Fair, or Poor, as shown in Figure 4-1.

Figure 4-1: IRI Pavement Condition Rating

	Excellent	Good	Fair	Poor
IRI (inches/mile)	<60	60 - 99	100 - 145	>145

Source: NDDOT

Overall, 41% of freight-designated highways in North Dakota are in excellent condition, and 43% are in good condition (Figure 4-2). As shown in Figure 4-3, 90% of the Level One Freight Corridors in North Dakota are in good condition or better. However, this declines to 80% for Level Two Freight Corridors (Figure 4-4) and 71% for

Level Three Freight Corridors (Figure 4-5). The pavement conditions associated with each Freight Corridor and their respective locations are illustrated in Figure 4-6 through Figure 4-9.

Figure 4-2: All Freight Corridor Pavement Condition (2020)

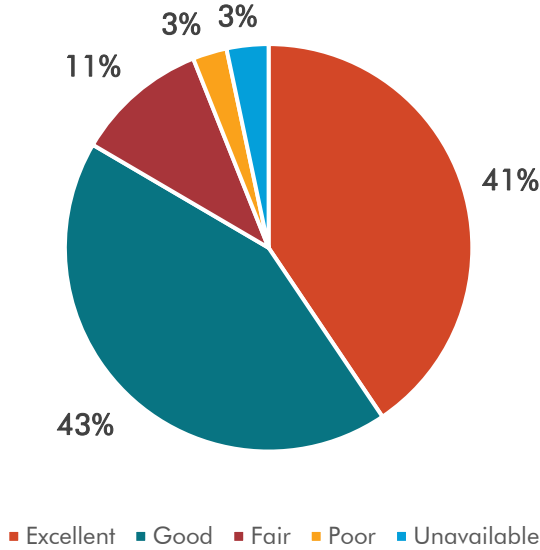


Figure 4-3: Level One Freight Corridor Pavement Condition (2020)

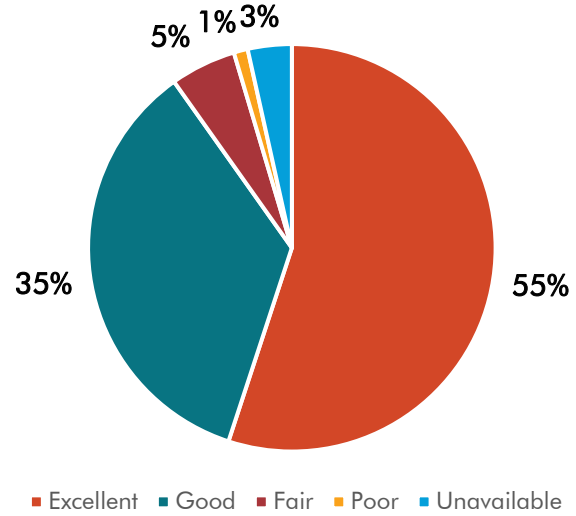


Figure 4-4: Level Two Freight Corridor Pavement Condition (2020)

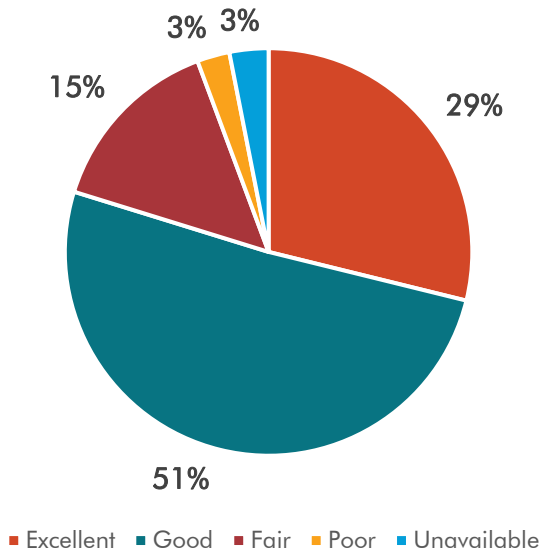
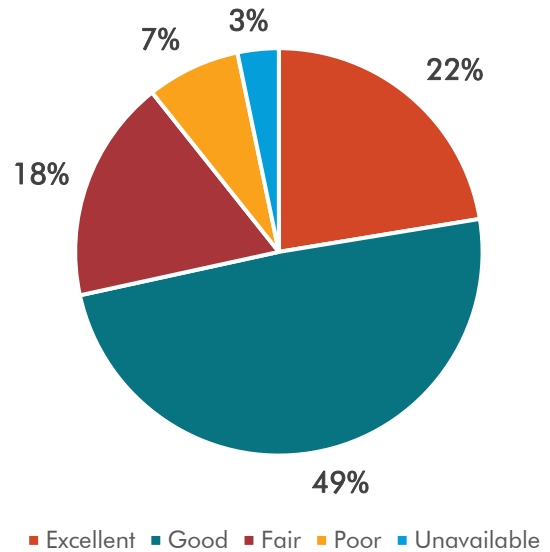
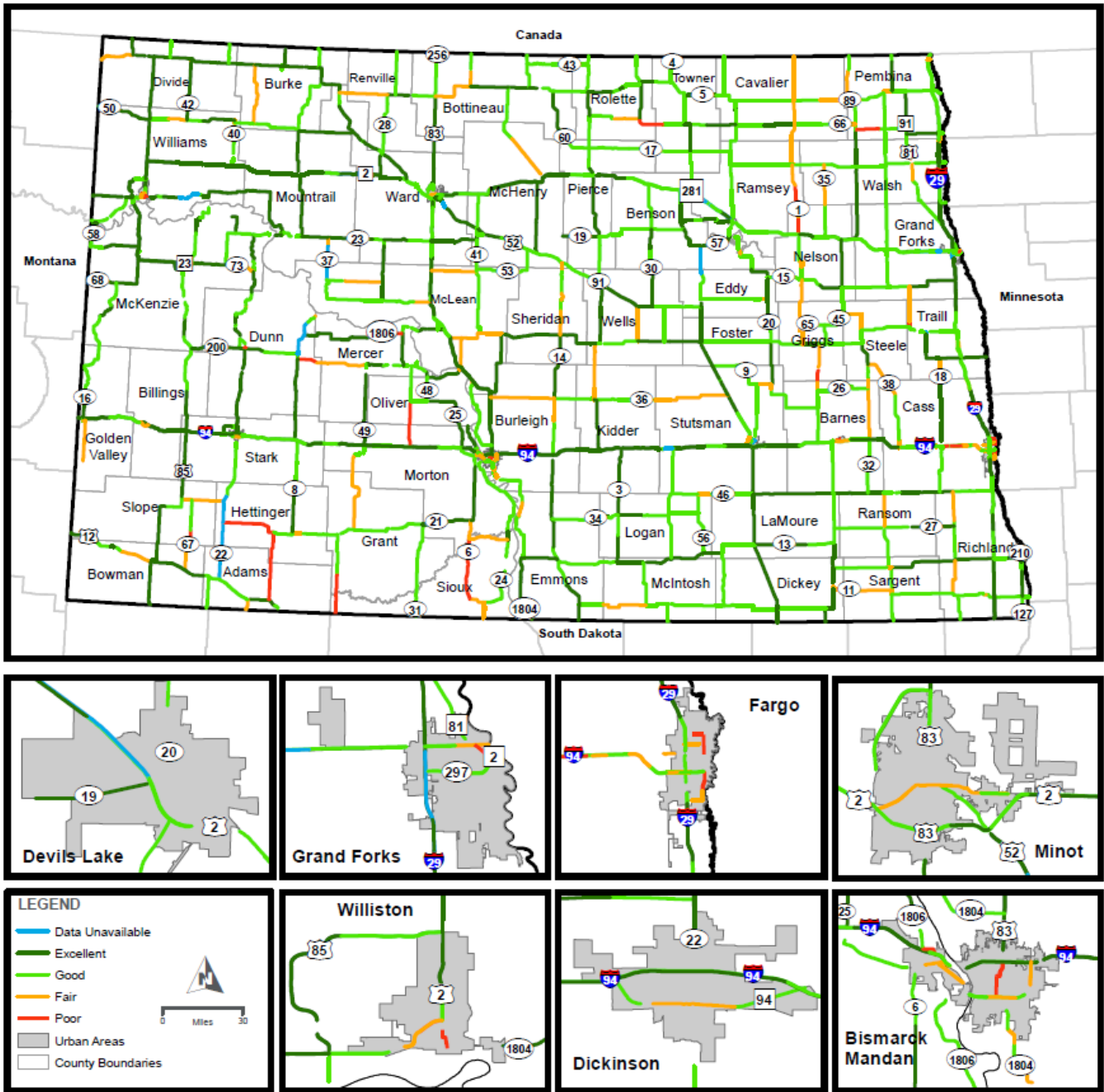


Figure 4-5: Level Three Freight Corridor Pavement Condition (2020)



Source: NDDOT Data

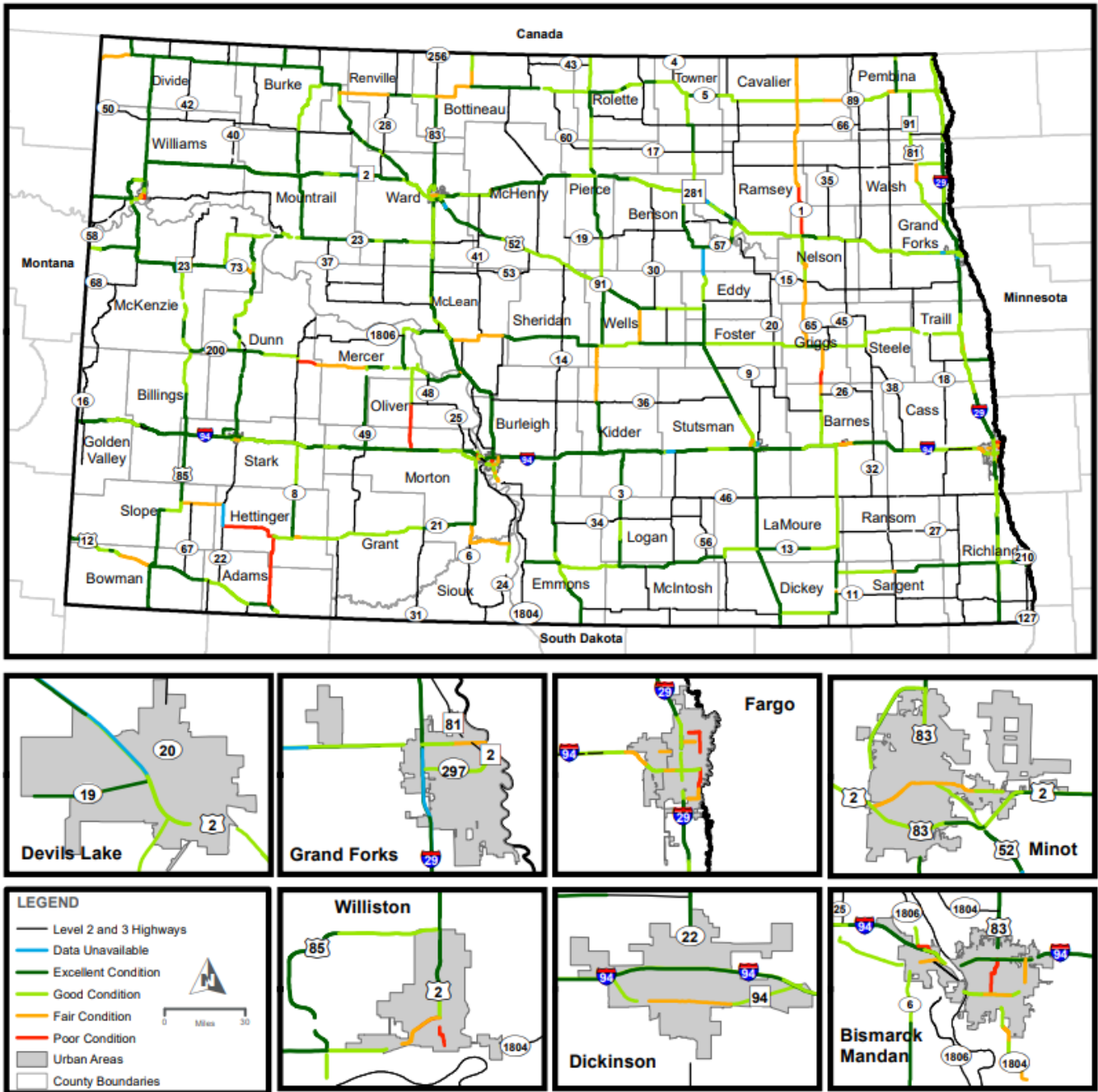
Figure 4-6: Pavement Conditions on All North Dakota State Highways (2020)



Source: NDDOT Data²³

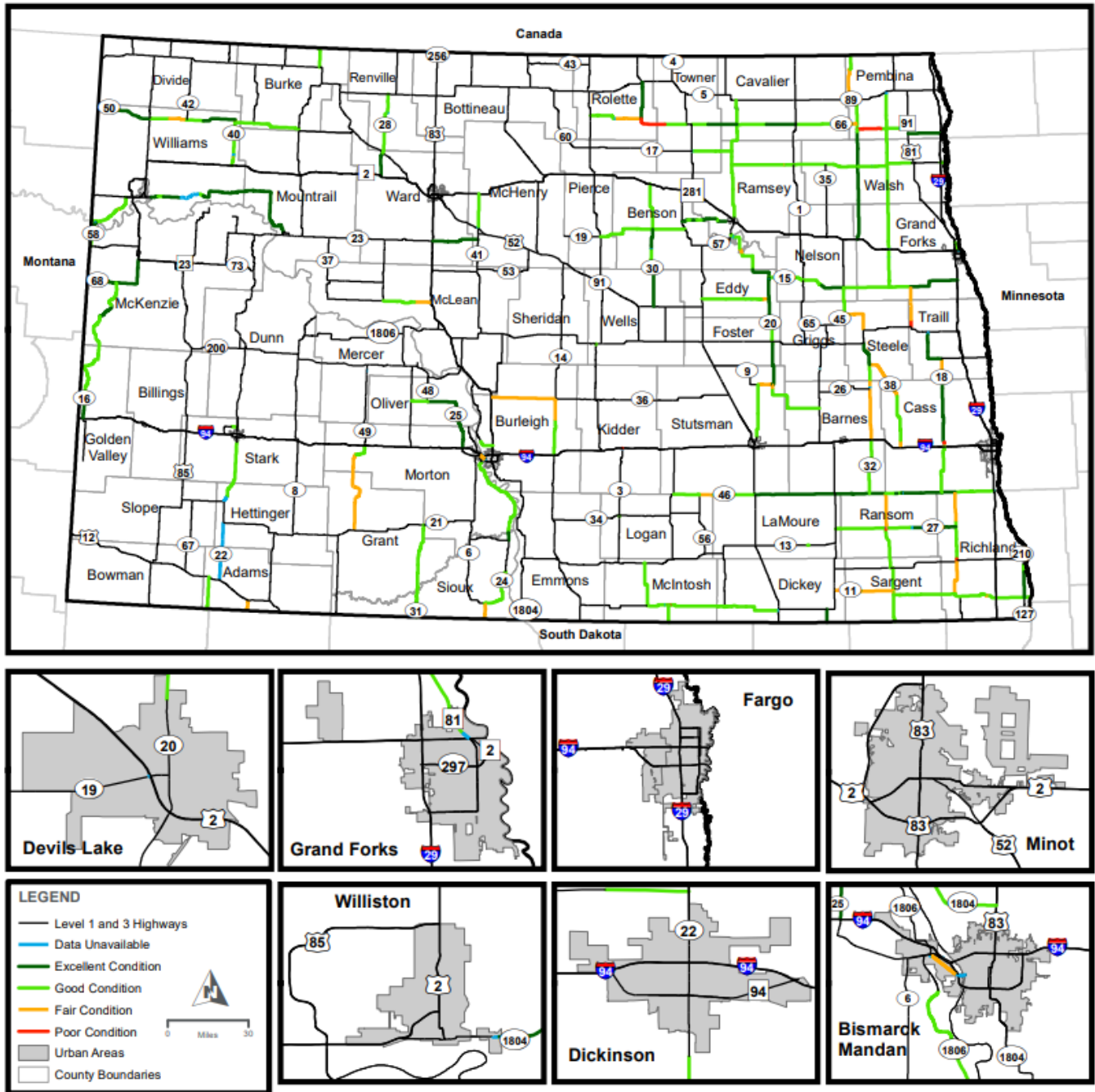
²³ Some sections of highways are labeled as “data unavailable” due to ongoing construction and other activity that precluded data from being collected at the time of the survey program.

Figure 4-7: Pavement Conditions on Level One Freight Corridors (2020)



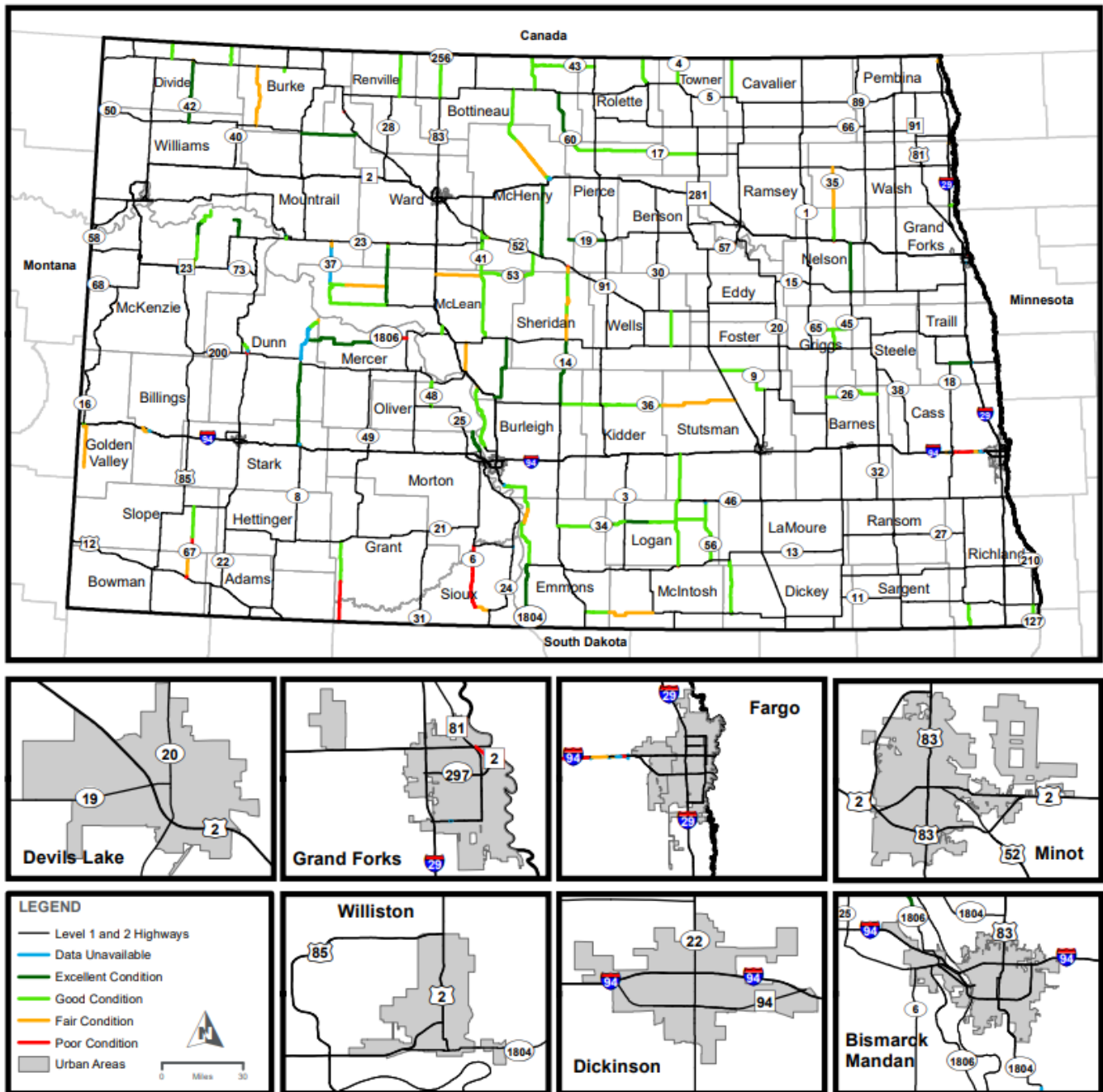
Source: NDDOT Data

Figure 4-8: Pavement Conditions on Level Two Freight Corridors (2020)



Source: NDDOT Data

Figure 4-9: Pavement Conditions on Level Three Freight Corridors (2020)



Source: NDDOT Data

BRIDGE CONDITION AND MAINTENANCE

North Dakota’s highway bridges are a critical component of the state’s highway infrastructure. The NDDOT state bridge system comprises 1,147 structures, of which 714 are bridges more than 20 feet long and 433 are culverts more than 20 feet long as defined in the National Bridge Inventory (NBI).

Error! Reference source not found. lists the number and square footage of structures associated with each level of the Strategic Freight System Highway classification.

Table 4-1: Bridges and Freight Highway System Classification

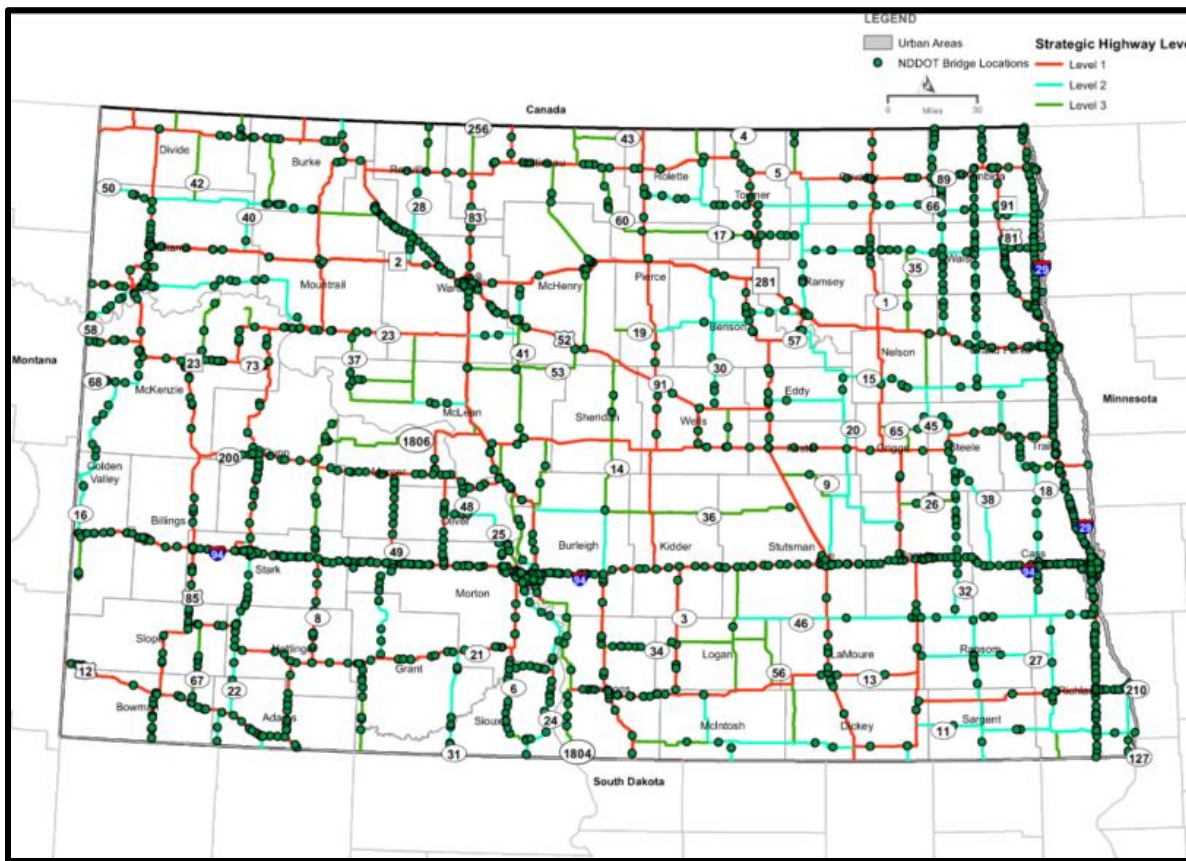
Structure or Area	Level One Freight Corridors	Level Two Freight Corridors	Level Three Freight Corridors	Non-Freight Corridors
Number of bridges > 20 (ft)	253	125	66	270
Number of culverts > 20 ft	215	145	57	16
Bridge deck area (sq ft)	3,204,269	1,066,888	606,649	2,961,624
Culvert deck area (sq ft)	307,413	151,656	53,197	16,025

ft = feet; sq ft = square feet

Source: NDDOT Data

Error! Reference source not found. shows the locations of bridges on the freight corridors in the state.

Figure 4-10: Bridge Locations



Source: NDDOT Data

The rating is based on the minimum condition of the three bridge components—the deck (the surface of the bridge carrying the highway), superstructure (the main structure supporting the bridge span) and substructure (piers, abutments and foundations that support the bridge superstructure) and the culvert conditions. When any of these components is at an NBI rating of 4 or below, bridges may be classified as in poor condition. This federal classification indicates that bridge components have experienced enough deterioration that the structure’s ability to carry design loads could be reduced. Classifying a bridge in a poor condition does not imply that it is likely to collapse or is unsafe. If a component of a bridge receives an NBI rating less than or equal to 4, or a poor-condition classification, this indicates that various components need to be maintained or rehabilitated to improve the bridge’s condition.

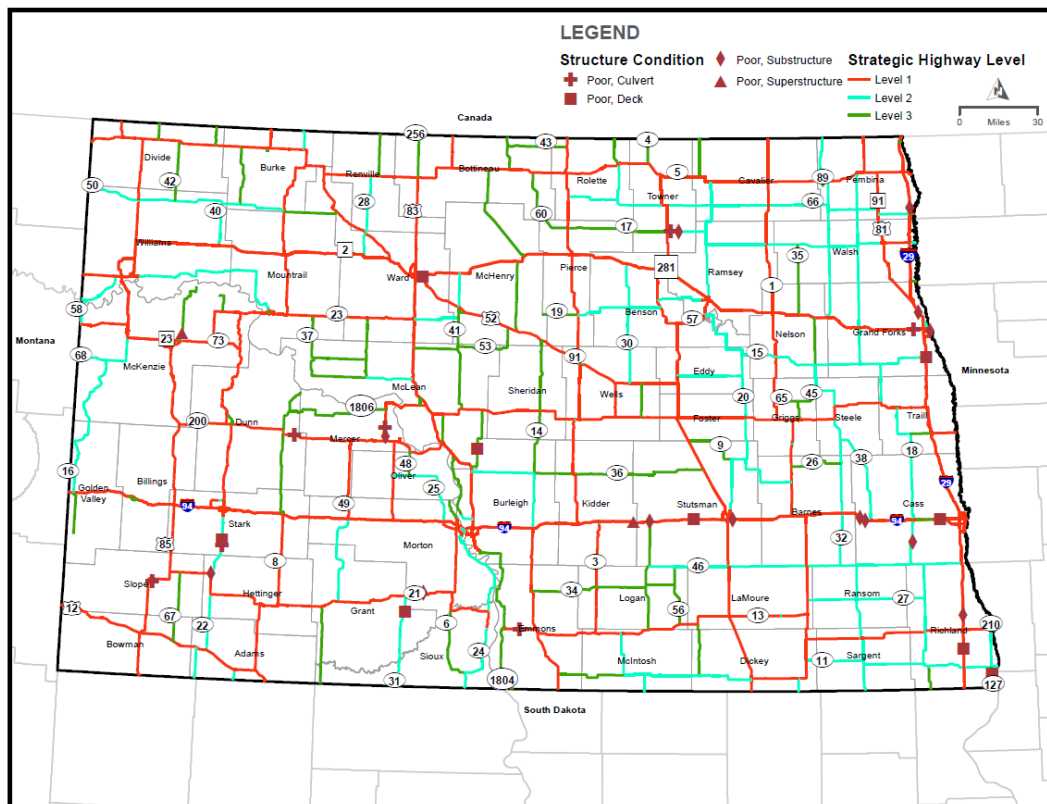
Table 4-2: Bridge and Culvert Conditions

Freight Corridors	Good		Fair		Poor	
	Number	Percentage	Number	Percentage	Number	Percentage
Level One Freight Corridors	240	51%	218	47%	10	2%
Level Two Freight Corridors	148	55%	114	42%	8	3%
Level Three Freight Corridors	63	51%	54	44%	6	5%

Source: NDDOT Data

Figure 4-11 shows the locations of bridges in poor condition in North Dakota.

Figure 4-11: Bridges and Culverts in Poor Condition



Source: NDDOT Data (2020 NBI Data)

INTERSTATE TRUCK TRAVEL TIME DELAY

TTR is used by state DOTs, MPOs, and the federal government to assess the reliability of truck travel times on the interstate system. It can identify locations where bottlenecks and travel time variability could occur. Corridors with more consistent travel times are deemed to be more reliable than those corridors where significant fluctuations in travel time exist. Weather, congestion, crashes, and highway maintenance can all influence travel time reliability.

TTR is calculated by looking at the difference between the 90th-percentile truck travel time and the 50th-percentile truck travel time. For this chapter, the target TTR was set at 1.25; road sections that have a TTR greater or equal to 1.25 are identified as having lower reliability. Per FHWA recommendations, the level of TTR determined to be unreliable is 1.5; however, a target reliability of 1.25 is more appropriate for North Dakota corridors due to the lower overall volumes in urban areas and a more expansive rural area, and so expectations for better reliability are higher. Figure 4-12 shows the maximum level of TTR observed throughout the day along the corridors. Data is from 2020.

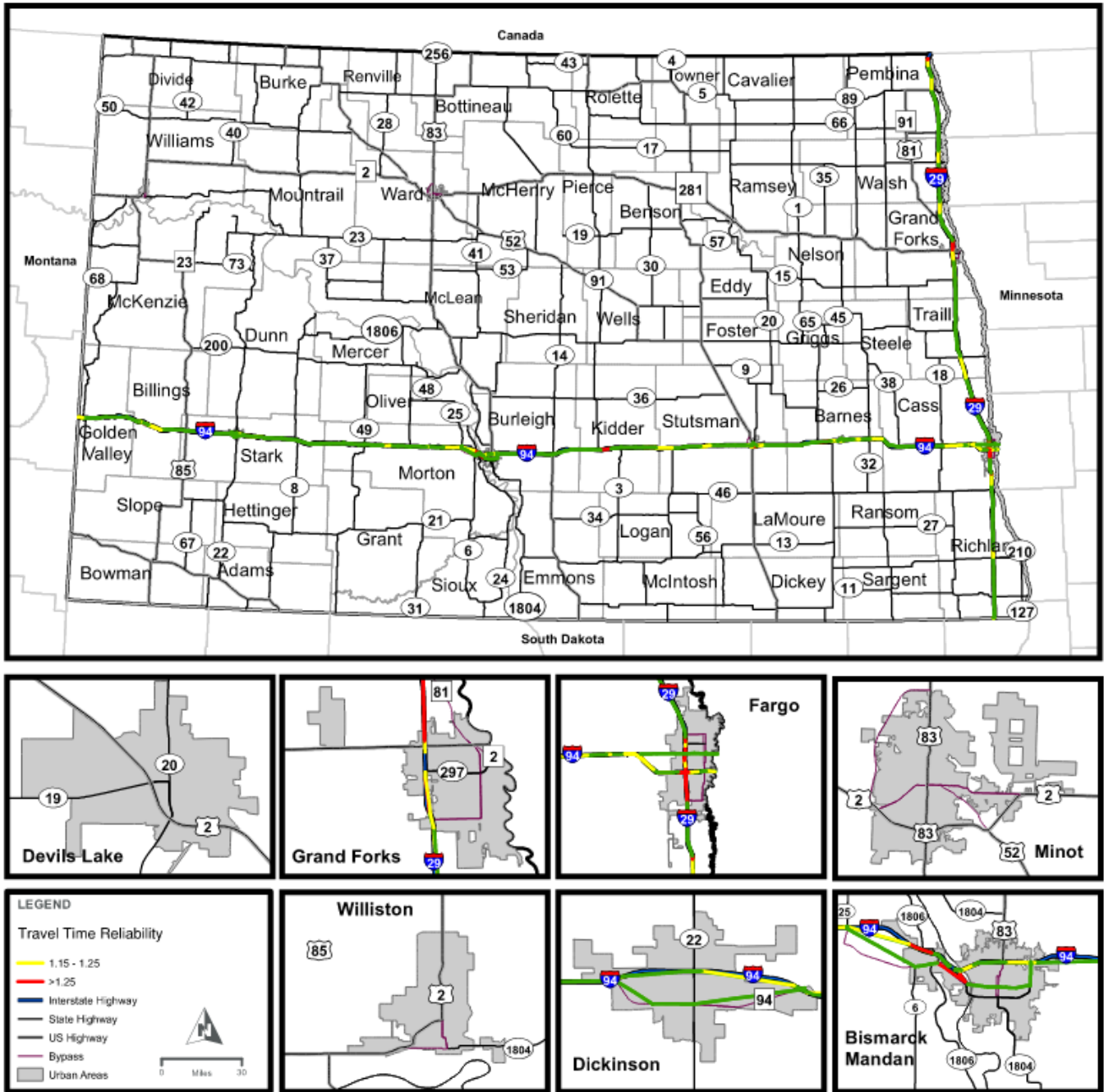
In common with many other areas across the United States, TTR suffers in North Dakota’s urban areas. Figure 4-12 also identifies unreliable travel times associated with I-29 connecting to the U.S.–Canada border crossing at Pembina-Emerson. The volume of truck traffic, the number and type of truck and cargo inspections being conducted, and the number of border crossing staff all influence the numbers of trucks that can be processed and travel through the border crossing. Table 4-3 identifies the highway segments with low TTR.

Table 4-3. Segments with Low TTR (2020)

Road Name	Start Latitude	Start Longitude	End Latitude	End Longitude	Average TTR
ND-810	46.80476	-100.827	46.81016	-100.829	1.53
I-194	46.8177	-100.838	46.8136	-100.834	1.47
I-194	46.81016	-100.829	46.81774	-100.838	1.30
I-29	49.00031	-97.2382	48.93789	-97.2586	2.45
I-29	47.98633	-97.0932	46.25711	-96.8341	1.48
I-29	46.71387	-96.8303	48.99853	-97.2378	1.79
I-94	46.82896	-100.871	46.8136	-100.834	1.70
I-94	46.86137	-101.633	46.84726	-96.8314	1.41
I-94	46.84747	-96.8341	46.84779	-100.915	1.44

Source: NDDOT Data

Figure 4-12: Maximum Level of TTTR (2020)



Source: NDDOT Data

Table 4-4 identifies the urban and rural highway miles associated with highway segments where the TTTR was above 1.25 for the respective time band.

Table 4-4: Truck Freight Reliability – Time Bands (2020)

Period	Urban Miles Above Target	Rural Miles Above Target
AM peak (6-10am)	24.7	28.0
Midday (10am-4pm)	22.2	16.9
PM peak (4-8pm)	24.2	10.4
Overnight (All days 8pm-6am)	23.6	14.4
Weekends (6am-8pm)	18.4	8.8

Source: NDDOT Data

Table 4-5 shows the breakdown by facility of those road sections exceeding the 1.25 TTTR target in all four time bands. The largest TTTR observed is on an individual segment of I-29 connecting the U.S. and Canada borders in Pembina-Emerson with a value of 7. This is incredibly high compared to the typical values of 1 to 2. This value was observed on I-29 during the midday, with the AM having a similar TTTR of 6.8 on the same segment. As previously mentioned, this is attributed to truck processing time through the border crossing.

Table 4-5: Truck Freight Reliability – Highway Sections (2020)

Interstate	Urban Area /Rural	Miles Above Target
I-29	Rural	4.5
	Fargo	8.8
	Grand Forks	2.2
I-94	Rural	2.6
	Bismarck	1.9
	Fargo	2.5
I-194/ND-810	Bismarck	2.2

Source: NDDOT Data

HIGHWAY CLOSURES

Commercial-vehicle operators need a safe roadway system as well as a reliable roadway system. The reliability of a roadway system is indicated by the frequency and duration of its closures rather than by the condition of the road. Although road closures include only those times when vehicles are not allowed to travel the road, delay includes road closures plus incidental slowing of vehicles from various conditions such as poor winter weather.

To represent the most current closure trends and vehicle delays on North Dakota freight corridors, closure data gathered by NDDOT was analyzed for the 5-year period from 2017 to 2021.

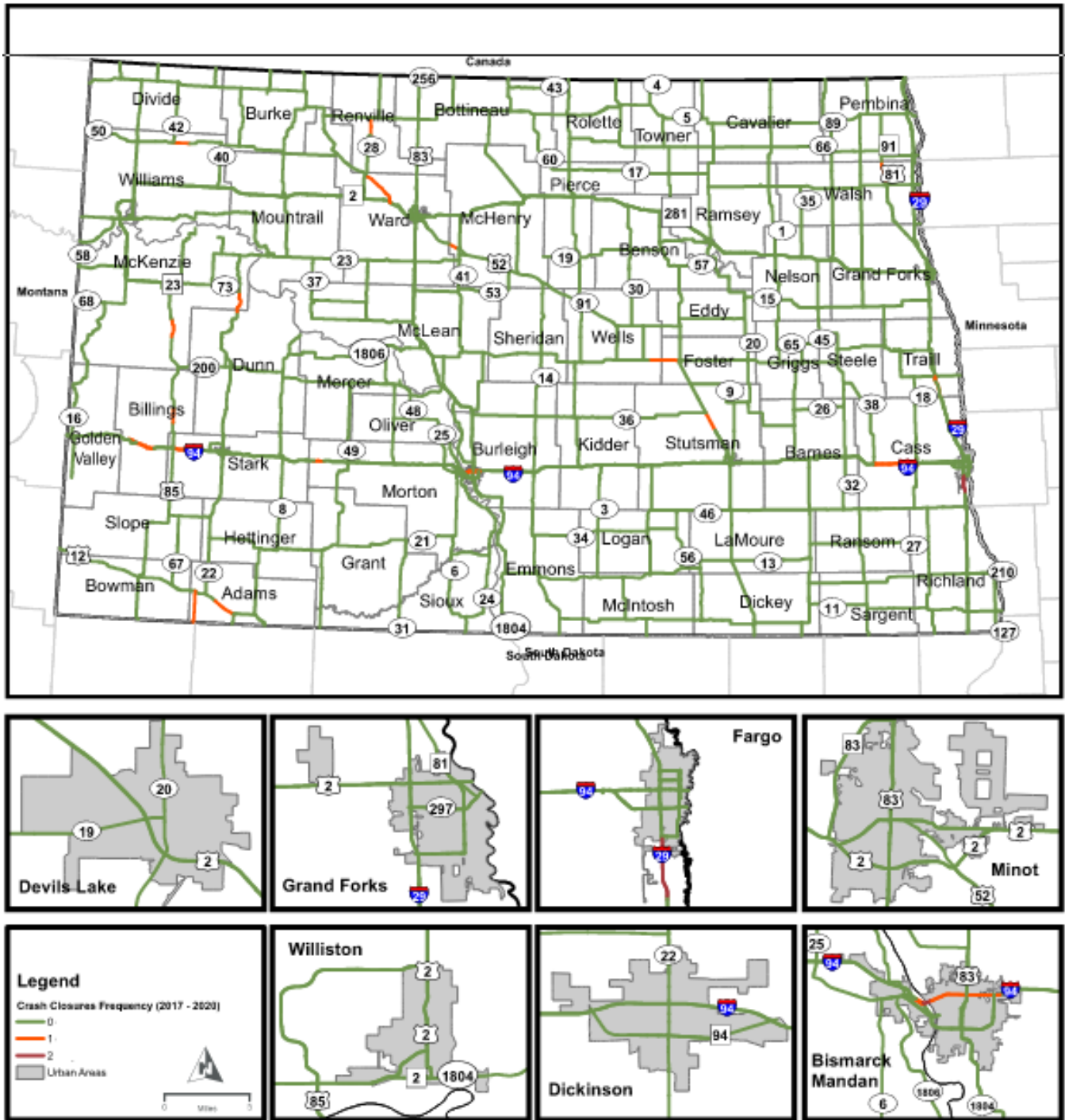
CRASH CLOSURES

Crashes are the most unpredictable type of closure for a roadway system because crashes can occur at any time of the day or year. Historical trend maps are the best way to analyze areas with high crash frequencies. This analysis assumes that vehicle crashes occurring during severe winter weather or high wind advisories should take precedence over weather-related events and therefore should be assigned all the delay identified during the crash

event. Consequently, crashes could be considered overrepresented and severe weather events underrepresented in this analysis.

As shown in Figure 4-13, of all corridors in North Dakota, I-94 historically has had the highest frequency of closures due to crashes. Of all recorded crash closures during the 5-year period from 2017 to 2021, 27% occurred on I-94. This could be because I-94 is one of the more traveled corridors in the state and therefore has a higher chance of crashes occurring. The highest frequency of crash closures is on I-94 between mileposts (MP) 156 and 157 (between Mandan and Bismarck).

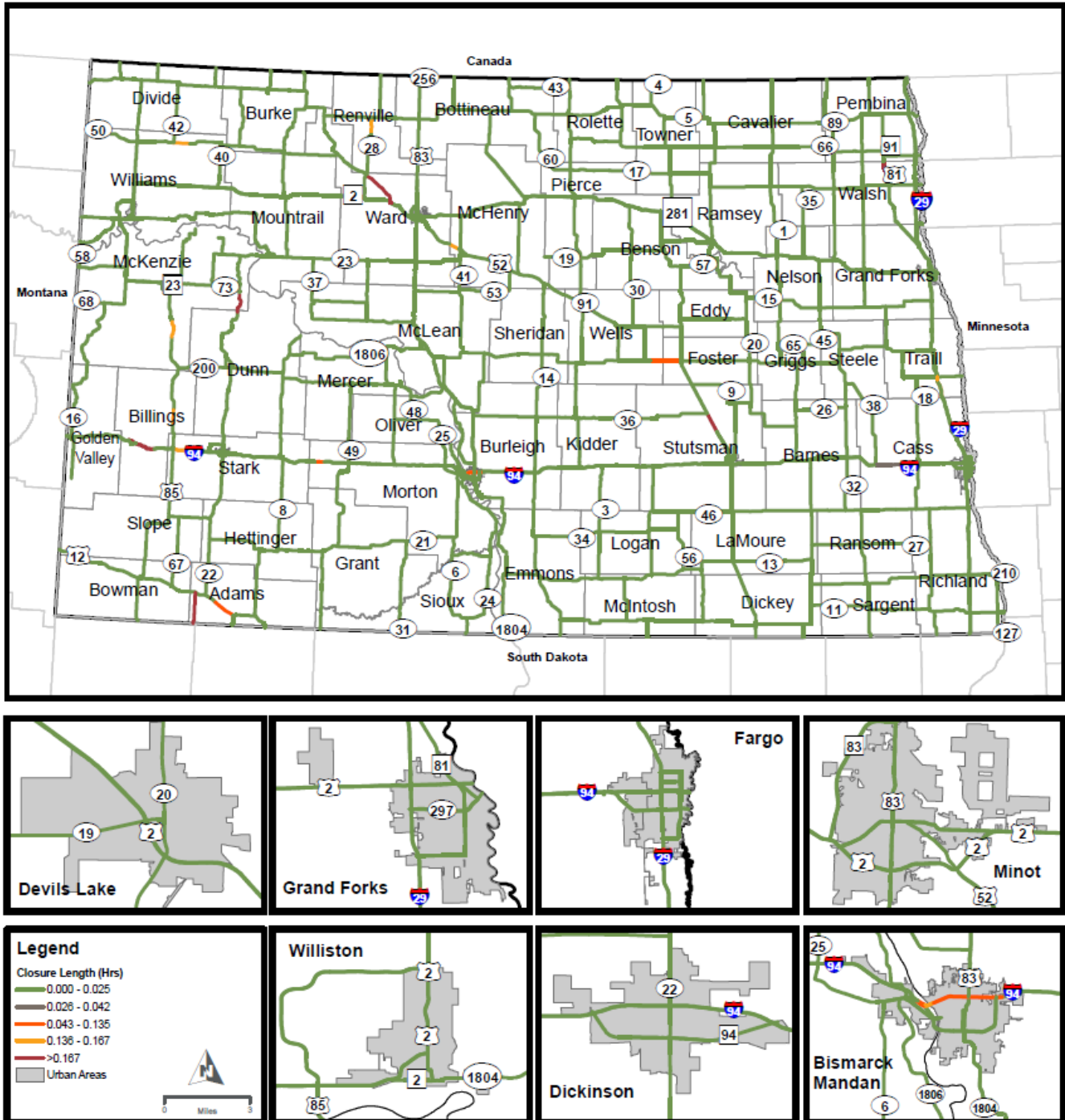
Figure 4-13: Frequency of Crash Closures (2017–2021)



Source: NDDOT Data

Figure 4-14 shows the historical average duration of crash-related closures on each corridor. The segments on I-94, which has the highest frequency of crash-related closures, do not correlate with the location with the highest average duration of crash-related closures. This location is on US-81 between MP 196 and MP 200, which has a recorded average duration of 2.1 hours.

Figure 4-14: Duration of Crash-related Closures (2017–2021)



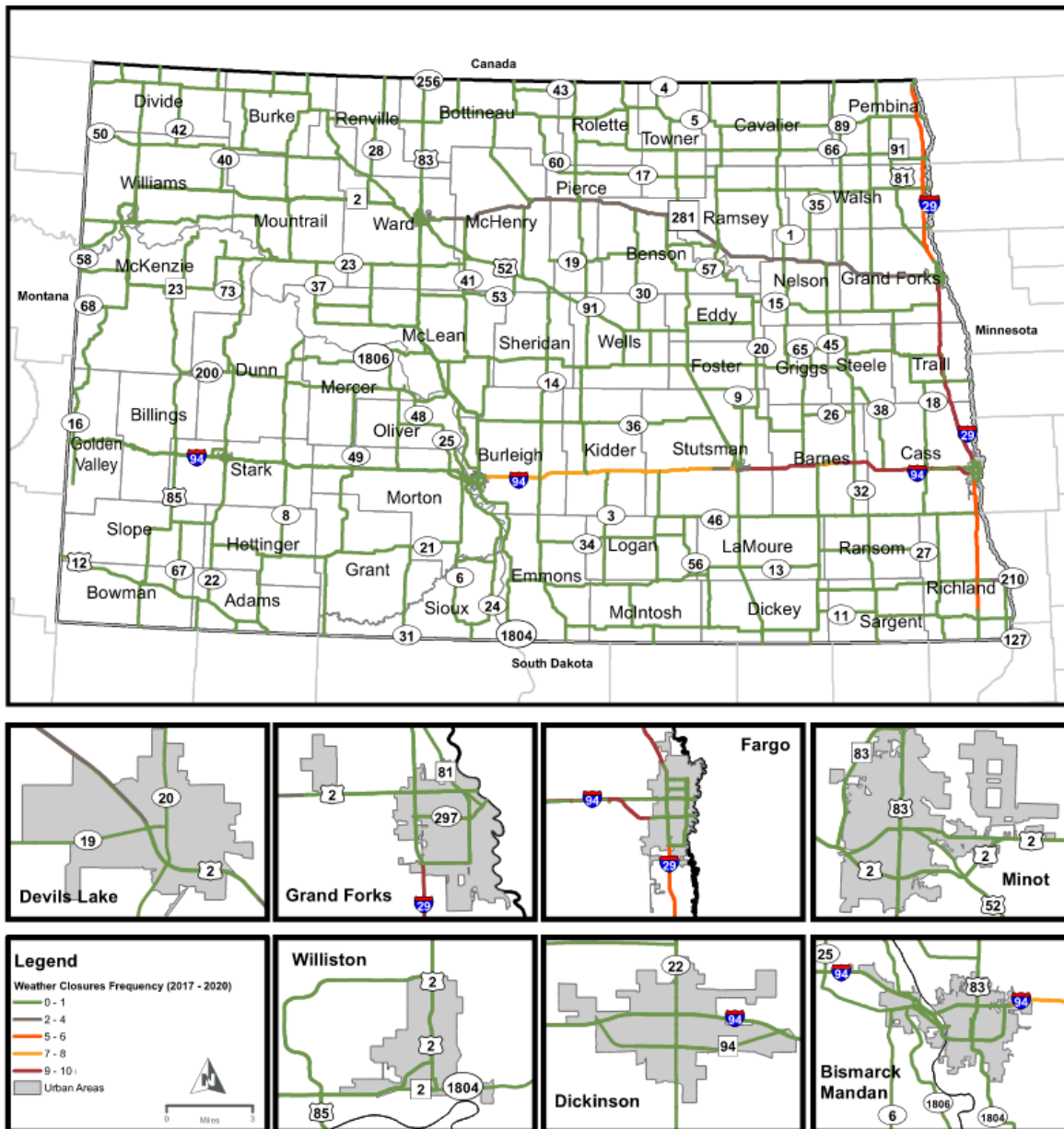
Source: NDDOT Data

WEATHER CLOSURES

In addition to closures due to crashes, North Dakota has many closures due to weather as well as flooding.

Figure 4-15 shows the historical frequency of closures due to weather for all the corridors. Thirty-one percent of all recorded weather-related closures during the 5-year period from 2017 to 2021 occurred on I-94. The area on I-94 that has the highest frequency of weather-related closures is between MP 300 and MP 335. This area is in Barnes and Cass Counties. I-29 has the second highest frequencies of weather closures, occurring between Fargo and Grand Forks.

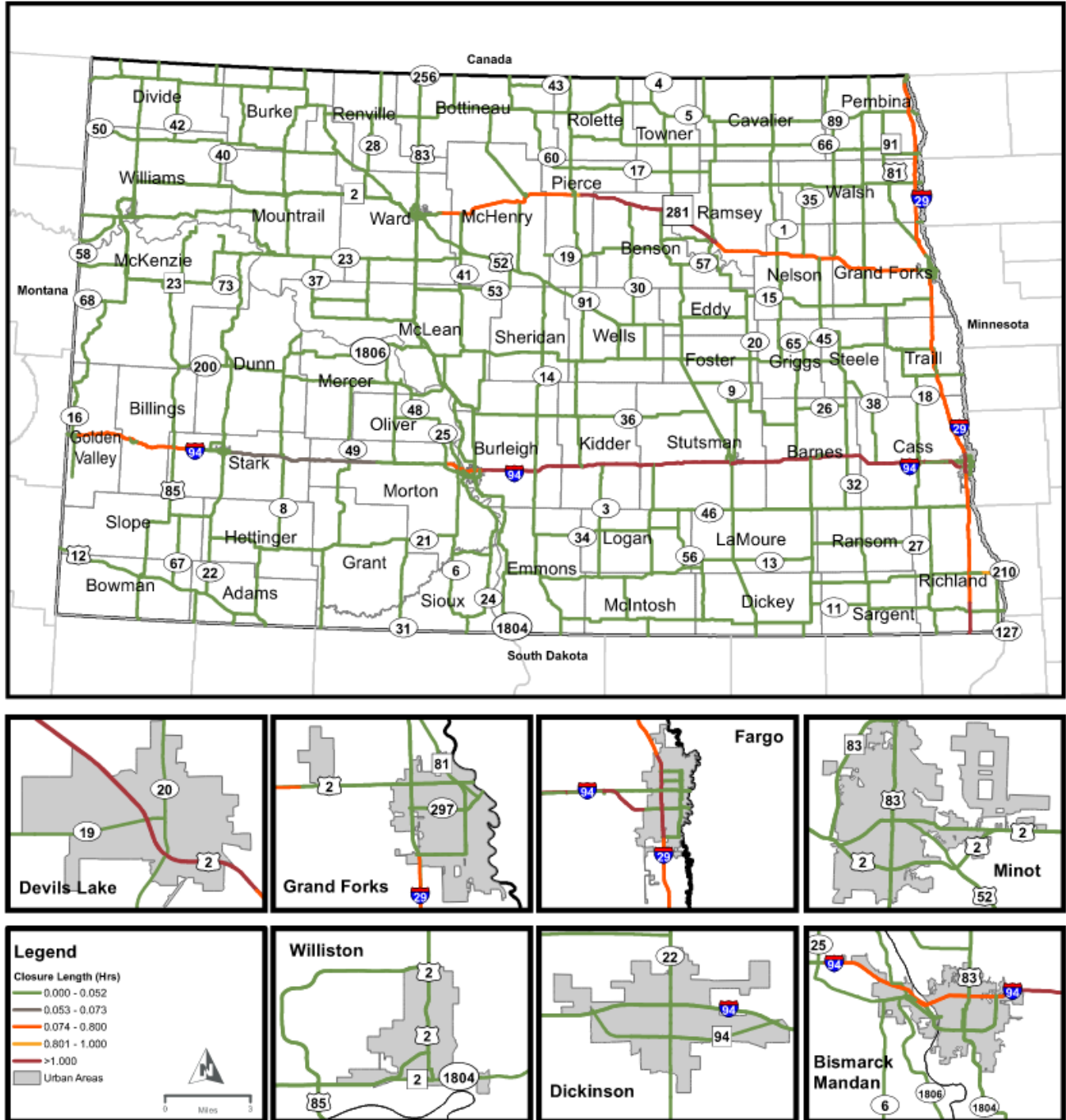
Figure 4-15: Weather Closure Frequency (2017–2021)



Source: NDDOT Data

Figure 4-16 shows the historical average duration of weather-related closures in each key corridor. The location with the highest recorded average duration for weather-related closures with more than one closure is also located on I-94 between MP 256 and MP 262. The highest average duration at this location is 1.2 hours.

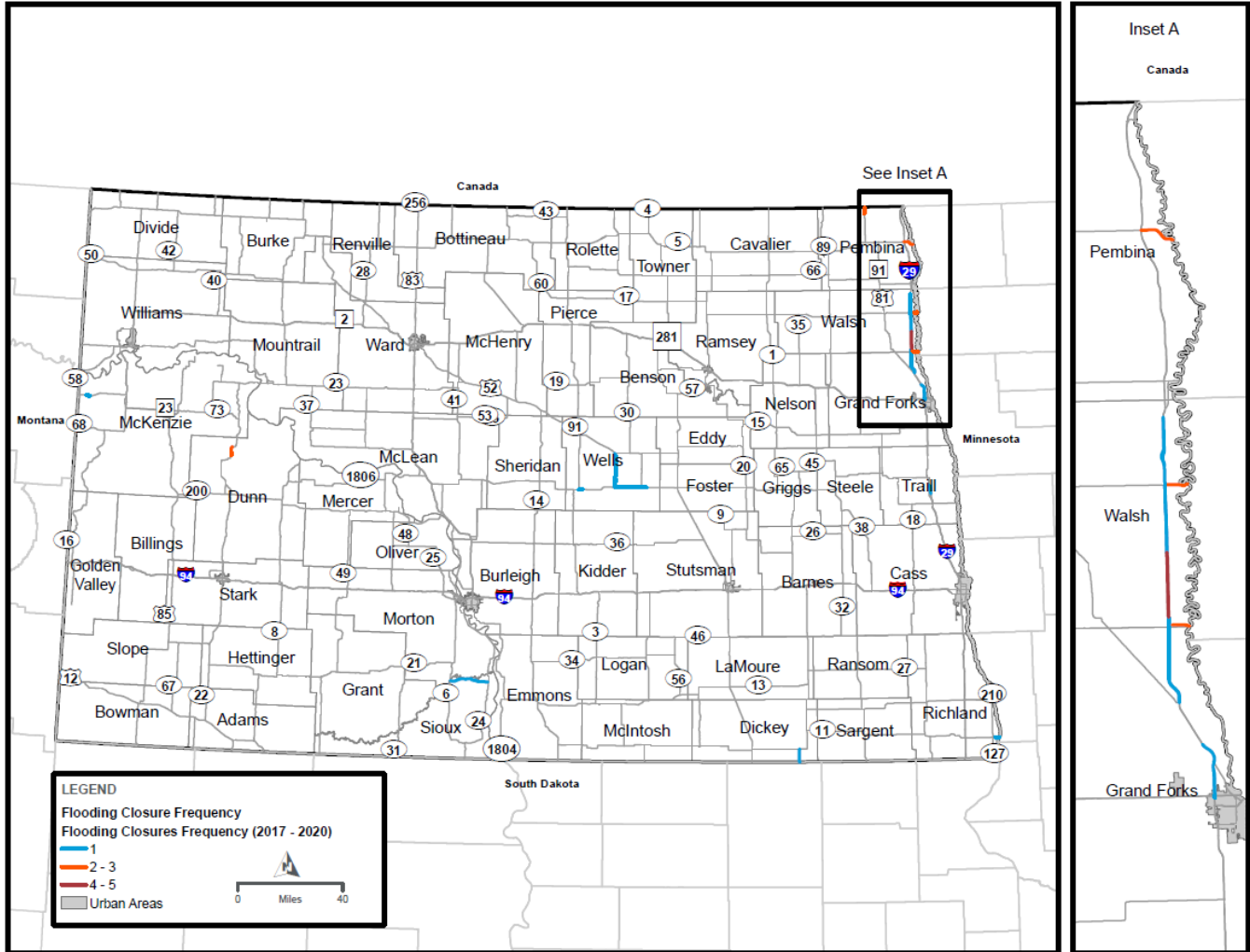
Figure 4-16: Duration of Weather-related Closures (2017–2021)



Source: NDDOT Data

For locations with flooding, the location with the highest frequency of flooding closures is on I-29 between MP 161 and MP 168. This stretch of the interstate experienced five closures due to flooding during the 5-year period from 2017 to 2021. Flooding closure frequency is shown in Figure 4-17.

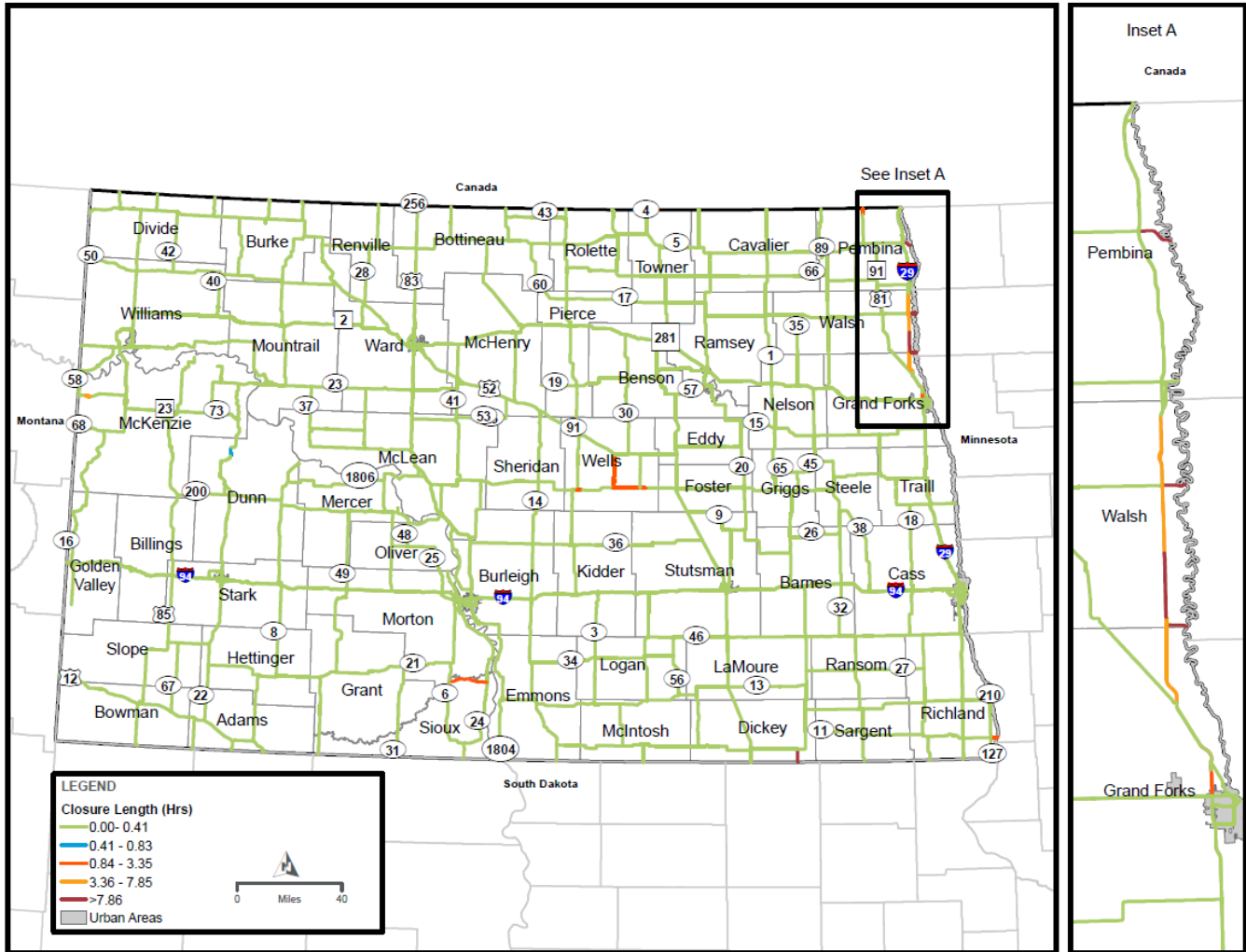
Figure 4-17: Highway Closures Associated with Flooding (2017–2021)



Source: NDDOT Data

Flooding closures have the highest average closure duration. The longest flooding-related closure over the last five years lasted 35 hours. The highest recorded average closure duration occurred on ND-5 between MP 332 and MP 336 with an average closure duration of 28.2 hours. On the Level One Freight Corridors, the longest average closure duration is on I-29 between MP 161 and MP 168 with a duration of 23.6 hours (Figure 4-18).

Figure 4-18: Highway Flooding Closure Duration (2017–2021)



Source: NDDOT Data

TRUCK CRASHES

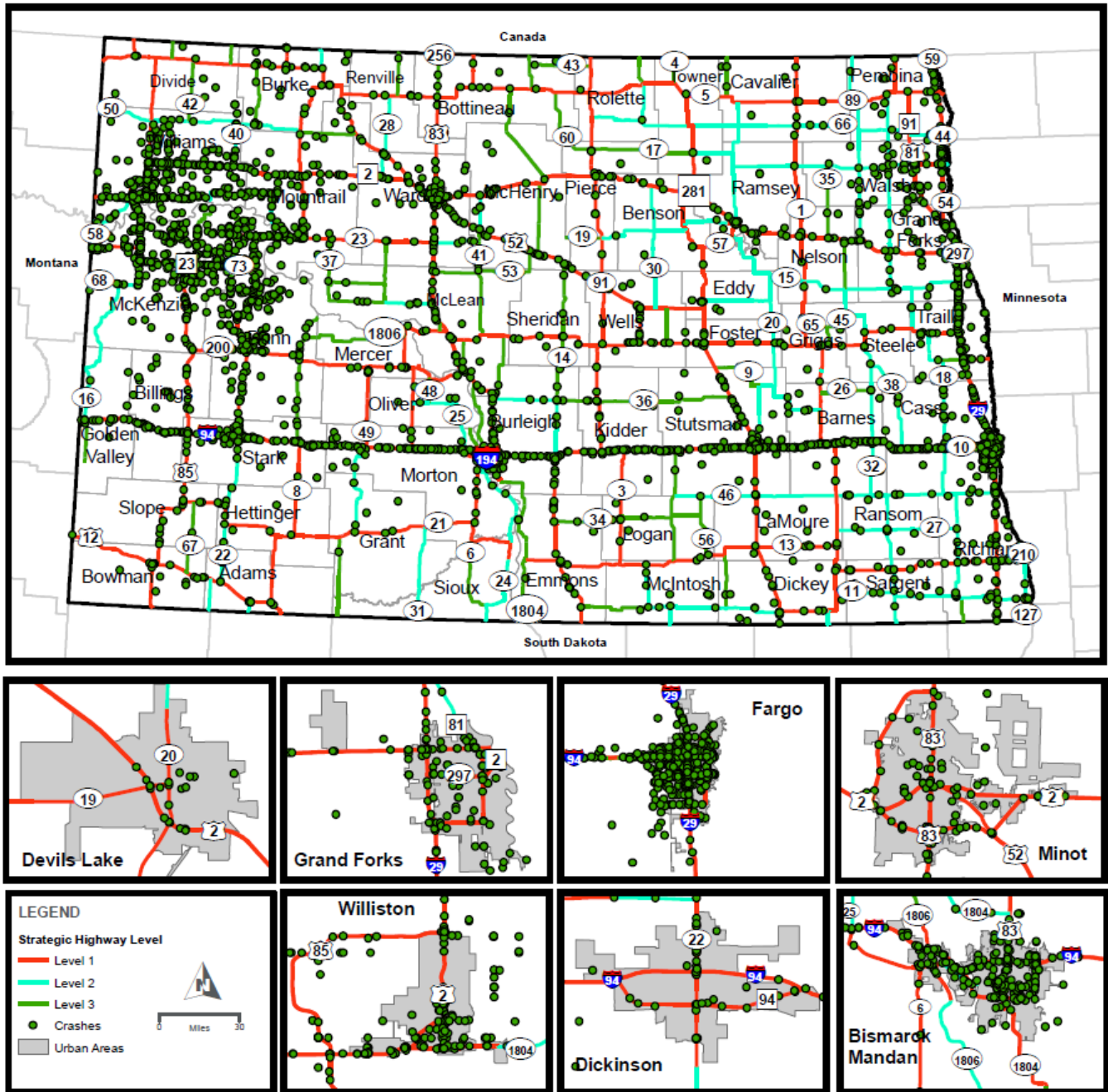
The objective of the highway freight truck crash analysis is to identify locations with frequent truck crash rates and provide countermeasures to reduce future crashes involving freight vehicles throughout North Dakota. This analysis uses both an observed crash cluster and a systemic approach to safety management.

This analysis evaluated safety conditions for freight vehicles on the three freight corridor levels in North Dakota. Overall trends in crashes were analyzed.

TRENDS AND EMPHASIS AREA

Overall, 4,206 crashes involving freight vehicles occurred on North Dakota roads during the 4-year period from 2017 to 2020, as shown in Figure 4-19. A heat map of crash frequency is shown in Figure 4-20, where red indicates a high density of crashes and yellow indicates a low density of crashes. The heat maps in Figure 4-21 through Figure 4-23 show the density of fatal, injury, and property damage only (PDO) freight vehicle crashes.

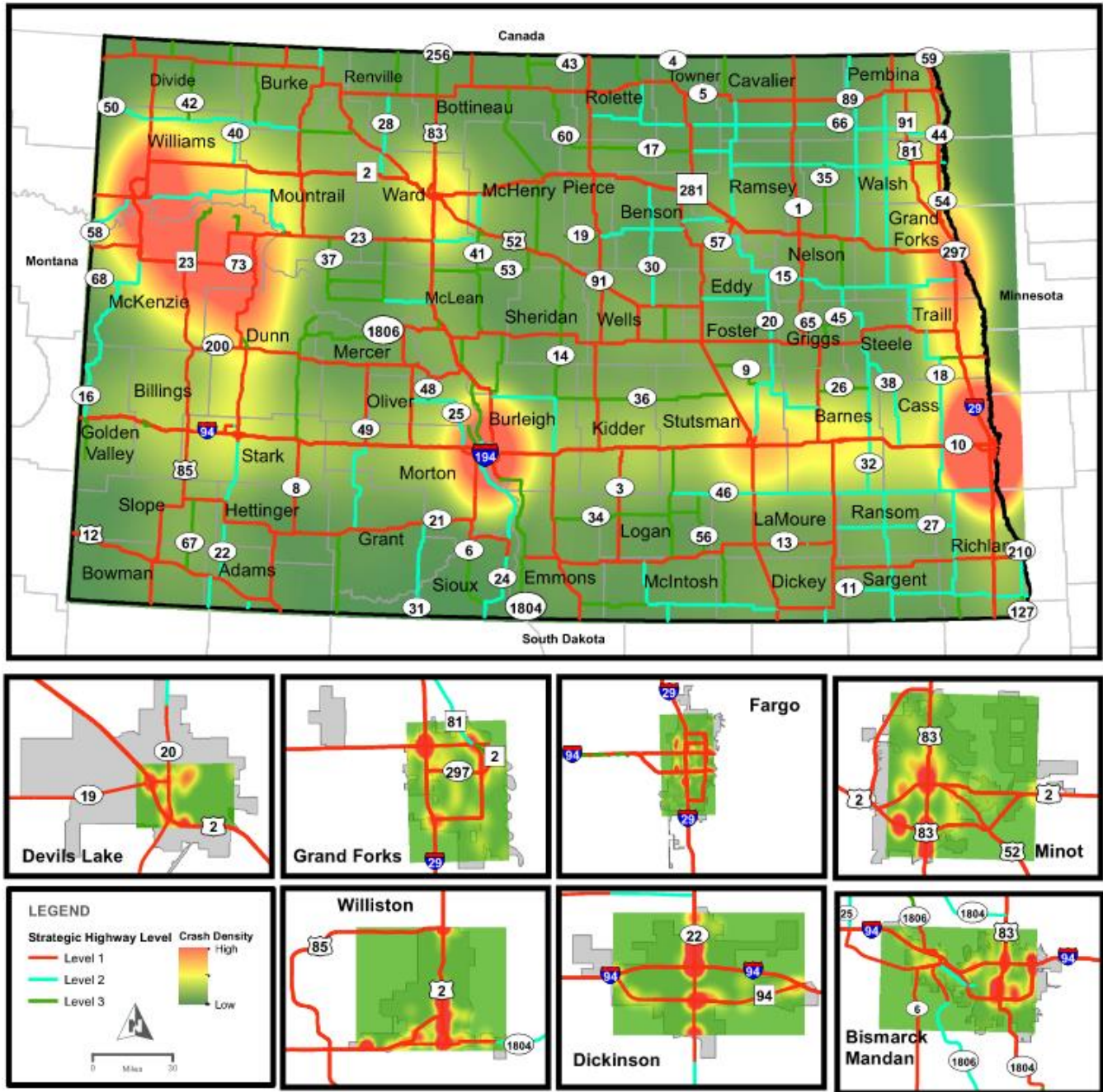
Figure 4-19: Locations of Crashes Involving Freight Vehicles (2017–2020)



Source: NDDOT Data

23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

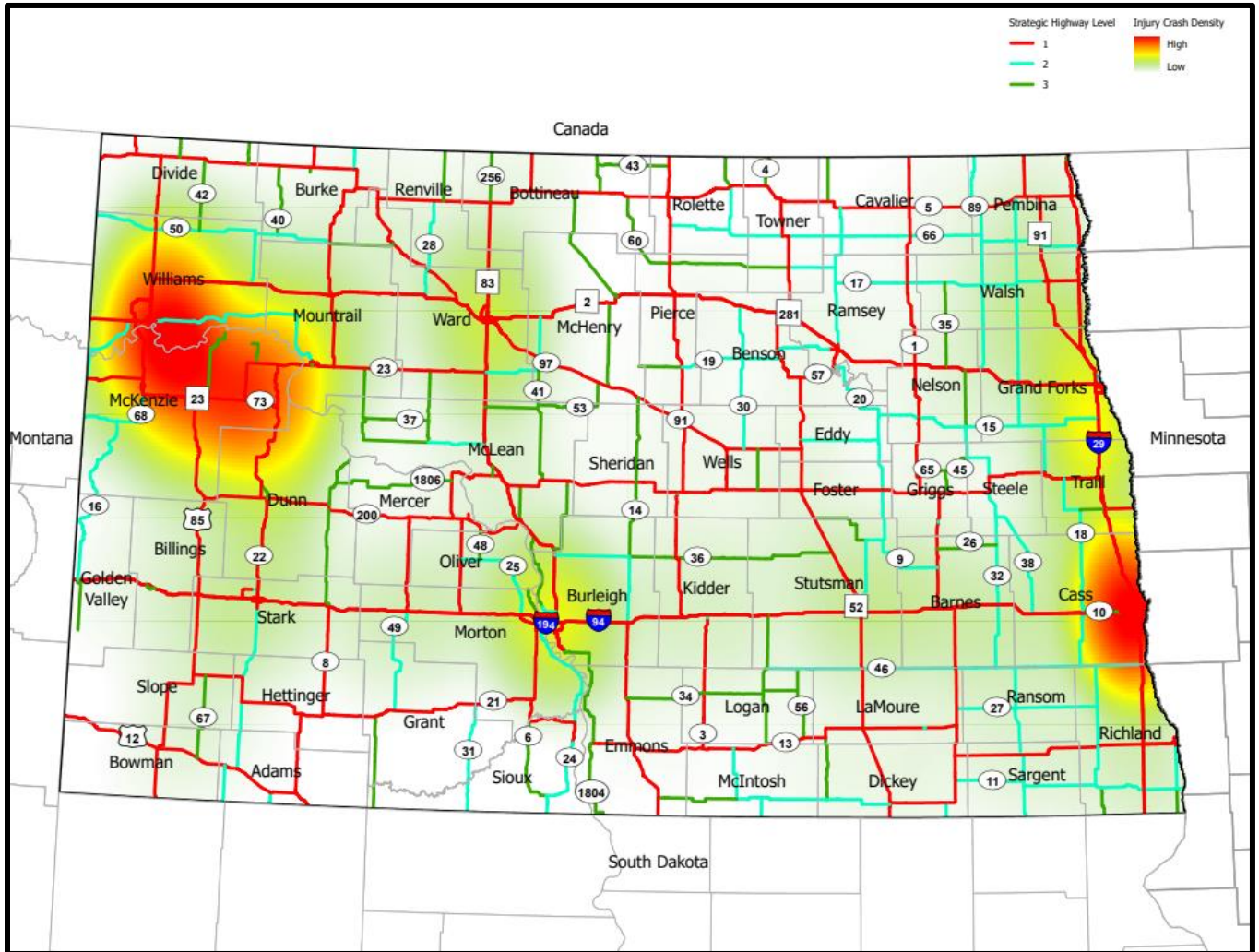
Figure 4-20: Heat Map of Freight Vehicle Crashes (2017–2020)



Source: NDDOT Data

23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

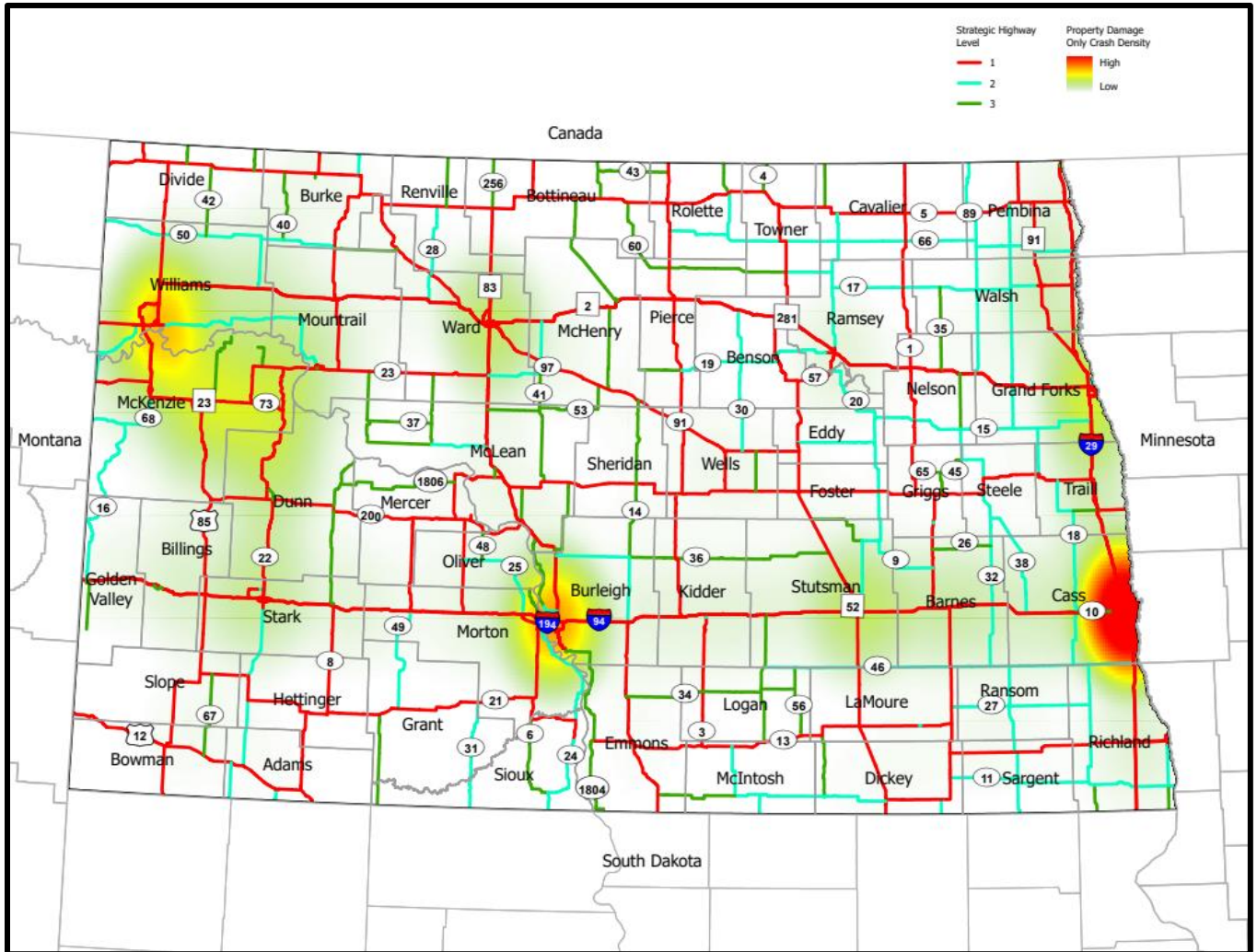
Figure 4-22: Heat Map of Injury-related Crashes Involving Freight Vehicles (2017–2020)



Source: NDDOT Data

23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

Figure 4-23: Heat Map of PDO Crashes Involving Freight Vehicles (2017–2020)

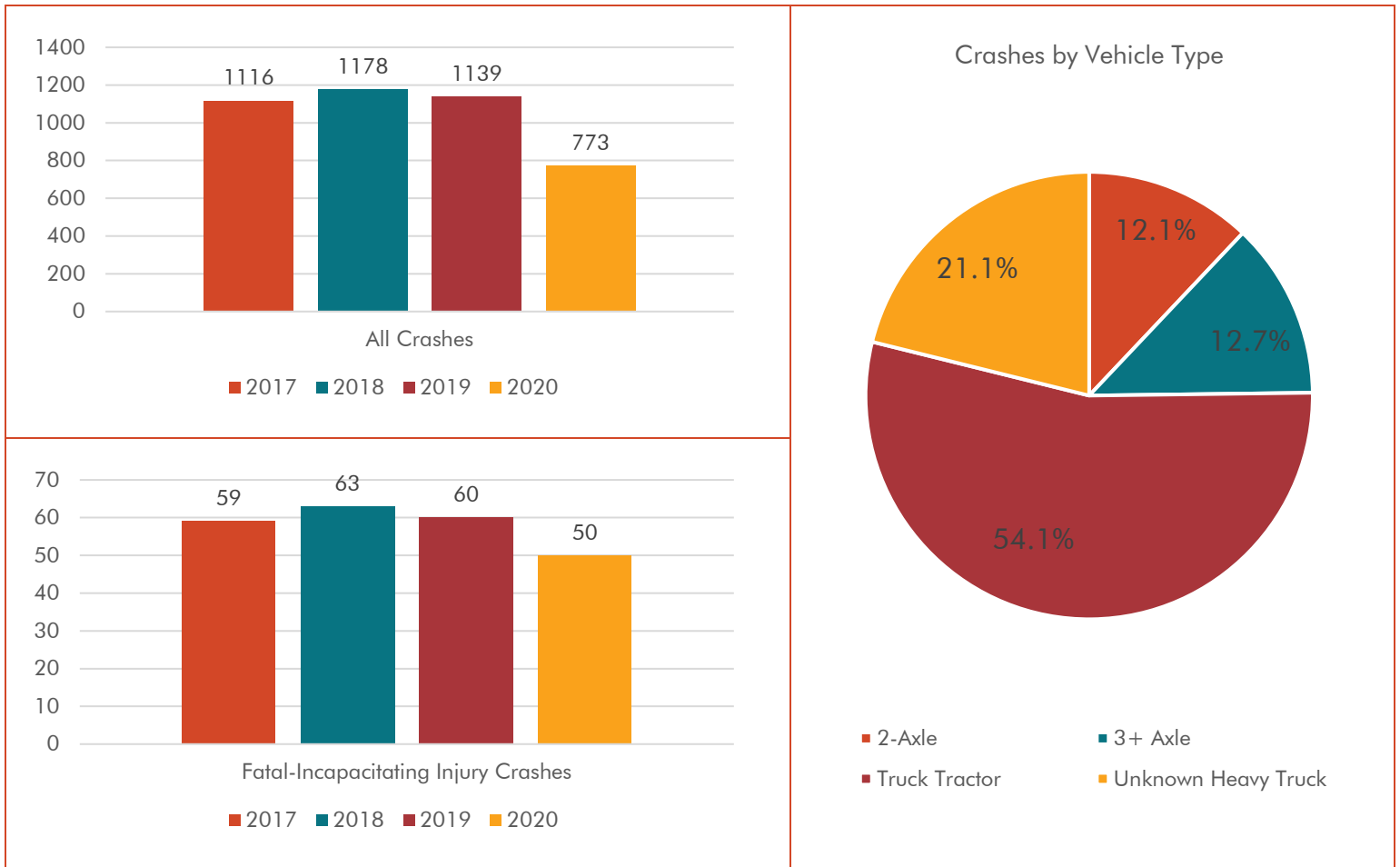


Source: NDDOT Data

23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

From 2017 to 2020, the total crash rate of trucks observed on North Dakota corridors was approximately 11 crashes per 100 million vehicle-miles traveled (MVMT). This is lower than the national average of crash rates per 100 MVMT of 17.8 crashes. Most truck crashes in North Dakota (up to 76.2%) resulted in property damage.²⁴ Only 6.5% of truck crashes during the 4-year period resulted in a fatality or an incapacitating injury. This data is further elaborated on and shown in Figure 4-24. More than 50% of all truck crashes involved tractor trucks.

Figure 4-24: Truck Crash Trends (2017–2020)



Source: NDDOT Data

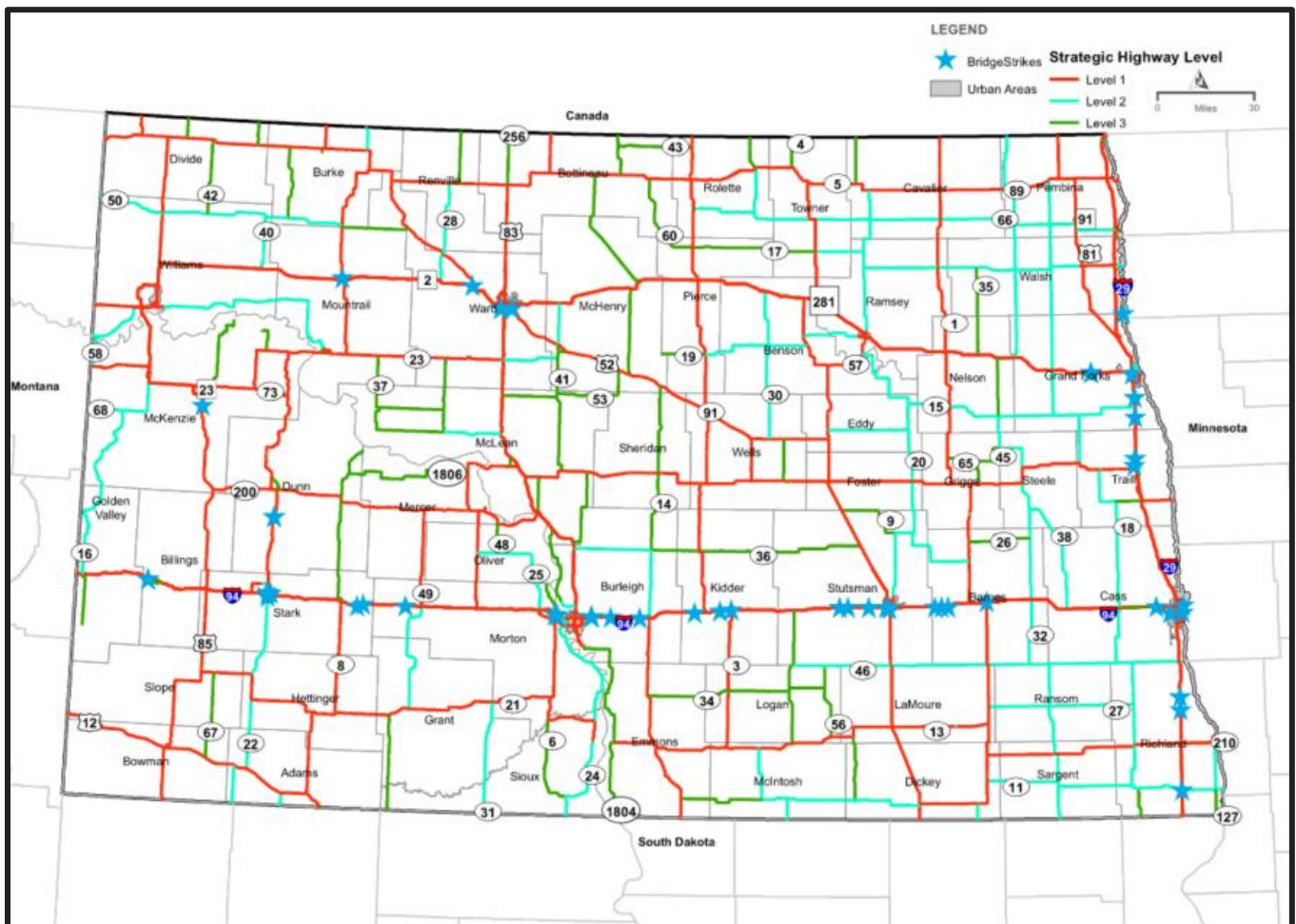
**23 U.S.C. § 407 Documents
NDDOT Reserves All Objections**

²⁴ Legislation changed the reportable crash definition on August 1, 2019, increasing the property damage threshold amount from \$1,000 to \$4,000 for PDO crashes. Data indicates the number of PDO truck-related crashes were relatively consistent between 2017 and 2019 but dropped significantly in 2020. There were 852 PDO truck involved crashes in 2017, 902 in 2018, 854 in 2019 and 595 in 2020.

BRIDGE STRIKES

Bridge strikes are a recurring occurrence on North Dakota highways. A bridge strike occurs when a vehicle attempts to pass under a bridge with inadequate vertical clearance and damages the bridge. Figure 4-25 shows the locations where bridge strikes have occurred. The exact location of the strike is not identifiable, since law enforcement and incident reports mark only the general location, not the underpass, overpass or structure which was struck.

Figure 4-25: Locations of Bridge Strikes (2011-2021)



Source: NDDOT Data

One bridge that featured significantly in previous bridge strike statistics was the Long X Bridge on US-85. Originally constructed in 1959, the bridge had a vertical clearance of 16 feet, but the overhead truss was often struck by trucks. When the bridge was closed due to incidents, alternate detour routes added 50 miles to trips. In 2019, construction started on a new bridge that would remove any height clearance issues. Figure 4-6 shows the old bridge and the new bridge being constructed.

Figure 4-26: Long X Bridge and New Replacement Bridge



Source: NDDOT

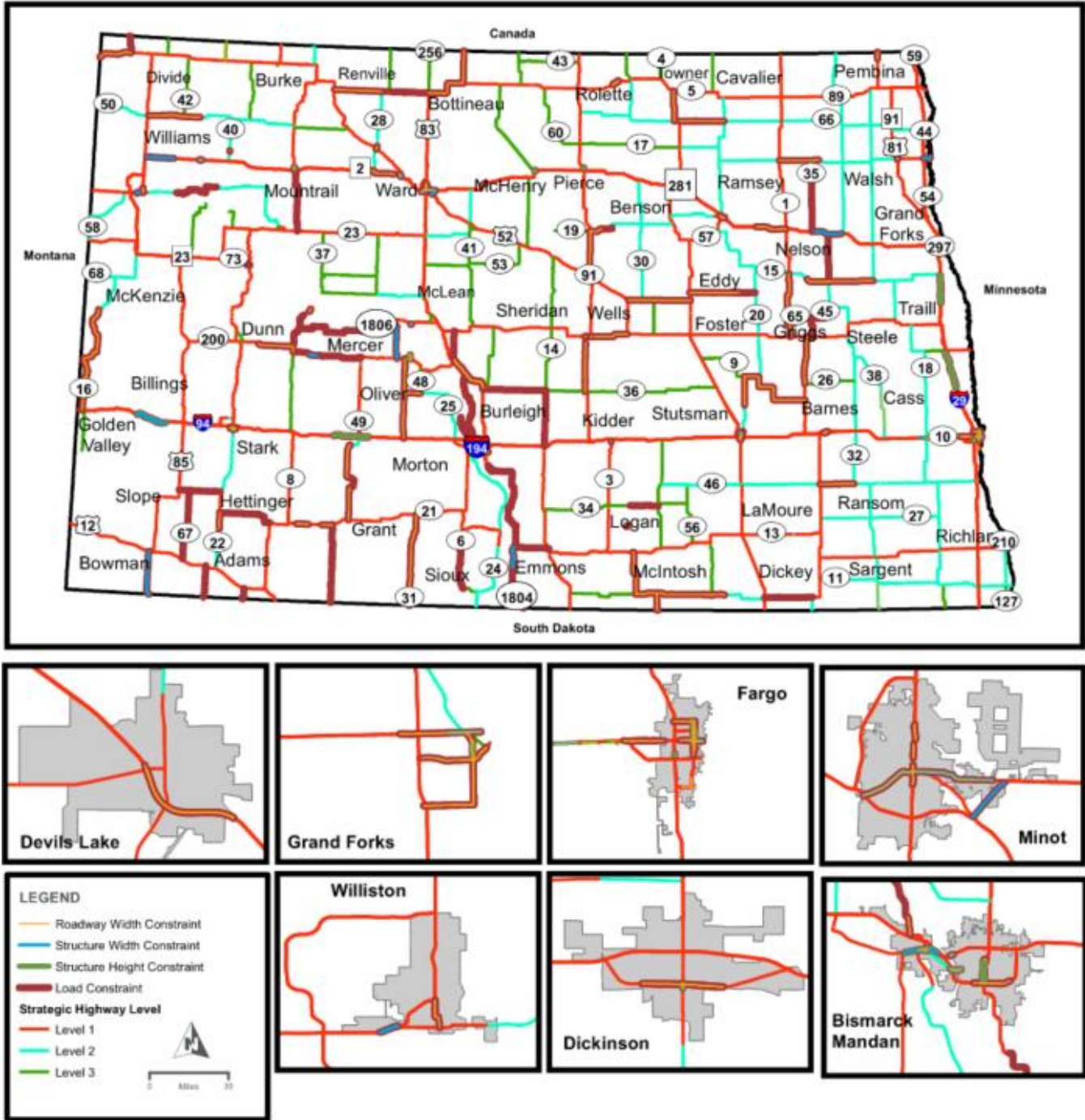
HIGHWAY FREIGHT CONSTRAINTS

Infrastructure constraints can reduce the overall capacity of the highway system, become bottlenecks, and impose particular operating restrictions on truck activity such as lower overall gross vehicle weight, height, or width. NDDOT has identified a series of freight constraints, categorized into five categories, that could impede the travel of freight traffic. These categories and the restrictions are listed in Table 4-6. Locations of these constraints are shown in Figure 4-27.

Table 4-6: Categories of North Dakota Highway Constraints

Constraint	Interstate	Interregional Four-Lane	Level One Freight Class	Level Two Freight Class	Level Three Freight Class
Structure Height	< 16 feet	< 16 feet	< 16 feet	< 15 feet	< 15 Feet
Structure Width	< 32 feet	< 32 feet	< 28 feet	< 26 feet	< 24 feet
Load/Distress Limit	≤ 8 tons	≤ 8 tons	≤ 8 tons	< 8 tons	< 7 tons
Roadway Width	< 32 feet	< 32 feet	< 28 feet	< 26 feet	< 24 feet
Capacity	$v > 21,100 * \text{Number of Lanes};$ $v = \text{AADT}/f_{HV}$ $f_{HV} = 1/[1 + P_{HV} * (E_{HV} - 1)]$ $P_{HV} = \text{TAADT}/\text{AADT}$ $E_{HV} = 2$	$v > 20,800 * \text{Number of Lanes};$ $v = \text{AADT}/f_{HV}$ $f_{HV} = 1/[1 + P_{HV} * (E_{HV} - 1)]$ $P_{HV} = \text{TAADT}/\text{AADT}$ $E_{HV} = 2$	Rolling Terrain: AADT > 12,600 Level Terrain: AADT > 13,400	Rolling Terrain: AADT > 12,600 Level Terrain: AADT > 13,400	Rolling Terrain: AADT > 12,600 Level Terrain: AADT > 13,400

Figure 4-27: Locations of Highway Infrastructure Constraints (2021)



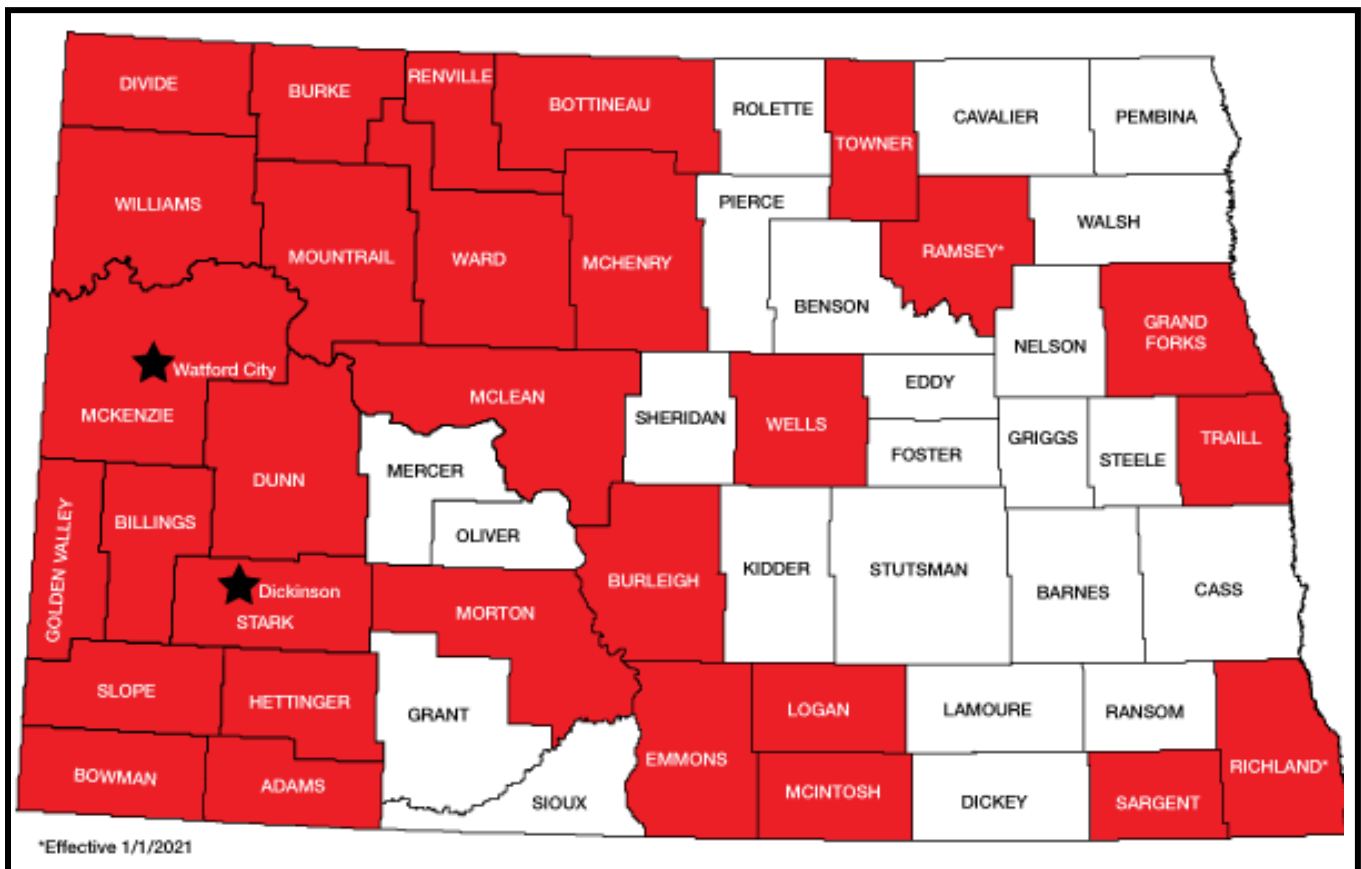
Source: NDDOT Data

OVERSIZE AND OVERWEIGHT RESTRICTIONS

The efficient movement of oversize and overweight (OSOW) loads is a vital enabler and supporting function for North Dakota’s agricultural, construction, and energy industries. Farm machinery, construction equipment, drilling rigs, cargo-handling equipment, wind tower blades, and prefabricated housing are items that cannot easily be reduced in size and weight. These types of loads, known as indivisible loads, exceed vehicle weight and legal-size requirements. In order to move these loads, permits are required from infrastructure owners. This can be the State, Counties, Tribal, Cities, and other regional and local municipalities. An operator wanting to move an OSOW load across different jurisdictions would need to apply for and receive a permit from each of these entities.

Permits issued for state roads are managed by the North Dakota Highway Patrol (NDHP). Other entities issuing permits in the state include the Executive Board and Load Pass Permit Advisory Committee of the Western Dakota Energy Association (formerly the North Dakota Association of Oil & Gas Producing Counties). This organization operates the LoadPass Permit system. The system was originally focused on oil-producing counties but is now open to non-oil-producing counties, townships, and cities in the state. This conglomeration allows an operator to use one system for permitting on local roads and to receive one permit for loads that travel across members’ infrastructure. The Counties (highlighted in red) and Cities (indicated by stars) that are members of the LoadPass system are shown in Figure 4-28.

Figure 4-28: Counties and Cities Participating in the LoadPass Permit System



Source: Western Dakota Energy Association

In 2019, the NDHP Permit Office issued 250,687 overweight permits and 26,654 permits related to height. Table 4-7 and Table 4-8 identify the number of permits issued by NDHP during 2019 associated with different weight and height bands (ranges).

Table 4-7: NDHP Permits Issued by Gross Vehicle Weight Band

Gross Vehicle Weight Band (Pounds)	Number of Permits	Percentage	Cumulative Percentage
0–80,000	138,554	55.270%	55.270%
80,001–120,000	75,214	30.003%	85.273%
120,001–150,000	24,047	9.592%	94.865%
150,001–180,000	6,162	2.458%	97.323%
180,001–210,000	3,004	1.198%	98.522%
210,001–240,000	2,104	0.839%	99.361%
240,001–270,000	1,452	0.579%	99.940%
270,001–300,000	70	0.028%	99.968%
300,001–350,000	39	0.016%	99.984%
350,001–400,000	12	0.005%	99.988%
400,001–500,000	18	0.007%	99.996%
500,001–600,000	10	0.004%	100.000%
600,001–999,999	1	0.000%	100.000%

Source: NDHP

Table 4-8: NDHP Permits Issued by Vehicle Height Band

Vehicle Height Band (Feet and Inches)	Number of Permits	Percentage	Cumulative Percentage
14'1"–15'	11,889	44.605%	44.605%
15'1"–16'	11,005	41.288%	85.893%
16'1"–17'	2,674	10.032%	95.926%
17'1"–18'	800	3.001%	98.927%
18'1"–19'	195	0.732%	99.659%
19'1"–20'	48	0.180%	99.839%
20'1"–21'	15	0.056%	99.895%
21'1"–22'	17	0.064%	99.959%
22'1"–23'	5	0.019%	99.977%
23'1"–24'	5	0.019%	99.996%
24'1"–99'11"	1	0.004%	100.000%

Source: NDHP

Unfortunately, not all OSOW loads can use the most direct route between an origin and destination. Issues with weight limits at bridges and over-height clearances can cause OSOW loads to travel much farther than other loads. One example is trips from the rail yard at Beulah to Killdeer. Bridge constraints on ND-200 between ND-22 and ND-49 result in loads having to travel east along ND-200, US-83, ND-23, ND-23 Bypass, ND-23 (again), and ND-22. This detour adds 142 miles to what would be a 51-mile route. Other constraints include bridges with a less than 16-foot clearance on interstates. The height limitation at some overpasses can be avoided by using the off and on ramps, but this is not always feasible. For example, on I-29, the lowest vertical clearance northbound is 15'10" at MP 165.701 and southbound is 15'11" at MP 115.969. These low clearances cannot be avoided by using ramps. On I-94, several bridges have low vertical clearances, the lowest being 15'7" both east- and westbound at MP 164.527 and the same height westbound at MP 26.204.

SEASONAL WEIGHT AND WEATHER RESTRICTIONS

Prudent managers of infrastructure seek to maintain the highest condition of infrastructure possible given the resources available to them. But they also must consider other factors that are outside their control, such as weather, and where necessary must limit use of the infrastructure to ensure that it is not damaged and lead to excessive repair and rehabilitation costs.

Many northern states and Canadian provinces impose truck weight limits to protect highways from the effects of the spring thaw. These weight limits are usually in effect from late February or early March until there is no longer a threat of frost, usually in May (the timing varies by year). During spring, water saturates the base of the road and subgrade, which causes these layers to lose strength. The overall gross vehicle weight of trucks, in addition to variations in axle loadings and tire configurations, affect these weakened surfaces. Traffic loading during the spring thaw results in 5 to 8 times more damage to pavements than that same loading at other times of the year.²⁵ NDDOT, and other authorities responsible for highways in the state, apply a series of different load restrictions, as listed in Table 4-9, to mitigate the effect of trucks during the spring thaw considering the needs and characteristics of individual roads.

Table 4-9: Spring Load Restrictions

Vehicle Characteristic	Legal Weight (Pounds)	8-Ton (Pounds)	7-Ton (Pounds)	6-Ton (Pounds)	5-Ton (Pounds)
Single axle	20,000	16,000	14,000	12,000	10,000
Tandem axle	34,000	32,000	28,000	24,000	20,000
3-axle group or more per axle	17,000	14,000	12,000	10,000	10,000
Max. axle group	48,000	42,000	36,000	30,000	30,000
Gross weight	105,500	105,500	105,500	80,000	80,000

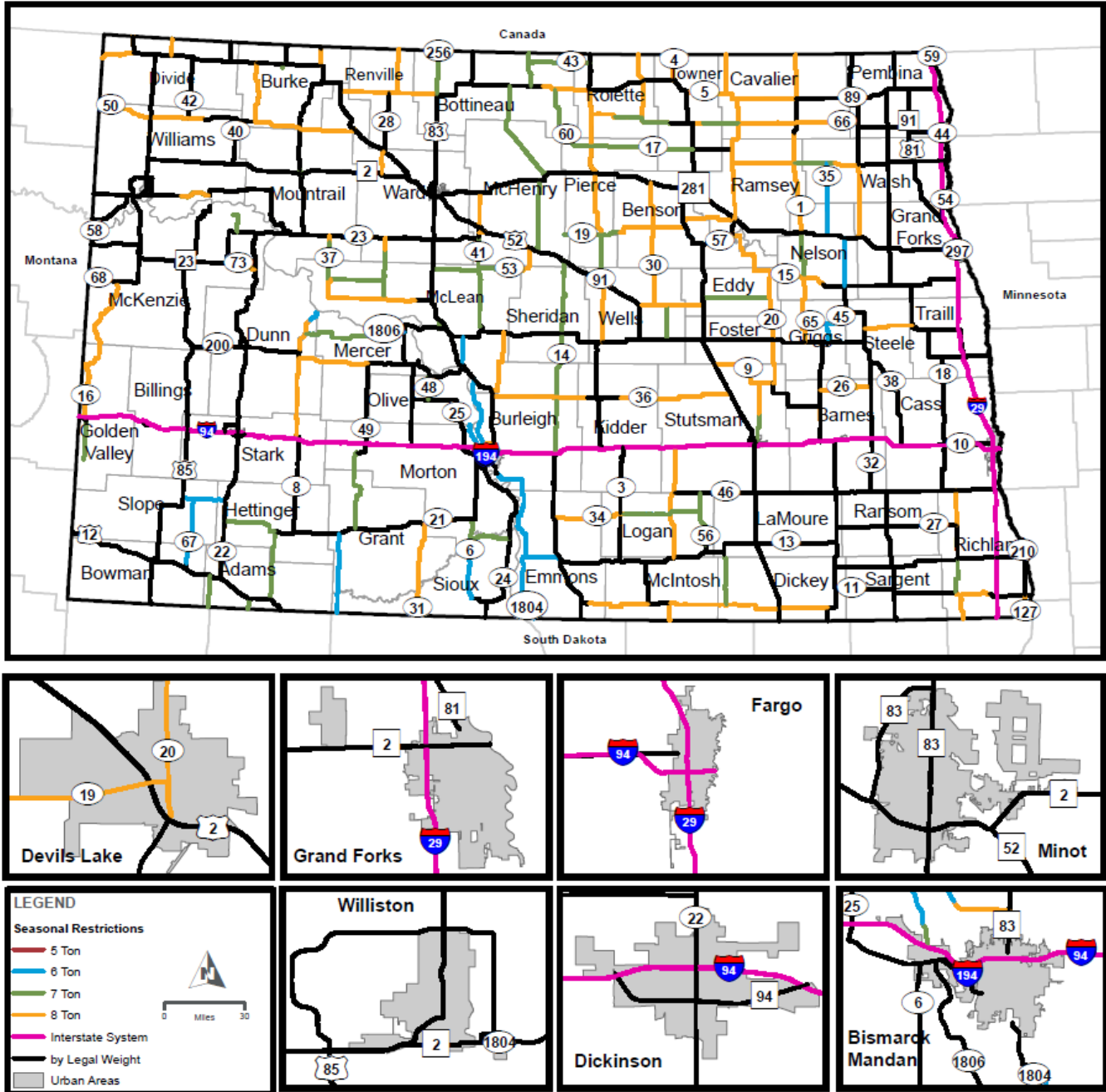
Source: NDDOT Data

* Not to exceed this gross weight on divisible loads

²⁵ [North Dakota State University, Upper Great Plains Transportation Institute, "County Regional Representative Meeting: Truck Size and Weight," July 2, 2013.](#)

Figure 4-29 illustrates the typical seasonal weight restrictions across the North Dakota Strategic Freight System Highway Network.

Figure 4-29: Typical Seasonal Weight Restrictions



Source: NDDOT Data

Many county and township roads serving well pads, tank facilities, disposal wells, and industrial facilities are gravel roads. During inclement weather, highway authorities place restrictions on the movement of trucks on these roads to protect the integrity of the highway. County and township road managers use weather information to identify which roads require temporary restrictions. However, prior to 2019, weather information was provided by only eight weather stations that had significant gaps in distance between them. The rain cores of thunderstorms are often only a couple of miles wide, and, even in widespread storms, often there are embedded cores of heavier precipitation a few miles across. This lack of information often meant that road managers restrict roads that were not affected by weather.

To address this problem and provide additional detailed accurate weather information to county road managers, the Western Dakota Energy Association developed Wise Roads (Weather Information System to Effectively Reduce Oilfield Delays and Disruption) in partnership with the North Dakota Agricultural Weather Network at NDSU. The project will ultimately deploy up to 50 research-grade weather stations throughout the oil-producing counties, thereby ensuring better-informed outcomes aimed at keeping highways open and maintaining the flow of goods and services while protecting highway infrastructure and the safety of highway users.

One other aspect of Wise Roads research is geared toward improving “frost law” policy. The project will install soil moisture and temperature probes in the bed of gravel roads in the major oil-producing counties. Data will be collected by the Western Dakota Energy Association’s partner in the project, the UGPTI, which will use data from the roadbed sensors to better determine when frost or load restrictions need to be placed on roads and when those restrictions can be lifted. The probes will be installed at 6–8”, 24”, 48”, and 72” depths on the edge of the road and compare data on state highways and probes in ground adjacent to the weather station. Temperature profiles from the roadbed and soil in the gravel roads will be compared to determine whether other existing soil temperature sensors in the region and state can be used to estimate the subsurface temperature of roads.

TRUCK PARKING ANALYSIS

NDDOT completed a high-level truck parking analysis using the StreetLight Insight platform and information from the most recently available Jason’s Law Survey regarding the location and quantify of truck parking spaces throughout the country. The analysis highlights areas with the highest levels of truck parking activity as well as locations most likely to experience excessive truck parking demand relative to the existing capacity.

DATA SOURCES

Three key data sources were used to measure the truck parking supply and demand in North Dakota. They are described in further detail here.

STREETLIGHT INSIGHT TRUCK GPS DATA:

A project-level subscription to the StreetLight Insight platform was purchased for the development of this plan. The platform provides information on truck and passenger vehicle travel patterns based on the definition of analysis zones and other criteria. One limitation of the data is that there is no continuity in vehicle ID between when a trip ends and when the next trip begins for that same vehicle. Therefore, this data cannot be used to measure truck parking duration. However, the data can be used to estimate overall truck parking activity after appropriate filtering measures have been taken. The following criteria were used to identify truck trips most likely to require the use of public or private truck parking facilities:

- **Heavy vehicles (> 26,000 pounds):** StreetLight provides two truck vehicle types (heavy and medium) for analysis either in combination or separately. Medium trucks are more likely to be “box” or “straight” trucks

typically used for local freight shipments. Heavy trucks are more likely to be larger tractor trailers typically used for long-haul freight shipments that require mid-shipment parking.

- **Trip duration of 4 hours or more:** The StreetLight analysis can be filtered to include only trips that fall within specified ranges of trip length and trip duration. For this analysis, the trips were filtered to include only those trips of four or more hours in duration. The purpose of this criterion is to further filter the data to focus more on the long-haul trip types likely to utilize truck parking facilities.

2019 JASON'S LAW SURVEY TRUCK PARKING DATA (PUBLIC FACILITIES):

As codified in Section 1401 of the Moving Ahead for Progress in the 21st Century Act (MAP-21) (PL 112-141), "Jason's Law" was established to emphasize the importance of addressing shortages in long-term parking for commercial vehicles. Under this provision, the USDOT routinely collects information on the location and quantify of truck parking facilities across the country. As of the writing of this document, FHWA has made this information available for public facilities for the most recently completed 2019 survey. However, information on private facilities has not yet been released in spatial format. Instead, this analysis uses an alternate data source for private facility information.

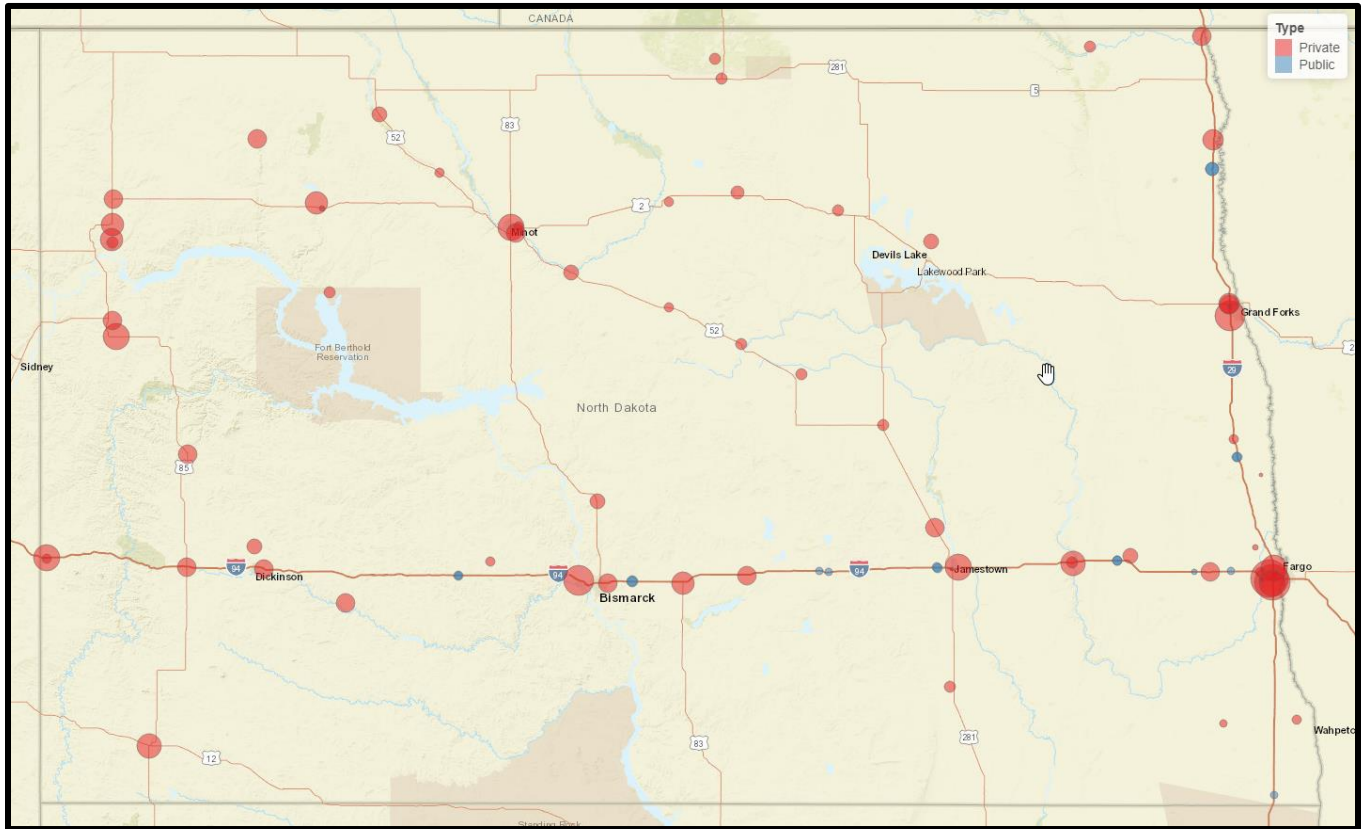
DC BOOK COMPANY TRUCK PARKING DATA (PRIVATE FACILITIES)

Truck parking facility data is available from the DC Book Company at the website truckstopandservices.com. The site maintains a directory of truck stop locations including information on amenities and the total number of truck parking spaces and is routinely updated. This data was combined with the Jason's Law Survey data for public facilities to create a complete picture of truck parking in North Dakota.

COMBINED PUBLIC AND PRIVATE FACILITIES

The locations of public and private truck parking facilities in North Dakota are shown in Figure 4-30. Truck parking facilities are primarily concentrated along I-94, I-29, and US-2. The largest concentration of truck parking capacity is in the Fargo-Moorhead region. According to this combined dataset, North Dakota has 189 truck parking spaces at 17 public rest areas and 3,021 truck parking spaces at 67 private truck parking spaces outpacing that of SD and MN. Note that a state-by-state summary of the most recent Jason's Law Survey shows a substantially higher quantity of truck parking spaces in North Dakota, particularly for private facilities at 71 private truck stops and 3,746 spaces. However, since the more recent data is not available in a spatial format, it could not be used for this assessment of demand and capacity. A baseline assumption for this analysis is that the additional truck parking spaces identified in the most recent survey were located uniformly across the existing truck parking facilities rather than at a small number of new facilities or facility expansions.

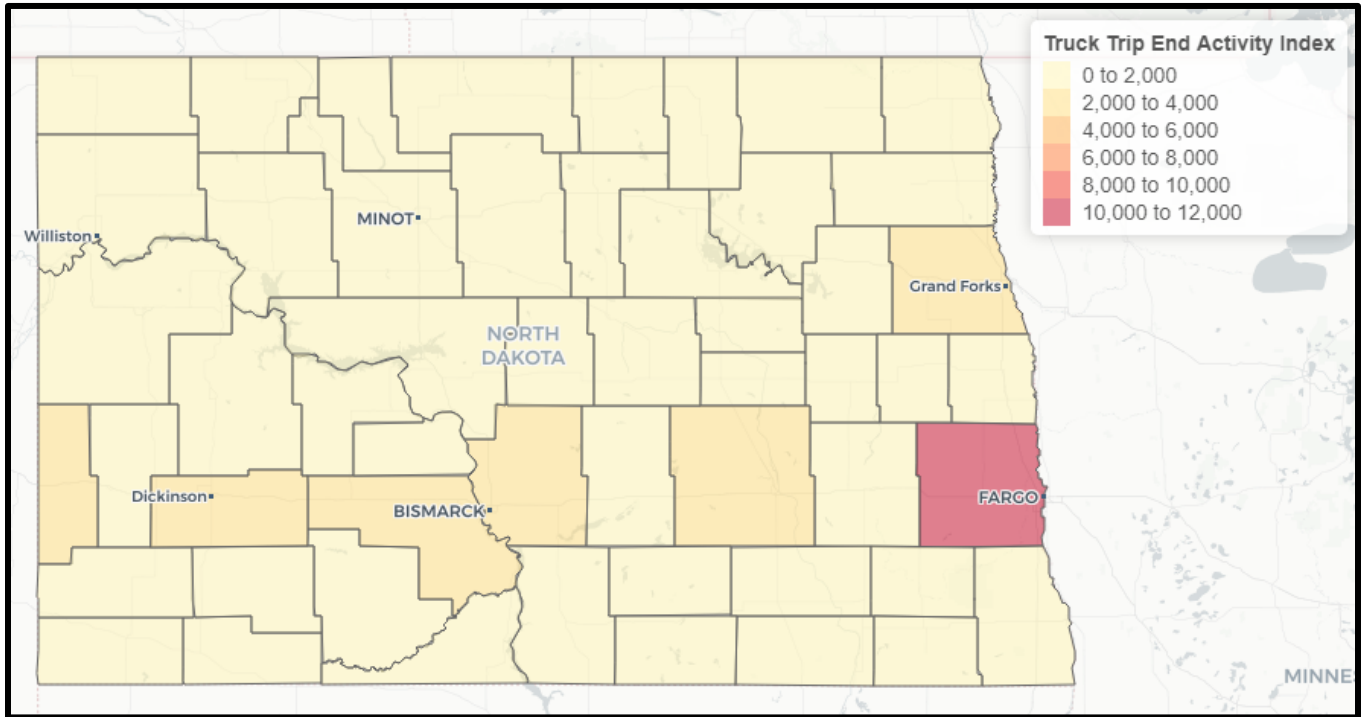
Figure 4-30: North Dakota Public and Private Truck Parking Facilities



TRUCK PARKING DEMAND

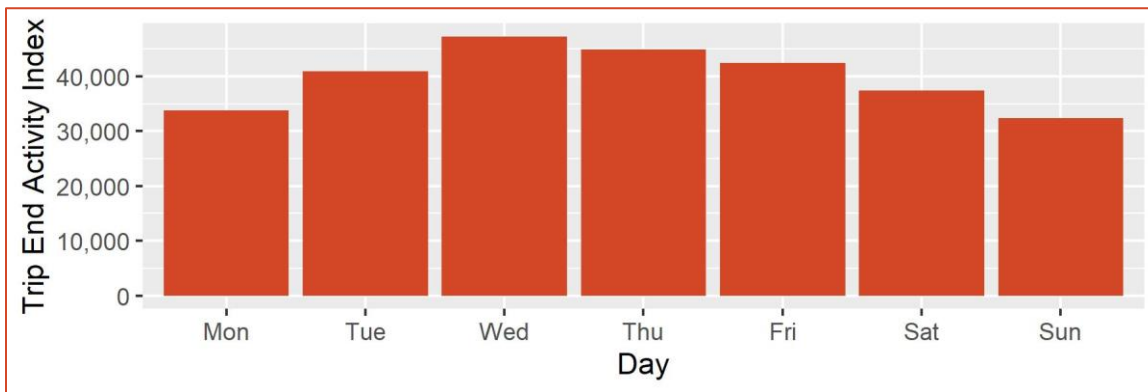
Using filtered vehicle type and trip duration filters the StreetLight data was used to measure the overall level of activity for trip ends by county. The results of this analysis are shown in Figure 4-31. This figure highlights the high levels of truck parking activity in Cass County and the Fargo area. Additional locations with higher levels of demand include multiple counties adjacent to I-94 and Grand Forks County.

Figure 4-31: Long-haul Truck Parking Activity by County



Additionally, Figure 4-32 shows the relative level of truck parking activity by day of the week. The data shows that Wednesday has the highest levels of activity followed closely by Thursday and Friday.

Figure 4-32: Long-haul Truck Parking Activity by Day of Week

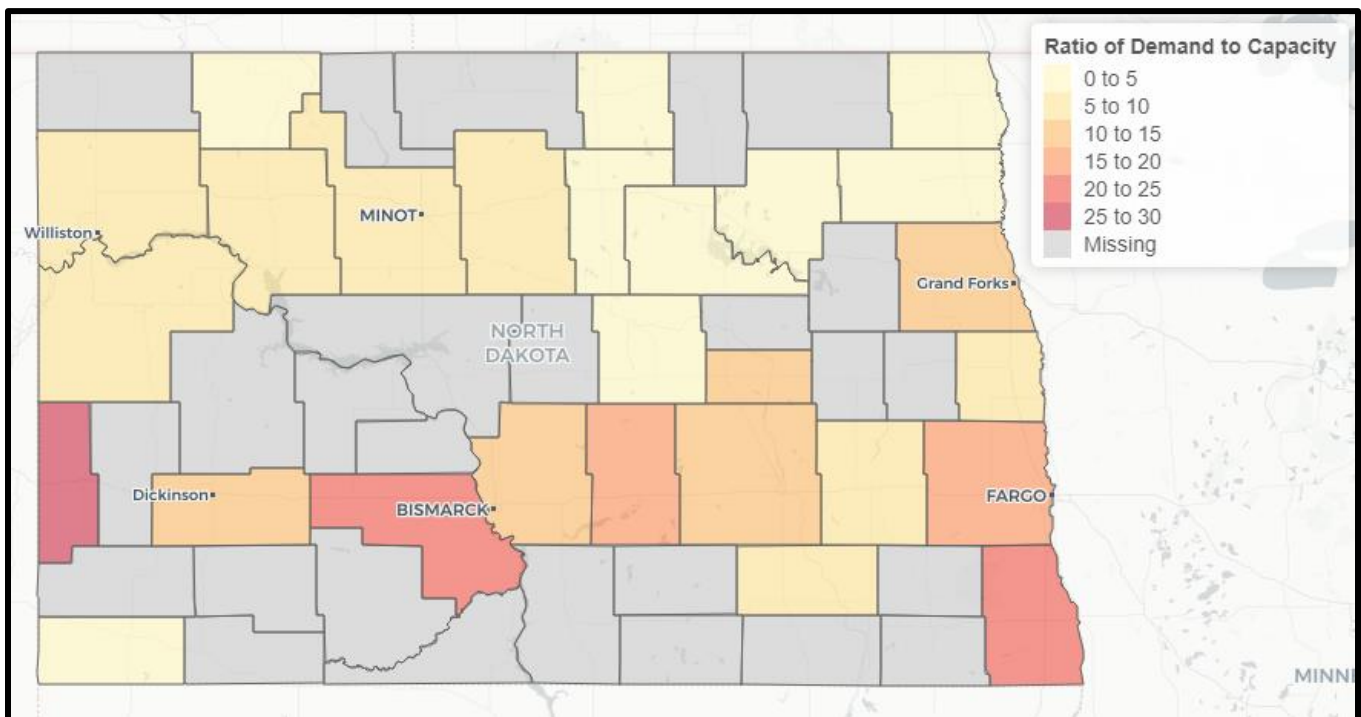


DEMAND TO CAPACITY RATIO

While the StreetLight data cannot be used to measure precise levels of truck parking activity without substantial additional analysis, it can be used to compare the overall truck parking activity levels to the count of available truck parking spaces throughout North Dakota. This approach will result in a ratio that represents an indicator of the overall demand to capacity ratio.

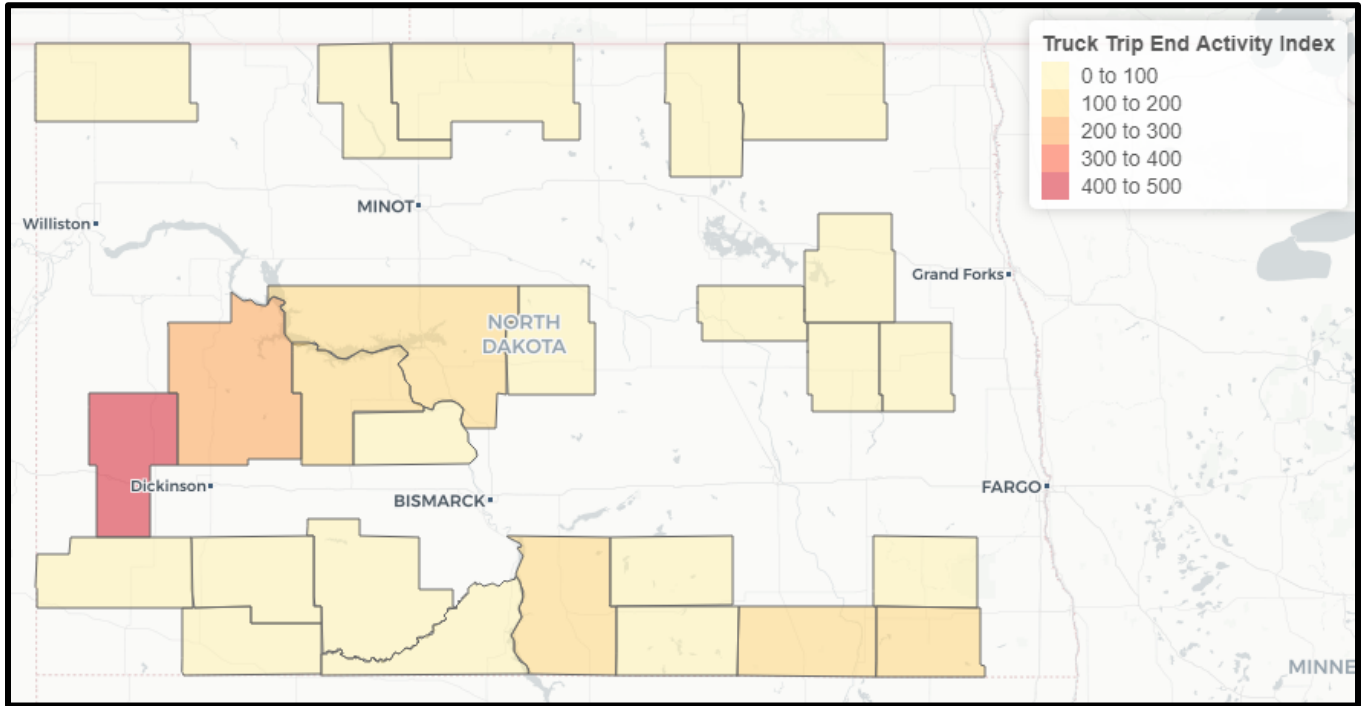
This demand to capacity ratio is shown in Figure 4-33. Note that counties labeled as “Missing” are those that do not have any truck parking facilities. The results show that Golden Valley County west of Dickinson results in the highest ratio of truck parking demand to capacity. Other counties that exhibit higher ratios are Morton County west of Bismarck, and Richland County south of Fargo. Notably, the demand to capacity ratio in Cass County (16.7) is relatively low despite having some of the highest activity levels in the state. This could indicate that the existing truck parking facilities are adequate for the current levels of demand. However, more detailed analysis of actual truck parking demand would need to be conducted before confirming this finding.

Figure 4-33: Ratio of Truck Parking Activity to Total Truck Parking Spaces by County



The truck parking activity levels by county for counties that do not have truck parking facilities are shown in Figure 4-34. Of these counties, Billings County west of Dickinson has the highest level of estimated truck parking activity. The second highest level of estimated truck parking activity is in Dunn County north of Dickinson.

Figure 4-34: Truck Parking Activity in Counties Without Truck Parking Facilities



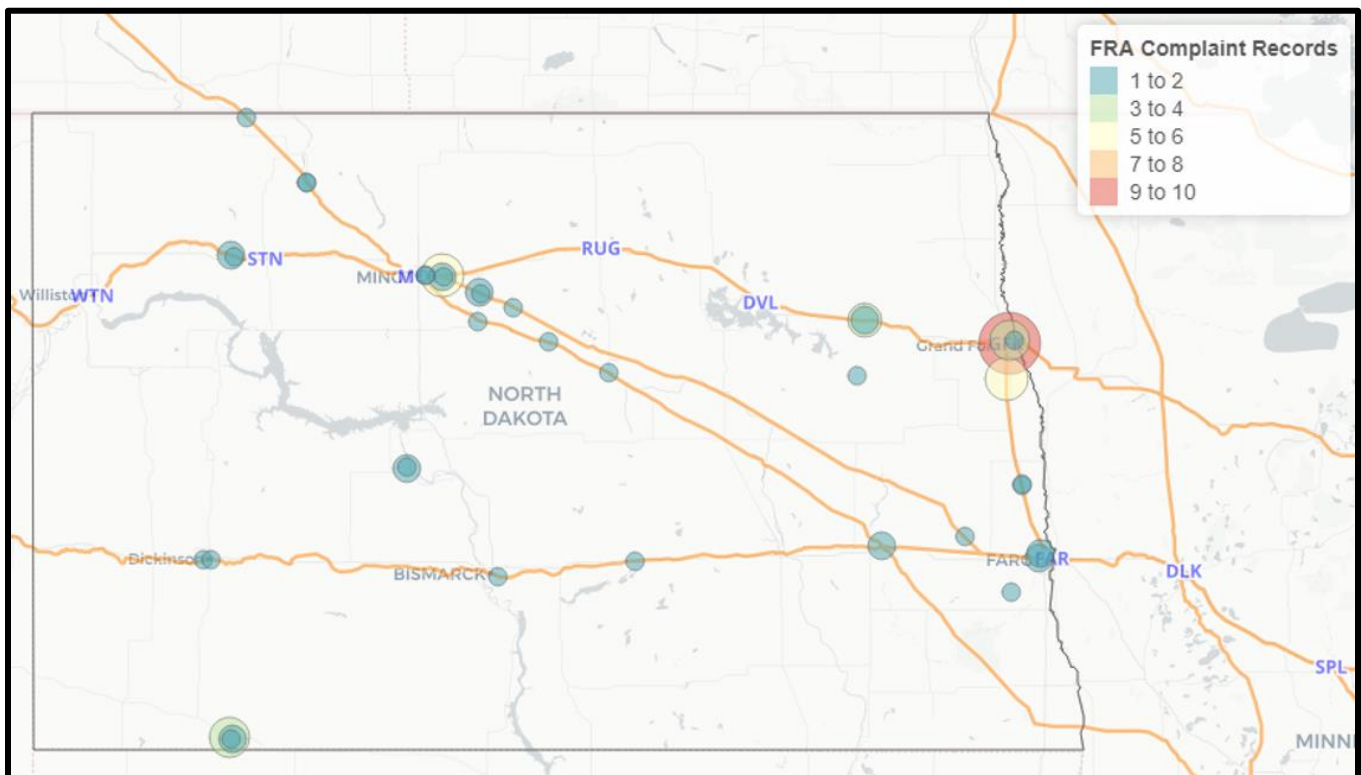
SUMMARY

This analysis provided a high-level assessment of truck parking supply and demand at a county level throughout North Dakota. The analysis found that Cass County has both the highest levels of truck parking demand and also the largest quantities of existing truck parking facilities. A comparison of the estimated magnitude of truck parking demand to truck parking capacity at the county level showed that the areas of the state that exhibit the highest ratios of demand to capacity are in the western portions of the state. In particular, McHenry, Golden Valley, Morton, Burleigh, Barnes, Billings, and Dunn counties showed the highest ratios of demand to capacity and should be reviewed for potential truck parking capacity issues. As noted previously, this level of analysis cannot predict precise levels of demand. Additionally, this analysis used the 2015 Jason’s Law Survey data for private facilities. This data may be out-of-date or inaccurate, but the more recently collected data is not yet available in spatial format. Given these limitations, a more robust truck parking analysis should be completed prior to making decisions regarding the installation or modification of truck parking facilities.

BLOCKED CROSSING COMPLAINT ANALYSIS

In 2019, the Federal Railroad Administration (FRA) established a dedicated webpage to allow members of the public and law enforcement agencies to report instances of blocked highway-rail grade crossings.²⁶ The complaint webpage allows the user to note the location, date, and duration of the incident. A review of the complaints on record within North Dakota show that there have been 73 complaints at 39 distinct crossing locations since the FRA webpage was established. The locations of these complaints are shown in Figure 4-35. The largest concentration of complaints is located in and around Grand Forks. The crossing with the most complaints is 42nd Street in Grand Forks. The records show 10 complaints at this location.

Figure 4-35: Locations of FRA Blocked Crossings Complaint Records

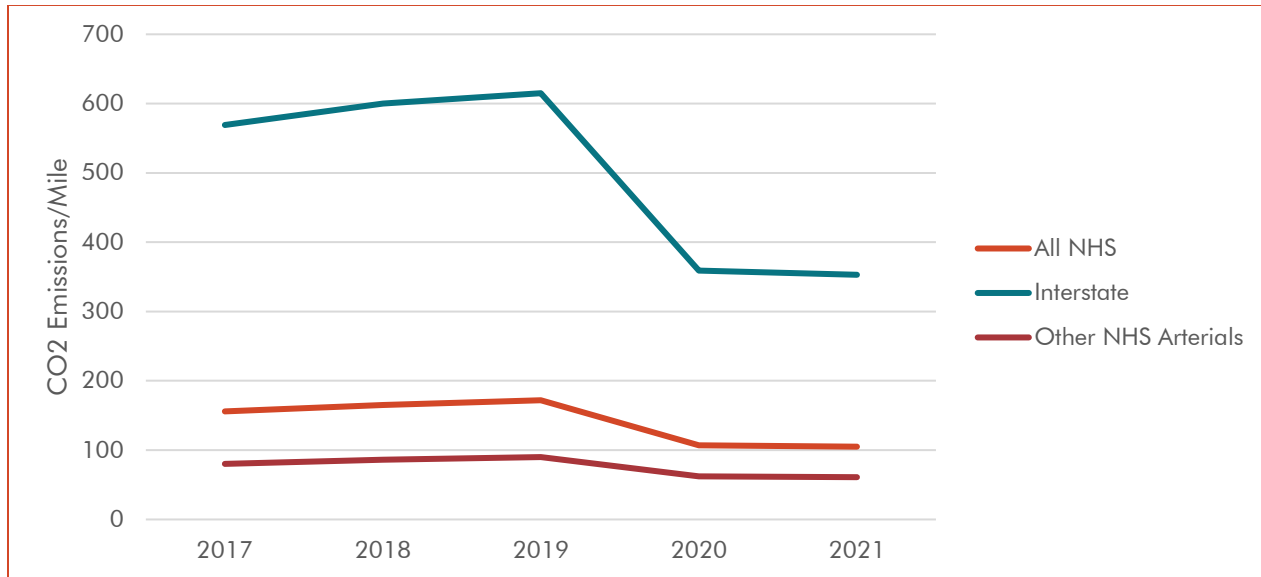


FEDERAL HIGHWAY DATA EMISSIONS ANALYSIS

The FHWA Freight Mobility Trends Analysis Tool includes federal data associated with truck CO₂ emissions per mile of the NHS. Figure 4-36 illustrates the truck CO₂ emissions per mile associated with North Dakota’s NHS functional classes from 2017 to 2021.

²⁶ FRA Blocked Crossing Portal: <https://www.fra.dot.gov/blockedcrossings/>

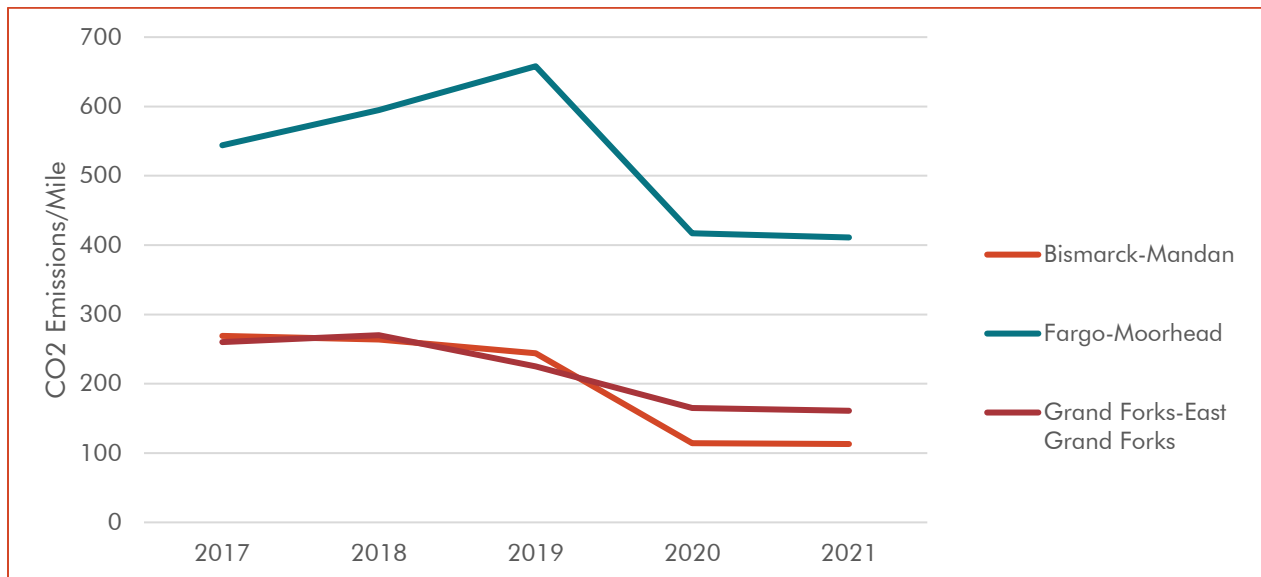
Figure 4-36: North Dakota NHS Functional Class Truck CO2 Emissions/Mile



Source: FHWA

The tool also identifies truck emissions related to the NHS in the three North Dakota MPOs. This data is illustrated in Figure 4-37.

Figure 4-37: North Dakota MPO All NHS Highways Truck CO2 Emissions/Mile



Source: FHWA

RAIL

CLASS I RAILROAD NETWORK

BNSF NETWORK OVERVIEW

BNSF owns the most rail miles in the state. The railroad operates over a network of 1,632 miles, serving the Bakken Shale region, North Dakota's agricultural areas, as well as all the state's major population centers. North Dakota's BNSF network provides the state's economic centers direct access to the railroad's 32,500 miles and approximately 9,000 miles of trackage rights on lines of other railroads throughout 28 states and two Canadian provinces in addition to other Class I, regional, and short line railroads through interchange connections.

BNSF's principal route in North Dakota is the Northern Transcontinental Corridor (Northern Transcon) connecting Chicago with the Pacific Northwest. The Northern Transcon runs between Fargo and Buford via Hannaford, New Rockford, and Minot. From there it proceeds west serving the Bakken Shale region. A second BNSF main line connects Grand Forks and Surrey where it meets the Northern Transcon. This line, used by Amtrak, serves Devils Lake, Churches Ferry, and Rugby. Both lines were part of BNSF's predecessor, the Great Northern Railroad. A third BNSF main line, the former Northern Pacific main line traverses the state between Fargo and Beach via Bismarck.

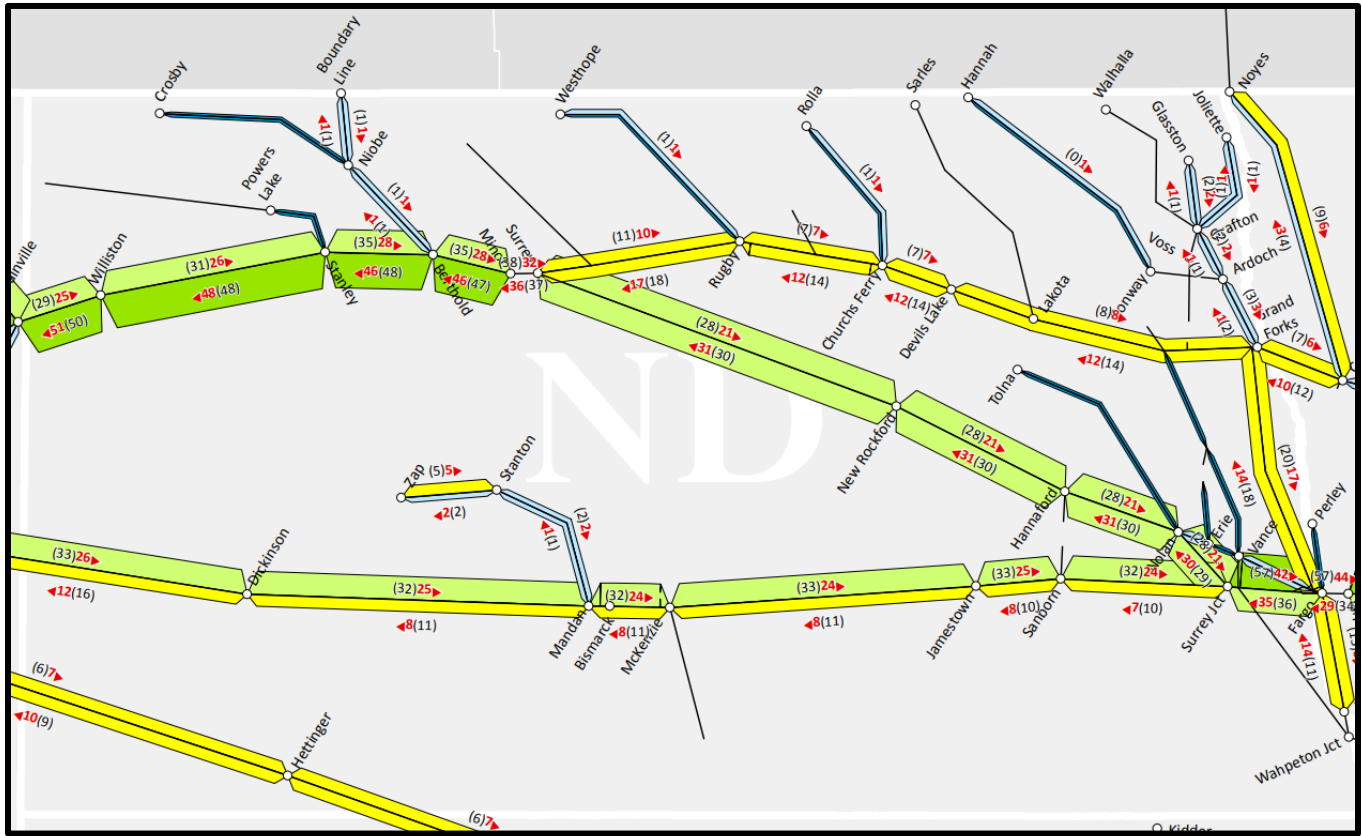
BNSF NETWORK UTILIZATION

Figure 4-38 shows the tonnage volumes on each line of the BNSF network in North Dakota.

With respect to tonnage shipped over the BNSF network:

- The Northern Transcon carries the highest traffic volume in the state, with the largest concentration west of Minot where westbound traffic on the line from Grand Forks is combined with westbound traffic on the Fargo-Minot leg of the Northern Transcon along with traffic originating in Minot.
- Conversely, traffic moving east on the Northern Transcon splits at Minot. The majority of that traffic remains on the Northern Transcon to Fargo with the remainder moving on the line to Grand Forks or being dropped off in Minot.
- The former Northern Pacific line to the south of the Northern Transcon, between Fargo and the Montana border through Bismarck, the former Northern Pacific route, also carries significant traffic volumes. Unlike the lines to the north this line has a heavier traffic volume in the easterly direction—nearly twice that moving westbound.

Figure 4-38: BNSF Network Utilization – Tonnage



Source: BNSF

An alternative perspective on BNSF’s network utilization is the number of trains operating on each of the lines in the state (Figure 4-39).

The North Dakota BNSF network had the following train operations in 2020:

- 17 trains per day between Fargo and Minot on the Northern Transcon
- 26 trains per day on the Northern Transcon west of Minot
- 11 trains per day on the line through Bismarck
- 8 trains per day between Grand Forks and Minot

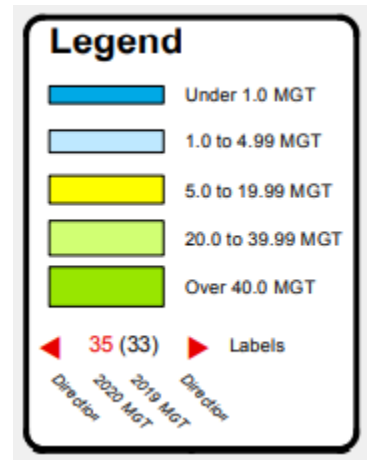


Figure 4-39: BNSF Network Utilization – Trains



Source: BNSF

The following sections describe the BNSF’s operating territories and infrastructure in the state, including the following for each subdivision:

- Subdivision name
- Mileage in North Dakota
- Geographic end points
- Branch line/main line designation
- Number of tracks: single- or double-track configuration and number of passing sidings
- Maximum freight and passenger train speeds, where the latter operates
- Train control system:
 - Centralized Traffic Control (CTC): Train-management technology and signal system operated remotely at a central dispatching center

- Automatic Block Signaling (ABS): Train-management technology in which a rail line is divided into segments, with the technology automatically managing the train and the occupancy of the segments
- Track Warrant Control (TWC): A set of instructions issued to a train crew authorizing specific train operations
- Indicator of the subdivision being part of the railroad’s intermodal train network
- Indicator of the subdivision being part of the Amtrak passenger rail network

BNSF OPERATING TERRITORIES

As discussed in Chapter 2, BNSF operations in North Dakota are structured as two divisions with 21 subdivisions, 16 in the Twin Cities Division and 5 in the Montana Division.

TWIN CITIES DIVISION

The Twin Cities Division (Table 4-10) operating territories include six main line subdivisions with maximum operating speeds reaching 70 miles per hour on the Northern Transcon, BNSF’s intermodal route between Fargo to Minot. The Devils Lake, Hillsboro, KO, and Prosper Subdivisions carry the Empire Builder, the state’s Amtrak service. Passenger trains operate between 70 miles and 79 miles per hour. All the main line subdivisions have train control systems using CTC. The subdivisions are all single track.

The 10 branch line subdivisions have maximum operating speeds of 25 miles per hour with the exception of the Hunter Subdivision, which has a maximum speed of 10 miles per hour over its 11-mile length. A track warrant system governs train activities on the branch line subdivisions.

Table 4-10: BNSF– Twin Cities Division Infrastructure Profile

Subdivision	North Dakota Miles	End Points	Branch (B) Main (M) Line	Number of Tracks & Sidings	Max Train Speed MPH	Train Control System	Intermodal Network	Amtrak Service
Devils Lake	194.9	Devils Lake Switch (Grand Forks) Surrey	M	1 Track 8 Sidings	Freight 45-60 Passenger 79	CTC	N	Y
Drayton	35.3	Grafton Joliette	B	1 Track	10-25	TWC	N	N
Glasston	30.6	Grand Forks Minto	B	1 Track	10-25	TWC	N	N
Grand Forks	4.0	Devils Lake Switch MN Border	M	1 Track 5 Sidings	45-60	CTC	N	N
Hannah	50.8	Conway Langdon	B	1 Track	25	TWC	N	N

Subdivision	North Dakota Miles	End Points	Branch (B) Main (M) Line	Number of Tracks & Sidings	Max Train Speed MPH	Train Control System	Intermodal Network	Amtrak Service
Hillsboro	74.0	Fargo Grand Forks	M	1 Track	Freight 50 Passenger 70	CTC	N	Y
Hunter	11.0	Hunter Vance	B	1 Track	10	TWC	N	N
Clifford Line	17.5		B	1 Track	25	TWC	N	N
Warwick	68.7		B	1 Track	25	TWC	N	N
Jamestown (Northern Pacific)	169.1	Surrey Junction Mandan	M	1 Track 11 Sidings	45-60	CTC	N	N
KO (Northern Transcon Source: BNSF)	203.2	East Dilworth MN Minot	M	1 Track 16 Sidings	60-70	CTC	Y	Y
Mayville	31.5	Mayville Jct. Mayfield	B	1 Track	25	TWC	N	N
Prosper	41.0	Fargo Yard Nolan	M	1 Track 1 Siding	49	TWC	N	Y
Rolla	47.3	Church Ferry Rolla	B	1 Track	25	TWC	N	N
Westhope	40.1	Rugby Bottineau	B	1 Track	25	TWC	N	N
Zap	80.5	Mandan Zap	B	1 Track 3 Sidings	25	TWC	N	N

Source: BNSF

MONTANA DIVISION

The Montana Division in the western part of the state comprises three main line subdivisions and two branch line subdivisions, as shown in Table 4-11. The Glasgow Subdivision, extending west from Minot, is part of both North Dakota’s intermodal and passenger rail networks with maximum speeds of 50 miles per hour for freight trains and 79 miles per hour for passenger trains. The subdivision is double tracked between Minot and Williston. The other two main line subdivisions have maximum train speeds of 40 miles per hour (Hettinger) and 60 miles per hour (Dickinson). Operations on two of the main line subdivisions are controlled by CTC, while one, the Hettinger Subdivision, uses ABS (Table 4-11).

The three branch line subdivisions, Crosby, Grenora, and Niobe have maximum train speeds of 10 to 25 miles per hour. Operations on the three subdivisions are governed by track warrants.

Table 4-11: BNSF – Montana Division Infrastructure Profile

Subdivision	North Dakota Miles	End Points	Branch (B) Main (M) Line	Number of Tracks & Sidings	Max Train Speed MPH	Train Control System	Intermodal Network	Amtrak Service
Crosby	47.0	Berthold Coteau	B	1 Track 2 Sidings	10-25	TWC	N	N
Dickinson (Northern Pacific)	175.0	Mandan MT Border	M	1 Track 14 Sidings	50-60	CTC	N	N
Glasgow (Northern Transcon)	145.0	Minot MT Border	M	2 Tracks 7 Sidings	Freight 50 Passenger 79	CTC	Y	Y
Niobe	21.5	Niobe Canadian Border	B	1 Track	25	TWC	N	N
Grenora	26.0	Stanley Powers Lake	B	1 Track 1 Siding	10	TWC	N	N
Hettinger	76.0	Hettinger MT Border	M	1 Track 2 Sidings	40	ABS	N	N
Mobridge		SD Border Hettinger	M	1 Track	40	ABS	N	N

Source: BNSF

CP RAIL NETWORK OVERVIEW

CP Rail's²⁷ main line in North Dakota is one of the railroad's principal routes in the United States. It connects CP Rail's transcontinental corridor across Canada with Minneapolis, St. Paul, Chicago, and Kansas City. The line provides North Dakota shippers with access to the Port of Vancouver as an alternative to the Pacific Northwest ports served by BNSF. Should the proposed CP Rail–Kansas City Southern merger be implemented, the line will be the first to provide North Dakota with single line service to Mexico and its growing markets. CP Rail's main line enters North Dakota at Portal-North Portal, passes through Minot, and exits at the southeast corner near Fairmount, ND.

The following sections describe CP Rail's operating territories and infrastructure in the state, including the following for each subdivision:

- Subdivision name
- Mileage in North Dakota
- Geographic end points
- Branch line/main line designation
- Number of tracks: single- or double-track configuration and number of passing sidings
- Maximum freight and passenger train speeds, where the latter operates

²⁷ SOO Line is CP Rail's U.S. subsidiary The railroad, however, is commonly referred to as CP Rail.

- Train control system:
 - CTC: Train-management technology and signal system operated remotely at a central dispatching center
 - ABS: Train-management technology in which a rail line is divided into segments, with the technology automatically managing the train and the occupancy of the segments
 - TWC: A set of instructions issued to a train crew authorizing specific train operations
- Indicator of the subdivision being part of the railroad’s intermodal train network

CP RAIL OPERATING TERRITORIES

CP Rail’s operations in North Dakota are structured as five subdivisions comprised of three main line and two branch lines described in Table 4-12.

The three main line subdivisions, Portal, Carrington, and Elbow Lake, combine to form the principal CP Rail line in the state and part of CP Rail’s international intermodal network. Each main line subdivision has maximum speeds of 60 miles per hour. Train operations are controlled by CTC.

The two branch line subdivisions, New Town and Veblen, have speed limits of 40 miles per hour and 25 miles per hour, respectively.

Table 4-12: CP Rail North Dakota Operating Territories – Infrastructure Profile

Subdivision	North Dakota Miles	End Points	Branch (B) Main (M) Line	Number of Tracks & Sidings	Max Train Speed MPH	Train Control System	Intermodal Network	Amtrak Service
Portal	152.5	Canadian Border Harvey	M	1 Track 17 Sidings	60	CTC	Y	N
Carrington	112.2	Harvey Enderlin	M	1 Track 14 Sidings	60	CTC	Y	N
Elbow Lake	67.0	Enderlin Fairmont	M	1 Track 4 Sidings	60	CTC	Y	N
New Town	114.7	Drake Max New Town Prairie Junction Plaza	B	1 Track 5 Sidings	40	TWC	N	N
Veblen	8.9	Hankinson South Dakota Border	B	1 Track 0 Sidings	25	TWC	N	N

Source: CP Rail

REGIONAL AND SHORT LINE RAILROADS

North Dakota’s two regional and two short line railroads are important elements of the state’s rail network, providing essential services to rural areas. The following are the asset and operating profiles of the four short line railroads in North Dakota.

DAKOTA MISSOURI VALLEY & WESTERN RAILROAD

The DMVW, a regional railroad, operates in southeastern and central North Dakota serving Richland, Sargent, Dickey, LaMoure, McIntosh, Logan, Emmons, Burleigh, and McLean Counties. It interchanges with the CP Rail network at Hankinson in Richland County and at Max in McLean County. The DMVW also interchanges with the BNSF network in Bismarck.

The DMVW also operates in northwest North Dakota in Divide and Burke Counties which connects to the CP Rail network at the eastern end in Lignite, ND, and at the western end proceeds into Montana at Westby, Montana (Table 4-13).

Table 4-13: DMVW Railroad Infrastructure and Operating Profile

DMVW	
Owned Track	10 miles
Leased Track	365 miles
Trackage Rights	14 miles (BNSF)
Track Class*	Class 1 239.2 miles Class 2 108.9 miles
Restrictions on 286K-pound railcars	Dakota Subdivision 123.1 miles Missouri Valley Subdivision 54.0 miles Western Subdivision 62.2 miles
Bridge Strength	7 bridges < 286K pounds (lbs.) 29 bridges @ 286K lbs.
Transload Facilities	None
Train Operations	Aberdeen Subdivision 2 trips per week Dakota Subdivision 12 trips, 7 days per week Missouri Valley Subdivision 2 trips, 6 days per week Western Subdivision 5 trips per week
Locomotives	24 Units
Freight Cars	Coal 80 cars Other Open Top Hoppers 19 cars Gondolas 9 cars Covered Hoppers 4 cars Side Dumps 2 cars
Inbound Commodities	Cement, Frac Sand, Fertilizer
Outbound Commodities	Grain, Fly Ash, Ethanol

Source: Dakota Missouri Valley & Western Railroad

Note: FRA Track Class identifies maximum allowable operating speeds for freight and passenger trains. Freight train maximum speeds are Class 1 – 10 miles per hour (mph), Class 2 – 25 mph, Class 3 – 40 mph, Class 4 – 60 mph, Class 5 – 80 mph. Excepted track is limited to 10 mph for freight trains, excludes passenger trains and has restrictions on the movement of hazardous materials.

DAKOTA NORTHERN RAILROAD

The DNR, a short line, operates in two counties in northeast North Dakota: Pembina and Walsh. It interchanges with the BNSF network in Grafton (Table 4-14).

Table 4-14: DNR Infrastructure and Operating Profile

DNR	
Owned Track	0
Leased Track	48 miles
Trackage Rights	0
Track Class	Class 1 28.8 miles Class 2 19.0 miles
Restrictions on 286K-pound railcars	Glasston Subdivision 2 miles
Bridge Strength	NA
Transload Facilities	None
Train Operations	1 trip, 5 days per week; occasional weekends
Locomotives	1 Unit
Freight Cars	0
Inbound Commodities	Urea Fertilizer, Phosphate Fertilizer, Ammonium Sulfate Fertilizer
Outbound Commodities	Grain, Soybeans, Edible Beans

Source: Dakota Northern Railroad

NORTHERN PLAINS RAILROAD

NPR, a short line, operates across the northern tier of the state serving Grand Forks, Walsh, Nelson, Ramsey, Cavalier, Towner, Bottineau, Renville, and Ward Counties. It interchanges with the CP Rail network in Kenmare and with the BNSF network in Devils Lake, Bisbee, Conway, and Ardoch. To the east, NPR enters and operates into Minnesota at Oslo, Minnesota (Table 4-15).

Table 4-15: NPR Infrastructure and Operating Profile

NPR	
Owned Track	57 miles
Leased Track	247 miles
Trackage Rights	0
Track Class	Class 1 268 miles Class 2 36 miles
Restrictions on 286K-pound railcars	Bisbee Subdivision 70 miles @ 268K lbs.

NPR	
	Devils Lake Subdivision 55 miles @ 268K lbs. Gilby Subdivision 14 miles @ 268K lbs. Mohall Subdivision 11 miles @ 268K lbs. Sarles Subdivision 27 miles @ 268K lbs
Bridge Strength	25 < 286K lbs. 15 @ 286K lbs.
Transload Facilities	NPR Transload, Lansford, All rail transported commodities, 30 Car Spots NPRS Transload, Grand Forks, all rail transported commodities, 30 Car Spots
Train Operations	Bisbee East Subdivision 1 trip, 2 days per week Bisbee West Subdivision 1 trip, 4 days per week Devils Lake East Subdivision 1 trip, 5 days per week Devils Lake West Subdivision 1 trip, 2-3 days per week Gilby, Mohall, Sarles Subdivisions 1 trip, 1 day per week
Locomotives	24 Units
Freight Cars	Ballast 5 Cars Covered Hoppers 74 Cars Flats 3 Cars Tanks 10 Cars
Inbound Commodities	Aggregates, Fertilizer
Outbound Commodities	Wheat, Soybeans, Corn

Source: Northern Plains Railroad

RED RIVER VALLEY & WESTERN RAILROAD

RRVW has extensive operations in southeastern and central North Dakota serving a multitude of counties: Richland, Sargent, Dickey, Ransom, LaMoure, Cass, Stutsman, Foster, Eddy, and Benson. RRVW interchanges with both the BNSF and CP Rail networks. BNSF connections are at Casselton, Jamestown and New Rockford. CP Rail connections are at Enderlin, Oakes, Hankinson, and Carrington (Table 4-16).

Table 4-16: RRVW Infrastructure and Operating Profile

RRVW	
Owned Track	491 miles
Leased Track	0
Trackage Rights	87 miles
Track Class	Excepted track 55 miles Class 1 18 miles Class 2 355 miles
Restrictions on 286K-pound railcars	Subdivision 2 11.8 miles Excepted Subdivision 4 9.0 miles Class 2 Subdivision 6 35.0 miles Excepted

RRVW	
	Subdivision 6 11.0 miles Class 1 Subdivision 7 96.0 miles Class 2 Subdivision 8 17.0 miles Out of Service
Bridge Strength	20 < 286K lbs. 46 @ 286K lbs.
Transload Facilities	Breckenridge, Cross Dock Crete, Transload Pingree, Transit/Storage
Train Operations	Subdivision 1 12 trips per day Subdivision 2 4 trips per day Subdivision 3 2 trips per day Subdivision 4 2 trips per day Subdivision 6 1 trip per week Subdivision 7 4 trips per week
Locomotives	15 units
Freight Cars	Covered Hoppers 260 Flats 4 Open Top Hoppers 48 Side Dumps 2
Inbound Commodities	Corn, Coal, Soybeans
Outbound Commodities	Corn, Soybeans, Corn Syrup

Source: Red River Valley & Western Railroad

LOGISTICS PARK OF NORTH DAKOTA

HISTORY

NDDOT and the City of Minot have had an interest in an intermodal terminal for decades. In 2003, an inland port authority was established for the ownership and operation of an intermodal facility, and the North Dakota 58th Legislative Assembly passed enabling legislation. The revenue for the port authority would have been primarily through a property tax of up to four mills. In 2017, the port authority was repealed by the 65th Legislative Assembly as part of a property tax reform initiative.

North Dakota has never had an intermodal terminal, BNSF operated a terminal in Dilworth, Minnesota, near the North Dakota border that provided intermodal access for at least the eastern half of North Dakota. It ceased terminal operations in 2008. Consequently, North Dakota intermodal shippers were left with Minneapolis (a 6-hour drive from Bismarck; 7.5 hours from Minot) and Winnipeg (6.25 hours from Bismarck; 5 hours from Minot).



In 2007, prior to the closing of the Dilworth intermodal facility, NDDOT completed a study of a two-terminal intermodal concept. The concept involved an upgraded Dilworth terminal and a new terminal in Minot. The premise behind the two-terminal concept was to build enough container volumes to support intermodal rail service. Each train was to load containers at both terminals to meet the volume requirements by BNSF. As volumes grew, the plan was to operate individual trains. At the time of the study, the high demand in the U.S. for Pacific Rim products resulted in ocean carriers requiring an expedited return of containers. Unfortunately, ocean carriers were reluctant to tie up containers in North Dakota and preferred an empty backhaul.

In October 2020, the intermodal facility was launched with intermodal rail service for the state's agricultural producers and other industries. RMG was contracted as the operator of the facility. RMG operates two other terminals, one in Amarillo, Texas and another in Fremont, Nebraska terminal in Fremont, NE, also served by BNSF.

With continuing interest in an intermodal terminal, in 2021 the 67th Legislative passed Senate Bill 2445 funding a \$2 million intermodal facility grant program for capital projects to expand rail capacity at the intermodal terminal.

INTERMODAL OPERATIONS

Current service is multiple 220 container trains approximately every month to the Ports of Seattle and Tacoma, one of the top agricultural export gateways in North America. Future plans including adding one additional train and to transition to weekly shipments.

At the Intermodal Facility there is limited track space for a full unit train and current operations require partial occupancy of the BNSF main line. To improve the efficiency of the terminal, expansion into the adjacent BNSF Gavin Yard is necessary. The cost of the expansion is estimated at \$2.4 million and is scheduled to be substantially complete by the end of 2022.

LOGISTICS PARK OF NORTH DAKOTA IN MINOT

The Logistics Park of North Dakota in Minot is an 800-acre area. Within the Logistics Park of North Dakota is a 386-acre, BNSF-certified site whose purpose is to attract rail-related economic development. It is owned by the Minot Area Chamber Economic Development Corporation. A little more than 80 acres of the site are graded and ready for construction. There is rail access on the west side of the property with the capability to construct spurs to service individual industries and shippers.

For BNSF to certify a site it must meet criteria determined to be critical for a commercial development project, including property size and boundaries, confirmed availability of utilities, public services, highway access, proper zoning for industrial use and transparency of current land ownership. BNSF will also evaluate assessments on environmental issues, geotechnical reviews and endangered species considerations or cultural matters such as land with known archeological value. The benefits of a certified site are reduced development time, increased speed to market and reduced risk of unavailable rail-service.

NORTH DAKOTA RAIL LINE CONDITIONS

Short of physical inspection, two measures of rail infrastructure condition are the rail's ability to handle efficient, high-capacity rail cars and the rail's ability to support cost-effective train speeds.

NORTH DAKOTA RAIL CAR WEIGHT RESTRICTIONS

In the early 1990s, the railroad industry began to shift from the Association of American Railroads standard maximum freight car gross weight (weight of freight car and contents) of 263,000 pounds to 286,000 pounds. With the increase in standard weight, rail track infrastructure had to be sturdy enough to accommodate the

additional weight. With national rail car fleets composed principally of the heavier cars, track that can support these cars has also become standard, particularly on the Class I rail networks.

For the railroads and their customers, larger cars offer increased cost savings and efficiency due to the larger loading capacity while the empty weight of a car remains relatively unchanged. These cars have a 10% higher capacity than older smaller cars. Studies from the Association of American Railroads (AAR) have shown operating savings to be about 6%, which includes increased track maintenance costs attributable to the heavier weight.²⁸

Table 4-17: North Dakota Rail Mileage Not Meeting 286,000 Pound Car Weight Standard

Railroad	Owned/Leased in North Dakota (Miles)	Less Than 286K-pound Compatible Track (Miles)	Percent
BNSF	1,552	0	0%
CP Rail	502	0	0%
<i>Total Class I Mileage</i>	<i>2,054</i>	<i>0</i>	<i>0%</i>
DMVW	522	239	46%
DNR	50	2	4%
NPR	304	177	58%
RRVW	428	163	38%
<i>Total Local Railroad Mileage</i>	<i>1,304</i>	<i>581</i>	<i>45%</i>

Source: North Dakota Railroads

With the exception of some branch lines, all Class I railroad lines in North Dakota can carry the standard 286K-pound rail cars at the maximum rated track speed. Short lines are extremely limited in available track miles capable of accommodating 286K-pound cars. Nearly 45% of the North Dakota local railroad mileage cannot accommodate the larger rail cars. On those routes, only lower-capacity cars or higher-capacity cars that are not fully loaded can be used.

NORTH DAKOTA RAIL CROSSING INVENTORY

The FRA grade crossing inventory database is a national catalog of crossings and their features and is overseen by the FRA. NDDOT is the state agency charged with maintaining and updating the grade crossing inventory for North Dakota. North Dakota has 3,279 public highway-railroad grade crossings. A public railroad crossing is defined as a location where a public highway, road, or street, including associated sidewalks or pathways, crosses one or more railroad tracks at-grade. The term includes a crossing if a public authority maintains the roadway on both sides of the crossing. (N.D.C.C. Chapter 49-11-00.1, Public and Private railroad crossing definitions).

²⁸ M.B. Hargrove, Thomas S. Guins, and Carl D. Martland, "Economics of Increased Axle Loads: FAST/HAL Phase II Results," Report No. LA-007, Association of American Railroads, October 1996.

CROSSING PROFILE

The five counties with the greatest number of public crossings are Cass (278), Walsh (209), Ward (175), Richland (159), and Grand Forks (134).

Table 4-18 describes the use of protective warning devices on North Dakota’s grade crossings. Arrayed vertically by degree of technology, thus degree of protection, crossbucks are the most prevalent warning device at public (77.9%) crossings. This is followed by automated gates and lights at public crossings (19.4%).

Table 4-18: 2020 North Dakota Public Crossing Control Device Profile

Principal Warning Device	Number of Crossings
Crossbucks Only	2,554
Gates	635
Stop Signs	55
None	17
Flashing lights (excluding gates)	12
Four Quad Gates	5
Special Warning	1
Total	3,279

Source: FRA, Highway-Rail Crossing Database

Table 4-19 shows the distribution of North Dakota public crossings by railroad. Consistent with having the most extensive network in the state, BNSF has the most crossings 1,492 of the six railroads. CP Rail has the second most crossings with 494. It is closely followed by the two regional railroads, the RRVW and the DMVW with 459 crossings and 403 crossings.

Table 4-19: Railroad Distribution of Public Grade Crossings

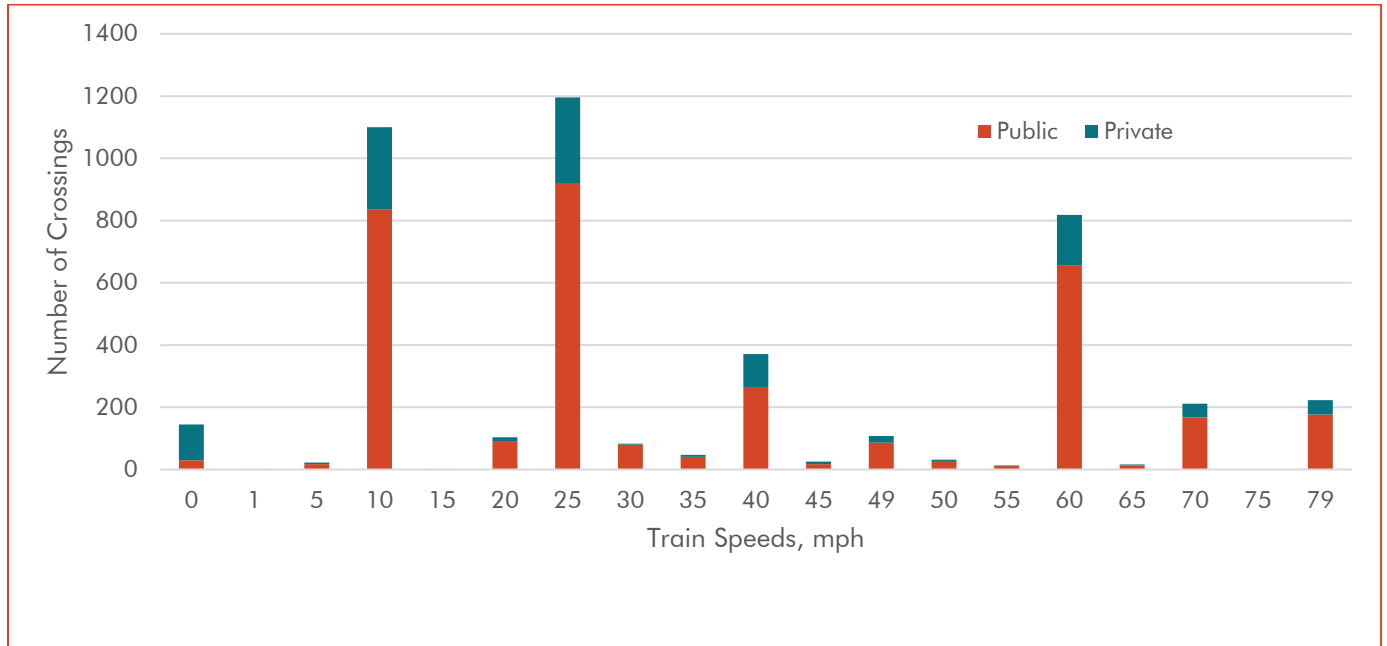
Railroad	Crossings	Percent
BNSF	1,492	46%
CP Rail	494	15%
RRVW	459	14%
DMVW	403	12%
NPR	344	10%
DN	87	3%
Total	3,279	100%

Source: FRA, Highway-Rail Crossing Database

CROSSING TRAIN SPEEDS

Figure 4-40 shows the distribution of train speeds at North Dakota’s crossings. Maximum train speeds vary, with most crossings having train speeds of 10 miles per hour, 25 miles per hour, or 60 miles per hour reflecting FRA track class speed limits. Of the 4,553 crossings in North Dakota, 1,454 (31.9%) have trains operating at maximum speeds of 40 miles per hour or more. Gates are installed at 213 of those crossings. There are 1,276 crossings with maximum train speeds over 60 miles per hour; 138 of those crossings are protected by gates.

Figure 4-40: Distribution of Crossing Maximum Train Speeds (Miles per Hour)



Source: FRA, Highway-Rail Crossing Database

RAILROAD QUIET ZONES

In 1994, Congress required FRA to issue a federal regulation requiring the sounding of train horns at public highway-rail grade crossings. It also gave FRA the ability to provide for exceptions to that requirement by allowing communities under some circumstances to establish quiet zones.

The Train Horn Rule became effective on June 24, 2005. The rule provided nationwide standards for the sounding of train horns at public highway-rail grade crossings. The rule also established a process for communities to obtain relief from the routine sounding of train horns by providing criteria for the establishment of quiet zones. Locomotive horns may still be used in the case of an emergency and to comply with Federal regulations or certain railroad rules.

Since the absence of routine horn sounding increases the risk of crossing collisions, a public authority that desires to establish a quiet zone usually will be required to mitigate this additional risk. At a minimum, each public highway-rail crossing within a quiet zone must be equipped with active warning devices: flashing lights, gates, constant warning time devices and power out indicators. Table 4-20 lists the cities with quiet zones.

Table 4-20: North Dakota Quiet Zones

City	Number of Quiet Zones	Number of Crossings Impacted
Beach	1	2
Bismarck	1	3
Casselton	1	5
Fargo	1	7
Grand Forks	3	10
Harwood	1	3 (1 crossing closed)
Jamestown	1	5
Mandan	1	1
Mapleton	1	1
Medora	1	2
Minot	1	3
South Heart	1	1
Surrey	2	3
Totals	16	46

Source: FRA, Highway-Rail Crossing Database

RAIL SAFETY

Over the 10-year period from 2011 to 2020, there were 196 rail-motor vehicle crashes, of which 25 were fatalities, 63 resulted in injuries, and 108 were PDO. The breakdown of the crashes at-grade crossings is shown in Table 4-21.

Table 4-21: Number of Rail-related Crossing Crashes in North Dakota (2011–2020)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
Fatal Crashes	0	4	3	4	2	1	5	3	2	1	25
Injury Crashes	8	15	11	4	6	6	2	5	4	2	63
PDO Crashes	12	10	14	20	8	8	12	8	9	7	108
Total Crashes	20	27	27	28	15	15	19	16	15	10	196

Source: FRA, Highway-Rail Crossing Database

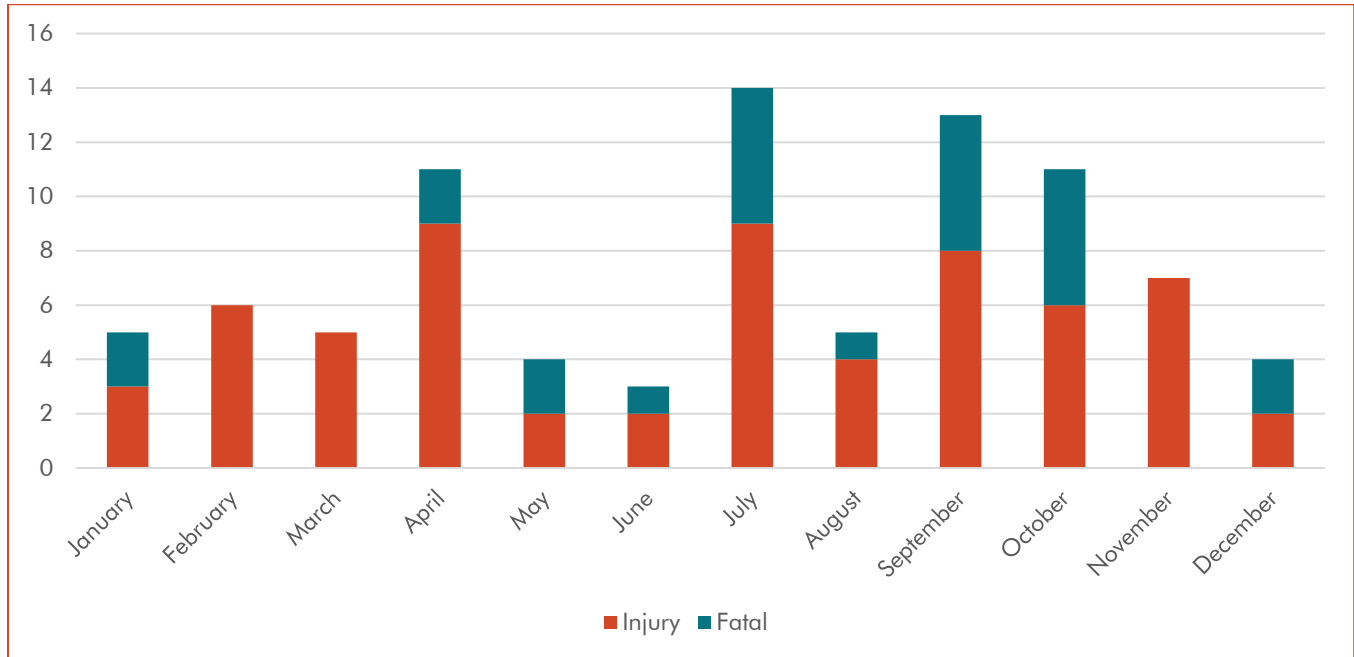
Within the same 10-year period, the peak period for crashes was 2012–2014. Since that time, although the number of crashes changes from year to year, the overall number of crashes has been decreasing. In 2020, there were only 10 crashes, almost a 64% reduction in crashes between the peak years of 2012 and 2014.

Similarly, crashes that caused injuries and fatalities followed the same trend, decreasing over the period. During the last four years, the number of crashes resulting in fatalities has fallen from five in 2017 to only one reported in 2020. Injury crashes spiked in 2012 and 2013, but they too have decreased, having declined from 2011.

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Figure 4-41 breaks down injury and fatal crashes by month for the 10-year period. It reflects a higher number of crashes during the late summer and early fall months, which corresponds to the months when vehicle traffic is at its highest levels.

Figure 4-41: Injury and Fatal Crashes by Month (2011–2020)



Source: FRA, Highway-Rail Crossing Database

Table 4-22 describes the collision type that resulted in a fatality or injury. Within the period analyzed, 100% of the fatalities were a result of a vehicle being struck by a train. Injuries from a vehicle being struck by a train happened on average twice as often as from a vehicle striking a train. A vehicle being struck by a train is typically a result of a vehicle becoming immobilized on the tracks, an unsafe driver trying to outrace a train to a crossing, an unsafe driver going around gates and/or ignoring flashing lights, or by an inattentive driver. Each has a high likelihood of ending with a fatality or injury.

Table 4-22: Fatality and Injury by Collision Type (2011–2020)

Year	Train Struck Vehicle		Vehicle Struck Train		Total # of Crashes	
	Fatality (# of crashes)	Injury (# of crashes)	Fatality (# of crashes)	Injury (# of crashes)	Fatality	Injury
2011	-	5	-	3	-	8
2012	4	11	-	4	4	15
2013	3	8	-	3	3	11
2014	4	1	-	3	4	4
2015	2	5	-	1	2	6
2016	1	5	-	1	1	6

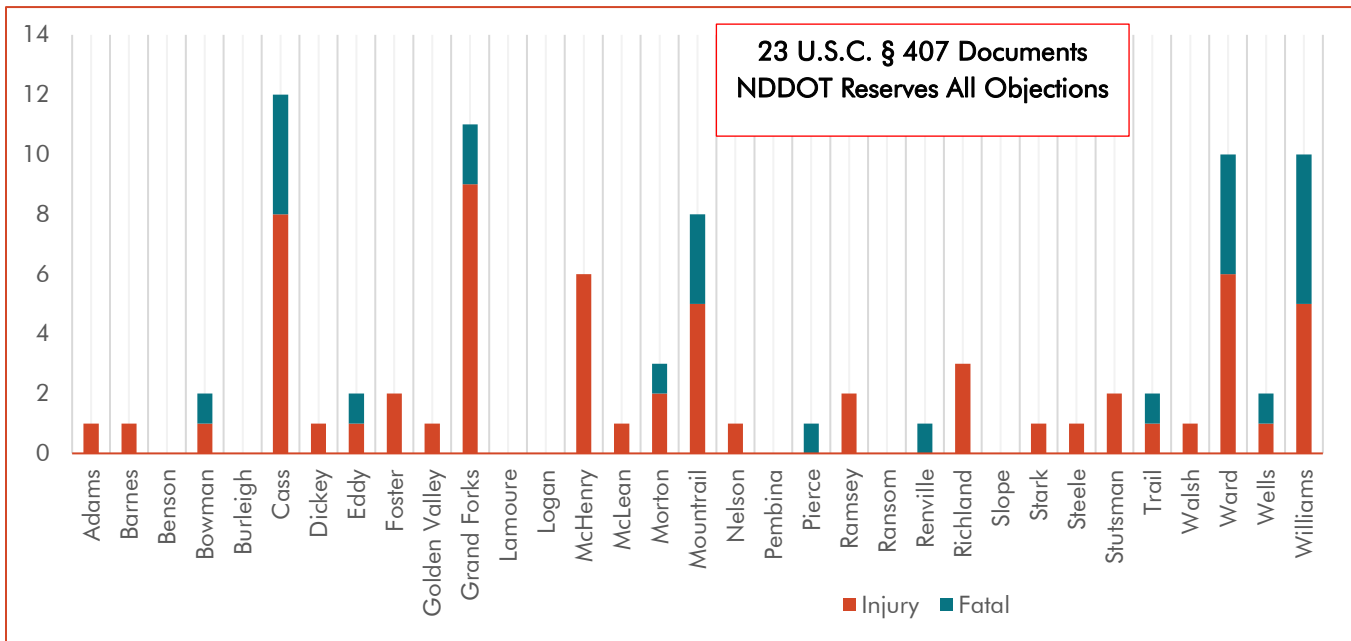
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Year	Train Struck Vehicle		Vehicle Struck Train		Total # of Crashes	
	Fatality (# of crashes)	Injury (# of crashes)	Fatality (# of crashes)	Injury (# of crashes)	Fatality	Injury
2017	5	2	-	-	5	2
2018	3	4	-	1	3	5
2019	2	3	-	1	2	4
2020	1	2	-	-	1	2
Average	2.78	4.60	-	2.13	2.78	6.30

Source: FRA, Highway-Rail Crossing Database

Figure 4-42 shows the breakdown of fatal and injury crashes by county for the 10-year period. The counties with the highest incidents of injury are Cass (8), Grand Forks (9), McHenry (6), Mountrail (5), Ward (6), and Williams (5). Similarly, the counties with the highest reported fatal crashes are in Cass (4), Grand Forks (2), Mountrail (3), Ward (4), and Williams (5). These counties correspond with higher populations and population density.

Figure 4-42: Injury and Fatal Crashes by County (2011–2020)



Source: FRA, Highway-Rail Crossing Database

Another way to characterize injury and fatal crashes is by the type of vehicle involved. Having this information can help determine measures that could be implemented to improve safety at these crossings. Table 4-23 shows the average number of injury and fatal crashes by type of vehicle involved for the 10-year period. According to the crash data, automobiles and pickup trucks account for an average of 1.2 and 1.4 crashes that result in a fatality, while a truck-trailer accounts for 2.0, even though trucks with trailers account for a smaller percentage of traffic volumes.

Table 4-23: Annual Average of Injury and Fatality by Vehicle Type (2011–2020)

Crash Outcome	Auto	Motor-cycle	Other	Other Motor Vehicle	Pedestrian	Pickup Truck	School Bus	Truck	Truck-Trailer	Van
Injury	0.20	0.10	0.00	0.30	0.50	0.60	0.10	0.10	0.50	0.10
Fatality	1.40	0.00	0.30	0.20	0.40	1.20	0.20	0.50	2.00	0.10

Source: FRA, Highway-Rail Crossing Database, HDR/WSP Analysis

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PIPELINES

Pipeline transport is one of the safest and most cost-effective ways to transport natural gas and hazardous liquid products.²⁹ Maintaining, upgrading, and operating pipelines correctly is critical to the safety of people who live and work near pipelines and the surrounding environment. Certain locations through which hazardous liquid pipelines pass are defined as high-consequence areas (HCA). These include high population areas, other population areas, and areas unusually sensitive to environmental damage. Regulations require a pipeline operator to take specific steps to ensure the integrity of a pipeline for which a release could affect an HCA and, thereby, ensure the protection of the HCA.

Despite precautions, unfortunately incidents involving pipelines do occur. Incidents for natural gas and hazardous liquid pipelines are defined as follows:

- An event that involves a release of gas from a pipeline, gas from an underground natural gas storage facility, liquefied natural gas (LNG), liquefied petroleum gas, refrigerant gas, or gas from an LNG facility, and that results in one or more of the following consequences:
 - A death or personal injury requiring in-patient hospitalization
 - Estimated property damage of \$122,000 or more, including loss to the operator and others, or both, but excluding the cost of gas lost
 - Unintentional estimated gas loss of three million cubic feet or more

A hazardous-liquid or carbon dioxide incident is defined as a failure in a pipeline system in which there is a release of the hazardous liquid or carbon dioxide transported resulting in any of the following:

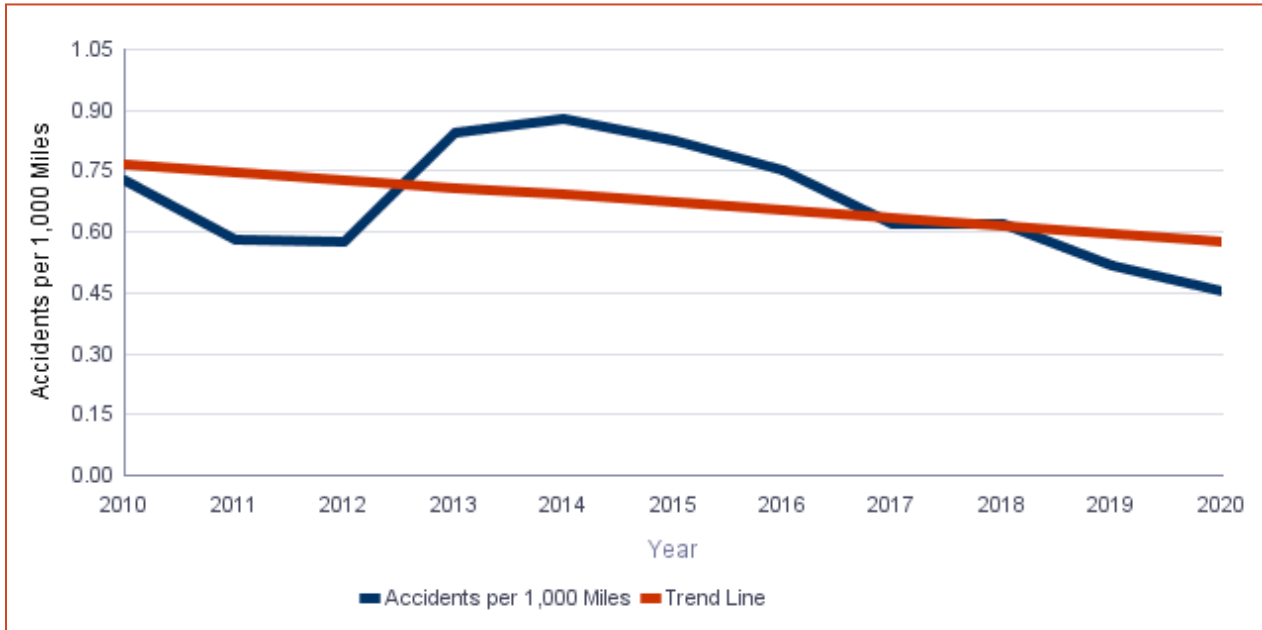
- Explosion or fire not intentionally set by the operator
- Release of 5 gallons or more of hazardous liquid or carbon dioxide
- Death of any person
- Personal injury requiring hospitalization
- Estimated property damage, including cost of clean-up and recovery, value of lost product, and damage to the property of the operator or others, or both, exceeding \$50,000

A measure to understand the overall safety performance of the nation’s pipeline networks that carry crude oil and refined petroleum products and biofuel is the number of incidents affecting people or the environment per

²⁹ Pipeline and Hazardous Materials Safety Administration (PHMSA)

1,000 miles of pipeline. As illustrated in Figure 4-43, according to Pipeline and Hazardous Materials Safety Administration (PHMSA) data, the national rate of accidents per 1,000 miles has decreased since 2014.

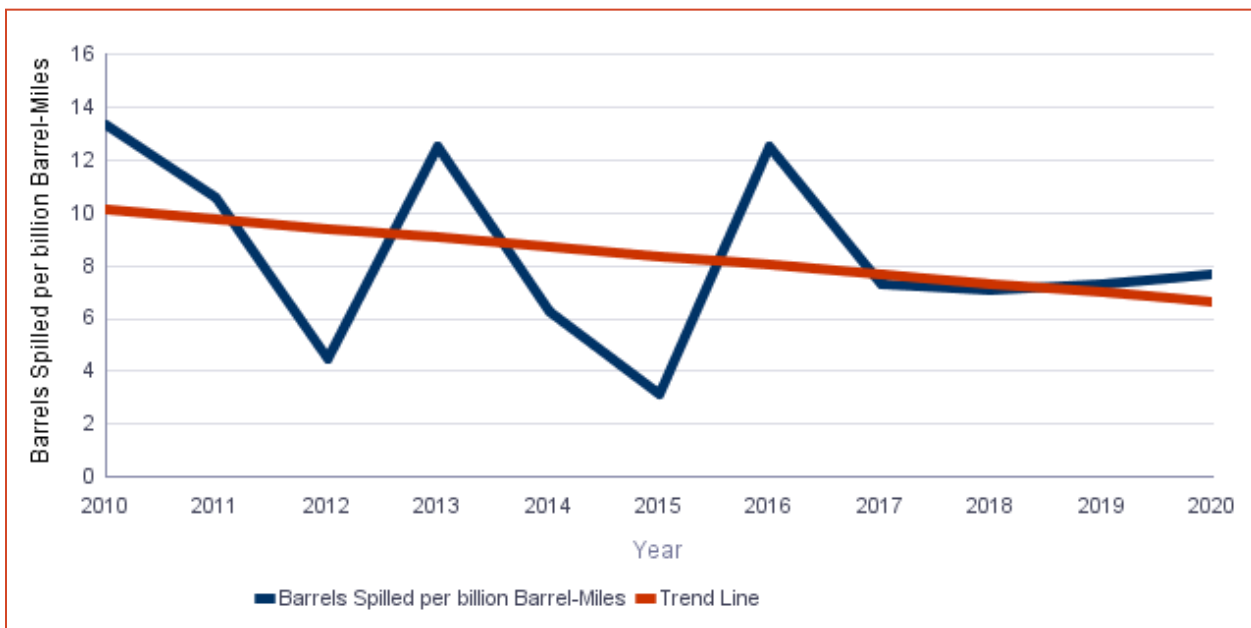
Figure 4-43: National Accident Rate for Crude Oil and Refined Petroleum Products and Biofuel Pipeline Networks



Source: PHMSA

The volume spilled in these accidents is measured by billion barrel-miles transported. The national volume spilled rate per billion barrel-miles transported has fluctuated since 2010 (Figure 4-44).

Figure 4-44: Barrels Spilled per Billion Barrel-miles



Source: PHMSA

The overall number of incidents as reported to PHMSA in North Dakota, for both natural gas and hazardous liquid pipelines, is listed in Table 4-24. Table 4-25 through Table 4-28 list the number of pipeline incidents in North Dakota by pipeline category.

Table 4-24: Pipeline Incidents in North Dakota

Year	Number of Incidents	Fatalities	Injuries	Total Cost
2010	8	1	-	\$4,754,615
2011	8	-	-	\$1,774,922
2012	5	-	-	\$2,757,318
2013	15	-	-	\$20,578,078
2014	12	-	-	\$4,339,591
2015	5	-	-	\$673,939
2016	11	-	-	\$13,411,156
2017	11	-	-	\$1,568,794
2018	18	-	-	\$2,157,394
2019	6	-	-	\$39,591,984
2020	6	-	-	\$1,076,581

Source: PHMSA

Table 4-25: Crude Oil Pipeline Incidents

Year	Number of Incidents	Fatalities	Injuries	Total Cost	Barrels Spilled
2010	5	-	-	\$4,232,080	3,845
2011	6	-	-	\$1,669,350	2,420
2012	3	-	-	\$2,555,968	226
2013	9	-	-	\$19,484,096	20,737
2014	7	-	-	\$3,929,079	1,548
2015	3	-	-	\$596,465	417
2016	7	-	-	\$12,170,770	12,823
2017	8	-	-	\$319,483	639
2018	16	-	-	\$414,968	148
2019	5	-	-	\$39,537,793	4,544
2020	5	-	-	\$1,075,471	9

Source: PHMSA

Table 4-26: Refined Petroleum Products

Year	Number of Incidents	Fatalities	Injuries	Total Cost	Barrels Spilled
2010	1	-	-	\$5,700	1
2011	0	-	-	-	-
2012	0	-	-	-	-
2013	1	-	-	\$575,000	870
2014	2	-	-	\$182,385	6
2015	1	-	-	\$22,154	1
2016	2	-	-	\$935,177	21
2017	2	-	-	\$527,811	105
2018	2	-	-	\$1,742,426	638
2019	0	-	-	-	-
2020	1	-	-	\$1,110	-

Source: PHMSA

Table 4-27: Hazardous Volatile Liquids, Flammable and Toxic Liquid Pipelines

Year	Number of Incidents	Fatalities	Injuries	Total Cost	Barrels Spilled
2010	0	-	-	-	-
2011	1	-	-	\$2,572	1
2012	0	-	-	-	-
2013	0	-	-	-	-
2014	0	-	-	-	-
2015	0	-	-	-	-
2016	0	-	-	-	-
2017	1	-	-	\$721,500	3,000
2018	0	-	-	-	-
2019	0	-	-	-	-
2020	0	-	-	-	-

Source: PHMSA

Table 4-28: Gas Transmission Pipelines

Year	Number of Incidents	Fatalities	Injuries	Total Cost
2010	2	1	-	\$516,835
2011	1	-	-	\$103,000
2012	1	-	-	\$80,960
2013	5	-	-	\$518,982

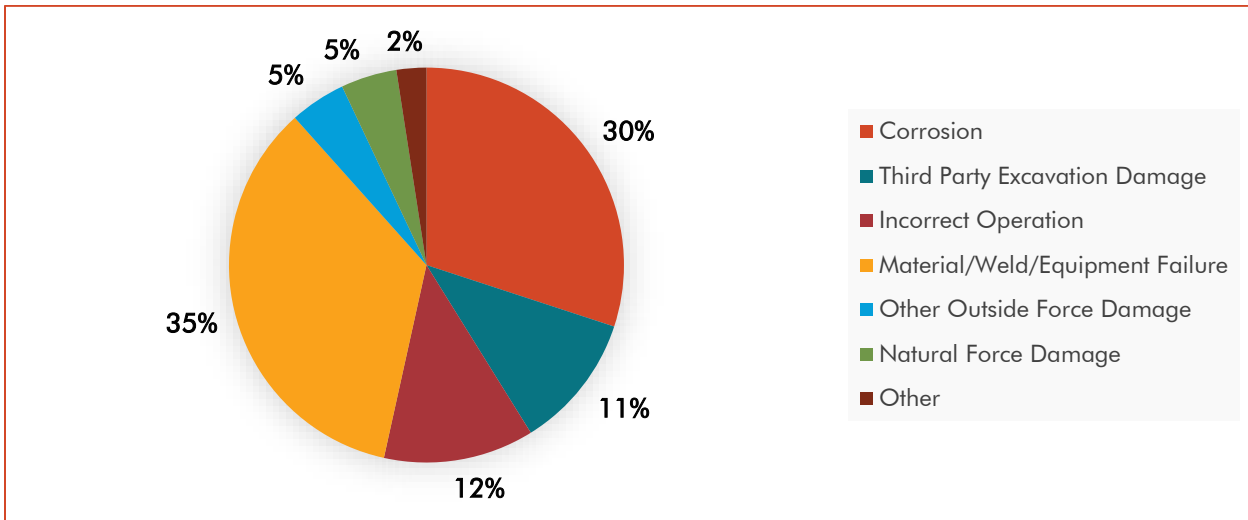
Year	Number of Incidents	Fatalities	Injuries	Total Cost
2014	2	-	-	\$226,127
2015	1	-	-	\$55,320
2016	2	-	-	\$305,209
2017	0	-	-	-
2018	0	-	-	-
2019	0	-	-	-
2020	0	-	-	-

Source: PHMSA

There were no recorded incidents for gas-gathering pipelines. Gravity-fed and hazardous liquid-gathering pipelines also fall outside this reporting process.

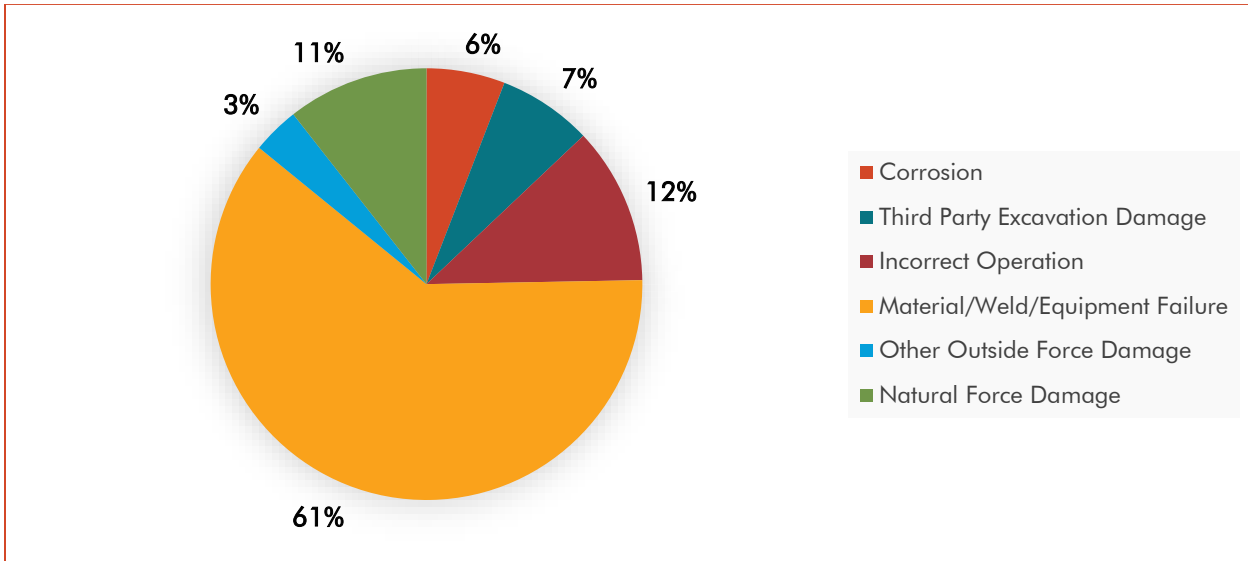
Nationally, from 2010 to 2020, there were 982 reported incidents associated with pipeline systems that carry crude oil and refined petroleum products and biofuel. In North Dakota over the same period, there were 85. The leading cause of incidents across the nation is pipeline corrosion followed by equipment failure and material failure of pipe or weld, as illustrated in Figure 4-45. North Dakota, however, has a different profile of the causes of incidents associated with crude oil and refined petroleum products pipelines, and these are illustrated in Figure 4-46.

Figure 4-45: Causes of Incidents on National Crude Oil and Refined Petroleum Products Pipeline Networks (2010–2020)



Source: PHMSA

Figure 4-46: Causes of Incidents on North Dakota Crude Oil and Refined Petroleum Products Pipeline Networks (2010–2020)



Source: PHMSA

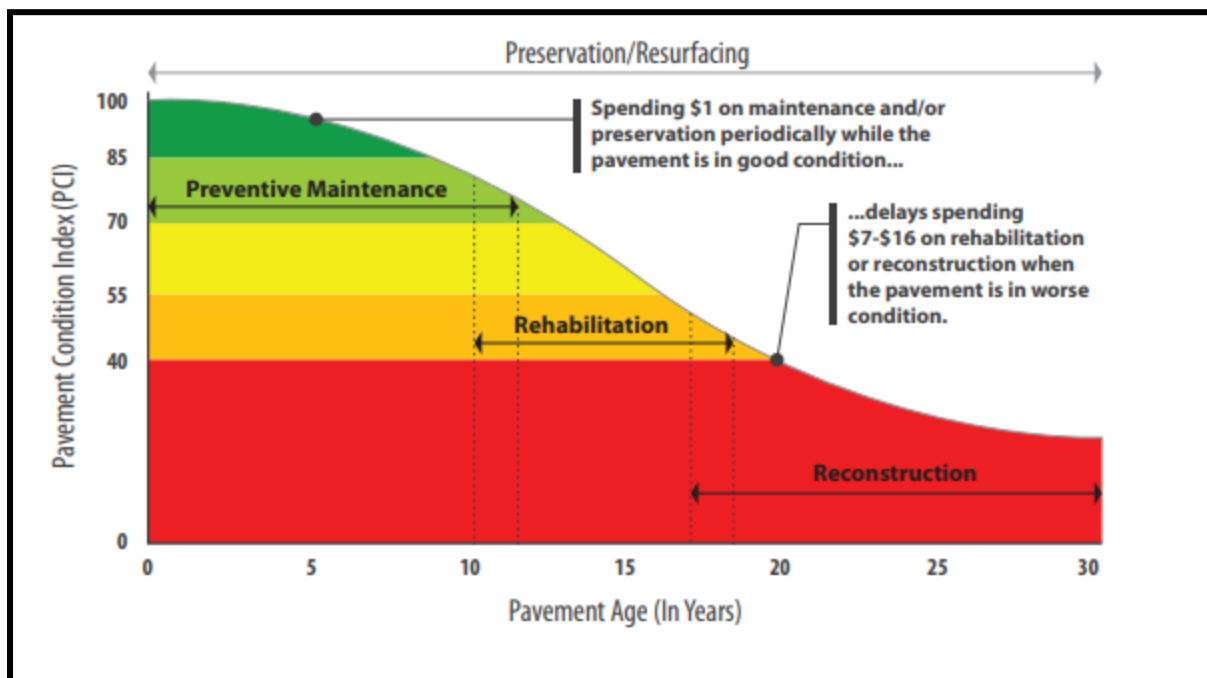
AIRPORTS

The condition of airport pavements (aircraft aprons, taxiways, and runways) is critical to the safe and efficient operation of aircraft. Immense forces associated with aircraft landing—heavy aircraft, rapid acceleration and deceleration during takeoff and landing, jet blast, and snow clearance—all contribute to deterioration of airport pavements. Hazardous pavement conditions include holes and cracking that can produce pavement debris. This debris can be pulled into jet engines and damage aircraft, with potentially life-threatening or fatal consequences.

Cargo aircraft at integrator hub airports can be the largest and heaviest aircraft that the state’s airports handle. An Embraer E175 commonly used on short- and medium-length passenger routes from Hector International Airport for example has a maximum takeoff weight (MTOW) of 85,517 pounds, and an Airbus A321 capable of carrying 191 passengers has a MTOW of 205,000 pounds, while a cargo-carrying Boeing 757 has a MTOW of 255,000 pounds and an Airbus A300 freighter has a MTOW of 375,900 pounds.

The condition of airport pavements is assessed continually, but every 3 years the North Dakota Aeronautics Commission evaluates the current pavement conditions of North Dakota’s airports and predicts a future condition based on the Pavement Condition Index (PCI), as shown in Figure 4-47. The PCI procedure is the standard used by the aviation industry to visually assess pavement condition, thereby providing engineers with a consistent, objective, and repeatable tool to represent the overall pavement condition. During a PCI inspection, inspectors identify signs of deterioration on the surface of the pavement. Pavement defects are characterized in terms of type of distress, severity level of distress, and amount of distress. This information is then used to develop a composite index (or PCI) that represents the overall condition of the pavement in numerical terms, ranging from 0 (failed) to 100 (excellent).

Figure 4-47: Pavement Condition Index



Source: North Dakota Aeronautics Commission

Table 4-29 lists the current and forecasted PCI for regular cargo service airports in North Dakota.

Table 4-29: Current and Forecasted PCI

Airport	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Bismarck	76	76	74	73	71	70	68	66	65	63	62
Devil's Lake Regional	66	65	63	61	59	57	55	53	50	48	46
Dickinson–Theodore Roosevelt Regional	87	83	85	84	82	81	79	78	77	75	74
Fargo Hector International	80	80	79	77	76	75	73	72	70	69	68
Jamestown Regional	69	69	67	65	63	61	59	57	55	53	51
Minot International	74	74	72	70	68	66	63	61	59	56	54
Williston Basin International	99	98	97	96	95	94	93	92	91	91	90

Source: North Dakota Aeronautics Commission

SWOT ANALYSIS

A summary of the key strengths, weaknesses, opportunities, and threats are as shown here.

<p>Strengths</p> <ul style="list-style-type: none"> • Uncongested highways • Highway infrastructure is in a good state of repair • Extensive air express/integrator operations • Growing urban population attracting e-commerce • North Dakota's position leading the development of beyond visual line of site drone operations • Use of longer combination vehicles supporting energy and agricultural sectors 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Sections of the freight network are susceptible to flooding • Conflicts with train operations in urban areas • Short line railroads have infrastructure constraints restricting use of industry standard 286K-pound rail cars • Geometry of some highway intersections impacts freight activity
<p>Opportunities</p> <ul style="list-style-type: none"> • Improving processing capacities at border crossings • Improve resiliency of the freight network • Consolidation of grain elevators and potentially removing some rail-served elevators and mills from urban areas • Improve safety and reduce incidents associated with freight transportation such as bridge strikes and truck crashes including rollovers • Reducing rail and traffic conflicts in urban areas through a targeted program of addressing at-grade crossings 	<p>Threats</p> <ul style="list-style-type: none"> • A global energy market in transition • Shortage of labor to drive trucks and trains • Civil unrest and terrorism

STRENGTHS

Relatively uncongested highways, and a small number of highways with recurring congestion, result in reliable journey times for freight movement.

North Dakota's highway system is in a state of good repair. Most bridges are rated good or fair, and more than 80% of freight corridor highway pavements have ratings of excellent or good.

The integrator hub and gateway operations at Hector International Airport, which are supported by an extensive feeder flight network, generate freight-related employment, and provide a wide coverage for North Dakota's residents and businesses with expedited access to domestic and global delivery networks.

A growing population will generate increased e-commerce activity, which is already attracting companies (such as Amazon) to locate warehouses close to the main population centers in North Dakota.

Key North Dakota industry sectors such as agriculture and energy have good access to rail and pipeline networks.

The Class I rail networks do not have weight limitations associated with 286K-pound rail cars.

North Dakota's position leading the development of beyond visual line of sight (BVLOS) drone operations could incentivize the use of drones for freight-related applications within the state ranging from small package delivery drones through to larger drones that could replace aircraft operating feeder services on behalf of express package companies.

The Logistics Park of North Dakota in Minot provides North Dakota's agricultural shippers with a cost-effective solution to access containerized export shipping services.

North Dakota is one of 23 states that are allowed to operate longer combination vehicles. A gross vehicle weight of 105,000 pounds and vehicle combinations up to 100 feet long greatly benefit the agricultural and energy sectors by reducing cost while also reducing vehicle emissions per ton transported.

WEAKNESSES

Sections of the North Dakota freight and rail highway network are susceptible to flooding. The Red River regularly floods. The approach road to the Gretna-Neche border crossing, ND-18, can be closed because of flooding and port operations at Pembina-Emerson can be impacted by spring flooding events on I-29. The railway crossing the Missouri River can be affected by major flooding, which affects pier stability, at certain flood levels overtopping and shifting columns or bridge decks.

In common with many other urban areas in the nation, cities, and towns in North Dakota experience conflicts with trains, largely as a result of historic legacies associated with railroad and urban development and changing operational practices of the railroads (longer trains). The presence of railway yards and loading facilities in urban areas also creates challenges when trains are marshalled and reconfigured while undergoing loading or discharge operations.

Short line railroads have infrastructure constraints that prevent them from maximizing the payload associated with 286K-pound rail cars. These constraints also result in operating trains at lower speeds.

The Missouri River creates a barrier to east-west travel and focusses rail and highway traffic at a limited number of crossing points.

The geometry of some highway intersections does not meet today's safety standards or accommodates high volumes of traffic.

OPPORTUNITIES

One opportunity is further investing in highway and rail international border crossings to increase processing capacities, including physical infrastructure; investing in screening and nonintrusive inspection technologies; and increasing the uptake of streamlined processing and preclearance programs such as the Free and Secure Trade (FAST) program.

Connected and autonomous trucks could have some, albeit limited, opportunities in North Dakota. This might first take a foothold in through traffic rather than freight vehicles that have an origin or destination in the state. Automation tends to favor less complex roads, so any activity is likely to occur on interstates first.

Newer, purposely designed feeder aircraft, such as the Cessna Skycourier, could improve handling arrangements at feeder and hub airports, thereby reducing cost and improving efficiency over loose-loaded aircraft.

The Minot intermodal facility has the potential to accommodate other export commodities and import containers.

Another opportunity is to improve the resiliency and recovery of the freight network, and in particular strategic freight assets that are threatened by flooding and drifting snow.

There is a continuing trend to increased consolidation of grain elevators for more efficient rail service.

Increasing the coverage of Wise Roads and applying this technology to other areas would improve the decision-making associated with load restrictions on rural, high-volume truck routes.

A further opportunity is to improve safety and reduce incidents associated with freight transportation such as bridge strikes and truck crashes including rollovers. NDDOT should consider using technology such as overheight detectors to protect critical infrastructure. Infrastructure enhancements and signage could also be used at truck crash hotspots to reduce the number of truck crashes.

The number of rail quiet zones in urban areas could be increased, subject to funding and meeting the appropriate safety criteria.

Another opportunity is reducing rail and traffic conflicts in urban areas through a targeted program of addressing at-grade crossings with new bridges and underpasses and potential reconfigurations of freight and rail yards.

THREATS

A global energy market that is in transition could create threats to the state's freight transportation system ranging from a reduced tax base to reduced investment in infrastructure such as pipelines.

Potential removal of rail served grain facilities due to low volume.

Using drones to replace aircraft feeder services would reduce airport activity and associated revenue.

Interstates and main freight corridors pass through urban areas. As urbanized populations continue to grow, congestion on interstates passing through these urban areas will likely continue to grow and reduce the reliability of freight movement.

A shortage of labor to drive trucks and trains affects the cost, flexibility, and responsiveness of freight services to, from, and within North Dakota. North Dakota is the fifth-top-paying state for heavy and tractor-trailer truck drivers, with an annual average wage of \$54,550, and the western North Dakota nonmetropolitan area is the third-top-paying nonmetropolitan area in the country, with an annual average wage of \$57,170³⁰. According to North

³⁰ <https://www.bls.gov/oes/current/oes533032.htm>

Dakota Labor Market Information (LMI) employment data, there were estimated to be 10,554 heavy duty trucks drivers employed in 2020 within the state, and by 2030 this is expected to increase to 11,823, a 12.1% change.

Civil unrest and demonstrations include activities, such as protests, blocked activities to disrupt construction (i.e., pipelines), to demonstrate against policies, trade issues, etc. could disrupt trade flows and goods movements. For example, in February 2022, Canadian farmers and truckers blocked border crossings to protest Canada's vaccination policy.

Terrorism and other criminal acts, including cyber-attacks on critical infrastructure could damage and disrupt goods movement for periods of time.

CHAPTER 5: FREIGHT AND RAIL MOBILITY ISSUES AND NEEDS

INTRODUCTION

This chapter identifies freight and rail issues and needs and potential strategies to consider in relation to the goals of *Transportation Connection*, the state of North Dakota's LRTP. The LRTP is a policy plan with a 25-year horizon that serves as the umbrella plan for the DOT's family of plans. Also included in this chapter is a section related to friction points and livability impacts associated with freight activity. An important goal for this Plan is to maximize prosperity, livability, and quality of life for North Dakota residents while addressing the needs of North Dakota businesses and freight and rail operators for an efficient, responsive, and innovative transportation system that allows continued success for all. This expands on previous chapters of the State Freight and Rail Plan and is informed by stakeholder and outreach feedback.

FREIGHT ISSUES AND NEEDS



KEEPING YOU SAFE

*Safety is reflected in
everything we do.*

Goal 1 – Keeping You Safe.

Safety is reflected in everything we do.

Reduce the number and severity of truck-involved crashes. Between 2017 and 2020, there were 4,206 crashes on North Dakota highways involving commercial motor vehicles (CMV), and 6.5% of these resulted in a fatality or an incapacitating injury. A significant proportion of these crashes occurred in the state's northwestern oil-producing region and North Dakota's major urban centers. Each year, the NDHP conducts one large oil field strike force and four smaller oil field strike forces in northwest North Dakota to target hazardous material and cargo tank loads for compliance purposes. The Motor Carrier Division of the NDHP is a key asset in enforcing commercial vehicle regulations and supporting the Federal Motor Carrier Safety Administration's Motor Carrier Safety Assistance Program (MCSAP). The goal of this program is to reduce CMV-involved crashes, fatalities, and injuries through consistent, uniform, and effective CMV safety programs. During fiscal years 2019, 2020, and 2021, NDHP performed 14,500 CMV inspections with 12 dedicated MCSAP troopers, two MCSAP sergeants, and one MCSAP civilian inspector. Maintaining this unit is critical to keeping unsafe vehicles off North Dakota highways.

The 2018 North Dakota Vision Zero Plan and Strategic Highway Safety Plan Update 2018-2023 also identified several safety measures and strategies to reduce Heavy Vehicle crashes. These included:

- Reduce fatigue-related crashes by improving the efficiency of existing truck parking spaces and by installing center and edgeline rumble strips
- Conduct traffic enforcement, coupled with public outreach, with a special focus on higher-risk traffic areas/times, such as the oil region, winter driving, and grain and sugar beet harvest season
- Increase safety awareness of the motoring public, motor carriers, and heavy vehicle drivers through Share the Road Safely/No-Zone education and outreach activities

- Improve safety through expanded truck maintenance programs, increased driver and vehicle inspections, and post-crash analysis
- Improve roadway infrastructure for heavy vehicle operation by adding turn lanes at key intersections, developing/deploying rural safety corridors, and installing dynamic intersection warning systems at intersections determined to be at-risk
- Improve heavy vehicle safety data by increasing the accuracy and completeness of crash reports
- Improve CMV safety and size and weight compliance by using enhanced screening technologies

Reduce the impact of overweight trucks. If a truck is carrying too much weight, this can exceed the design limits of various vehicle components such as tires and brake systems and therefore be unsafe. Overweight trucks can also damage highway surfaces and structures if they exceed the various regulatory weight limits or do not follow truck weight formulas and the correct configuration of axle spacing and number of axles. Overweight vehicles traveling on county and township roads during severe rain events or on state highways during spring load restriction season can also unduly damage highway infrastructure. Trucks must operate within the correct weight limits to ensure highway surfaces and structures can facilitate freight movement. Key needs are continuing driver education and awareness, enforcement through NDHP truck inspections and virtual weigh-in-motion systems, and the consideration of future technological applications.

Maintain and expand truck parking availability. Truck parking spaces are key assets in the freight transportation system because they ensure that truck drivers have available locations to park and take their legally mandated rest periods. According to the Federal Motor Carrier Safety Administration’s Large Truck Crash Causation Study, 13% of CMV drivers were fatigued at the time of their crash. The number of truck parking spaces in North Dakota is shown in **Error! Reference source not found.**

Table 5-1: Truck Parking Spaces in North Dakota

Public		Private		Total Spaces
Facilities	Truck Spaces	Truck Stops	Truck Spaces	
17	189	71	3,746	3,935

Source: Federal Highway Administration, Jason’s Law Truck Parking Survey, 2020

In neighboring states, South Dakota was reported to have 2,828 truck parking spaces, Montana 3,544, and Minnesota 3,883. A key need is ensuring that both the public and private sectors maintain existing truck parking facilities and, where possible, expand existing facilities and provide new facilities so truck drivers have a safe place to rest. While there are significant numbers of truck parking spaces in the state, there are a number of regions that do lack sufficient truck parking capacity. A high-level assessment conducted as part of this plan and outlined in Chapter 4 showed that the areas of the state that exhibit the highest ratios of demand to capacity are in the western portions of the state. McHenry, Golden Valley, Morton, Burleigh, Barnes, Billings, and Dunn Counties showed the highest ratios of demand to capacity and should be reviewed for potential truck parking capacity issues. A more robust truck parking analysis should be completed prior to making decisions regarding the installation or modification of truck parking facilities.

Reduce the number and severity of crashes at highway-rail grade crossings by reducing crossing defects. Although the number of highway-rail grade crossing crashes in the state has been declining, crossing safety remains a high priority. The strategy of the NDDOT to address rail crossing safety comprises several elements:

- Annual identification of crossing issues and concerns by local and regional stakeholders with the crossings ranked by NDDOT and diagnostic reviews conducted of the highest-ranking crossings
- Annual identification of opportunities to close high-risk/low-volume crossings in coordination with railroads and other stakeholders with incentive funding provided through the Section 130 funds
- Bi-annual update of NDDOT grade crossing safety programs to incorporate changes from new legislation
- Five-year prioritized replacement program of signal systems that are 25 years old or older

High-risk highway-rail crossing locations are identified annually through NDDOT office review and field diagnostics. Crossings that potentially need to be upgraded are identified by the three MPOs and 10 other agencies throughout the state. Crossing risks are evaluated using the FRA’s Crash Predictor and NDDOT’s Protective Devices Calculator, from which these risks receive a crossing risk value. Risk factors include the 5-year crash history, train volumes and speeds per day, total number of tracks, annual average daily (vehicle) traffic, type of warning device, total roadway lanes, and roadway surface type (paved or unpaved). The evaluation also considers sight distance, roadway geometry, and others physical attributes of the crossing.

As of December 2021, the following candidate crossings were proposed for improvement according to the *North Dakota Highway-Rail Grade Crossing State Action Plan*:

- Crossing surface improvements:
 - Total: 30 crossings
 - BNSF: 13 crossings
 - CP Rail: 7 crossings
 - Short lines: 10 crossings
- Crossing signal improvements:
 - Total: 73 crossings
 - BNSF: 40 crossings
 - CP Rail: 8 crossings
 - Short lines: 25 crossings
- State highway passive crossing upgrades:
 - Total: 11 crossings
 - BNSF: 3 crossings
 - Short lines: 8 crossings

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Improve highway-rail grade crossing safety by reducing the number of unprotected crossings. North Dakota has a significant number of unprotected crossings (i.e., have no signage of any kind), but only 17 of these crossings are on public roads.

Reduce the number and severity of hazardous materials rail crashes through a continuation of the state’s inspection program. The North Dakota Public Service Commission in cooperation with FRA has established a Railroad Safety Program to promote a strong safety culture and to ensure that a reliable rail system continues to operate in North

Dakota. The program implements inspection and compliance practices that reduce the potential for crashes, derailments, and equipment failures and is built on the following priorities:

- Expand safety inspections of track infrastructure to include main line, sidings and industrial spurs, railroad equipment, and cars
- Use enforcement actions to include education, notification, and penalties regarding compliance with safety standards
- Work with railroads and shippers to upgrade safety and community relations
- Ensure that crude oil and hazardous materials routes are inspected regularly, as well as components and equipment used to transport and carry commodities
- Serve as a safety resource and provide guidance regarding federal and state laws for private industry terminals and switching yards

The program employs several full-time employees in two of the six FRA inspection disciplines:

- Track
- Motor power and equipment (mechanical)

The other four FRA inspection disciplines are:

- Operating practices
- Signal and train control
- Hazardous material
- Grade crossing safety and trespasser prevention

The Commission's inspectors are state employees who are trained and certified by FRA to inspect and enforce federal laws and are authorized to inspect all equipment and track used by Class I and short line railroads operating in North Dakota.

Improve community safety by reducing the number of blocked crossings. Another safety issue are trains blocking crossings. When a crossing is frequently blocked by trains, it can create a barrier between residential areas, business locations, leisure activities, emergency responders, hospitals, and other essential safety services, splitting communities. In addition, impatient motorists might try to outrace oncoming trains to the crossing creating safety risks.

Blocked crossings are caused primarily by Class I freight railroad operations because they tend to operate frequent, longer trains. Crossings can be blocked by either stationary or moving trains. Stationary trains can be stopped for any number of reasons: rail line congestion, safety, switching activity at local industries, loading/unloading activities, traffic, or train breakdowns, among others. Moving trains can also block crossings particularly where there are speed restrictions.

North Dakota Century Code provides for the fining of locomotive engineers who operate trains obstructing crossings for 10 or more consecutive minutes, however, with exceptions attributable to (1) the need to comply with safety signals, (2) the need to avoid striking an object or person on the track, (3) when the train is disabled by accident or otherwise, (4) when the train is in motion except when engaged in switching operations or loading or unloading operations, (5) when vehicular traffic is not waiting to use the crossing, (6) when necessary to comply

with a government statute or regulation, or (7) when allowed by written agreement between the governmental entity that controls the roadway and the interested commercial entities.³¹

The time that crossings are obstructed by moving trains can be expected to increase. Railroads are continually evaluating increasing their train lengths to use their rail line capacity more effectively. In 2021, the average BNSF train length was 6,900 feet, and the average CP Rail train length was 8,000 feet.³²

Improve safety through education and partnerships. Continue to promote and support freight-related safety education initiatives, including Operation Lifesaver and work with other organizations and agencies such as the North Dakota Motor Carriers Association and the ND Highway Patrol. Given the number of truck crashes in the oil-producing region, consider a targeted/focused safety awareness campaign for truck drivers in this region.

Develop strategic safety planning and mitigation initiatives across state and federal agencies. Collaboration with partners, be they federal, state, tribal or local agencies and entities is vital to maximize limited resources and better assess future risks and impacts to North Dakota’s supply chains and freight-related infrastructure.



**CARING FOR
 WHAT WE HAVE**

*Fixing what we have
 is our priority.*

Goal 2 – Caring for What We Have.

Fixing what we have is our priority.

Prevent over height bridge strikes. Although the number of over height bridge strikes in North Dakota is low, each one damages infrastructure, increases maintenance costs, and can sometimes result in lane or highway closures, often with long detours. Many bridge strikes are caused by over height equipment, such as excavators and other tall equipment, being transported by truck—and the driver failing to secure the load, follow their route they are supposed to follow, know the height of the load, or recognize when the load cannot pass under a low structure. Two possible ways to prevent over height bridge strikes are education programs and technological solutions, such as detection and alert systems to protect structures with high collision rates.

Maintain a state of good repair. One element that is vital to the reliable and efficient movement of freight is keeping infrastructure in safe and good condition on major freight corridors, first- and last-mile highways, and other strategic freight assets such as freight-served airports, rail facilities, and pipelines. Sufficient funding across all levels of local, state, and federal government and the private sector is needed to support continued investment in North Dakota’s freight-related infrastructure. Improving the condition of highway pavement, repairing existing bridges, and replacing old bridges with modern structures will ensure that infrastructure supports and meets the needs of North Dakota freight movement. Maintaining highways also includes implementing seasonal weight restrictions each year to protect highway surfaces and structures during the spring thaw.

As private-sector entities, railroads are responsible for maintaining their assets in a state of good repair. These assets include their track, crossings, facilities, and rail cars. However, because the state’s short line railroads lack available internal funds, they find it a challenge to continually maintain their assets in a state of good repair.

Preserve freight and rail infrastructure. The future use of freight assets can be affected by many factors including market and economic conditions and changes to land use and surrounding development. Low-volume rail lines

³¹ North Dakota Century Code Section 49-11-19

³² Systemwide numbers for both railroads. No train length data is available specifically for North Dakota.

and first- and last-mile highways might not carry significant amounts of freight, but they are important to local businesses that rely on this infrastructure to connect to larger freight networks and marketplaces.

A key challenge in urban areas is friction between freight facilities and residential development. Noise, light, vibration, and traffic are effects of freight transportation that can be detrimental to surrounding residents. Rail facilities in urban areas, particularly those where rail car marshaling and switching occur close to at-grade rail crossings, can create extended periods of roadway congestion. A key need is finding solutions—including, where feasible, grade separations, changes in local zoning, and changes to rail operations—to mitigate the effects of freight facilities and preserve their use in the future.

Improve freight resiliency. Freight movements are often disrupted by a wide variety of events such as weather or the closure of a main highway. In these situations, a key consideration is how long the disruption will last and therefore how quickly freight movement can recover. A common example is the closure of a highway due to snow and ice. If NDDOT has enough resources, including snowplows, snowplow drivers, and road salt, the highway can be cleared and reopened quickly after weather conditions improve. However, if resources are limited, the highway might be reopened slowly, resulting in lengthy delays in the movement of goods, missed delivery slots, unfilled customer orders, and so on. In addition, 148 miles of highway and 170 miles of rail in the state are located within 100-year floodplains. To safeguard and improve the resilience of freight movement, it is vital to protect this infrastructure from floods and maintain existing flood defenses. Strategic planning with other agencies including the North Dakota Department of Emergency Services (NDDDES), the U.S. Army Corps of Engineers (USACE), the Federal Emergency Management Agency (FEMA) and FHWA can help to identify priorities and focus resources to address freight resiliency issues within the state.



**CONNECTING
NORTH DAKOTA**

*Transportation
matters.*

Goal 3 – Connecting North Dakota.
Transportation Matters.

Encourage investment in border crossings. Improving the efficiency of border crossing operations can reduce border wait times and queues. NDDOT recognizes that CBP, CBSA, U.S. Department of Homeland Security (DHS), and other agencies must instigate checks on goods, vehicles, and people to collect taxes and revenue and to prevent the movement of contraband and dangerous material, undocumented persons, and people being trafficked. Nonetheless, these checks take time and resources. Using Non-Intrusive Inspection (NII) technology and other streamlined processes can help reduce the time it takes to pass through border crossings, especially by regular freight movements and drivers. A key future need will be ensuring the structural and technological capacities of the border crossings can accommodate increasing numbers of freight vehicles and rail cars.

Invest in and develop freight facilities. Investing in existing and new transportation facilities is necessary to enhance the economic competitiveness of the state's businesses in regional, national, and global markets. Some examples of facilities are the Logistics Park of North Dakota intermodal facility in Minot, the Farmer's Elevator of Honeyford (which was expanded to accommodate 8,500-foot-long unit trains), the UPS air cargo hub at Hector International Airport in Fargo, and energy-related facilities such as natural gas gathering pipelines. NDDOT has been told additional truck-rail transload facilities will be needed in the future, particularly on the short line railroads. Larger scale rail freight development such as the current Logistics Park of North Dakota with its BNSF-certified development site will support future economic development. Furthermore, these facilities also generate direct and

indirect jobs. Most of the investment in freight-related facilities will be in the private sector, but public incentives and other partnerships can help the private sector develop and enhance these facilities.

Upgrade freight-related infrastructure. To keep pace with the growth in freight demand and activity, freight-related infrastructure will require capacity enhancements to avoid future bottlenecks associated with greater congestion. This includes first- and last-mile connectors in areas that have experienced significant development. One such connector is 40th Avenue North in Fargo, which provides access to a new Amazon distribution center and the FedEx and UPS air cargo operations located on the northern perimeter of Hector International Airport.

Replacing outdated infrastructure—such as the Long X Bridge on US-85 south of Watford City, which was repeatedly hit by over height trucks—is a key example of improving the freight network with new infrastructure that meets modern freight operating requirements. Bottlenecks on the rail system need to be addressed, where economically feasible, to improve the speed of goods movement and reduce transportation costs. These bottlenecks occur as a result of longer trains, limited siding capacity, and restrictions on rail car weight (ideally, all rail segments would accommodate the 286K-pound rail car standard). The short line railroads in particular need to upgrade their infrastructure to allow higher train speeds and meet future freight needs. As shown in Table 5-2, 54% of the short line mileage in the state is FRA track Class 1 or less. Forty-five percent of short line mileage also cannot accommodate the industry standard 286K-pound rail car,

Table 5-2: Route-Miles for Short Line Railroads by FRA Track Class

Short Line Railroad	Class Track 1 or Less	Class Track 2	Total
DMVW	239	109	348
DN	28	19	47
NPR	268	36	304
RRVW	73	355	428
Total	608	519	1,127

If the Red River Valley & Western Railroad mileage is not included, the percentage increases to 77% of the route-miles. Trains operating over tracks designated as Class 1 are limited to 10 miles per hour or less. The speed restrictions increase crew costs, fuel consumption, and other operating costs. Both locomotive and rail car utilization are also reduced by slower train speeds thus increasing the needed numbers and cars.

The state’s key industries of agriculture and energy rely on the efficient movement of OSOW loads. Agricultural loads include farm machinery, crop storage facilities, and agricultural products, and loads associated with the energy sector include wind turbines and drilling rigs for oil and gas wells. Low bridges, other overhead structures, narrow width structures and weight limitations on bridges can cause significant detours. For example, the bridge on US-2 at MP 145.343 has a clearance height of 16 feet, which can cause an OSOW load to take a 113-mile detour. Similarly, weight restricted bridges on ND-200 can cause OSOW loads to travel an extra 143 miles. These detours result in the same impacts as traditional congestion, namely time wasted, fuel wasted, extra cost, and increased greenhouse gas emissions. Additionally, they disrupt freight service and require the loads to be transported through towns and cities. One example of an approach to better facilitate OSOW movement was adopted in Texas. In 2017, Texas DOT provided general guidance for the TxDOT Freight Vertical Clearance Program. New structures on the Texas Highway Freight Network must meet the minimum vertical clearance requirements of 18 ½ feet. The purpose of the Freight Policy is to provide a long-range vision and plan to provide a continuum of efficient freight movement within North Dakota.

Infrastructure investments in other states will also help the movement of North Dakota's products. Export markets have become vital to oil producers in North America ever since the 1975 embargo on crude oil exports was lifted in 2015. Pipeline projects, including existing pipeline expansions, and pipeline reversals allow Bakken-produced crude oil to flow south to key export locations on the Gulf Coast. These ports include Houston, Texas; the Beaumont-Nederland-Port Arthur area; the Louisiana Offshore Oil Port (currently the only Gulf Coast terminal capable of fully loading a very large crude carrier without lightering); and the proposed Blue Marlin Offshore Port (a new terminal that could accommodate such carriers off the coast of southwestern Louisiana).

Many freight and infrastructure projects will provide benefits to multiple states and regions, though the costs of these projects are typically borne by one state. Opportunities in this area include potential policy changes at the state and federal levels. For example, NDDOT or another state DOT obtaining the authority to be a lead agency on multistate projects that could increase access to grant funding and federal programs while improving project delivery. This may increase access to funding opportunities through bundling of individual projects along a particular corridor and supporting existing initiatives or developing new partnerships.

Accommodate growth in e-commerce. According to the U.S. Census Bureau, e-commerce sales in the second quarter of 2021 accounted for 13.3% of total U.S. sales. North Dakota has seen an increase of predominantly smaller trucks and vans in urban areas because of this growth in e-commerce; changes in the package delivery market (more carriers serving business-to-consumer markets, including "in-house" delivery operations); the gig economy; and same-day delivery. According to FHWA, since 2010, the number of overall vehicle-miles traveled in North Dakota has increased by about 9%, while truck traffic in urban areas has increased by more than 17%. Some of this traffic will be operating in residential areas undertaking deliveries to households. Regarding residential development planning, planners will need to consider making changes to existing streets to accommodate loading and unloading vehicles in residential areas, including downtown locations, along with other alternative delivery options including locker boxes. In addition, increases in walking and bicycling in urban areas will also require planners to consider measures to reduce the potential for crashes involving vulnerable road users and trucks.

E-commerce will also increase demand for package services in rural areas, but the lack of delivery density typically results in fewer delivery options than an urban resident might be offered. Furthermore, the additional cost of serving rural areas is typically included in parcel rates via a delivery area surcharge. However, delivery companies are continuing to develop options to reach rural customers cost-effectively and with frequent services. For example, in 2019, FedEx partnered with Dollar General to use its stores as pickup and drop-off facilities for FedEx packages. Package delivery companies may adopt new technologies or strategies to accommodate growing volumes of packages to reduce cost and emissions, including use of drones, electric vehicles and in urban areas, the use of cargo bikes.

E-commerce growth is also expected to increase the volume of air cargo carried to, from and within the state, and through hub and air cargo feeder services operating from Hector International Airport in Fargo.

React to energy market volatility and change. A significant amount of freight activity in North Dakota is directly related to the movement of energy products, which includes both fossil fuel-based commodities and non-fossil feedstocks for ethanol and renewable diesel plants, in addition to the movement of refined products from refineries to consumer markets. The ebb and flow of these products is directly related to both domestic and international market conditions, including structural changes in the electric power generation sector (a shift from coal to natural gas and renewables nationally), tariffs on exports and imports, pricing and production quotas by oil-producing countries, and environmental regulations. Fuel programs such as the Low Carbon Fuel Standard in California and the federal Renewable Fuel Standard are aimed at reducing emissions of greenhouse gases and increasing the volume of lower-carbon, renewable fuels.

Examples of recent changes in the North Dakota energy sector include:

- The Marathon oil refinery in Dickinson was converted from producing products refined from crude oil to renewable diesel. In 2021, the Marathon oil refinery reached a full production capacity of 180 million gallons per year of renewable diesel produced from soybean and corn oils and is currently the second-largest renewable diesel production facility in the United States, predominantly supplying the California fuels market. Also in 2021, Marathon, the refinery owner, and ADM announced a joint venture to produce soybean oil using ADM’s processing center in Spiritwood. This venture is expected to produce about 600 million pounds of refined soybean oil annually, which is enough feedstock for about 75 million gallons of renewable diesel per year.
- In June 2021, Bakken Energy and Mitsubishi Power Americas announced they had entered into a strategic partnership to create a world-class clean hydrogen hub in North Dakota to produce, store, transport, and locally capture and sequester carbon dioxide.
- In 2027, Canada’s largest renewable diesel facility and canola processing plant in Regina, Saskatchewan is expected to be operating. This could become a destination for North Dakota’s canola production.

Ensuring the multimodal freight network can respond to changes in demand and continue transporting energy products where they are needed is vital to energy producers, refiners, and consumers in North Dakota.

Reduce transportation cost. To help North Dakota businesses compete, especially in the bulk agriculture and energy sectors, the transportation cost per ton needs to be as low as possible. The maximum truck length in North Dakota is 100 feet. Longer combination vehicles (LCV) up to 130 feet could provide shippers an opportunity to lower transportation costs. However, the issues associated with operating these vehicles, such as any impact on existing infrastructure, and public safety concerns, need to be assessed in addition to understanding the viability of using such vehicles, given the constraints on vehicle dimensions associated with federal highways. As directed by the 2021 North Dakota Legislative Assembly, NDDOT will study and conduct pilot projects to assess the feasibility of LCVs on North Dakota roads. Expanding the capability of short line railroads to accommodate the larger, 286K-pound railcars will reduce transportation costs to the railroads and their customers, thereby improving the competitive position of rail users in the state.



HELPING YOU GET THERE

Transportation should be easy.

Goal 4 – Helping You Get There.
Transportation should be easy.

Provide consistent and reliable highway travel times. The freight industry thrives on reliability. Unpredictable and unreliable journey times create issues with schedules, on-time deliveries, reduced productivity of drivers and equipment, and so on. NDDOT recognizes that events happen that disrupt goods movement such as weather, highway maintenance, and crashes. Responding to these events and developing measures to reduce the impact on freight movement will improve reliability. Traffic congestion in urban areas in the state impact freight mobility, but so does infrastructure constraints such as unacceptable height, weight, and width restrictions in rural areas, especially the movement of OSOW loads that are necessary to support the energy and agriculture sectors. Promoting the use of the existing NDDOT Road Conditions information service could also help and better inform drivers about traffic, weather and Border Crossing wait times.

Provide reliable freight rail service. The short line railroads rely on Class I railroad connections to reach their markets throughout the country. Reliable connections and interfaces between the Class I and short line railroads are essential for high-quality service. Similarly, reliable connections are important to ensuring the required supply of returning empty rail cars.

Coordinate with neighboring states and Canadian provinces regarding OSOW processes. Although North Dakota and surrounding states have sought to streamline the administration associated with OSOW permits using online systems within their states, these systems do not apply when OSOW loads cross state borders. When crossing state borders, an OSOW operator must take into account the different permit processes and requirements in each state, which adds complexity and time. According to Report 830, *Multistate, Multimodal, Oversize/Overweight Transportation*, from the National Cooperative Highway Research Program, several options are available to improve multijurisdictional coordination.

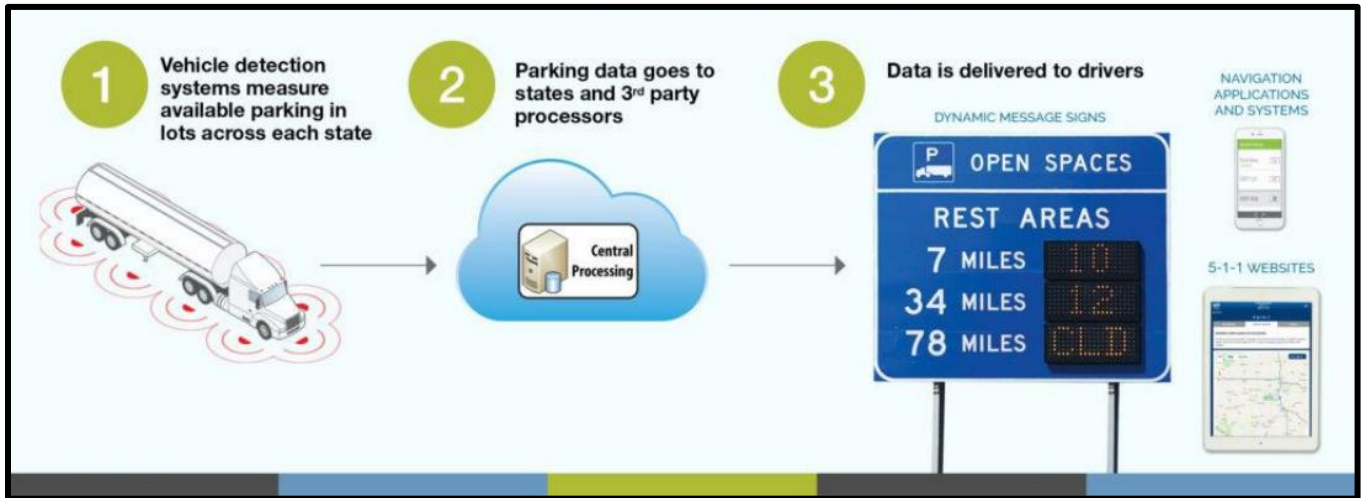
One option is harmonizing regulations between North Dakota's neighboring states or regions of states including Canadian provinces. In this case, each state would seek to harmonize some or all regulations with other states. In 2014, the American Association of State Highway Transportation Officials (AASHTO) instigated a multiphase project seeking to develop a minimum standard for certain aspects of OSOW movements including escort requirements, flag size and color, and format for oversize load signs.

Another option is instigating a multistate permit process to streamline the process and reduce time and effort when applying for multiple state permits. Since 2009, the Wisconsin and Minnesota Departments of Transportation (WisDOT and MnDOT) permit offices have worked closely to better understand each other's permitting processes, compare statutory and regulatory requirements and consider ways to harmonize, share best practices that improve customer understanding and compliance with permitting rules, and look for ways to promote seamless cross-border permitting. WisDOT and MnDOT have developed a web interface which allows a carrier traversing both Wisconsin and Minnesota to make one application and receive a permit from each state.

Coordinate with North Dakota government agencies and the private sector regarding OSOW permits. Significant coordination and cooperation already occur among North Dakota county, township, and city governments to manage OSOW loads traveling on local roads. In 2012, the online LoadPass Communication System was implemented, and in 2016 it was expanded from the Western Dakota Energy Association counties to include all North Dakota counties that wanted to use the system. Increasing coordination among different levels of government in North Dakota could streamline the process for all parties and reduce costs and administrative effort.

Improve truck parking information and management. Improving communication and better informing truck drivers as to where truck parking spaces are available will help manage truck parking in the state and ensure that truck drivers have access to safe truck parking spaces. Several state DOTs have developed and installed truck parking information management systems (TPIMS) to help truck drivers identify, in real time, the number of available truck parking spaces at both private truck stops and public rest areas. These systems use cameras or sensors to identify the number of parking spaces available and use various communication channels such as websites, smartphone applications, and variable message signs to inform drivers, as shown in Figure 5-1.

Figure 5-1: How a Truck Parking Information Management System Works



Source: Minnesota Statewide Truck Parking Study 2019



INVESTING FOR THE FUTURE

We work for you.

Goal 5 – Investing for the Future.
We work for you.

Assess automation, data resources, and new transportation technologies. Autonomous trucks, truck platooning, and delivery robots, are examples of technology intended to improve the efficiency, sustainability, and safety of freight movement. Although these technologies are currently being tested, it is only a matter of time as to when they will be in use in North Dakota. Some of these technologies will bring challenges and issues that require a more detailed assessment (for example, truck platooning could affect bridge sufficiency ratings). NDDOT is ready to maximize the opportunities associated with these technologies while ensuring safe operations.

Maximize grant and partnership opportunities. A key issue for freight infrastructure and many facilities is the availability of funding to maintain, improve, enhance, upgrade, and develop new projects in North Dakota. Successfully competing for competitive grants and fully utilizing formula funding will be vital to investing in North Dakota’s freight system.

Develop use of drones for deliveries and freight movement. North Dakota is a leading state in the development of unmanned aerial vehicles (UAV). Drones have a significant potential to serve North Dakota’s rural population with e-commerce–related services. A key issue is developing solutions that enable safe drone operations and allow autonomous or remotely controlled drones that will travel beyond the line of sight of a human operator. U.S. regulations generally prohibit operators from flying drones beyond their line of sight. However, North Dakota has established itself as a leader in drone technology and was one of 10 participants in the USDOT’s Unmanned Aircraft Systems Integration Pilot Program announced in 2018. As the rules and regulations regarding drone operations in national airspace continue to evolve, drone use could revolutionize some forms of rural package delivery and better connect rural communities to the e-commerce marketplace.

Reduce emissions and the impact of freight movement on local air pollution. Despite significant improvements in reducing flaring from North Dakota oil and gas wells, flaring still occurs. According to the North Dakota Pipeline Authority, approximately 95 percent of natural gas produced in ND is captured and sold, the remaining five percent is flared, due to lack of pipelines (1 percent) and challenges with existing infrastructure (4 percent). There is a continued need to develop gathering, processing and take away capacity to reduce flaring. As the price of natural gas is likely to remain high in international markets, this may influence investment decisions to increase the amount of natural gas that is captured rather than flared.

The age of trucks and off-road freight-related equipment can have a significant impact on local air quality, especially those vehicles pre-dating the introduction of emission control equipment such as selective catalytic reduction (SCR) for NO_x control and diesel particulate filters (DPFs) for Particulate Matter control. Recognizing that the ownership and decision-making associated with vehicle replacement is largely outside the control of NDDOT, NDDOT will partner where possible with public sector agencies (including the North Dakota Department of Environmental Quality, the lead state agency for air quality monitoring and goal setting) and the freight industry to scope projects and seek funding to decrease the impacts of freight movement on local air pollution. A challenge with alternative power sources is the availability of fuel or power. Battery electric trucks will require access to chargers and hydrogen trucks will need to be supported by a new fuel supply chain including production, distribution, and supply of hydrogen. The recent announcement associated with the development of a proposal for a regional Heartland Hydrogen Hub supported by North Dakota, Minnesota, Montana, and Wisconsin, would support the development of hydrogen charging infrastructure for trucks and other freight modes in North Dakota. The availability of Renewable Diesel, which has a lower carbon intensity than traditional fossil fuel, may increase in the state when the Spiritwood Crushing Plant begins supplying the Marathon Petroleum refinery in Dickinson

Pursue alternative fuels. According to the U.S. Environmental Protection Agency (EPA), alternative fuels include gaseous fuels such as hydrogen, natural gas, and propane; alcohols such as ethanol, methanol, and butanol; vegetable and waste-derived oils; and electricity. These fuels can be used in a dedicated system that burns a single fuel, or in a mixed system with other fuels including traditional gasoline or diesel, such as in hybrid-electric or flexible-fuel vehicles. These fuels are increasing in prominence in the truck industry, but this varies significantly depending on industry sector, vehicle duty cycle, and company ownership. For example, battery electric power is suited to medium-duty trucks involved in urban and suburban operations (part of a private fleet travelling 100 to 150 miles per day and returning back to base), whereas battery electric power is not currently suited for owner-operated trucks traveling long haul routes of hundreds of miles a day to and from disparate locations. However, the use of renewable diesel (a drop-in replacement for fossil diesel fuel) could be suited to the latter situation.

NDDOT expects that North Dakota will see increasing numbers of trucks, locomotives, and freight-handling equipment powered by alternative fuels as technology and alternative fuel markets continue to evolve. Over time, the capital costs for alternative-fueled equipment and cost parity with traditionally fueled equipment will be reduced, communities will work to improve local air quality, environmental regulations will change, and shareholders and customers will demand greener and more sustainable supply chains. Fleets and truck stops will need to address challenges with funding, planning, and developing the infrastructure for refueling alternative fuels.

Accommodate new types of feeder aircraft. Air cargo feeder operations that link regional airports with integrator hubs at Hector International Airport, typically rely on small single- or twin-engine turboprop aircraft. These aircraft are modified passenger aircraft that were not designed for cargo operations. One example is the Cessna C208 Caravan that has been used by FedEx for many of its feeder services in North America. However, aircraft are being introduced that are specific to the smaller feeder aircraft market. New aircraft include the Cessna SkyCourier 408, which can accommodate cargo unit load devices (ULD) and carry nearly double the weight carried and volumetric capacity of the Cessna C208 Caravan, which it aims to replace. Containerization of the feeder fleet represents a significant change in feeder aircraft operations, especially at regional airports, which might not have the infrastructure for handling aircraft ULDs.

FRICITION POINTS AND LIVABILITY IMPACTS

INTRODUCTION

Community livability is a complex topic encapsulating several inter-related components that describe the quality of life or experience of people living in, working in, or visiting a community.

Some of the factors included for consideration are the quality of experiences provided by the community's built environment, its economic prosperity, social stability, equity, educational opportunity, access to, and quality of, that community's natural environment, and cultural, entertainment and recreational opportunities. In short, the sum of positive attributes available to people in that location.

When discussing freight and rail operations and livability, it's important to ensure that:

- All communities have equal access to their benefits and to a livable environment overall, and,
- That no community receives disproportionate impacts from negative externalities caused by the operations of these two key transportation sectors.

In North Dakota, there are numerous racial, ethnic, income, and other populations that should be kept in mind when discussing friction points and impacts, including populations in the state's major cities, in small rural communities, and in Tribal Nations. Descriptions and analysis of these potential Environmental Justice impacts are described in the second half of this chapter.

PRINCIPLES OF LIVABLE COMMUNITIES

A livable community is generally defined as a place that responds to or offers these qualities:

- **Human-Scaled Design** where compact, pedestrian-friendly communities allow residents to walk to shops, services, and cultural resources
- **Choices and Variety** in housing, shopping, recreation, transportation, and employment options
- **Mixed-Use Development** that integrates different land uses and varied building types to create vibrant, pedestrian-friendly, diverse communities
- **Focus on Urban Centers** by restoring, revitalizing, and infilling urban centers and leveraging existing streets, services, and buildings and avoid the need for new infrastructure
- **A Variety of Transportation Options** that offer people the option of walking, biking, and using public transit, in addition to driving, for their daily needs

- **Vibrant Public Spaces** that encourage civic participation, stimulate face-to-face interaction, and provide gathering places for community life
- **Neighborhood Identity** and a “sense of place” created by leveraging neighborhoods' unique character, enhancing the walking environment, and enhancing pride in the community
- **Protection of Environmental Resources** by balancing the needs of nature and development, and preserving natural systems, protecting waterways, reducing air pollution, and protecting property values
- **Conservation of Landscapes**, open space, farms, and wildlife habitat as essential elements for environmental, recreational, and cultural reasons
- **Fostering Excellence in Design** as a foundational element for successful and healthy communities

Transportation, as a key place- and prosperity-shaping factor, plays a significant role in determining quality of life and livability for a community. Shaping access to community assets and mobility between them, it determines the relative ease of movement for both people and goods.

FHWA describes livability in transportation as “leveraging the quality, location, and type of transportation facilities and services available to help achieve broader community goals such as access to a variety of jobs, community services, affordable housing, quality schools, and safe streets.”

An important goal for NDDOT's Freight and Rail Plan is to maximize prosperity, livability, and quality of life for North Dakota residents while addressing the needs of North Dakota businesses and freight and rail operators for an efficient, reliable, and safe transportation system that allows continued success for all.

TENSIONS BETWEEN COMMUNITY LIVABILITY AND FREIGHT OPERATIONS

The experiences and needs of successful, livable communities intersect with freight operations in two important ways:

- Successful, livable communities hosting many residents, jobs, employees, and visitors will need freight operations to supply shops, restaurants, and industry (in addition to other transportation services to provide for people’s mobility needs).
- Successful, livable communities are often located on or near transportation corridors that play an important role in freight mobility for communities and industries located elsewhere.

Some tensions that may arise between successful, livable communities and the needs of freight operations include:

- **Conflicts between modes and safety issues and concerns:** Interactions between freight and other modes, especially walking and biking, can be hazardous due to visibility and geometric issues associated with large trucks.
- **Environmental Justice:** Environmental justice principles require that no populations be disproportionately impacted by freight movement.
- **Undesirable environmental effects:** Unwanted noise, smells and vibrations.
 - Freight vehicles have significant externalities affecting main street and mixed-use areas.
 - Increases in e-commerce, online ordering, and home delivery require trucks to travel through residential areas more frequently.
- **Vehicle congestion:** Freight vehicles contribute to and are impacted by roadway congestion.

- **Vehicle emissions:** Freight vehicles, especially older vehicles that predate more modern pollution abatement equipment, emit harmful emissions that negatively impact air quality, public health, and environmental sustainability.
- **Parking and loading:** Lack of available parking and loading zones in towns and cities can lead to increased truck circulation to find available parking/loading space, or to illegal parking on bus or bicycle lanes which increases congestion and causes hazardous conditions for other users.

LIVABILITY AND FREIGHT TENSIONS IN NORTH DAKOTA

North Dakota communities have recently experienced two types of livability impacts from freight & rail operations:

- Typical / customary impacts
- New impacts from the recent oil boom

TYPICAL / CUSTOMARY IMPACTS

Typical / customary impacts are those that can be usually expected as a result of the interactions between freight movements and communities. Trucking in downtown or main street areas, or difficulty at railroad crossings, are typical livability concerns encountered in communities of all sizes (Figure 5-2).

Figure 5-2: Typical Livability Concerns Encountered in Communities



Although important and with potential serious consequences for communities, these generally develop over time, and therefore allow opportunity for addressing them, providing time for adjusting different planning and infrastructure systems in a community. These include impacts like:

- Main Street livability and economic impacts
- Impact of railroad crossings and truck routes on safe routes to school
- Pedestrian and bicycle friendliness
- Local air pollution

IMPACTS FROM THE RECENT OIL BOOM

Impacts from the recent oil boom are new, and because they have happened over a relatively short time, they led to unforeseen demand, unplanned growth, and even the collapse of important systems for livability.

One key piece of information for understanding the freight-related component and impacts of the oil boom is provided by the UGPTI in their 2014 report "Infrastructure Needs: North Dakota's County, Township and Tribal Roads and Bridges: 2015-2034." UGPTI notes that each oil well generates about 2,300 truck trips during its

lifetime - from the initial movement of rig and drilling equipment to establishing the well to the supplies, wastewater, and waste that are part of its operations (please note that this trip total does not account for the movement of the extracted, outbound crude, about 60% of which travels via truck).

Given that approximately 10,000 wells were anticipated by UGPTI to be in production in 2015, the trucking-related movements needed for establishing and keeping these wells in production totaled about 23 million truck trips, which in turn required a massively large influx of operators, mechanics, logistical support personnel and others.

The oil boom-related new trips and the addition of vast numbers of new workers to support trucking operations led to significant impacts on a variety of livability-related systems, including:

- Housing Affordability
- Roadway Capacity
- Roadway Maintenance
- Unplanned Community Growth
- Public Safety
- Education System
- And Others

According to observers who witnessed these impacts as they occurred (including NDDOT staff) these impacts also included several societal and economic issues such as a depletion of existing housing stock and a reduced workforce for retail/hospitality sectors. Furthermore, the demand for Commercial Driver's License (CDL) drivers in the oil region had increased driver wages. This increase in wages has also resulted in CDL drivers who worked outside the oil sector such as in local Public Works Departments and School Bus operations, to transfer to oil sector servicing companies. The national mean annual wage for Heavy and Tractor-Trailer truck drivers in May 2021, according to the Bureau of Labor Statistics was \$50,340. The West North Dakota nonmetropolitan area had a mean annual wage for Heavy and Tractor-Trailer truck drivers at \$56,560, making it the second highest top paying nonmetropolitan area for Heavy and Tractor-Trailer truck drivers after the Alaskan nonmetropolitan area. The West North Dakota nonmetropolitan area's annual mean wage for a school bus driver is \$50,910.

DOCUMENTATION OF FREIGHT-RELATED LIVABILITY ISSUES

Many of the freight-related issues noted in this chapter have been well-documented in the media as well as through North Dakota planning and legislative initiatives, including the North Dakota Oil and Gas Industry Impacts Study 2014-2019, completed in 2015.

However, some key freight-related issues, including impacts on safety and community livability, and disproportionate impacts on Tribal Nations and Environmental Justice communities, continue to need additional consideration. This chapter provides additional detail on these topics.

TRAFFIC SAFETY AND CRASH-RELATED ISSUES

The most serious and negative potential outcome from any system is development of a fatal outcome. The analysis of crash data in Chapter 4 identified the greatest number of fatal crashes involving large trucks took place in the western side of the state, where oil patch activities are concentrated. Importantly, there are several locations where clusters of multiple large truck crashes causing fatalities have occurred. Notably, this part of the state has lower residential densities, which makes the high number of crash fatalities highly disproportionate to population. Furthermore, roadways at many of these locations carry a proportionally higher level of large trucks in their traffic

mix. The eastern side of the state, with the Fargo and Grand Forks population centers, also has a high number of large truck-related fatal crashes.

It should also be noted that several of these crashes have taken place in roadways traveling through Tribal Nation lands. A section offering a discussion of livability issues specifically relating to Tribal Nations is provided in one of the sections included in this chapter.

MAIN STREET LIVABILITY IMPACTS

The term "Main Street" is a convenient placeholder to denote the streets around which most cities grow. Generally, these are a community's civic heart, with significant commerce, history, and character. Main streets are usually several blocks in length, with compact, mixed-use development, and buildings spaced close together and close to the street. They have short blocks, are interconnected with local street networks, have complete sidewalk networks, and include on-street parking. Because they are busy with commerce and activity, they also depend on freight operations to function effectively.

Figure 5-3: Main Street



Main streets are key assets for communities throughout North Dakota. Not surprisingly, one of the state's main economic development convenings is called the Main Street Summit.

There are main streets in all North Dakota communities. In many of them (especially in smaller and rural communities) this main street is also a State Highway - which means that they are heavily used by truck freight vehicles as they travel to and from their destinations.

Unfortunately, this also means that some of the principal assets and possibilities for those main streets (including their potential for walkability, tourist activities like outdoor dining, and general economic development and placemaking) are hindered by the negative externalities generated by the movement of large trucks through their historic and walkable areas.

Similarly, railroad operations in and around main street areas generate numerous negative externalities that work against improvement in some of these communities. It is noted that while many towns and cities in the state were established and grew as a result of railroads, they were also impacted by some of those historical legacies associated with railroad operations with rail infrastructure remaining in the center of towns and cities.

SAFETY AND THE PERCEPTION OF SAFETY AROUND MAIN STREETS

It is helpful to think of safety for people walking, biking, and enjoying main street districts as including these three elements:

- **Actual safety:** The actual probability or risk of experiencing a crash
- **Perception of safety:** How safe or unsafe in relation to traffic risk a facility or a place feels
- **Social safety:** How safe or unsafe in relation to public safety or crime a location feels

It is important to note that while *actual safety* is generally the focus of design when infrastructure is considered and is a key component of efforts like Vision Zero, *perception of safety* has an outside effect on the actual use or visitation of a place and is related to the relative risk that a person perceives when walking, biking, or sitting in a place. Loud noises, high traffic speeds, difficulty crossing streets, and other externalities commonly caused by freight operations (and by general high traffic levels or speeds) all work against successful main street experiences.

LIVABILITY CONSIDERATIONS NEAR K-12 SCHOOLS

Children are vulnerable users of the transportation system, as their cognitive abilities and their faculties for accurately perceiving risk continue maturing as they age and may sometimes lack impulse control and judgement to determine whether a traffic situation presents an actual hazard.

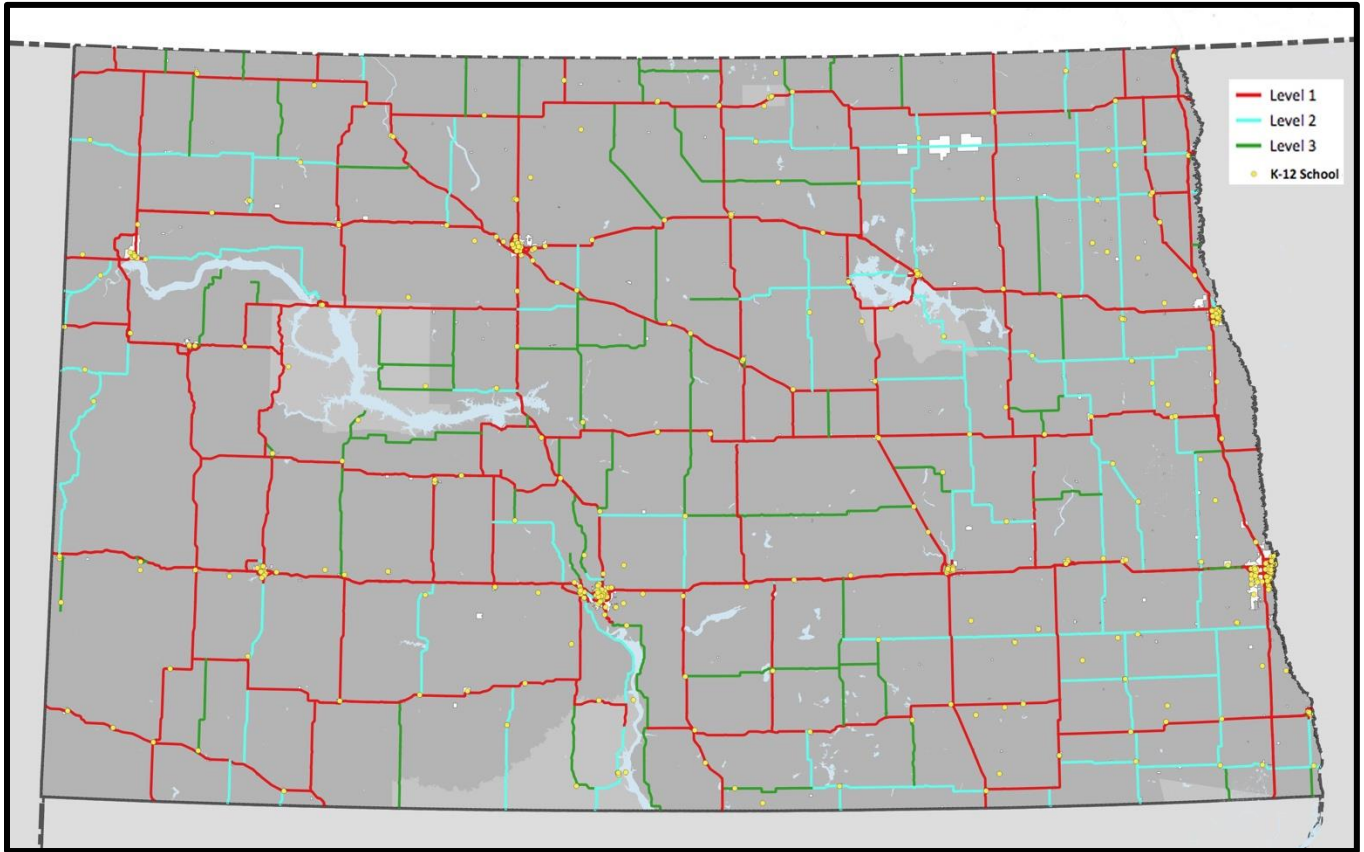
For numerous reasons, including well-established facts regarding improved physical and mental health, improved school performance, and general well-being, state and federal Safe Routes to School programs have sought to improve the ability of children and their parents to safely and conveniently travel to school by walking or biking (Figure 5-4).

In North Dakota, numerous K-12 schools are located along or within close proximity of major freight corridors, as shown in Figure 5-5. Heavy truck traffic through school zones and residential areas is an important deterrent to increased walking.

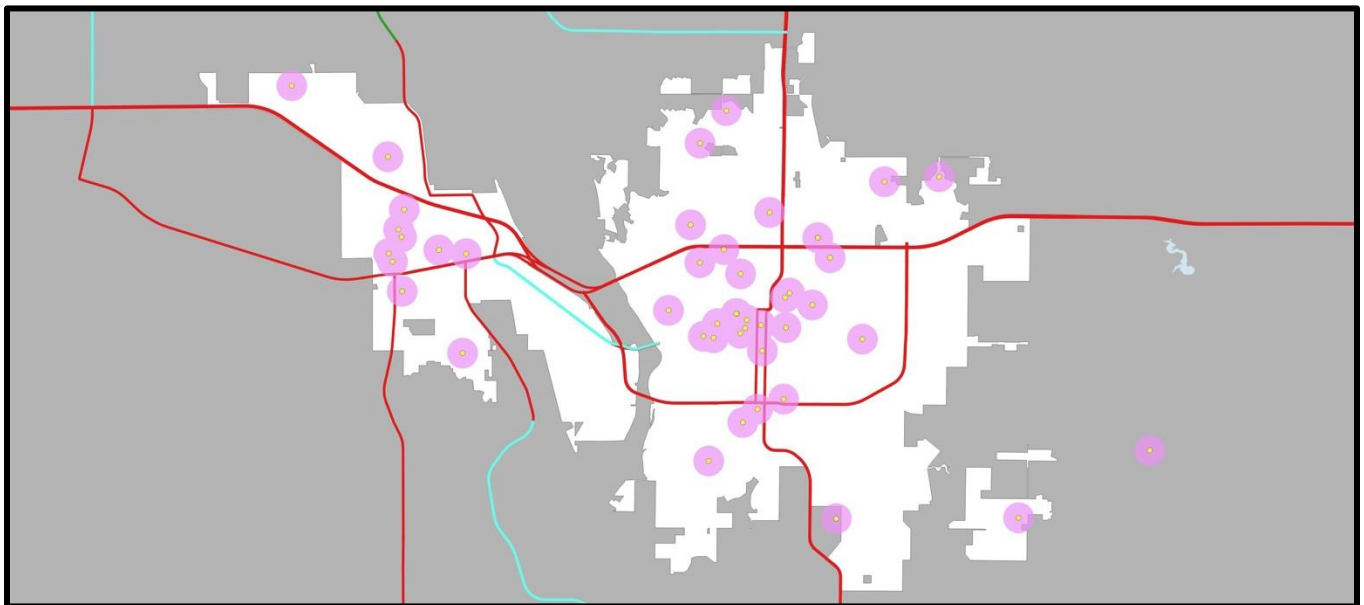
Figure 5-4: K-12 School Children Walking to School



Figure 5-5: K-12 Schools in Close Proximity to Freight Corridors



A 0.5-mile radius (a typical five-minute walk distance) from schools in Bismarck-Mandan can be seen in Figure 5-6.
Figure 5-6: Typical Five-Minute Walk Radius to Schools in Bismarck-Mandan



IMPACTS ON ENVIRONMENTAL JUSTICE COMMUNITIES

Environmental Justice is a set of policies to ensure that no communities receive disproportionate negative impacts from the planning, construction, development or operation of public systems or infrastructure.

FHWA defines Environmental Justice as “identifying and addressing disproportionately high and adverse effects of ... programs, policies, and activities on minority populations and low-income populations.” The goal of Environmental Justice initiatives is to “achieve an equitable distribution of benefits and burdens.”

ENVIRONMENTAL JUSTICE AND FREIGHT TRANSPORTATION

Freight transportation facilities and systems have the potential to generate significant negative externalities, including traffic safety and intermodal conflicts, undesirable environmental effects (including harmful levels of air pollution and noise), and negative impacts on community livability and economic development. These can be caused through:

- The movement of freight through communities
- Through the operation of cargo and intermodal facilities located within those communities

As part of an Environmental Justice perspective, it is important to ascertain how North Dakota’s existing freight and rail transportation system may be impacting the state’s Environmental Justice communities.

NORTH DAKOTA ENVIRONMENTAL JUSTICE COMMUNITIES

To determine potential impacts on North Dakota Environmental Justice communities, it is important to first define what constitutes such a community, and then to conduct a demographic analysis to determine the location of these communities throughout the state. Finally, once this information is determined, to analyze the existing freight and rail system to determine whether there are disproportionate impacts on these populations.

Federal adoption of Environmental Justice concerns and approaches took place in 1994 with the signing of Executive Order 12898, titled “Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.”

Since then, federal agencies have been required to identify and address potential or actual disproportional adverse environmental effects on minority and low-income populations. State agencies working with or funding projects through federal programs have also adopted these same guidelines and goals.

A geospatial demographic analysis to determine the location of these minority and low-income populations is a key input for an Environmental Justice strategy. This information, combined with information for the location and routing of freight movement, railroads, and freight-related facilities, can help illuminate locations where additional Environmental Justice investigation and considerations in the context of this Freight and Rail Plan may be warranted.

Developing a definition of minority populations and low-income populations is an important component of this approach. There is guidance from federal agencies, including the U.S. Department of Housing and Urban Development (HUD) as well as from several state DOTs and other agencies.

For the purposes of this chapter, an Environmental Justice community is any one or more of the following:

- **Minority Populations:** Census Block Group or Census Block where 50% or more of residents are non-White³³
- **Low-Income Populations:** Census Block Group or Census Block where 40% or more of individuals are living at or below the poverty guideline³⁴
- **Racially or Ethnically Concentrated Area of Poverty (R/ECAP):** A Census Block Group or Census Block where 50% or more of residents are non-White and where 40% or more of residents are living at or below the poverty guideline

In addition, seniors and children are also considered to be especially vulnerable to potential health impacts and other negative externalities caused by freight. For the analysis in this chapter, these populations are defined thus:

- **Elderly Population** refers to people who are 65 years and older
- **Children** refers to people who are 16 years of age or younger

Data from Census 2020 is used to determine the location of these populations.

ANALYSIS OF MINORITY POPULATIONS IN NORTH DAKOTA

An analysis of minority populations in North Dakota was conducted using Census 2020 data at the Census Block level.

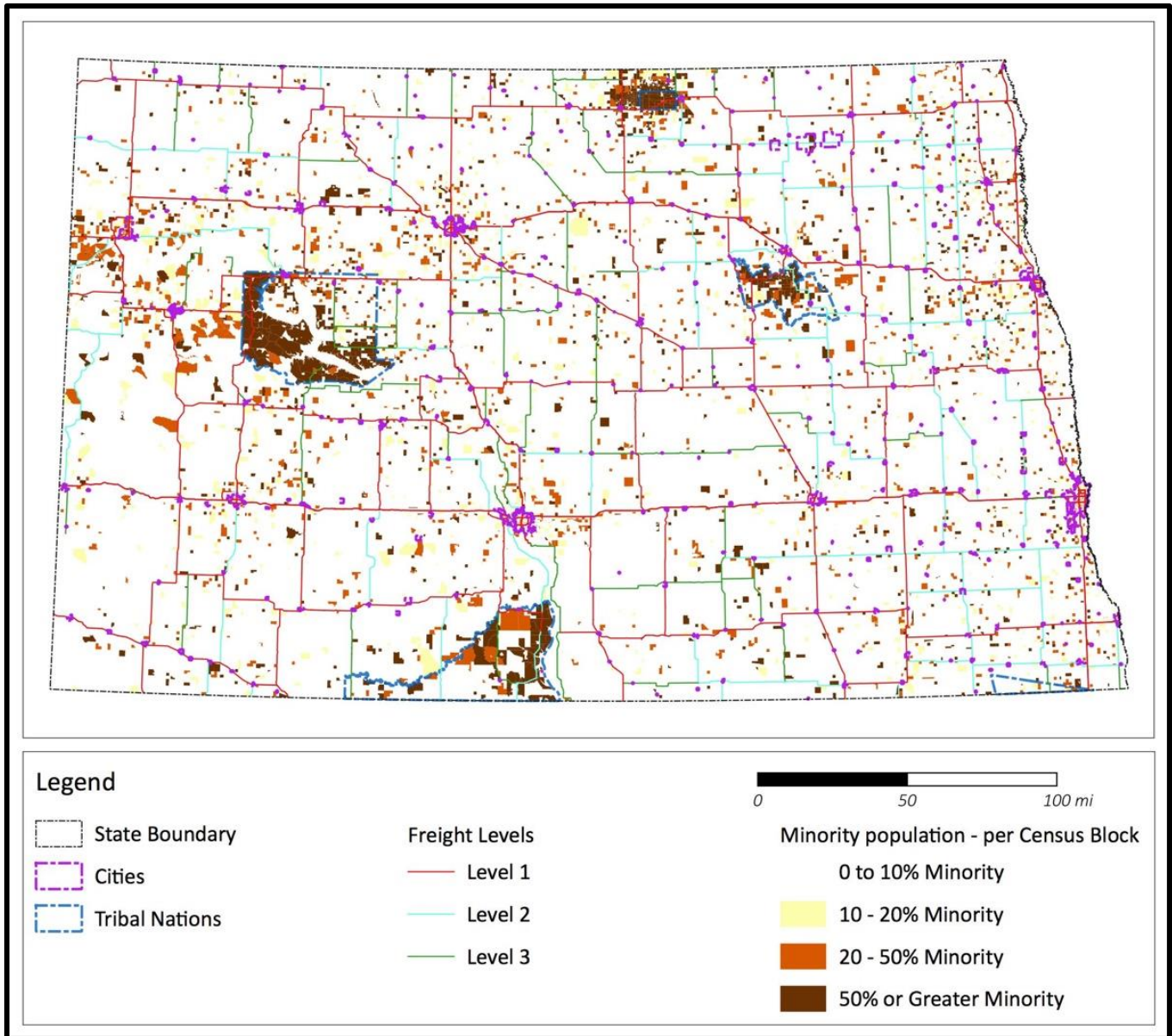
Census Blocks were chosen for this analysis because they are the smallest geographic unit for which actual counts of population (as opposed to estimates) are collected, and because of their size they can be used to more precisely identify locations where minority populations are more concentrated, and where disproportionate impacts from freight movements and operations may be present.

As can be seen from Figure 5-7, minority populations are present throughout the state of North Dakota. It should be noted that there is an important limitation for the map in the figure and for this analysis in general. In *urban areas*, Census Blocks are generally of a size similar to a city block. In *rural areas*, however, where population levels are much lower, Census Blocks are significantly larger and are usually bounded by roads and highways, town or city/county boundaries, creeks, etc. Because their size is greater, and this initial analysis does not currently account for Census Block population density, visual impression of results regarding the *number of people* in that Census Block can be misleading. However, the *minority percentage* shown in the maps in this section will be accurate.

³³ Non-White populations include people who are: (1) Black (a person having origins in any of the Black racial groups of Africa); (2) Hispanic (a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race); (3) Asian American (a person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands); (4) American Indian and Alaskan Native (a person having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition); and (5) Native Hawaiian or Other Pacific Islanders (a person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands)

³⁴ For North Dakota in 2022, the poverty guideline for a family of four was \$27,750

Figure 5-7: Proximity of Minority Populations to Freight Corridors



MINORITY POPULATIONS PROXIMATE TO FREIGHT CORRIDORS IN NORTH DAKOTA CITIES

In this section, a brief analysis of freight corridors and their proximity to concentrations of minority populations is conducted.

For the analysis in this section, the four largest urban areas in North Dakota are investigated (a similar analysis is conducted for Tribal Nations later in this chapter, under that section of this report).

The four urban areas in North Dakota with the highest population totals, according to Census 2020, are in order:

- 1) Fargo and West Fargo (total population of 164,616)
- 2) Bismarck and Mandan (total population of 96,519)
- 3) Grand Forks (total population of 59,166)
- 4) Minot (total population of 48,377)

The percentage of non-White population per Census Block is presented for each of these areas.

As discussed earlier, in cities a Census Block may approximately correspond to a city block (on average, about 40 Census *Blocks* make up a Census *Block Group*). Nevertheless, the population of a Census Block, even within cities, can vary greatly as there may be blocks with zero population, while blocks that are occupied by apartment buildings may have several hundred inhabitants.

To determine the likely "area of influence" of negative externalities from freight corridors potentially affecting residents, two distances are investigated as part of the mapping developed for this chapter:

- **Distance 1** is approximately about 1/10 of a mile (about 530 feet) from the *centerline* of a roadway designated as a freight corridor
- **Distance 2** is about 850 feet from the *centerline* of a roadway designated as a freight corridor - this is intended to indicate a distance of about *one city block from the edge* of wider roadways that are designated as a freight corridor.

Both are shown in Figure 5-8 through Figure 5-11, which identify the area of influence associated with negative freight externalities in Fargo and West Fargo; Bismarck and Mandan; Grand Forks; and Minot.

Figure 5-8: Fargo and West Fargo Minority Populations and Proximity to Freight Influence Corridors

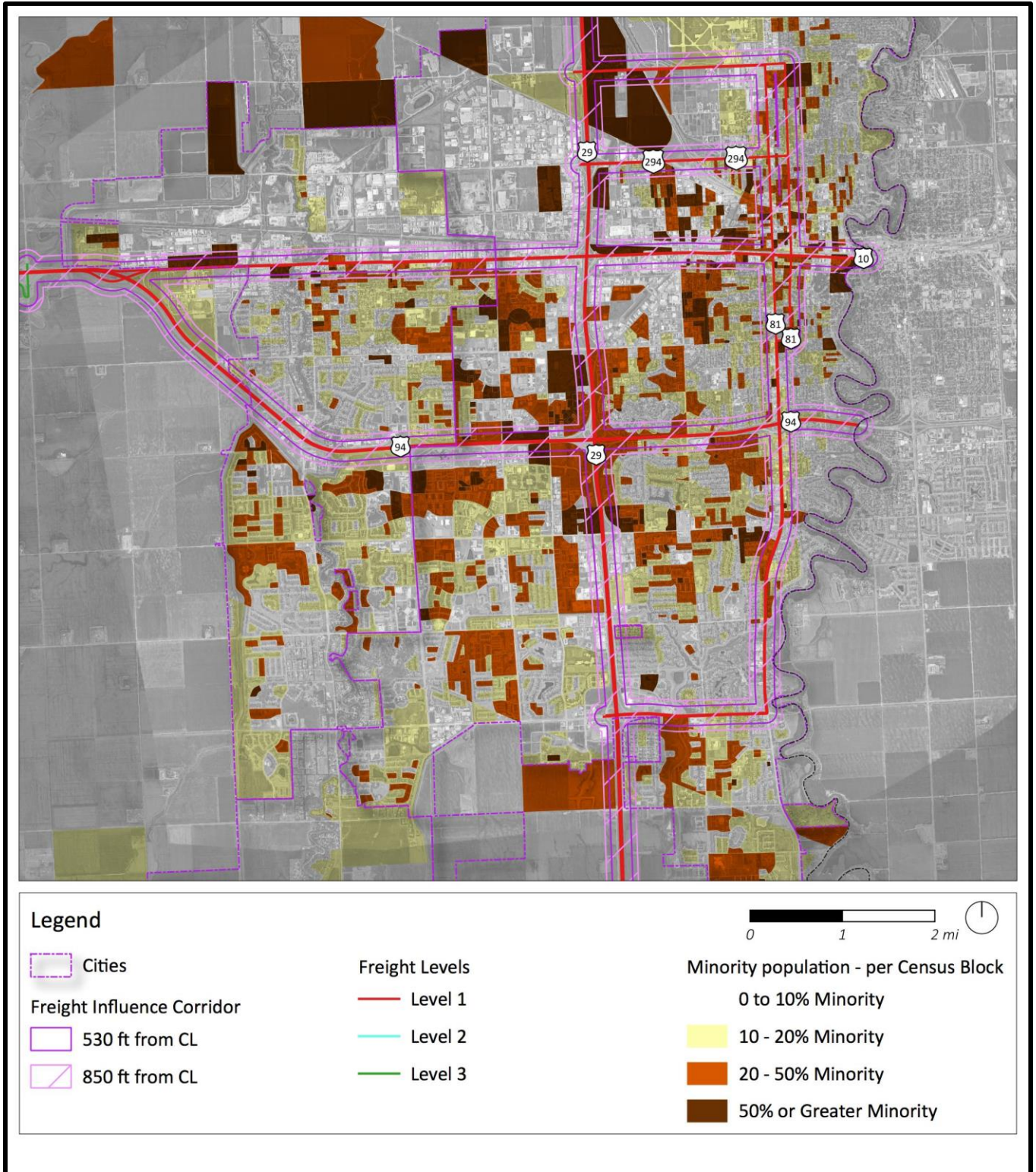


Figure 5-9: Bismarck and Mandan Minority Populations and Proximity to Freight Influence Corridors

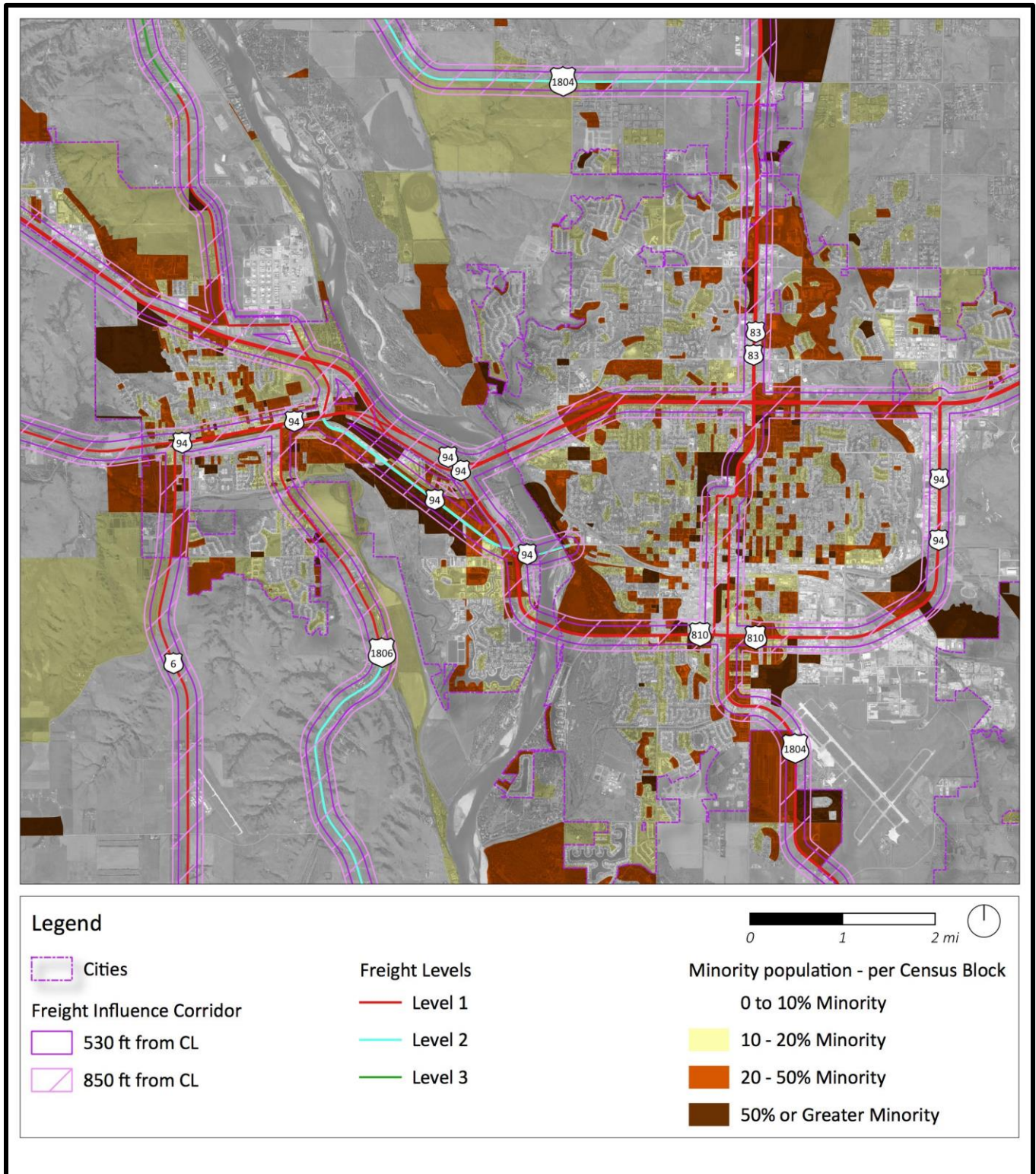


Figure 5-10: Grand Forks Minority Populations and Proximity to Freight Influence Corridors

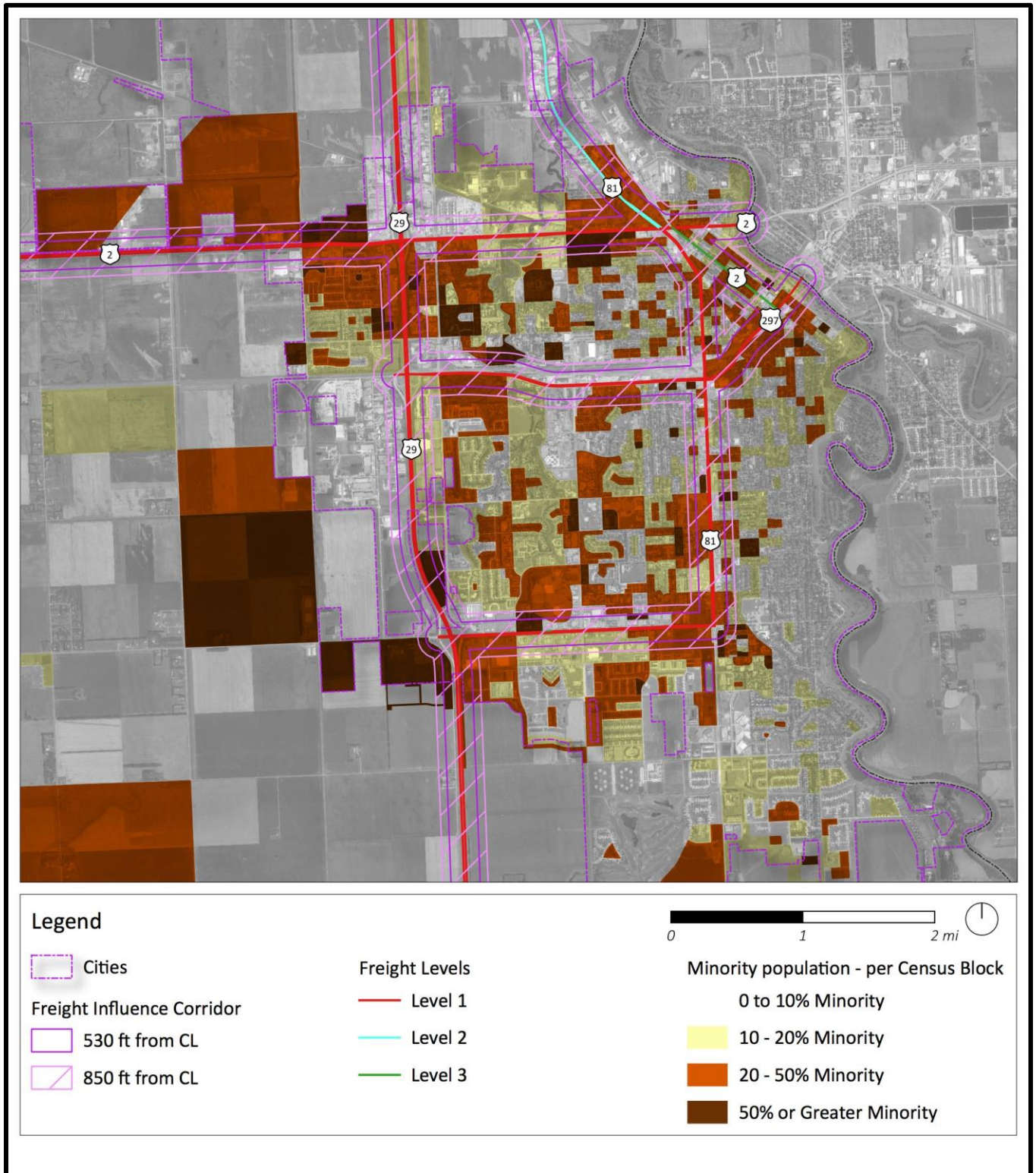
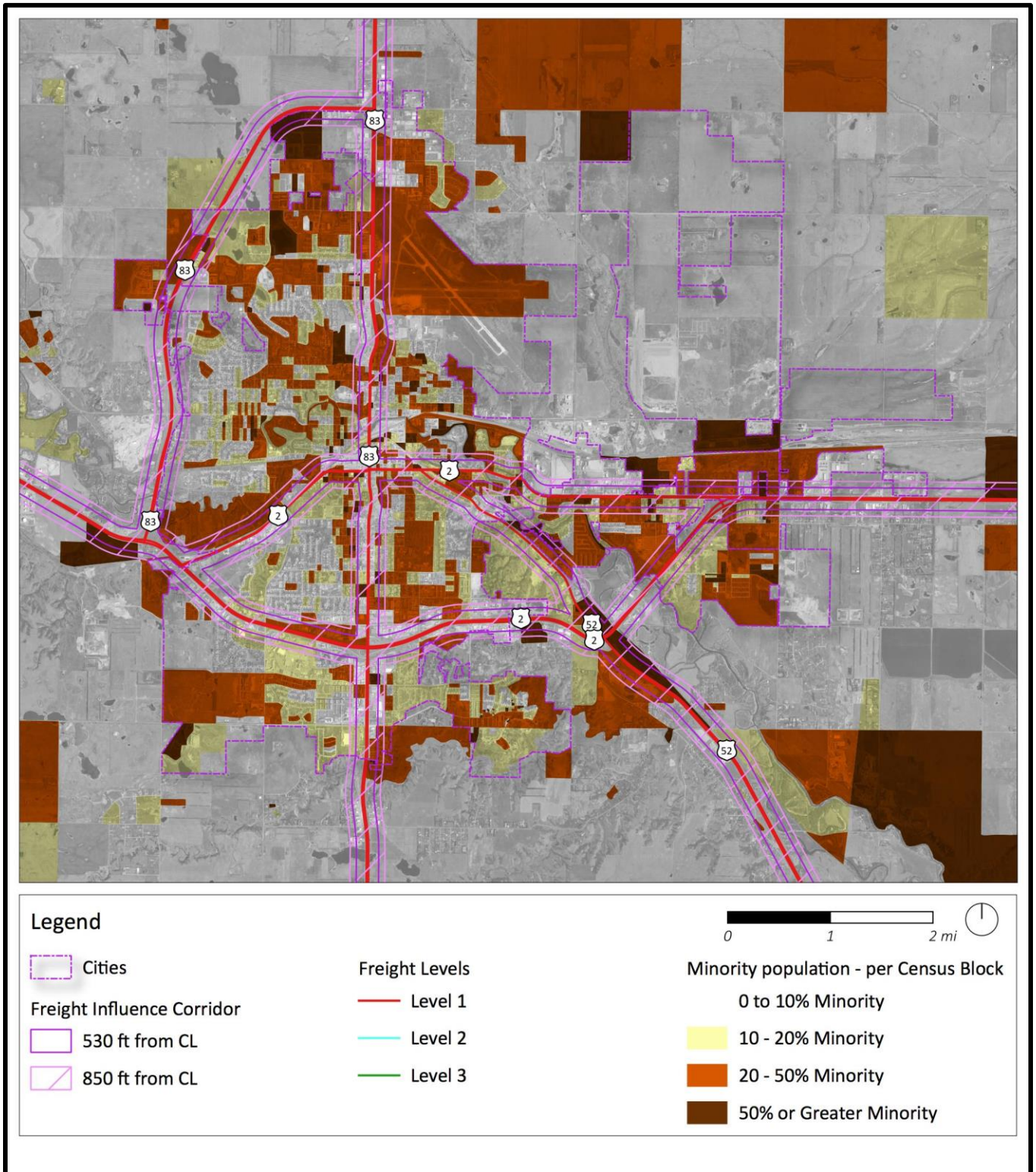


Figure 5-11: Minot (Population 48,377)



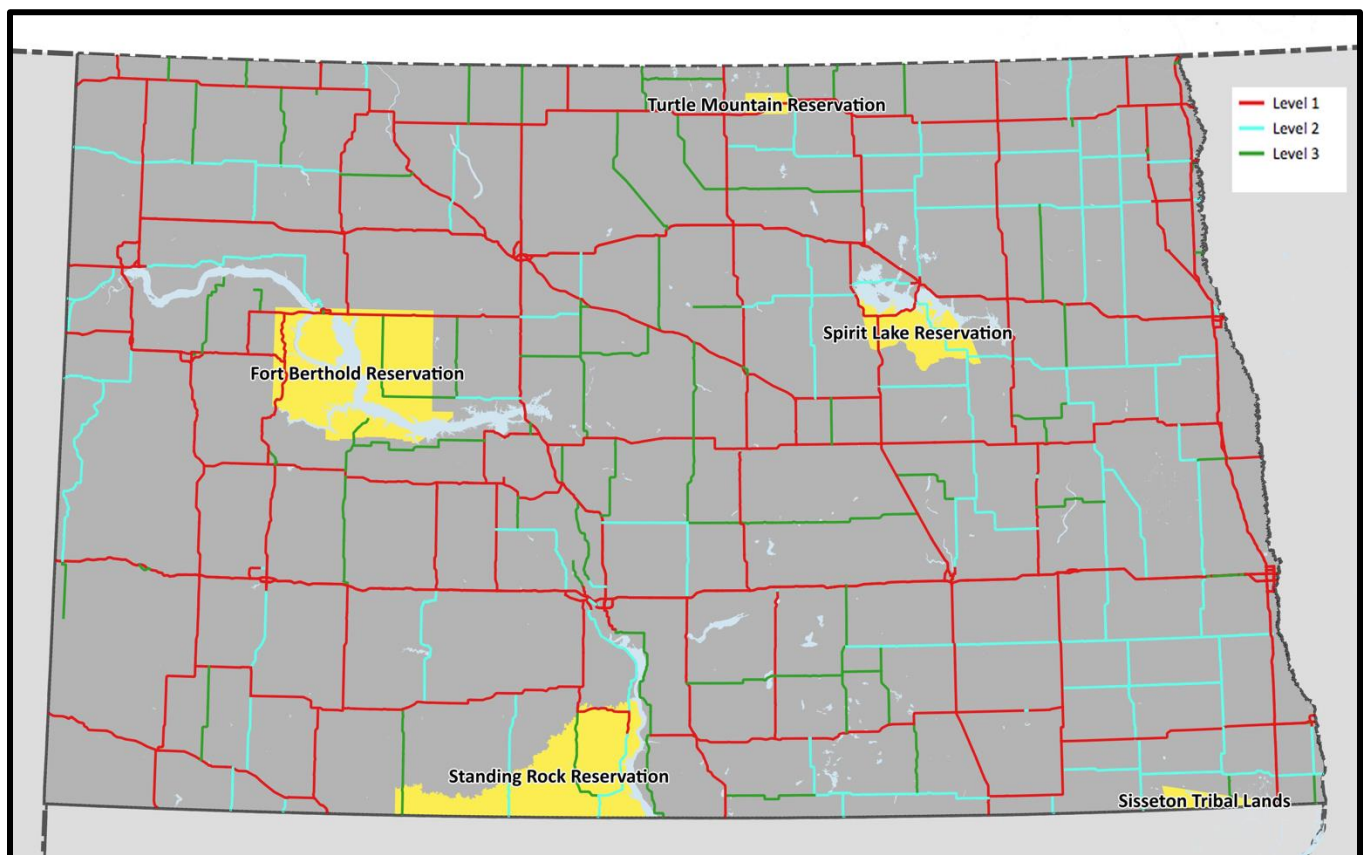
TRIBAL NATIONS

The people, lands, communities, and businesses located within the five federally recognized tribal nations in North Dakota experience both the benefits and burdens of freight and rail activities. These include the Three Affiliated Tribes (MHA Nation) at Fort Berthold, Standing Rock Sioux Tribe, Spirit Lake Nation, Sisseton-Wahpeton Oyate, and the Turtle Mountain Band of Chippewa Indians. Each of the Tribes have treaties with the United States that establish their reservation boundaries and have historic and cultural sites across the state.

Based on the 2020 Census, American Indian and Alaska Native people make up 7.2% of North Dakota’s population with a total reservation-based population of 40,419 people that includes 24,827 American Indian/Alaska Natives. Statewide 55,777 people identify as American Indian/Alaska Native.

Tribal land areas are served by 5,250 miles of public roads and bridges located within tribal boundaries. The roads are owned by six different government entities, including the Tribes, Bureau of Indian Affairs (BIA), State of North Dakota, counties, municipalities, and townships. Tribal communities have at least one major state highway passing through or nearby that carries significant truck-based freight. This freight traffic impacts community livability for tribal communities in similar ways to any other town.

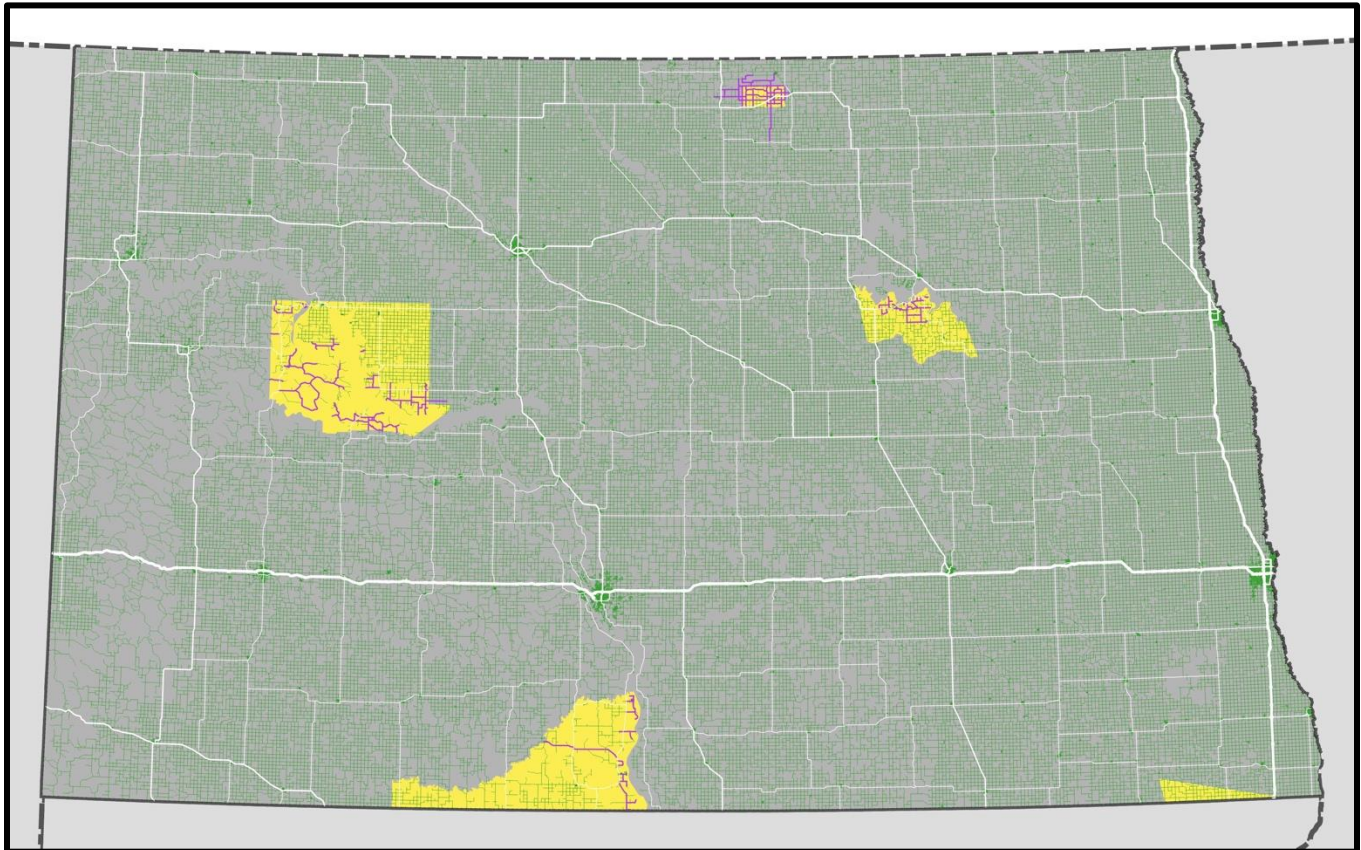
Figure 5-12: Tribal Lands and Freight Corridors



Tribal lands and communities are served by a transportation network composed of state, county, township, and BIA owned roads. The North Dakota state highway system crosses each tribal land area providing essential transportation infrastructure and network connections. These highways connect the people and businesses located on tribal lands to essential services including health care, education, and employment. State highways also provide access to freight that carry a wide range of products and materials that support local tribal economies.

Many of the municipalities and communities within tribal lands are established along the state highway. Figure 5-13 identifies the network of federal, state, county, city, and BIA highways. BIA roads are shown in purple.

Figure 5-13: Highways within Tribal Lands



MHA NATION

The Fort Berthold Indian Reservation (Fort Berthold or FBIR) is the home to the Three Affiliated Tribes, also known as the MHA Nation. The Three Affiliated Tribes is a sovereign federally recognized tribe located in west-central North Dakota. The Fort Berthold Indian Reservation consists of about 1 million acres and has a total population of 7,219 people, including 4,706 American Indian/Alaska Natives. The three tribes have historically occupied the Missouri River area of the Great Plains and into Canada. The 1851 Treaty of Fort Laramie reserved 12 million acres for the Tribes. Through a series of treaties and executive orders their lands have been reduced by roughly 90%, including flooding of their richest lands for the construction of Garrison Dam on the Missouri River. Lake Sakakawea divides the reservation with the only bridge crossing located on the far north side on US-23. Fort Berthold sits in the Missouri River basin and over the Bakken and Three Forks shale formations. The leasing and development of oil and gas reserves has resulted in substantial traffic and infrastructure impacts for reservation residents.

The Fort Berthold Reservation is divided into six segments, Four Bears, West Segment, North Segment, Lucky Mound/Northeast Segment, South (Twin Buttes) Segment and East (White Shield) Segment. Similarly, there are six main reservation communities: Twin Buttes, White Shield, Parshall, Mandaree, Four Bears, and New Town. The physical headquarters of the Tribe is in the Four Bears Complex at the west end of the Four Bears Bridge on ND-

23. A significant number of employers and service providers are in New Town and Four Bears which creates a significant commute for residents located in other parts of the reservation.

The Fort Berthold Indian Reservation is also located in six different counties, McLean, McKenzie, Mountrail, Dunn, Mercer, and Ward. The counties manage 1,041 miles of road within the Fort Berthold Indian Reservation.

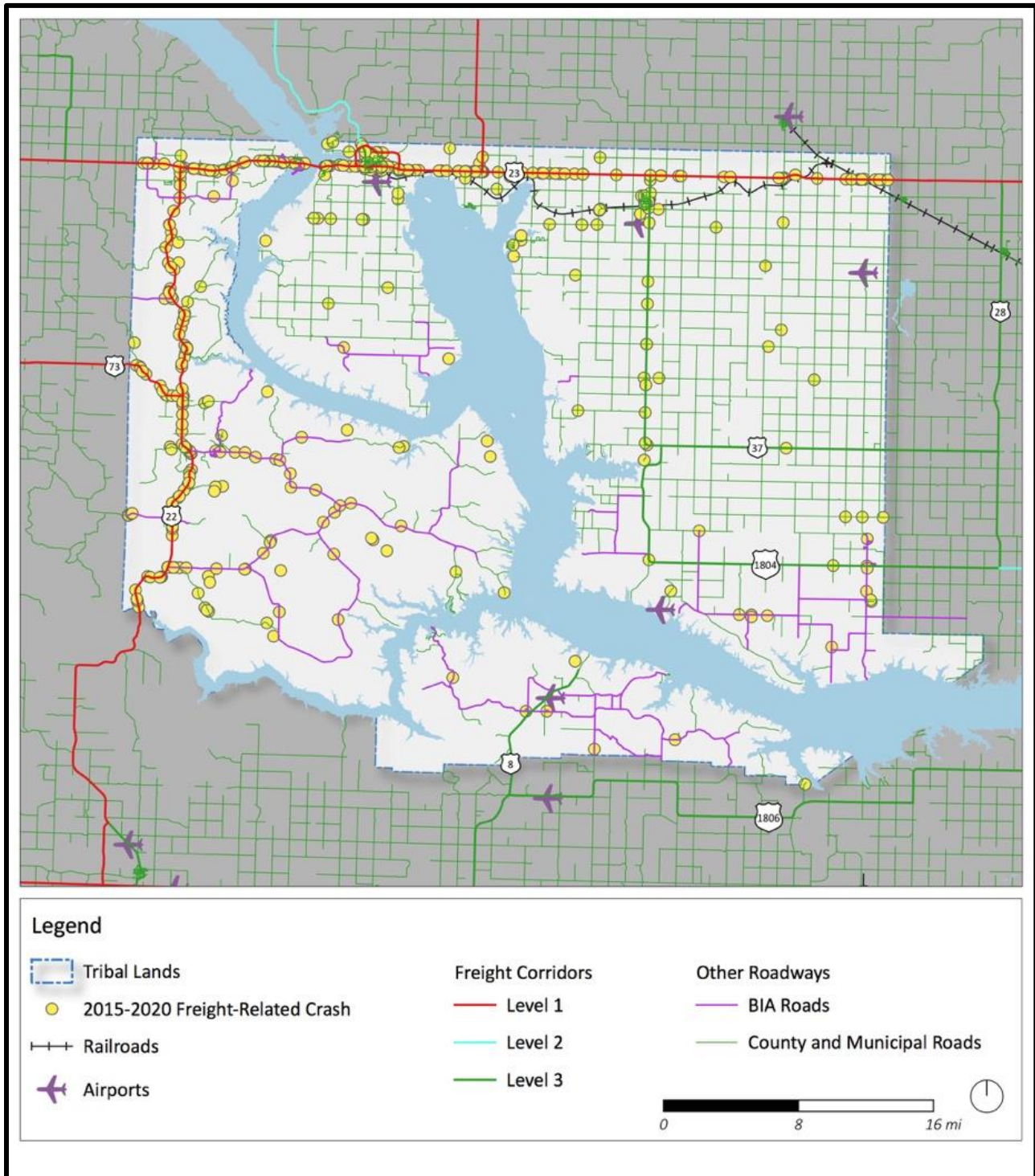
There are 1,569 miles of highway on Fort Berthold including 149.5 miles owned by NDDOT. County roads make up 853.4 miles, BIA owns 213.8 miles, the Tribe owns 28.9 miles and municipalities own 16.7 miles of roads.

Heavy trucks are a large contributor to traffic counts, with some areas having over 50% of the traffic identified as heavy trucks. Heavy truck traffic in the area is largely the result of oil-related activities and agriculture. Although the growth of oil and gas-related traffic has leveled off, all currently producing wells have significant heavy truck traffic associated with them. Although long-term truck traffic levels are difficult to predict, the high proportion of trucks on the road impact transportation planning and roads should continue to be designed to accommodate heavy truck traffic and measures taken to mitigate their impacts on the communities. The Transportation Administration of MHA Nation is currently developing and implementing a system to post, monitor, and enforce weight limits on roads to better manage the heavy truck traffic.

Motor vehicle crashes involving commercial vehicles and trucks are a significant concern throughout the Fort Berthold Reservation. Between 2015 and 2020 these vehicle types accounted for 224 crashes, including 8 fatal and 11 serious injury crashes. Though passing and turning lanes have been constructed since the increase of oil and gas-related traffic in 2008, the volume of heavy truck traffic continues to present safety concerns. Trucks departing oil pads during wet weather carry mud and debris onto the highway creating slick conditions and causing visibility issues. Broken windshields from truck borne debris are a persistent issue. Overweight vehicles cause damage to secondary roads that have not been constructed to heavy load standards. All of these factors create ongoing roadway safety issues. Figure 5-14 illustrates the transportation network within the MHA Nation and location of crashes.

Rail is an important part of the Fort Berthold transportation infrastructure. The Bakken Shale Oil Formation is centered on Fort Berthold requiring the import and export of a significant volume of raw material. BioUrja New Town Terminal operates a frac sand, crude oil, and NGL terminal in New Town. This facility provides commodity trans-loading and storage services on a 200-acre state-of-the-art facility, with unit train capability served by CP Rail and 270,000 barrels of storage capacity. In addition to transporting crude oil and well development materials, rail services carry a significant volume of agricultural materials including seed, grains, and fertilizer.

Figure 5-14: MHA Nation Transportation Network and Crashes (2015-2020)



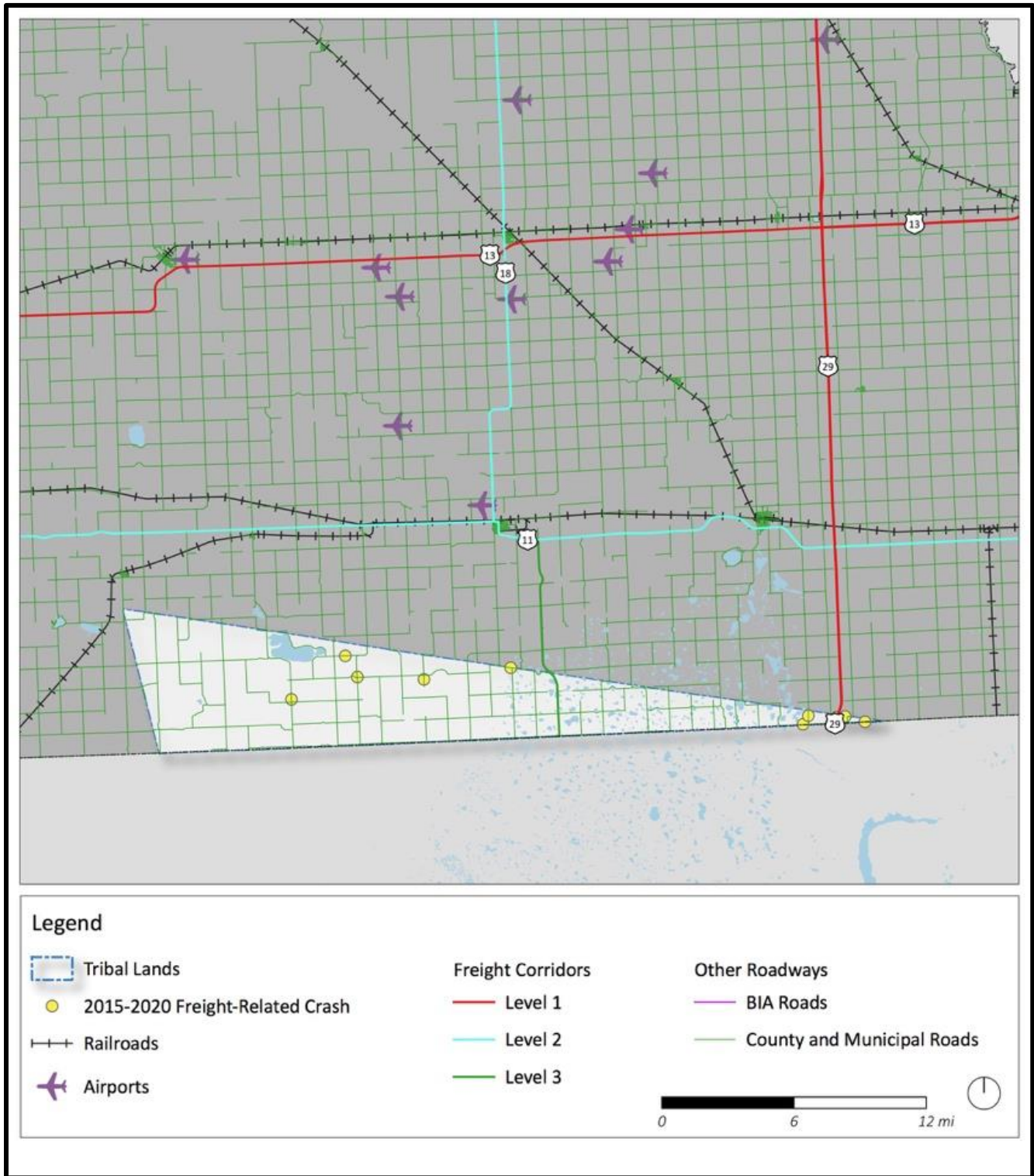
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

SISSETON-WAHPETON OYATE TRIBE

The Lake Traverse Reservation is home to the Sisseton-Wahpeton Oyate Tribe and located in the northeastern part of South Dakota and a small portion of southeastern North Dakota. The Treaty of 1867 reserved a tract of land that began at Lake Traverse and ran along the treaty line of the 1851 Treaty to Lake Kempeska. The northwest boundary extends into North Dakota to the Airy Mound in Sargent County. The reservation boundaries extend across seven counties, two in North Dakota and five in South Dakota. There are seven districts on the Lake Traverse Reservation: Big Coulee, Buffalo Lake, Enemy Swim, Lake Traverse, Long Hollow, Old Agency, and Veblen. The American Community Survey estimates 11,095 people reside within the Lake Traverse Reservation, including the North Dakota and South Dakota portions. There are currently 13,872 enrolled members nationwide with an estimated 4,634 members residing on the Reservation.

The Tribal government is centered in Agency Village. I-29 runs north-south through the middle of the reservation. Exit 1 in North Dakota provides access to the Dakota Magic Casino, a primary economic resource for the Tribe. Plans for further residential and economic development of this area are underway that will increase the traffic. Sisseton-Wahpeton Oyate is targeting motor vehicle crashes as a high priority in their transportation planning process. Three railroad companies provide freight services within the reservation including BNSF, The Twin Cities and Western Railroad, and the Sunflour Railroad. Figure 5-15 illustrates the transportation network within the Sisseton Wahpeton and Oyate Tribe and location of crashes.

Figure 5-15: Sisseton Wahpeton Oyate Transportation Network and Crashes (2015-2020)



23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

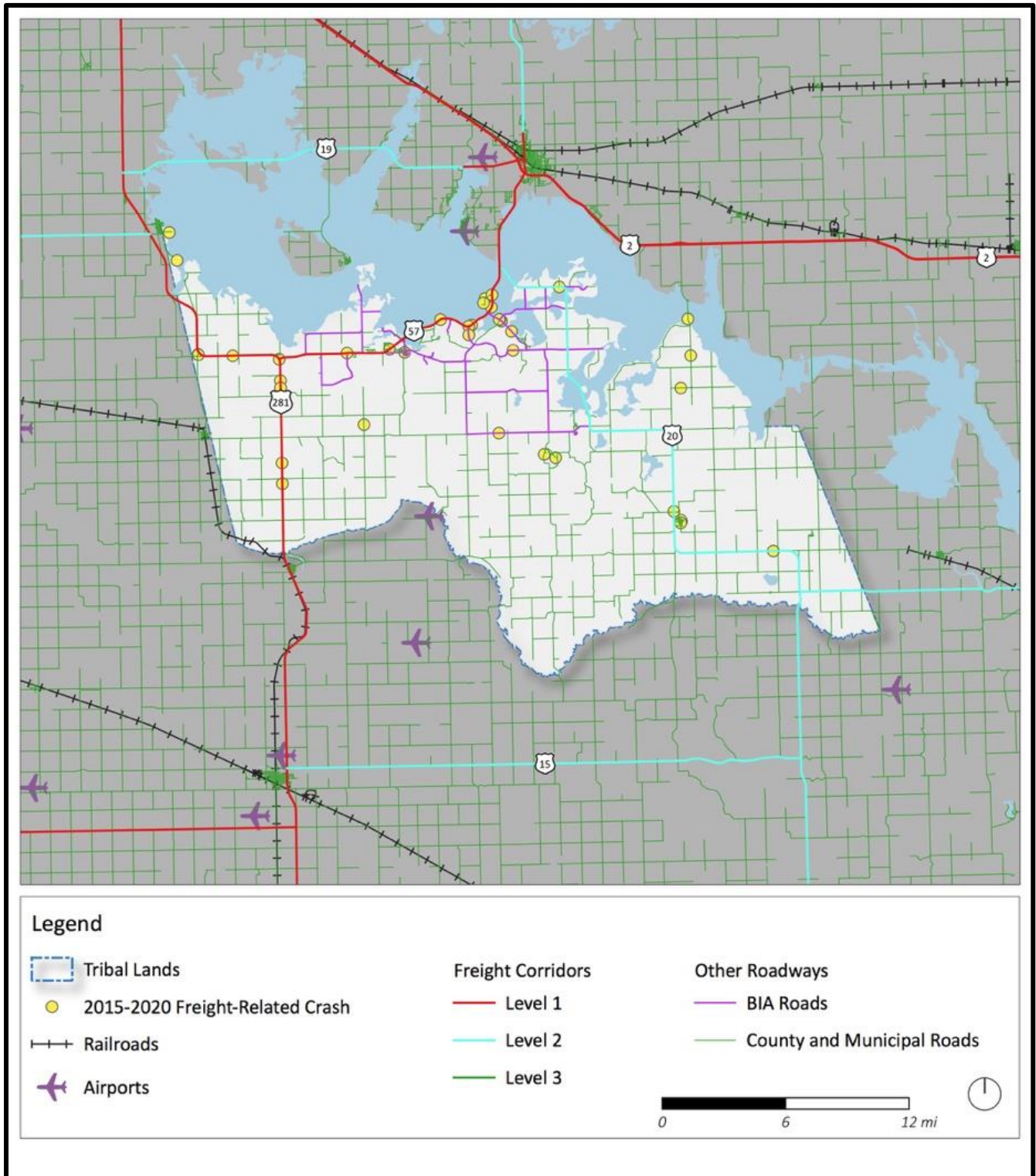
SPIRIT LAKE NATION

The Spirit Lake Nation Reservation is located in east central North Dakota and includes 245,141 acres. Devil's Lake occupies 90,000 acres and stretches over 200 miles of shoreline. The present-day Reservation was established by a treaty between the United States and the Sisseton and Wahpeton Bands of Dakota in 1867. Spirit Lake Tribe consists of four districts: Mission, Woodlake, Fort Totten, and Crowhill. The Fort Totten community is the tribal headquarters and includes the BIA and Spirit Lake Casino Resort. Other entities include Sioux Manufacturing Corporation, Spirit Lake Housing Corporation, Cankdeska Cikana Community College, Four Winds Community School, and several small businesses. Tourists are attracted to the numerous fishing opportunities and historic sites, including the Fort Totten State Historic Site and Sullys Hill National Game Preserve.

Within the Spirit Lake Nation there are 80 miles of BIA roads, 23 miles of tribal routes, 94 miles of county roads, 270 miles of township roads, and 69.2 miles of state highway. Highway safety is a high priority for the Tribe, and they have conducted several road safety audits. North Dakota Highway 57 carries a significant amount of traffic through the Fort Totten community, including the school zone and casino. The Tribe has developed a Transportation Safety Management Plan and coordinates data sharing with NDDOT. Pedestrian and bicycle safety is a high priority for this corridor and throughout the Reservation.

Figure 5-16 illustrates the transportation network within the Spirit Lake Nation and location of crashes.

Figure 5-16: Spirit Lake Nation Transportation Network and Crashes (2015-2020)



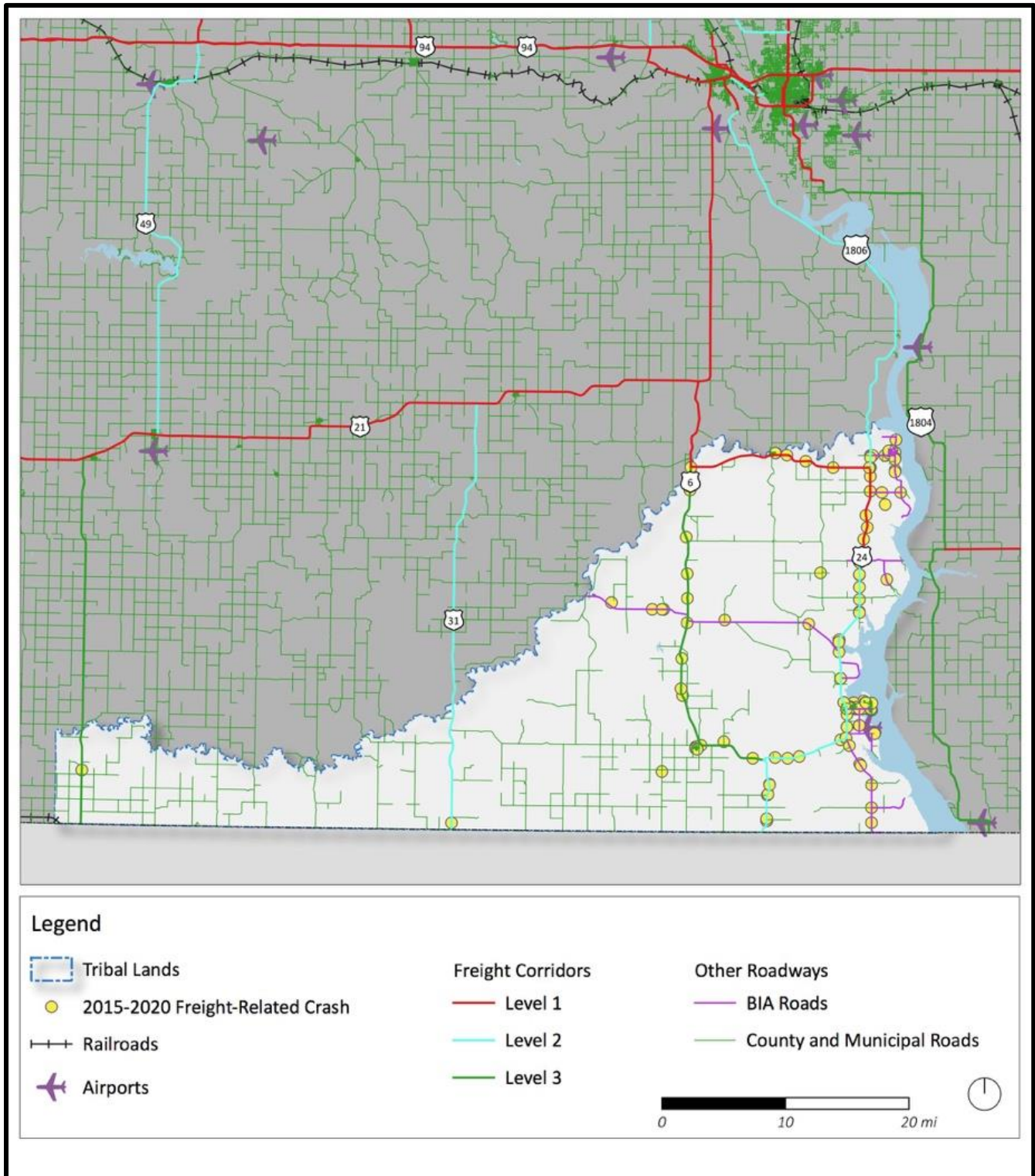
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

STANDING ROCK SIOUX TRIBE

The Standing Rock Sioux Reservation straddles the North Dakota/South Dakota border in the central portion of both states. Currently the Reservation is about 1,000,000 total acres and is divided into eight districts: Fort Yates, Porcupine, Kenel, Wakpala, Running Antelope, Bear Soldier, Rock Creek, and Cannon Ball. The North Dakota portion of the Reservation is in Sioux County. The community of Fort Yates is the administrative headquarters for tribal government and is home to Tribal Administrative Offices, Sitting Bull College, the Fort Yates Hospital, Standing Rock Transit, BIA, and several small businesses. The Standing Rock Sioux Tribe has two casinos, Prairie Knights Casino located near Cannon Ball, North Dakota, and the Grand River Casino near Wakpala, South Dakota. Agriculture (cattle and farming) is the leading private sector activity. Tourism is a growing industry due to the beautiful land base which includes the Missouri River (Lake Oahe), Cannon Ball River, Grand River, and many creeks, offering boating, fishing, swimming, camping, and hiking.

Freight movement is limited to a north-south direction due to the inundation of the Missouri River to create Lake Oahe that forms the eastern boundary. With Fort Yates located in the central part of the east boundary, the closest bridge crossings are at Mobridge South Dakota (50 minutes south) and Bismarck, North Dakota (67 miles and 1.25 hours north). A bridge crossing at Fort Yates has been identified as a high priority need though no current plan exists for construction. Figure 5-17 illustrates the transportation network within the Standing Rock Sioux Tribe and location of crashes.

Figure 5-17: Standing Rock Sioux Tribe Transportation Network and Crashes (2015-2020)



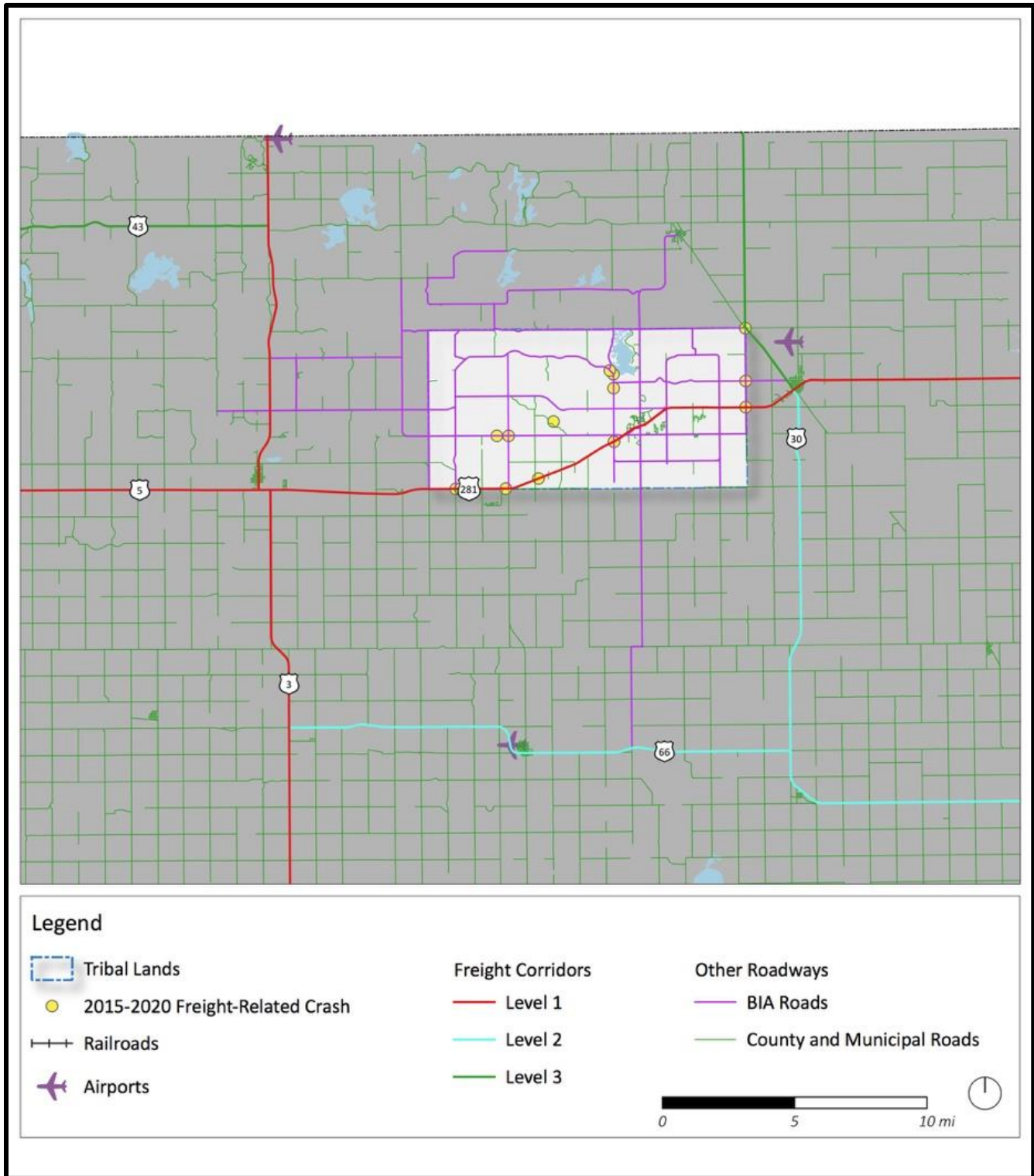
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

TURTLE MOUNTAIN BAND

The Turtle Mountain Indian Reservation headquarters is located in the extreme north central part of North Dakota and is home to the Ojibwe and Métis peoples of the Turtle Mountain Band of Chippewa Indians. Turtle Mountain tribal lands have a population of 9,085 people, including 8,884 American Indian/Alaska Natives. The main part of the Turtle Mountain Reservation is in Rolette County, North Dakota, encompassing an area of 6 miles by 12 miles. It covers 72 square miles (46,000 acres). Another 26,175 acres of trust land is in Rolette County, North Dakota, around the Turtle Mountain Reservation. Another 6,698 acres of trust land is managed by the Trenton Indian Service Area in western North Dakota. The remaining land, totaling 67,852 acres, is individually owned public domain allotments located primarily in Montana, with small parcels in North Dakota and South Dakota. The total area of the Turtle Mountain Reservation is 146,805 acres. The Turtle Mountain Band of Chippewa Indians host one casino with an accompanying hotel. There are also 70 farms, 16 of which are greater than 1,000 acres.

The Turtle Mountain Reservation consists of 246 miles of road, including about 18 miles of US-281/ND-5. This highway provides east-west traffic across the Reservation and connects Belcourt, the primary tribal community, to adjacent communities of Dunseith and Rolla. Most businesses, schools, the hospital, and government buildings are accessed from US-281.

Figure 5-18: Turtle Mountain Band Transportation Network and Crashes (2015-2020)



23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

TRIBAL TRAFFIC SAFETY AND CRASH-RELATED ISSUES

Law enforcement and highway safety are closely intertwined. Tribal and BIA police, County Sheriff, ND Highway Patrol, and municipal police have a role in different settings within tribal land. Though tribal governments have inherent sovereign powers over their territory, they lack criminal jurisdiction over non-Indian individuals. Similarly, state law enforcement authorities have limited criminal jurisdiction over tribal members within tribal reservation boundaries. This complex criminal jurisdiction environment combined with limited law enforcement resources in rural areas of the state creates issues that make enforcement of commercial freight traffic laws challenging.

On October 4, 2021, a historic Memorandum of Understanding (MOU) was signed between the Three Affiliated Tribes and the NDHP. The Agreement facilitates a cooperative law enforcement effort between the Department and the Tribe to provide mutual aid and assistance to each other for the safety and protection of the citizens of North Dakota and those persons who live or travel within the boundaries of the Fort Berthold Reservation. Traffic on the Fort Berthold Reservation is highly impacted by the oil and gas industry that requires a wide variety of commercial truck traffic in its daily operations. Law enforcement officers are responsible for enforcing traffic and criminal laws, commercial vehicle safety laws, responding to motor vehicle crashes, and hazardous materials releases.

Table 5-3 and Table 5-4 identify further detail associated with freight-related crashes on Tribal Lands between 2015 and 2020.

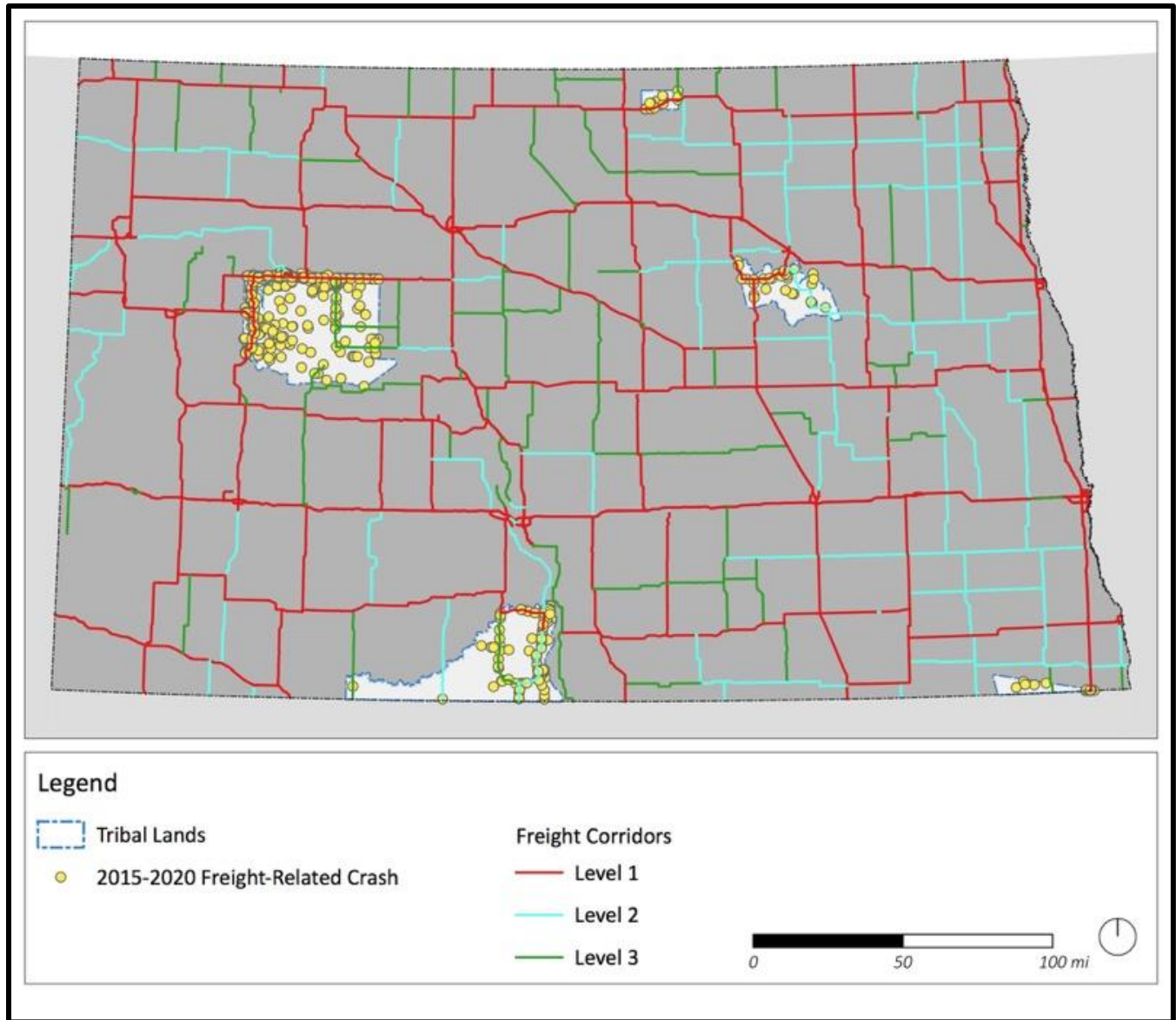
Table 5-3: Freight Vehicle Configuration Involved in Crashes on Tribal Lands

Tribe	2-Axle	3+ Axle	Construction Equipment	Single Unit Truck	Truck Tractor	Unknown Heavy Truck	Total
Spirit Lake	0	1	0	0	2	2	5
MHA Nation	10	25	5	8	142	38	228
Sisseton-Wahpeton Oyate	0	1	1	0	1	0	3
Standing Rock	3	1	0	0	2	0	6
Turtle Mountain	0	0	0	0	0	0	0
Total	13	28	6	8	147	40	242

Table 5-4: Freight-related Serious Crashes

Tribe	Fatal Injury	Serious Injury
Spirit Lake	0	0
MHA Nation	8	11
Sisseton-Wahpeton Oyate	0	0
Standing Rock	0	1
Turtle Mountain	0	0
Total	8	12

Figure 5-19: Freight-related Crashes on Tribal Lands (2015-2020)



23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

LIVABILITY ISSUES CAUSED BY COMMERCIAL AND FREIGHT ISSUES ON TRIBAL LANDS

Tribal governments, their residents, and economies are directly impacted by freight and rail activities. Tribal lands experience the same or similar benefits and burdens associated with freight and rail activities. Tribes across the state rely on freight to support their agricultural (livestock and crop), retail and tourism economic sectors. In western North Dakota the Three Affiliated Tribes and Trenton Service Area are highly impacted by freight and rail activity associated with the oil and gas industry.

Some specific livability impacts caused by freight movement on tribal lands include:

- Truck traffic passing through tribal communities present safety risks, impact school zones, and transport hazardous materials.
- Trucks create noise and air pollution.
- Trucks create parking issues, particularly at convenience stores, hotels, and restaurants.
- Trucks carrying oversize loads.
- Trucks carry rocks and mud onto the highway creating muddy conditions that reduce visibility, reduce braking distances, and damage windshields.
- Trucks intimidate and discourage pedestrian and bicycle use of the road.

Addressing these issues requires extensive coordination between NDDOT and each Tribe's transportation, planning and law enforcement departments. To facilitate this level of engagement NDDOT has established tribal liaison positions within the project development and cultural resources management programs. These liaisons provide important points of contact to hear concerns and assist in identifying issues. They provide referrals to other parts of the NDDOT organization depending on the issues and needs expressed.

MAPPING OF ENVIRONMENTAL JUSTICE / MINORITY POPULATION, PER NATION

The percentage of non-White population per Census Block population is presented for Tribal Nations in North Dakota. To determine the likely "area of influence" of negative externalities from freight corridors potentially affecting residents, two distances are investigated as part of the mapping developed for this chapter:

- **Distance 1** is approximately about 1/10 of a mile (about 530 feet) from the *centerline* of a roadway designated as a freight corridor.
- **Distance 2** is about 850 feet from the *centerline* of a roadway designated as a freight corridor - this is intended to indicate a distance of about *one city block from the edge* of wider roadways that are designated as a freight corridor.

Both are shown on the maps provided over the following pages. Figure 5-20 through Figure 5-24 identify each location of Minority populations within each Tribal area and the area of influence associated with freight corridors.

Figure 5-20: Minority Population and Freight Corridors – MHA Nation

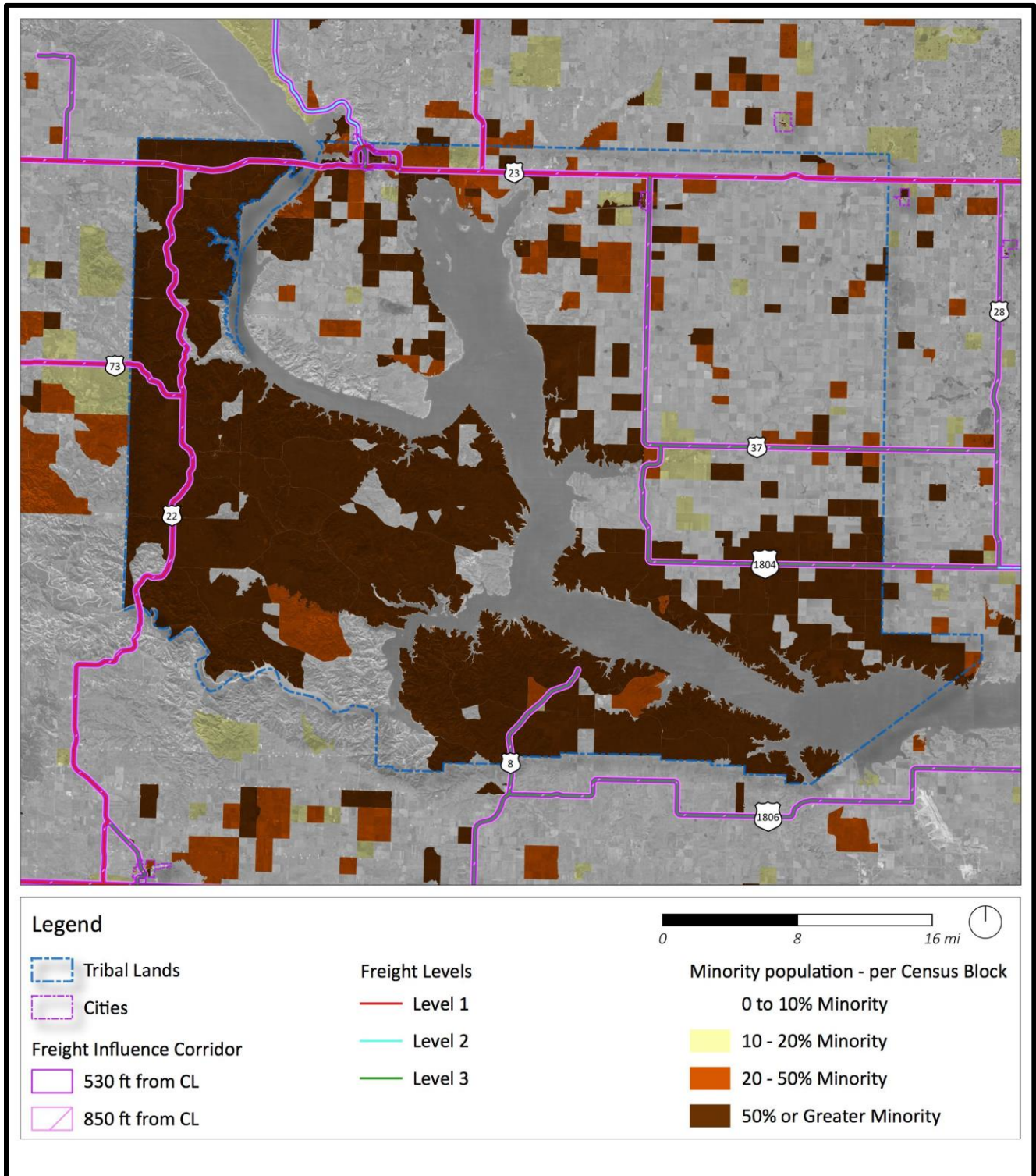


Figure 5-21: Minority Population and Freight Corridors – Sisseton Wahpeton Oyate

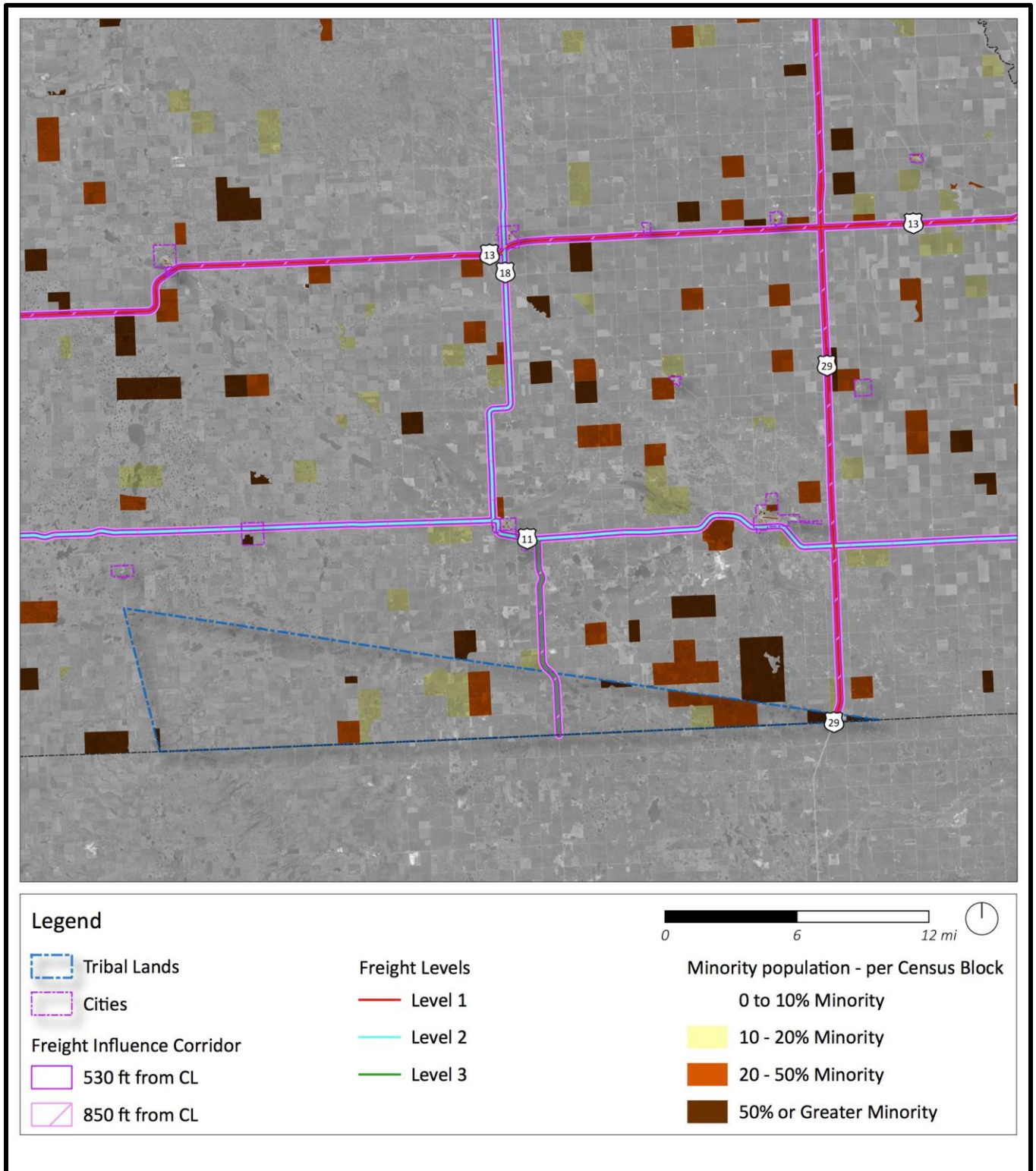


Figure 5-22: Minority Population and Freight Corridors – Spirit Lake Nation

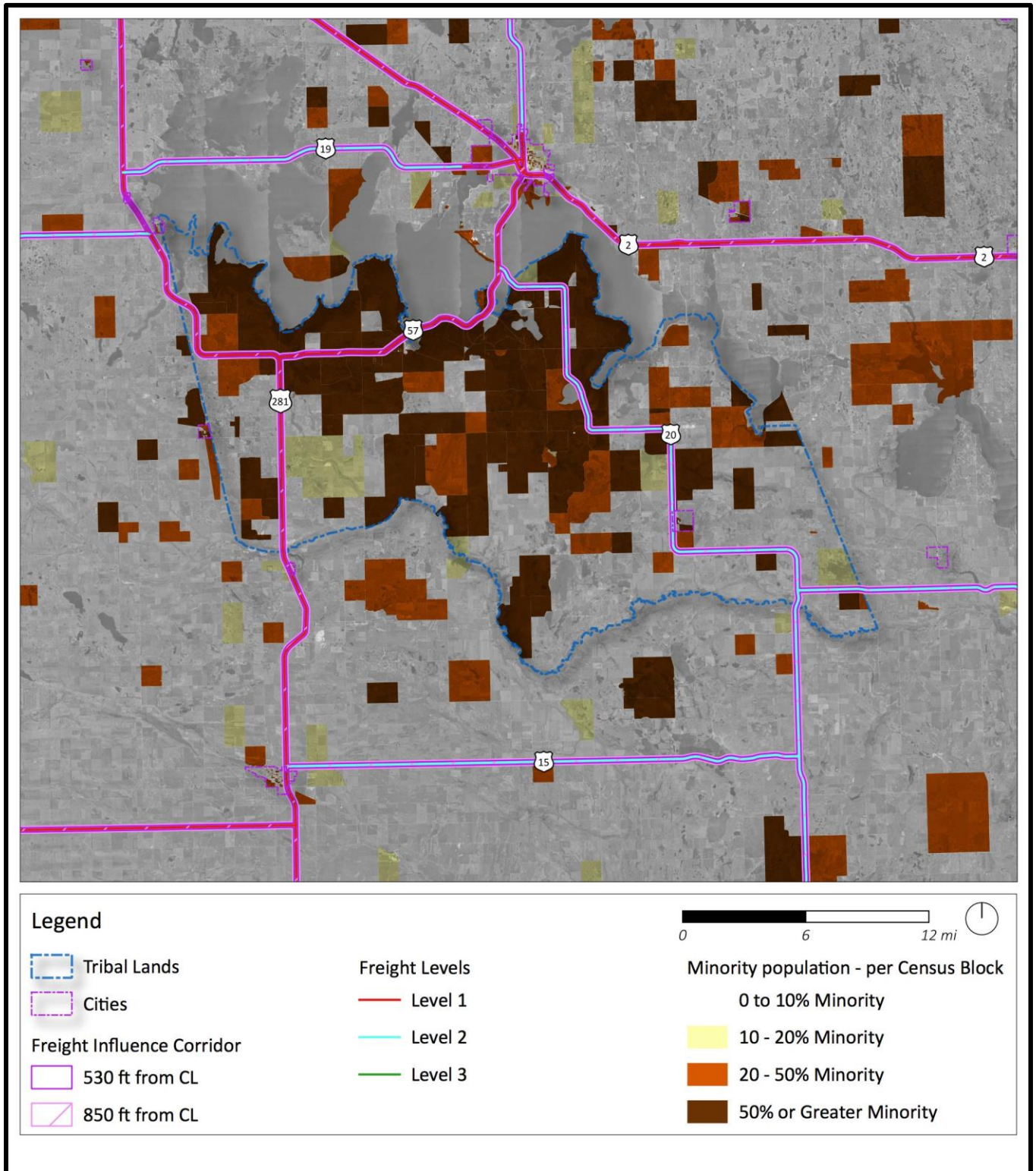


Figure 5-23: Minority Population and Freight Corridors – Standing Rock Sioux Tribe

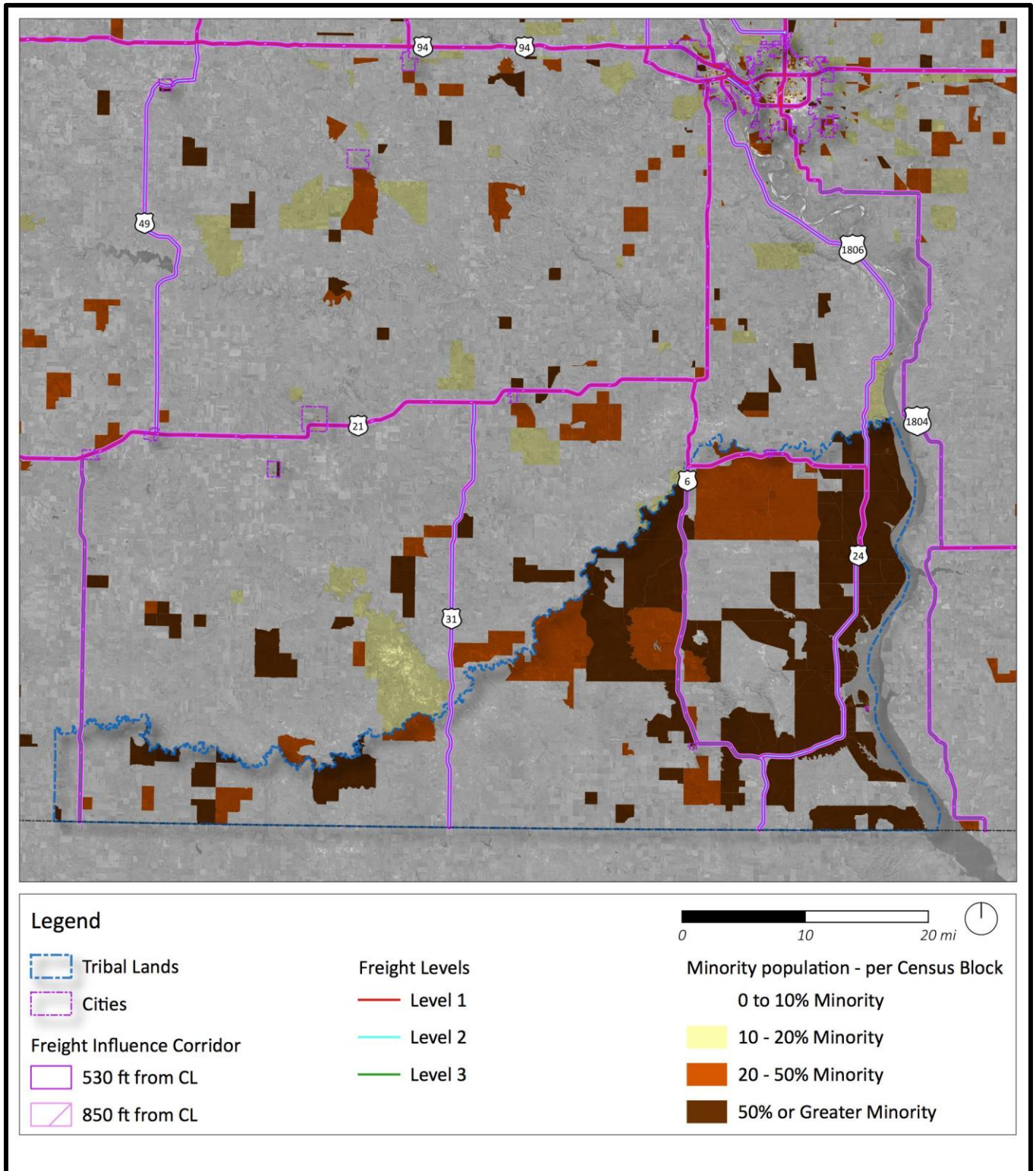
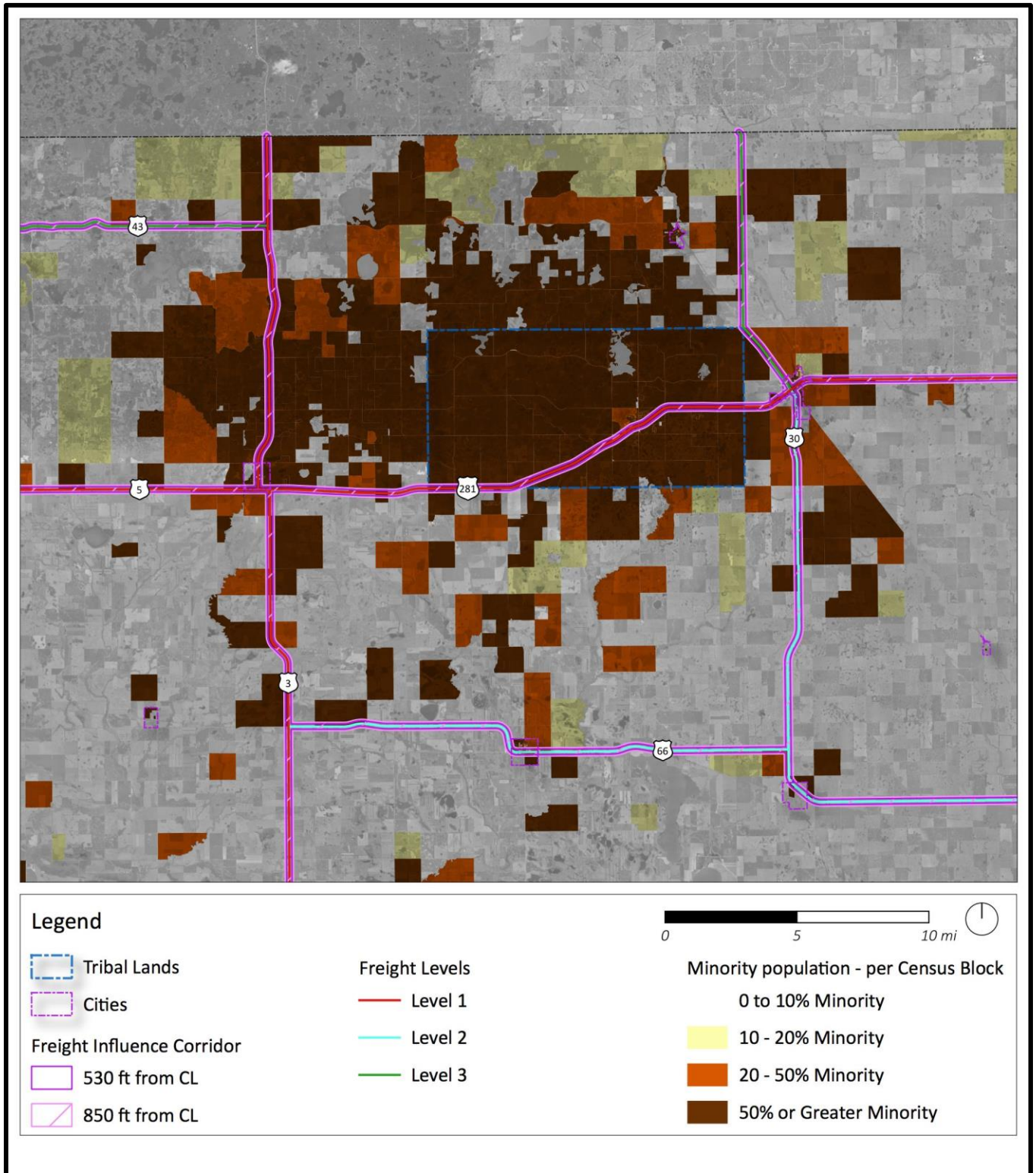


Figure 5-24: Minority Population and Freight Corridors – Turtle Mountain Band of Chippewa



FREIGHT MOVEMENT AND WILDLIFE HABITAT LOSS

By its design, transportation infrastructure poses negative impacts on wildlife habitat and movement. In many western U.S. states migratory big game herds may have to cross major transportation corridors in the fall and the spring, resulting in significant numbers of wildlife killed and also posing significant safety risks. In 2019, North Dakota ranked number 17 for the most animal-vehicle collisions. These include but are not limited to whitetailed deer, mule deer, moose, bison, bighorn sheep, mountain lions, bobcats, foxes, coyotes, bears, and farm animals.

NDDOT has an active program, the Wildlife Carcass Collection Program, to monitor and count the types and quantity of wildlife killed on roadways. The DOT Districts are responsible for removing animal carcasses from the roadways. NDDOT has a mobile phone application in which the District work crews can record the locations, dates, and types of dead wildlife. The data base is analyzed for trend information to support mitigation solutions and to alert motorists.

NDDOT has past experience of mitigating the impact of wildlife crossing highways. As part of the Long X Bridge replacement project and US-85 expansion project, the North Dakota Game and Fish Department and NDDOT constructed a wildlife crossing for Bighorn sheep near the North Unit of Theodore Roosevelt National Park. The expanded roadway is increasing from two to four lanes and would impose a greater hazard for Bighorn sheep known to cross at this particular location. A 150-foot-long tunnel under the highway was constructed to accommodate a 40-foot-wide and 15-foot-high wildlife trail suitable for the Bighorn sheep.

Figure 5-25: US-85 Wildlife Crossing



Freight movement impacts may also affect migratory routes for many bird species such as snow geese, ducks, whooping cranes, etc. Also, the prairie pothole ecosystem is a major region for breeding waterfowl. Depending on location and frequency, air quality, noise, and lights caused by trucks, cars, trains, and aircraft may pose habitat risks to many wildlife species.

CHAPTER 6: DEMOGRAPHIC AND ECONOMIC GROWTH FACTORS

INTRODUCTION

This chapter builds upon the economic and commodity flow analyses presented in Chapter 3. It describes the impact of freight mobility and goods movement on economic development on North Dakota, identifies future traffic growth, and presents the outcomes of a scenario planning workshop that was conducted as part of the development of the Freight and Rail Plan.

POPULATION GROWTH PROJECTIONS TO 2045

Census 2020 recorded North Dakota’s population at 779,094. In 2016, the North Dakota Census Office published three population growth scenarios for the state that vary by migration rate. The expected migration scenario shows North Dakota’s population increasing by 20% between 2020 and 2040. The project team used the Census 2020 counts with these county-level growth rates and estimated North Dakota’s 2045 population at 979,000.

Fueled by oil and gas production in the Bakken Region, northwestern North Dakota is projected to have the highest population growth in the state. McKenzie County on the Montana border is projected to almost double in population by 2045. Large increases are also projected for neighboring Williams County and Mountrail County. While the state’s urban counties are also expecting growth through the 2045 planning horizon, population in many rural agricultural counties in the central and eastern portions of the state is projected to decline. Improved agricultural productivity means fewer workers are needed to produce increasing amounts of crops and livestock. Pembina County is projected to decline by more than 1,000 people or 16% by 2045. Griggs County is projected to lose 390 people or 17% of its population. Table 6-1 shows the North Dakota 2045 population projections by county. Figure 6-1 shows county population growth percentage projected between 2020 and 2045.³⁵)

Table 6-1: North Dakota 2020 to 2045 Population Projections

Jurisdiction	2020 ^a	2045	Difference	% Difference.
North Dakota	779,094	979,140	200,046	26%
Adams County	2,200	1,980	-220	-10%
Barnes County	10,853	10,760	-93	-1%
Benson County	5,964	7,950	1,986	33%
Billings County	945	1,200	255	27%
Bottineau County	6,379	6,760	381	6%
Bowman County	2,993	3,590	597	20%
Burke County	2,201	3,030	829	38%
Burleigh County	98,458	114,490	16,032	16%
Cass County	184,525	234,730	50,205	27%
Cavalier County	3,704	3,580	-124	-3%

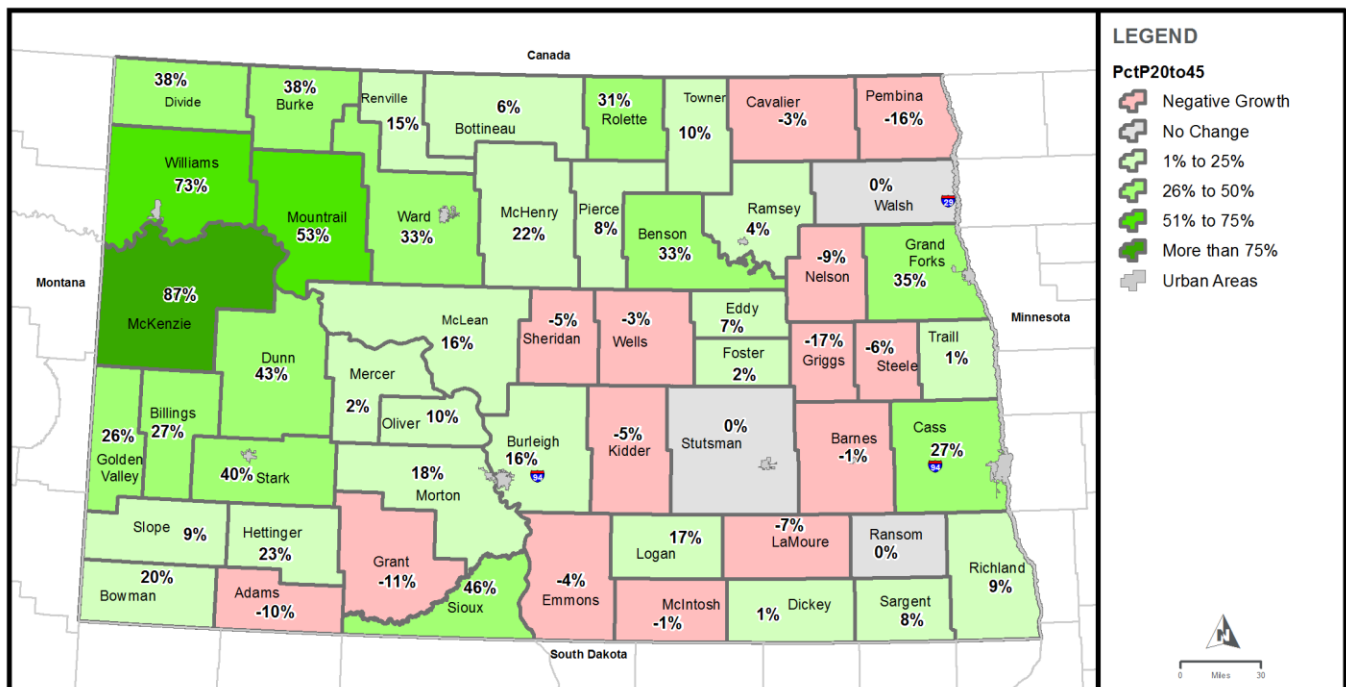
³⁵ [Woods & Poole Economics, Inc. | Economic Data Washington DC \(woodsandpoole.com\)](https://www.woodsandpoole.com/)

Jurisdiction	2020 ^a	2045	Difference	% Difference.
Dickey County	4,999	5,070	71	1%
Divide County	2,195	3,040	845	38%
Dunn County	4,095	5,870	1,775	43%
Eddy County	2,347	2,500	153	7%
Emmons County	3,301	3,170	-131	-4%
Foster County	3,397	3,460	63	2%
Golden Valley County	1,736	2,180	444	26%
Grand Forks County	73,170	99,140	25,970	35%
Grant County	2,301	2,040	-261	-11%
Griggs County	2,306	1,920	-386	-17%
Hettinger County	2,489	3,070	581	23%
Kidder County	2,394	2,270	-124	-5%
LaMoure County	4,093	3,800	-293	-7%
Logan County	1,876	2,190	314	17%
McHenry County	5,345	6,510	1,165	22%
McIntosh County	2,530	2,510	-20	-1%
McKenzie County	14,704	27,530	12,826	87%
McLean County	9,771	11,380	1,609	16%
Mercer County	8,350	8,520	170	2%
Morton County	33,291	39,380	6,089	18%
Mountrail County	9,809	15,000	5,191	53%
Nelson County	3,015	2,730	-285	-9%
Oliver County	1,877	2,060	183	10%
Pembina County	6,844	5,730	-1,114	-16%
Pierce County	3,990	4,300	310	8%
Ramsey County	11,605	12,120	515	4%
Ransom County	5,703	5,690	-13	0%
Renville County	2,282	2,620	338	15%
Richland County	16,529	18,080	1,551	9%
Rolette County	12,187	15,980	3,793	31%
Sargent County	3,862	4,160	298	8%
Sheridan County	1,265	1,200	-65	-5%
Sioux County	3,898	5,700	1,802	46%
Slope County	706	770	64	9%
Stark County	33,646	47,140	13,494	40%
Steele County	1,798	1,690	-108	-6%
Stutsman County	21,593	21,620	27	0%

Jurisdiction	2020 ^a	2045	Difference	% Difference.
Towner County	2,162	2,380	218	10%
Traill County	7,997	8,050	53	1%
Walsh County	10,563	10,520	-43	0%
Ward County	69,919	93,340	23,421	33%
Wells County	3,982	3,870	-112	-3%
Williams County	40,950	70,770	29,820	73%

a) U.S. Census Bureau 2020 Decennial Census.

Figure 6-1: North Dakota Population Growth 2020 to 2045



EMPLOYMENT GROWTH PROJECTIONS TO 2045

Woods & Poole Economics, Inc. estimates total full-time and part-time employment by county. Table 6-2 shows the Woods & Poole estimates for the total number of jobs by county for 2020 and 2045. Similar to the population growth projections, the counties with significant oil and gas extraction activities show significant job growth. However, employment growth in rural agricultural counties will be flat as farm communities lose jobs and population.

However, job growth is forecast for North Dakota’s urban areas as firms locate to these cities with available land and skilled labor. The economies in cities like Fargo, Bismarck and Grand Forks are more diversified and are also regional centers for retail trade and business services. They are also centers for transporting and processing

agricultural products from surrounding rural areas. Since these industries depend on farm output, not the number of farmers, these cities are expected to grow through 2045.³⁶

Table 6-2: North Dakota 2020 to 2045 Total Employment Projections

Jurisdiction	2020	2045	Difference	% Difference
North Dakota	568,526	784,394	215,868	38%
Adams County	1,631	1,826	195	12%
Barnes County	7,103	7,510	407	6%
Benson County	3,137	3,219	82	3%
Billings County	931	1,157	226	24%
Bottineau County	4,419	5,091	672	15%
Bowman County	2,345	2,868	523	22%
Burke County	1,381	1,550	169	12%
Burleigh County	74,772	106,238	31,466	42%
Cass County	152,286	227,255	74,969	49%
Cavalier County	2,897	2,909	12	0%
Dickey County	3,199	3,275	76	2%
Divide County	1,598	2,040	442	28%
Dunn County	3,363	5,573	2,210	66%
Eddy County	1,419	1,502	83	6%
Emmons County	2,141	2,106	-35	-2%
Foster County	2,572	2,740	168	7%
Golden Valley County	1,240	1,428	188	15%
Grand Forks County	52,032	64,071	12,039	23%
Grant County	1,399	1,367	-32	-2%
Griggs County	1,691	1,744	53	3%
Hettinger County	1,690	1,797	107	6%
Kidder County	1,565	1,695	130	8%
LaMoure County	2,643	2,851	208	8%
Logan County	1,362	1,547	185	14%
McHenry County	2,935	3,296	361	12%
McIntosh County	1,885	1,898	13	1%
McKenzie County	13,194	28,041	14,847	113%
McLean County	5,839	6,806	967	17%
Mercer County	5,732	6,596	864	15%
Morton County	17,649	22,846	5,197	29%
Mountrail County	7,321	15,094	7,773	106%
Nelson County	2,057	2,050	-7	0%

³⁶ [Woods & Poole Economics, Inc. | Economic Data Washington DC \(woodsandpoole.com\)](https://www.woodsandpoole.com/)

Jurisdiction	2020	2045	Difference	% Difference
Oliver County	1,262	1,468	206	16%
Pembina County	5,215	5,137	-78	-1%
Pierce County	2,871	3,144	273	10%
Ramsey County	8,287	8,795	508	6%
Ransom County	3,372	3,592	220	7%
Renville County	1,402	1,429	27	2%
Richland County	10,846	11,908	1,062	10%
Rolette County	6,056	6,145	89	1%
Sargent County	4,777	6,902	2,125	44%
Sheridan County	820	810	-10	-1%
Sioux County	2,046	2,084	38	2%
Slope County	498	800	302	61%
Stark County	24,880	40,077	15,197	61%
Steele County	1,200	1,490	290	24%
Stutsman County	14,683	16,080	1,397	10%
Towner County	1,624	1,597	-27	-2%
Traill County	5,224	5,857	633	12%
Walsh County	7,197	6,902	-295	-4%
Ward County	47,356	59,919	12,563	27%
Wells County	2,846	2,849	3	0%
Williams County	30,636	57,423	26,787	87%

Source: Woods & Poole Economics, Inc., 2021.

INDUSTRIAL OUTLOOK

Table 6-3 shows the North Dakota industrial outlook by sector through 2045. It shows the expected decline in farm employment, but it also shows mining employment related to oil and gas extraction to double through the planning horizon. Strong employment growth is also forecast for transportation and warehousing and real estate, for example, as urban centers grow.

Table 6-3: North Dakota Industrial Outlook by Sector - 2020 to 2045

Industrial Sector	2020	2045	Difference	% Difference
Total Employment	568,526	784,394	215,868	38%
Farm Employment	28,379	25,848	-2,531	-9%
Forestry, Fishing, Related Activities	5,046	6,272	1,226	24%
Mining Employment	20,879	43,048	22,169	106%
Utilities Employment	3,581	3,791	210	6%
Construction Employment	36,927	46,692	9,765	26%

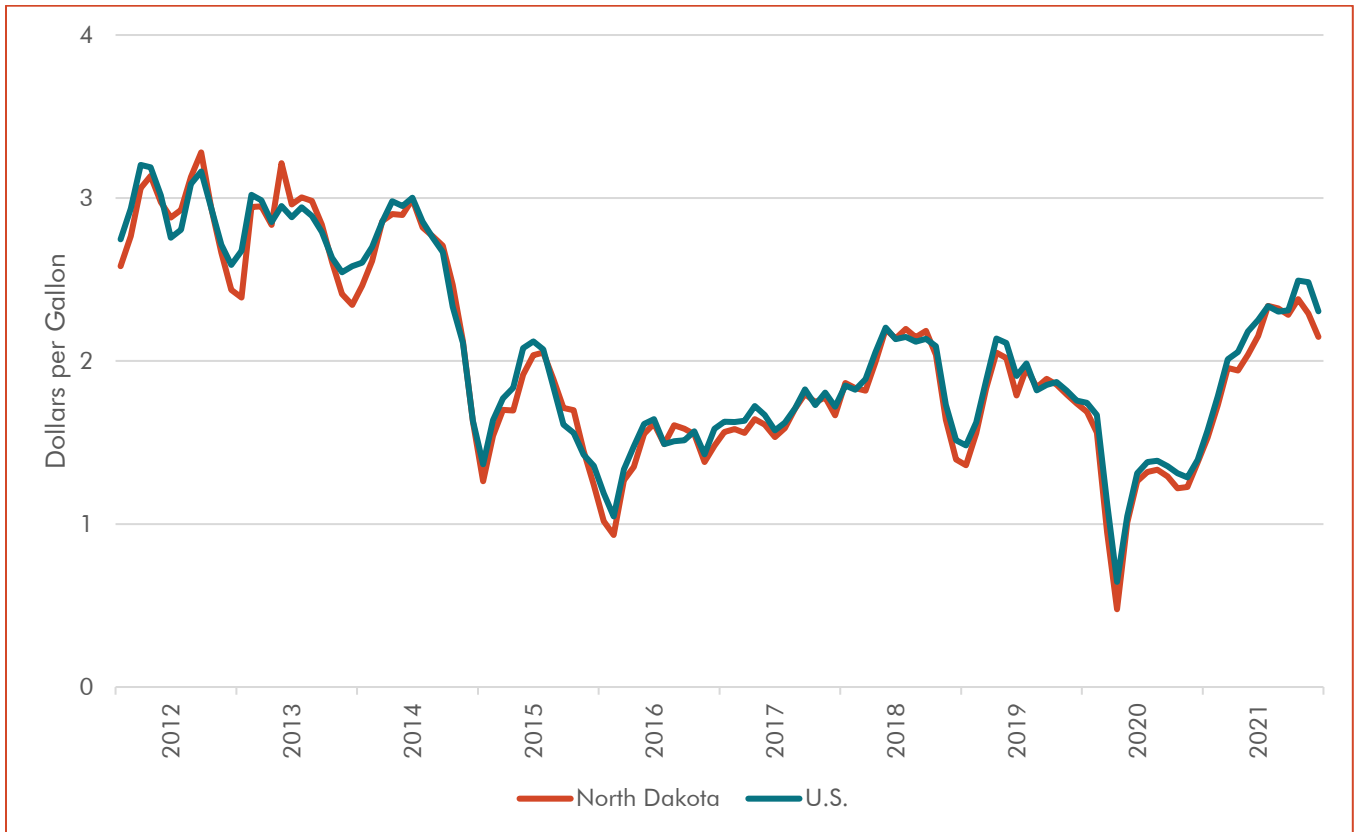
Industrial Sector	2020	2045	Difference	% Difference
Manufacturing Employment	28,044	32,478	4,434	16%
Wholesale Trade Employment	25,224	29,193	3,969	16%
Retail Trade Employment	56,040	64,871	8,831	16%
Transportation and Warehousing Employment	26,087	44,950	18,863	72%
Information Employment	6,764	6,542	-222	-3%
Finance And Insurance Employment	29,808	41,908	12,100	41%
Real Estate and Rental and Lease Employment	25,682	49,304	23,622	92%
Professional and Technical Services Employment	24,330	39,629	15,299	63%
Management of Companies and Enterprises Employment	4,171	7,978	3,807	91%
Administrative and Waste Services Employment	17,113	22,738	5,625	33%
Educational Services Employment	6,364	9,972	3,608	57%
Health Care and Social Assistance Employment	70,287	106,703	36,416	52%
Arts, Entertainment, and Recreation Employment	7,548	14,772	7,224	96%
Accommodation and Food Services Employment	31,647	50,446	18,799	59%
Other Services, Except Public Administration Employment	25,541	31,467	5,926	23%
Federal Civilian Government Employment	9,968	9,078	-890	-9%
Federal Military Employment	11,876	11,961	85	1%
State and Local Government Employment	67,220	84,753	17,533	26%

Source: Woods & Poole Economics, Inc., 2021.

RECENT FUEL COST TRENDS

Figure 6-2 compares wholesale/resale gasoline prices between North Dakota and the United States from 2012 through 2021. This data from the U.S. Energy Information Administration shows that North Dakota's wholesale/resale gasoline prices track closely with the national average.

Figure 6-2: Total Gasoline Wholesale/Resale Price by Refiners 2012 to 2021



Source: U.S. Energy Information Administration, 2022.

PASSENGER TRAVEL DEMAND AND GROWTH

GROWTH RATE DEVELOPMENT

The project team developed statewide passenger travel demand and growth estimates for 11 North Dakota transportation regions. These include the eight NDDOT Districts and the state’s three MPOs. Figure 6-3 shows the 11 North Dakota regions used to estimate growth.

For the eight transportation districts, annual growth in travel demand was based on the population growth shown in Table 6-1 that used the expected migration scenario from the North Dakota Department of Commerce – Census Office.

For the Grand Forks MPO, the project team estimated a traffic growth rate based on the MPO 2015 to 2045 population growth projections. The team used a similar approach using the Bismarck-Mandan MPO 2020 to 2045 growth projections. For the FM MetroCOG, the annual travel demand growth rate was based on the North Dakota Department of Commerce’s Cass County population projections. Figure 6-4 shows the regional rates used to grow 2019 traffic count data to forecast 2045 travel demand.

Figure 6-3: North Dakota Transportation Regions

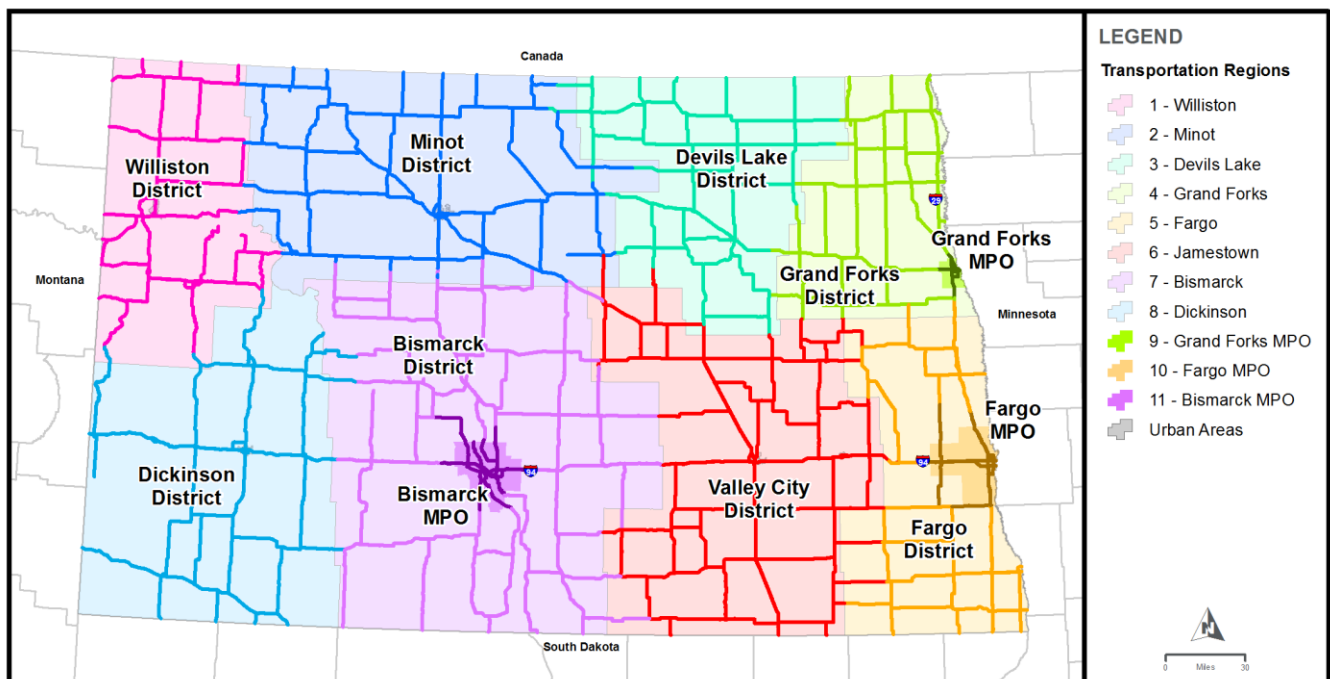
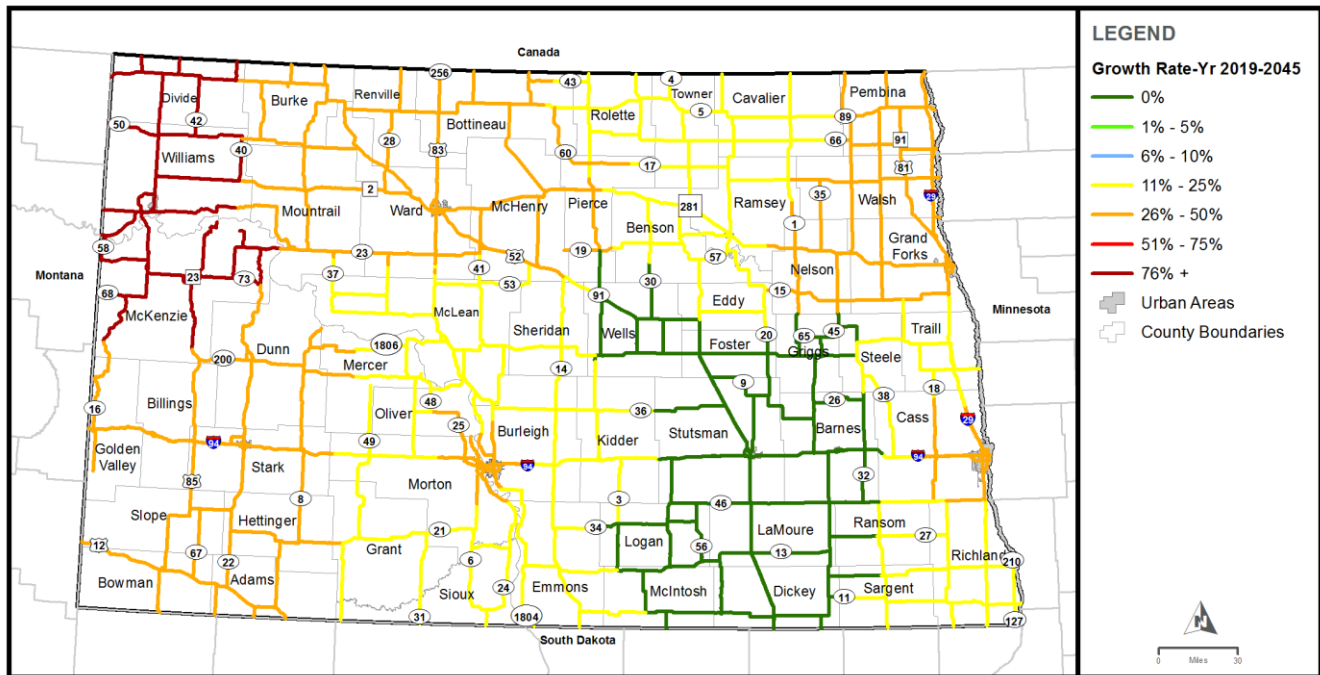


Figure 6-4: North Dakota 2019 to 2045 Traffic Growth Rates



EXISTING 2019 TRAFFIC

The NDDOT collects traffic data by region on an annual rotation. The project team used population growth rates by county to adjust traffic counts from 2017, 2018, 2019, and 2020 to estimate a common 2019 base year. Figure 6-5 shows the 2019 base year AADT. This figure shows that outside of the urban area, the highest traffic volumes are on I-94 and I-29.

Figure 6-6 shows 2019 truck AADT. I-94 and I-29 both carry the highest truck volumes. Truck volumes show that US-52 is another important truck route. Highways in the oil and gas producing areas of the Bakken Region in McKenzie County, Mountrail County, Williams County, and Dunn County have higher truck volumes.

Figure 6-5: North Dakota 2019 AADT Estimates

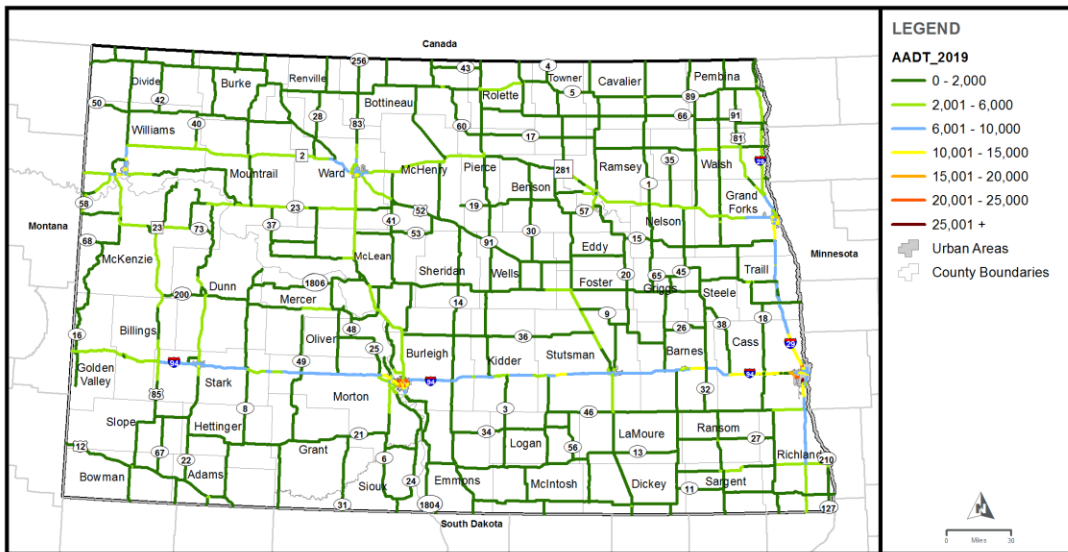
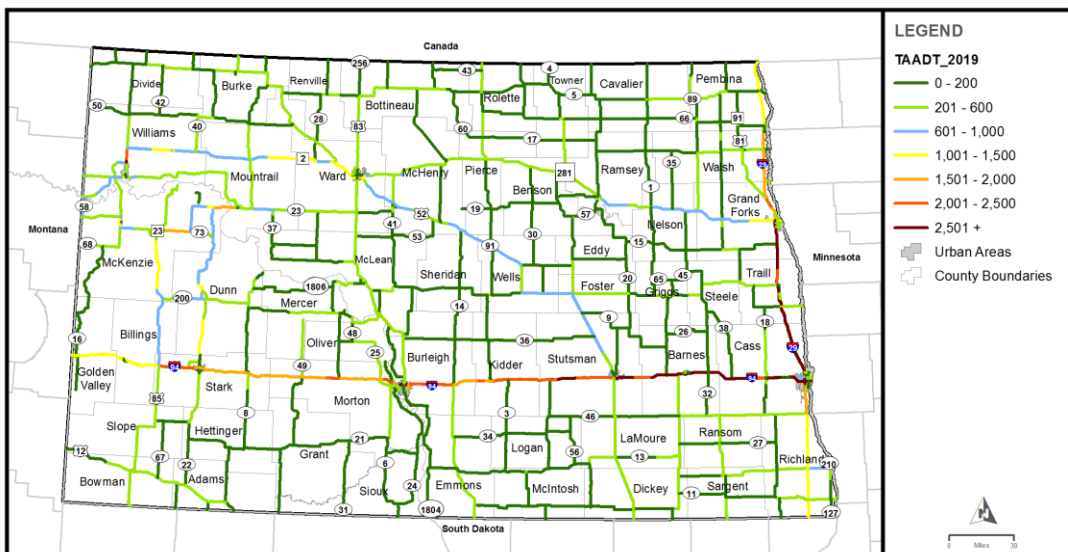


Figure 6-6: North Dakota 2019 Truck AADT Estimates



2045 TRAFFIC FORECASTS

To develop the 2045 traffic forecasts, the project team applied the regional growth rates shown in Figure 6-4 to the 2019 existing traffic estimates. The 2019 truck percentages were held constant through the planning horizon so that truck volumes increased at the same rate as other vehicle traffic. Figure 6-7 shows the 2045 AADT forecasts. Figure 6-8 shows the 2045 truck AADT forecasts. This growth scenario show traffic increasing in the Bakken Region that includes McKenzie County, Mountrail County, Williams County, and Dunn County. More than 2,500 trucks a day are forecast on US-85 in McKenzie County between Watford City and Grassy Butte. Traffic is also forecast to increase in Bismarck, Fargo, and the Grand Forks urban areas.

Figure 6-7: North Dakota 2045 AADT Forecasts

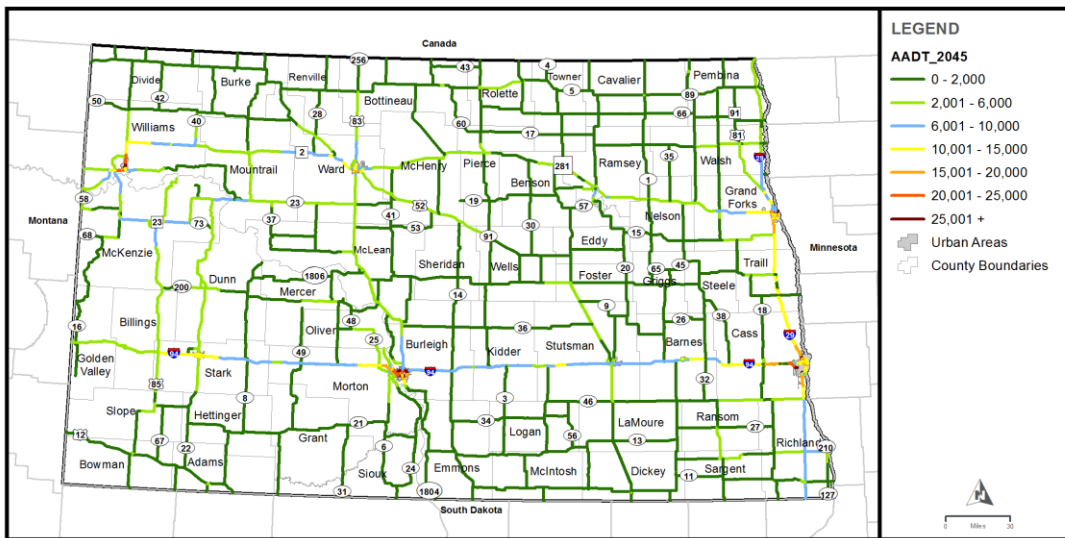
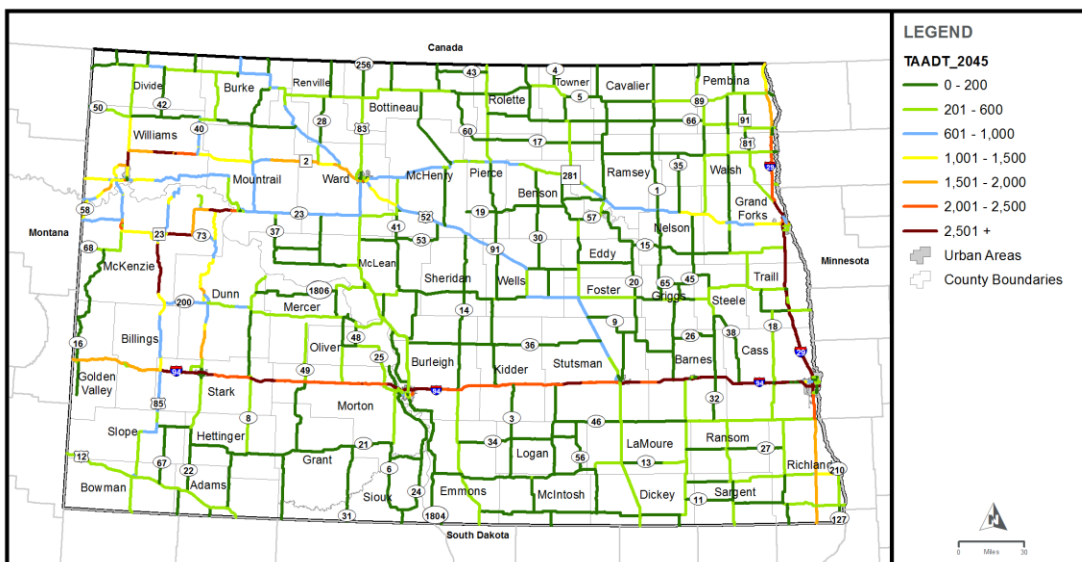


Figure 6-8: North Dakota 2045 Truck AADT Forecasts



SCENARIO PLANNING WORKSHOP EXERCISE

Before undertaking a planning effort, a future must be envisioned to plan towards. Freight planners have shifted from traditional methods such as looking at past data trends towards scenario planning to plan for the future. Traditional plans are driven by population and job growth, whereas statewide freight growth is largely a function of global economic and geopolitical trends which are much more unpredictable. Scenario planning envisions various outcomes based on emerging global trends to create more informed planning horizons that consider increasingly complex economic factors. Unlike traditional methods, this process promotes an open dialogue, where stakeholders can discuss and identify the trade-offs, nuances, and causal relationships to inform decisions in the future. Effectively, scenario planning will allow NDDOT to make better decisions based on common needs identified by stakeholders based on answering the open-ended question of “what if” to prepare for an uncertain future versus forecast one based on the past trends.

SCENARIO DEVELOPMENT

Scenario development begins with the project team identifying trends and potential future impacts based on stakeholder feedback historic trends. Using this conventional method as a starting point helps to identify where we’ve been and emerging trends applicable to the short-term future. Table 6-4 identifies the key trends that served as the framework for the development of future scenarios.

Table 6-4: Trends Driving Future Freight Movement in North Dakota

Category	Identified Trend
Demographics	Aging, heavily rural, and growing population
	Lack of education and training in specialized skills
	Shift of buying behavior to online shopping
	Tight labor market for freight transportation, i.e., truck drivers, rail operators, distribution/warehouse operators, etc.
Energy	Increasing demand for alternative fuels for transportation
	Decreasing demand for fossil fuels
	Increases in production of Bakken play oil mining and natural gas extraction
Agriculture	Strong national and international demand for grain paired with sustained increases in grain production
Commerce / Trade	Increasing demand for export agriculture (grain)
	Increasing demand for export energy (coal & natural gas)
	Increasing demand for advanced manufactured goods
Environmental	Increasing air quality concerns
	Increasingly extreme weather conditions
	Increasing severity of severe climate conditions (floods, blizzards, etc.)
Economics	Recent inflation
	Growing and diversified manufacturing output
Infrastructure	Available funding for freight infrastructure from FAST Act and the IJJA
	Fuel excise taxes (federal & state) falling short of needs
	Continued truck travel time and delivery reliability

Category	Identified Trend
Technology	Strong movement towards adopting transportation technologies
	Security threats increasing disruptions across industries
	Reliance on reliable data and available information

DEFINING FUTURE SCENARIOS

Based on these trends and their potential short-term future impacts, four scenarios were developed to take them several steps forward as shown in Table 6-5.

Table 6-5: Potential Future Scenarios

	Scenario	Description
1	Rural Renaissance: What if our rural areas become communities of choice in the future?	Imagine you just moved into your new smart house with open space and fields all around. You check your greenhouse before getting on a call with customers on the other side of the globe, while your spouse is out in an outbuilding 3D printing drone components for a manufacturing company based in North Dakota.
2	Smart and Connected: What if innovations accelerate and we live in a tech-driven future?	Imagine yourself with instant connectivity where everything around you has sensors, data streams, and is connected to everything else. Your work is mostly online, and you can live anywhere and visit everywhere. It's easy to hail an autonomous drone and zip across the town or the state in a matter of minutes.
3	Cities and Centers: What if our cities grow quickly and become centers of the state?	Imagine you and your family are living in a new high rise with your job just a few blocks away. You moved into the city recently because this is where all the opportunities are. No one travels very far anymore as your shopping, schools, workplaces, and even entertainment are all streamed or delivered right to you.
4	Ghost Towns: What if North Dakota's economy collapses and quality of life changes dramatically?	Imagine yourself looking for a job half a world away. There isn't much left to do anymore after the energy industry collapsed and frequent storms made agriculture unprofitable. Your friends and family have already moved away after repeated floods, market uncertainties, and with so few jobs still available in the state.

APPROACH

A scenario planning workshop was held in May 2022 to engage stakeholders in the scenario planning process. The workshop focused on identifying the future impacts and needs that result from the four potential scenarios to help identify the actions North Dakota would have to take to successfully capture the unique opportunities presented by each scenario, in addition to identifying adverse impacts and actions required to mitigate them. The impacts and actions discussion was open ended; however, the groups were asked to specifically address the following so that common themes could be derived:

- Economics
- People
- Highways
- Railroads

- Pipelines
- Air Cargo
- Border Crossings
- Other

Stakeholders were provided with an overview of the scenario planning process and then broken out into two groups. Two alternative future scenarios were described for each group and participants engaged in an open dialogue to discuss trade-offs, interrelationships, and impacts of each one. Group 1 was assigned scenarios 1 and 2, and Group 2 was assigned scenarios 3 and 4. The following is a summary of the breakout sessions' discussion for each of the scenarios.

SCENARIO 1: RURAL RENAISSANCE

Rural high-tech cottage industries like the scenario proposed will still require the movement of raw materials and finished goods to markets regionally, statewide, and globally. Urban areas will likely grow as hubs for freight distribution to and from the “spokes” – the growing rural communities. Freight modes are currently centered in urban areas, i.e., trucking, rail, and air cargo, etc., and future freight modes, i.e., drones or connected and autonomous vehicles, could be needed to provide more efficient freight mobility.

The group expects that at-grade freight modes will remain dominant to and from the state's rural communities. Highways and railways will experience greater volumes and experience increased congestion and conflicts at crossings as many of these rural towns have limited state highway and rail line access. The group identified the Minot Intermodal Facility as being poised to support increased rural area sourced freight, capitalizing on its ability to utilize empty containers to load locally sourced products for export via the Seattle and Tacoma gateway. Efforts to improve drone flying times and payload capacity would be required under this scenario.

The group identified that increases in roadway freight via truck, connected and autonomous vehicles, and drones, would create significant challenges due to the state's severe climate and environmental conditions such as heavy snow, flooding, temperatures, etc.

SCENARIO 2: SMART AND CONNECTED

Participants agreed that under this scenario, geography would not limit the operation of most businesses. This may reduce the need for some workers in rural and/or on-site locations, allowing current residents to live in urban areas or other locations. The result could be a decrease in rural population with a corresponding reduction in secondary/supporting economic activity.

The group acknowledged that U.S. /Canadian border crossings would have the potential to be faster, reliable, and more efficient with the advancement in technology as proposed under this scenario. Continuous monitoring would be possible at crossings without the availability of CBP personnel for vehicle checks. However, the state's severe climate and environmental conditions could also pose risks to certain technologies, specifically at these border crossings where floods are most prominent. The state would need to increase its focus on improving infrastructure and potentially make it subterranean to mitigate these challenges.

Highly connected systems are vulnerable to disruptions and would intensify security concerns. If North Dakotans become reliant on increased technology in their work and personal lives, there will be a need for redundant systems and increased security to ensure reliability.

SCENARIO 3: CITIES AND CENTERS SCENARIO

Under this scenario participants identified the need for long-distance travel will decrease, inducing a decrease in household car ownership as well, which will in turn affect gas tax revenue for transportation projects. Urban air mobility for passenger movements will be more common for intracity travel, and there will be a decrease in passenger air movement for long-distance travel.

The group also indicated that there could be an increase in inbound trucks and trains coming from large distribution centers outside urban centers and a corresponding need for additional intermodal facilities in the hinterlands. Trucking will likely become more automated for traveling into and out of the city and would require better curbside management for urban distribution. There would also be an upsurge in local drone deliveries and 'sidewalk bots'. Air cargo tonnage as well as aircraft sizes would increase at nearby airports.

SCENARIO 4: GHOST TOWNS

If North Dakota's economy, energy, and agriculture were to collapse, there will be a need to have critical supplies for those remaining due to less reliance on just-in-time deliveries, creating an increase in the need for reliability of large quantities of inventory. There would be a need to increase the number of border crossings and the necessity to address flooding issues at these locations. Multimodal freight infrastructure will also need more investment and consolidation in order to serve the remaining public and to address infrastructure and emergency management needs of the state.

Tax revenue would drop as the community is observing a decline in population. Airports will see a reduction in air cargo need and capacity and will need to be designed to support evacuation in case of emergency caused by floods and other natural disasters.

Looking at the state's climate and environmental conditions, the group foresaw that natural gas will be more vulnerable during blizzards, thus impacting power sources issues.

OVERARCHING THEMES

This exercise was intended to allow participants to think differently about the future to envision freight needs, and think about possibilities, impacts and solutions to the scenarios. Regardless of the scenario discussed, there were some freight system discussion items that were similar and could be used as a foundation for recommendations moving forward since they address future needs across all scenarios. These overarching themes and takeaways to assist in planning North Dakota's freight system are the following:

- **Growth of Urban Freight:** There was a consensus that there will be a growth in urban freight in the future. Growing rural areas would use the urban freight infrastructure as a hub to get raw materials and ship finished products. How that shapes the urban areas may be different depending on how technology or future trends shape the types of freight and modes on which they are shipped.
- **Connected and Multimodal System:** Additional intermodal connectors and access points will be needed to increase the capacity and improve the interoperability among different modes. There is likely to be additional modes and technologies in the future such as drone deliveries, electric propulsion trucks, delivery bots, etc. In addition to these modes, technology and data connectivity will need to be utilized to enhance the efficiency of each mode.
- **Improve Infrastructure Conditions:** Paired with the recurring theme of the state's severe climate and environmental conditions, there is a need to enhance the state's freight and 'information' infrastructure. Highways, rail tracks and border crossings are subject to flooding and all infrastructure is subject to

freezing temperatures. Subterranean options could improve operations at the border, ensure the reliability of telecommunications infrastructure, and provide accommodation for future connected modes.

- **Increase Border Crossing Locations and Technologies:** Many of the border crossings have limited operating hours and require the continuous presence of CBP personnel. Increasing the number of border crossings and installing advanced technologies at these locations would significantly improve the state's freight access, freight visibility, increased security and provide greater export opportunities.
- **Funding:** Additional infrastructure funding is needed as is the flexibility in which it is used to allow allocation to solve complex freight challenges across modes.

CHAPTER 7: POLICIES, PROGRAMS, AND INSTITUTIONS

INTRODUCTION

This chapter describes the policies, programs, and institutions that guide and oversee freight and rail transportation planning in North Dakota. This includes policies, programs, and institutions administered at the federal, state, and local levels, as well as multi-jurisdictional or multistate coalitions. This chapter also describes the federal and state funding currently available to support freight-related capital projects in North Dakota.

FREIGHT POLICIES AND STRATEGIES

FEDERAL TRANSPORTATION POLICY

FIXING AMERICA'S SURFACE TRANSPORTATION ACT

The Fixing America's Surface Transportation Act (FAST Act) of 2015 was landmark legislation for state freight transportation planning. The national freight goals first developed under the earlier MAP-21 legislation were revised and expanded to include new priorities emphasizing innovation, reliability, and balance between urban and rural improvements.

The FAST Act requires states to develop freight plans that support the National Multimodal Freight Policy Goals. The North Dakota Freight and Rail Plan has been developed to meet the FAST Act State Freight Plan requirements working in close collaboration with public and private sector partners. This plan identifies a multimodal freight network in which North Dakota can make strategic investments to support state and national freight goals. Chapter 1 discusses how North Dakota's transportation goals and objectives will help achieve the national freight policy goals.

NATIONAL FREIGHT STRATEGIC PLAN

In addition to requiring each state to develop a freight plan, the FAST Act also required the USDOT to develop a National Freight Strategic Plan (NFSP) to assess the conditions and performance of the national freight network, forecast future freight volumes, and identify needs and issues nationally. The NFSP was developed via extensive coordination with public and private sector freight stakeholders. Going forward, the NFSP will serve as a resource to inform the development of state-level plans.

The NFSP identifies several key trends nationwide that are affecting freight transportation. These include a growing population and economy, diversifying global supply chains, rising domestic energy production, changing urban-rural dynamics, increasing e-commerce, advancing technology, and an evolving workforce.

The NFSP defines a national vision and goals for the multimodal freight system and defines strategies to achieve those goals. The national freight goals and their relation to NDDOT's Freight and Rail Plan goals is discussed in Chapter 1.

PASSENGER RAIL IMPROVEMENT AND INVESTMENT ACT

The Passenger Rail Investment and Improvement Act of 2008 (PRIIA) was enacted principally to fund the development of high-speed passenger rail service. Language within PRIIA stipulated that each state seeking funding under any of the PRIIA programs must have a current SRP. The purpose of an SRP was outlined as the following:

- To set forth state policy involving freight and passenger rail transportation, including commuter rail operations, in the state
- To establish the period covered by the SRP
- To present priorities and strategies to enhance rail service in the state that benefits the public
- To serve as the basis for federal and state rail investments within the state

PRIIA also stipulated the mandatory elements of SRPs, which were not limited to passenger rail transportation. In 2013, the FRA issued its final SRP guidance, which expanded on the requirements of PRIIA. Since then, FRA has looked to SRPs to provide documentation of planning readiness for projects seeking funding from other sources beyond those that were initially outlined in PRIIA.

INFRASTRUCTURE INVESTMENT AND JOBS ACT

On November 15, 2021, President Biden signed into law the IIJA – also known as the Bipartisan Infrastructure Law (BIL), a comprehensive legislative package establishing more than \$1.2 trillion in U.S. infrastructure investments and establishing significant programs and policies to guide the development of infrastructure improvements.

Pertinent to transportation and rail, the IIJA funds existing discretionary programs administered by the USDOT at markedly higher levels and creates authorization for new discretionary programs aimed at delivering improvements to the nation’s transportation infrastructure, including highways, freight rail, passenger rail, transit systems, multimodal facilities, and ports.

The IIJA significantly increased the authorizations, and in some instances provided advance appropriations, for existing discretionary programs that fund freight rail projects, both for those programs administered by the Office of Multimodal Freight Infrastructure and by the FRA. For instance, the Consolidated Rail Infrastructure and Safety Improvements (CRISI), Infrastructure for Rebuilding America (INFRA), and Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant programs all received substantial funding increases, with at least \$18 billion available over five years just through those programs, at appropriated funding levels. Additional funding is authorized but subject to future appropriations.

Notably, the IIJA also established new programs targeting rail improvements, including the Railroad Crossing Elimination Program, to be administered by the FRA. The IIJA authorized and appropriated \$300 million annually, over the five-year authorization, for a total of \$1.5 billion available from FY 2022 through FY 2026 to fund highway-rail or pathway-rail grade crossing improvement projects, including rail line relocation, crossing elimination, and installation of advanced signaling, warning devices, and signage.

NORTH DAKOTA FREIGHT POLICY

In July 2021, NDDOT published *Transportation Connection*, North Dakota's current LRTP. *Transportation Connection* defines a vision for North Dakota's transportation future, focusing NDDOT's efforts on **"DELIVERING A SAFE, INNOVATIVE, AND CONNECTED FUTURE."**

Building on the guidance provided by *Transportation Connection*, the North Dakota State Freight and Rail Plan represents a new chapter in NDDOT's ongoing efforts to develop and maintain a world-class transportation system that is safe, secure, and provides efficient freight mobility.

As was discussed in Chapter 1, the North Dakota State Freight and Rail Plan is part of NDDOT's "family of plans," a group of transportation-related documents that work together to identify transportation needs in the state and recommendations to address those needs. Like *Transportation Connection*, the North Dakota State Freight and Rail Plan is a policy plan that defines NDDOT's freight and rail planning process.

STATE RAIL POLICIES

Historically, NDDOT has followed a set of informal rail-related policies. These informal policies are outlined below:

- North Dakota will not own or operate rail lines
- North Dakota will not subsidize railroad operations (including passenger rail)
- North Dakota regards the development of Rail Quiet Zones as a local issue
- North Dakota supports the continued evaluation and application of Intelligent Transportation Systems (ITS) to improve grade crossing safety and reduce urban traffic congestion
- North Dakota supports evaluation of at-grade rail crossings to improve sight distances and supports the removal or mitigation of obstructions to improve visibility at at-grade rail crossings
- North Dakota will provide letters of support for projects seeking federal funding

FREIGHT-RELATED INSTITUTIONS AND POLICY-MAKING ROLES

FEDERAL INSTITUTIONS

UNITED STATES DEPARTMENT OF TRANSPORTATION

The USDOT is the federal cabinet-level agency within the executive branch of the government of the United States of America that is responsible for overseeing all matters related to transportation. The USDOT was established by an act of Congress on October 15, 1966. The USDOT oversees and administers programs, policies, and regulations to keep the traveling public safe, secure, and mobile while ensuring that the nation's transportation system contributes to the nation's economic growth.

USDOT leadership is provided by the Secretary of Transportation, who is the principal advisor to the President in all matters relating to federal transportation programs. The Office of the Secretary oversees nine Operating Administrations, each with its own management and organizational structure.

USDOT Operating Administrations pertinent to freight transportation modes in North Dakota are discussed in the subsections below.

FEDERAL HIGHWAY ADMINISTRATION

FHWA is an agency within the USDOT that supports state and local governments in the design, construction, and maintenance of the NHS (Federal Aid Highway Program) and other highways on various federally and tribal owned lands (Federal Lands Highway Program).

FEDERAL MOTOR CARRIER SAFETY ADMINISTRATION

The Federal Motor Carrier Safety Administration (FMCSA) is an agency within the USDOT tasked with preventing CMV-related fatalities and injuries. Activities of the FMCSA contribute to ensuring safety in motor carrier operations through enforcement of safety regulations; targeting high-risk carriers and CMV drivers; improving safety information systems and CMV technologies; strengthening CMV equipment and operating standards; and increasing safety awareness.

FEDERAL RAILROAD ADMINISTRATION

The FRA is an agency within the USDOT that engages in the regulation of railroad safety, rail network development, research and development of new technologies, and the management of both competitive and targeted grant and loan programs that fund rail network improvements.

FRA staff includes nearly 400 safety inspectors who specialize in one of six technical areas focusing on compliance and enforcement:

- Grade crossings
- Hazardous materials
- Motive power and equipment
- Operating practices
- Signals and train control
- Track

The FRA has also established 12 Safety Management Teams (SMT) that serve as the Office of Railroad Safety's principal liaisons with railroad senior management. The SMTs are organized along railroad company lines with an additional SMT each for short lines located in the east of the country and short lines in the west.

In October 2021, the FRA published the Midwest Regional Rail Plan (MWRRP). The MWRRP is an intercity passenger rail network planning study led by the FRA, in partnership with stakeholders from across the Midwest. The plan area encompasses the states of Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. The plan sets out a strategic forty-year vision for the Midwest's passenger rail system, including elements such as network configuration, service levels, financing, and governance. The plan is the third in the FRA's national rail planning effort and follows the studies in the Southwest and Southeast. These regional rail plans are intended to support existing SRPs and LRTPs.

PIPELINE AND HAZARDOUS MATERIALS SAFETY ADMINISTRATION

The PHMSA is responsible for the safety of pipelines. PHMSA's mission is to protect people and the environment by advancing the safe transportation of energy and other hazardous materials that are essential to our daily lives. To do this, the agency establishes national policy, sets and enforces standards, provides education, and conducts research to prevent incidents.

FEDERAL AVIATION ADMINISTRATION

The Federal Aviation Administration (FAA) is responsible for the safety of civil aviation. FAA's activities include safety regulation, airspace and air traffic management, and the construction and installation of air navigation facilities. FAA's role also includes the regulation of drones and integrating these safely into the national airspace system.

SURFACE TRANSPORTATION BOARD

The Surface Transportation Board (STB), formerly known as the Interstate Commerce Commission (ICC), is an independent federal agency responsible for the regulation of surface transportation modes – particularly freight rail. In 1980, the Staggers Act eliminated most rate regulation, allowed railroads and shippers to sign confidential contracts, and established time limits for regulators to approve discontinuations of unprofitable service and mergers. Although the railroad industry is nearly completely deregulated, the STB still has jurisdiction over disputes related to railroad shipping tariffs and service issues, approvals of railroad restructuring transactions (including mergers), and approvals of rail line construction and abandonment activities.

STATE INSTITUTIONS

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

Originally called the State Highway Department, NDDOT was established in 1917. The NDDOT is an innovative organization that has a dedicated team of employees that work hard across the state to carry out the Department's mission to safely move people and goods.

The NDDOT strives to build and maintain an efficient transportation system consisting of approximately 8,624 miles of roadway and 4,865 bridges. It oversees the development of surface transportation including highways, bridges, rail, transit, pedestrian, and bicycle paths across the state.

NDDOT processes over 1,000,000 vehicle registrations annually and serves over 500,000 licensed drivers at branch offices located across the state. The NDDOT's Central Office is located on the North Dakota State Capitol Grounds in Bismarck and has eight District Offices across the state in Bismarck, Devils Lake, Dickinson, Fargo, Grand Forks, Minot, Valley City, and Williston.

The NDDOT comprises four groups: Engineering, Planning, Administration, and Driver Safety. Within the Planning group is Planning/Asset Management, which has rail planning as one of its functions.

The Planning/Rail Section of the Planning/Asset Management Division has rail planning responsibilities that include the following:

- Developing the SRP
- Administering the state rail loan programs
- Managing rail crossing programs, including the federal Railway-Highway Crossings (Section 130) Program

The Planning/Rail Section is also responsible for developing and implementing the statewide LRTP, the annual State Planning and Research Program, special studies and reports, development of new programs, and applying for discretionary grants; establishing and maintaining a network of contacts with other state and provincial DOTs, state, federal, tribal, local governments, and agencies; and supporting the activities of other NDDOT divisions. North Dakota DOT is in compliance with the requirements of Section 49 U.S. Code Section 22102.

NORTH DAKOTA HIGHWAY PATROL³⁷

The NDHP serves to provide law enforcement services to keep North Dakota's highways safe and secure.

Field operations consists of four regions, motor carrier operations, and the criminal interdiction team. Administration consists of the Law Enforcement Training Academy (LETA), human resources, planning, property, procurement, records, support, finance, capitol security, dignitary protection, homeland security, crash assistance, and safety and education.

The NDHP enforces laws governing criminal, traffic, and size and weight offenses in North Dakota.

Primary responsibilities include:

- Improving traffic safety through enforcement and education
- Investigating vehicle crashes
- Promoting safe driving practices
- Providing emergency law enforcement services
- Administering a federal CMV safety program

Motor Carrier Operations within the NDHP works cooperatively with the NDDOT, federal Motor Carrier Safety Administration, and FHWA. The Operations Commander and Assistant Chief of Operations oversee day-to-day activities.

Motor Carrier Operations enhances CMV safety through the following efforts:

- MCSAP
- Border Enforcement Program (BEP)
- New Entrant Program
- Size and weight enforcement
- Permitting and the E-permits system

NORTH DAKOTA PIPELINE AUTHORITY³⁸

The North Dakota Pipeline Authority (PA) was established by the State Legislature in 2007. The PA was created for the purpose of diversifying and expanding the North Dakota economy by facilitating development of pipeline facilities to support the production, transportation, and utilization of North Dakota energy-related commodities. The PA may participate in a pipeline facility through financing, planning, development, acquisition, leasing, rental, joint ownership, or other arrangements.

METROPOLITAN PLANNING ORGANIZATIONS

An MPO is a local decision-making body that is responsible for the metropolitan transportation planning process. An MPO is required for urbanized areas with populations greater than 50,000 people, as determined by the U.S. Census Bureau. Each MPO provides a forum for public officials, citizens, and other interested groups to collaboratively establish policies and plans to address regional transportation issues.

Each MPO must develop and regularly update a LRTP, a Transportation Improvement Program (TIP), and a Unified Planning Work Program (UPWP) to facilitate the programming of funding for planned transportation investments.

³⁷ North Dakota Highway Patrol. Retrieved from: <https://www.nd.gov/ndhp/>

³⁸ Industrial Commission of North Dakota, North Dakota Pipeline Authority. Retrieved from: <https://www.dmr.nd.gov/pipeline/>

The three established MPOs in North Dakota are described below.

BISMARCK-MANDAN MPO³⁹

The Bismarck-Mandan MPO comprises five jurisdictions, including the cities of Bismarck, Lincoln, and Mandan and portions of Burleigh and Morton Counties.

The Bismarck-Mandan MPO receives direction from its Technical Advisory Committee (TAC) and the Policy Board. The TAC is comprised primarily of planning and engineering staff members from the MPO's member jurisdictions. The TAC provides recommendations based on professional judgment for the MPO's Policy Board. The Policy Board is the decision-making body of the MPO and is composed of five members including the mayors of Bismarck, Lincoln, and Mandan, as well as one commissioner each from Burleigh and Morton counties.

FARGO-MOORHEAD METROPOLITAN COUNCIL OF GOVERNMENTS⁴⁰

The Fargo-Moorhead Metropolitan Council of Governments (Metro COG) is both the designated Council of Governments and MPO for the greater Fargo-Moorhead Metropolitan Area comprising the cities of Fargo, West Fargo, Horace, North Dakota and Moorhead and Dilworth, Minnesota.

Metro COG's boundaries were most recently expanded in 2013 and is currently comprised of approximately 1,073 square miles (687,000 acres), across two states, two counties, 14 cities, and 30 townships. This area is Metro COG's study area respective to transportation planning. The Metro COG includes existing urbanized areas as well as areas that are anticipated to be future population centers.

Metro COG is governed by two committees: the Policy Board and the Transportation Technical Committee (TTC). The Policy Board is the executive body of Metro COG, comprised of 16 voting members who represent the metropolitan planning area. The Policy Board consists of at least three-fourths elected officials, and each jurisdiction's voting power is based on its approximate share of the area's population. The TTC advises the Policy Board on technical matters related to transportation planning in the region. The TTC is made up of planning and engineering staff from local jurisdictions, transit agencies, and representatives from both NDDOT and MnDOT.

GRAND FORKS-EAST GRAND FORKS MPO⁴¹

The Grand Forks-East Grand Forks MPO spans across state lines between North Dakota and Minnesota. The MPO planning area encompasses the cities of Grand Forks, North Dakota and East Grand Forks, Minnesota as well as the surrounding urbanized areas and surrounding rural areas anticipated to be urbanized within the next 20 years.

The Grand Forks-East Grand Forks MPO consists of the Executive Policy Board, the Finance Committee, and the Technical Advisory Committee (TAC). The Executive Policy Board is composed of eight members who are representatives of the cities and counties in the metropolitan area. TAC members include city and county planning and engineering staff, staff from NDDOT and MnDOT, FHWA and the Federal Transit Administration (FTA) representatives, and a representative from BNSF.

NORTH DAKOTA PUBLIC SERVICE COMMISSION

State law indicates that the North Dakota Public Service Commission (NDPSC) is the state agency charged with representing the state's rail interests before federal agencies and in direct negotiations with rail carriers. The

³⁹ City of Bismarck, Metropolitan Planning Organization. Retrieved from: <https://www.bismarcknd.gov/133/Metropolitan-Planning-Organization>

⁴⁰ Fargo-Moorhead Metropolitan Council of Governments. Retrieved from: <https://fmmetrocog.org/about/whoandwhat>

⁴¹ Grand Forks – East Grand Forks Metropolitan Planning Organization. Retrieved from: <https://www.theforksmpo.org/home>

NDPSC also has jurisdiction over specific safety and landowner rights' matters. The NDPSC's regulatory authority over railroads diminished as a result of the enactment of the federal Staggers Rail Act in 1980 and the ICC Termination Act of 1995. The ICC Termination Act eliminated many ICC functions and transferred all remaining duties to the STB within the USDOT.

Today, the NDPSC has the following rail regulatory responsibilities as provided for by the North Dakota Century Code (NDCC):

- **Authority of public service commission:** The commission, to the extent not inconsistent with federal law, may regulate railroads within this state to the extent railroad activities constitute intrastate commerce. The commission may represent the state interests in direct negotiations with rail carriers and in proceedings before Congress, federal agencies, and courts.
- **Public policy concerning the regulation of railroads:** All railroads are common carriers affected with a public interest and subject to regulation as prescribed by this chapter and other applicable provisions of law. The commission, to the extent not inconsistent with federal law, shall regulate railroads to ensure that all rates, facilities, and services are just and reasonable, and are not unduly discriminatory, unduly, or unreasonably prejudicial, nor unduly or unreasonably preferential.
- **Regulatory powers:** In relation to all freight and passenger railroads, the commission can act to (1) Prevent unfair competition, unjust discrimination, or undue or unreasonable preferences between shippers or consignees by lines of competing railroads; (2) Require the filing of reports and data by railroads as the commission may determine to be necessary to allow it to carry out its regulatory functions under this chapter and other provisions of law; (3) Regulate railroads in all matters affecting the relations between railroads and the public to the end that this chapter may be fully and completely carried out.
- **Spur tracks:** On a finding by the commission that public convenience and necessity so require it, a railroad shall be required to build a spur track to serve elevators, warehouses, mills, or like structures, at the expense of the party desiring the spur track to be built. The person desiring the construction of said spur track may be required by the railroad to deposit the estimated cost of the spur track with the commission before the railroad can be required to construct said spur track. The person desiring said spur track may be charged a monthly charge by the railroad for the cost of maintaining the spur track and the switch.
- **Commission may adopt and enforce safety rules:** The commission, for the protection of persons and property, may adopt and enforce railroad safety rules not inconsistent with any federal agency having jurisdiction over railroads. The commission may adopt rules more stringent than federal rules when necessary to eliminate an essentially state or local safety hazard if the rules are not incompatible with any federal law or rule and do not create an undue burden on interstate commerce.
- **Railroad crossing determination:** If a dispute arises as to whether a railroad grade crossing should be classified as public or private as defined in section 49-11-00.1 of the NDCC, the railroad corporation, governmental entity, or private property owner may file with the commission a petition and the commission shall determine whether the crossing is public or private.

As part of its regulatory responsibilities, the NDPSC established and manages the state's rail safety inspection program. The North Dakota 64th Legislative Assembly approved funding for a state-run rail safety pilot program intended to supplement federal oversight of rail safety. An inspection program was established with state rail and mechanical inspectors who are accountable to the NDPSC. State rail inspectors inspect rail to federal standards and have the same enforcement authority and tools as federal inspectors. Funding for the program will expire in 2025 unless it is renewed by the Legislature.

NORTH DAKOTA DEPARTMENT OF EMERGENCY SERVICES

The NDDES provides 24/7 emergency communications and resource coordination with more than 50 lead and support agencies, private enterprise, and voluntary organizations to assist local jurisdictions in disaster and emergency response activities. It administers federal disaster recovery programs and the Homeland Security Grant Program. NDDES also manages the Emergency Management Assistance Compact that serves as a national clearinghouse through which member states may request and provide mutual aid assistance. With respect to rail, it has the legislative mandate to:

- **Crash reporting:** A railroad corporation shall provide immediate notification to the NDDES of an accidental release of a hazardous material.
- **Railroad incident response training programs:** The NDDES has oversight over railroad incident response training programs. Training must address the general hazards of oil and other hazardous substances, techniques to assess hazards to the environment and to the safety of responders and the public, factors an incident commander must consider in determining whether to attempt to suppress a fire or to evacuate the public and emergency responders from the area, and other strategies for initial response by local emergency responders. Training must include suggested protocol or practices for local responders to safely accomplish these tasks.

NORTH DAKOTA SAFETY COUNCIL

The North Dakota Safety Council (NDSC) is a private non-profit organization focused on providing safety training and advocacy throughout North Dakota. NDSC's primary role related to rail transportation is administering public education and awareness programs to prevent collisions, injuries, and fatalities on and around railroad tracks and highway-rail grade crossings. At the heart of the program is a cadre of volunteer presenters, most of whom are railroad employees. NDSC initiated its Operation Lifesaver program in the mid-1980s, which is financially supported by the state's railroads, NDDOT, and FRA and grants from safety organizations.

UPPER GREAT PLAINS TRANSPORTATION INSTITUTE⁴²

Section 54-53-01 of the NDCC established the UGPTI. Located at NDSU, UGPTI's purpose is to conduct and supervise research in the field of transportation and logistics. The institute also helps develop a wider knowledge and understanding of marketing factors associated with the geographical location of the state of North Dakota and the Upper Great Plains in the field of transportation and their influence on the socioeconomic systems of the state, region, and country. Since its inception, UGPTI has had a prominent role in the state's rail planning efforts. The institute, under contract to NDDOT, developed the state's first rail plan in 1978 and has been integrally involved in the development of each subsequent rail plan. UGPTI also developed the benefit cost analysis process used by NDDOT to determine rail project benefit-cost ratios and has been responsible for publishing several rail-related studies.

TRANSPORTATION TECHNOLOGY RESEARCH INITIATIVE⁴³

The Transportation Technology Research Initiative (TTRI) at the University of North Dakota (UND) serves to support NDDOT in its efforts to develop and maintain a modern transportation system. The TTRI will improve the design, construction, operation, and maintenance of intelligent, resilient, and sustainable transportation-related structures

⁴² Upper Great Plains Transportation Institute, About. Retrieved from: <https://www.ugpti.org/about/>

⁴³ University of North Dakota, Transportation Technology Research Initiative. Retrieved from: <https://engineering.und.edu/research/ttri/index.html>

by utilizing advanced materials and tools such as autonomous systems and artificial intelligence, advancing transportation-related technologies by engaging in NDDOT research, and training a diverse and highly skilled workforce.

The TTRI provides intellectual capital to the NDDOT and its partners to solve complex problems and address regional issues in structural design, advanced materials, and unmanned/autonomous systems. This resource assists the NDDOT with designing, building, operating, and maintaining an intelligent, resilient, and sustainable infrastructure in ways that are safer and more cost-effective.

REGIONAL AND MULTISTATE FREIGHT AND RAIL PLANNING ACTIVITIES

REGIONAL RAIL PLANNING COALITIONS

MIDWEST INTERSTATE PASSENGER RAIL COMMISSION

The Midwest Interstate Passenger Rail Commission (MIPRC) is a forum for a group of state leaders from across the region to advocate for passenger rail improvements. Formed by compact agreement in 2000, MIPRC's current members are Illinois, Indiana, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, and Wisconsin. The main purposes of the compact are the following:

- Promote both current improvements and long-range plans for intercity passenger rail service in the Midwest
- Coordinate interaction among Midwestern state officials, and between the public and private sector at all levels (federal, state, and local).
- Support current state efforts being conducted through state DOTs

North Dakota participates in the MIPRC as a non-voting associate member.

CROSS BORDER GROUPS

FEDERAL HIGHWAY ADMINISTRATION/TRANSPORT CANADA TRANS BORDER WORKING GROUP

In October 2000, the USDOT and Transport Canada (Canada's federal transportation ministry) developed a Memorandum of Cooperation that highlighted the importance of coordinating closely on transportation initiatives along the Canada-U.S. border. The memorandum cited the need for "increasing the degree and speed of communication" between both departments and stressed the importance of "meeting more regularly to conduct information exchanges and discuss issues of mutual concern.

Out of this, the Canada-U.S. Trans Border Working Group (TBWG) was formed in January 2001. Core membership includes federal, state, and provincial DOTs from both sides of the border, CBP, and CBSA. Additional members include Foreign Affairs Canada, the U.S. Department of State, regional planning agencies, Canadian provinces, and northern border U.S. States. NDDOT has been an active member of TBWG since its inception.

The mission of the TBWG is to facilitate the safe, secure, efficient, and environmentally responsible movement of people and goods across the Canada-U.S. border. TBWG subcommittees work on a variety of important issues such as promoting Border Flow Information Architecture to enhance border technology interoperability. In addition, although much of TBWG's focus has been on freight movements, cross border passenger movement is also an issue of importance.

PEMBINA/EMERSON LAND PORT OF ENTRY INTER-AGENCY PLANNING GROUP

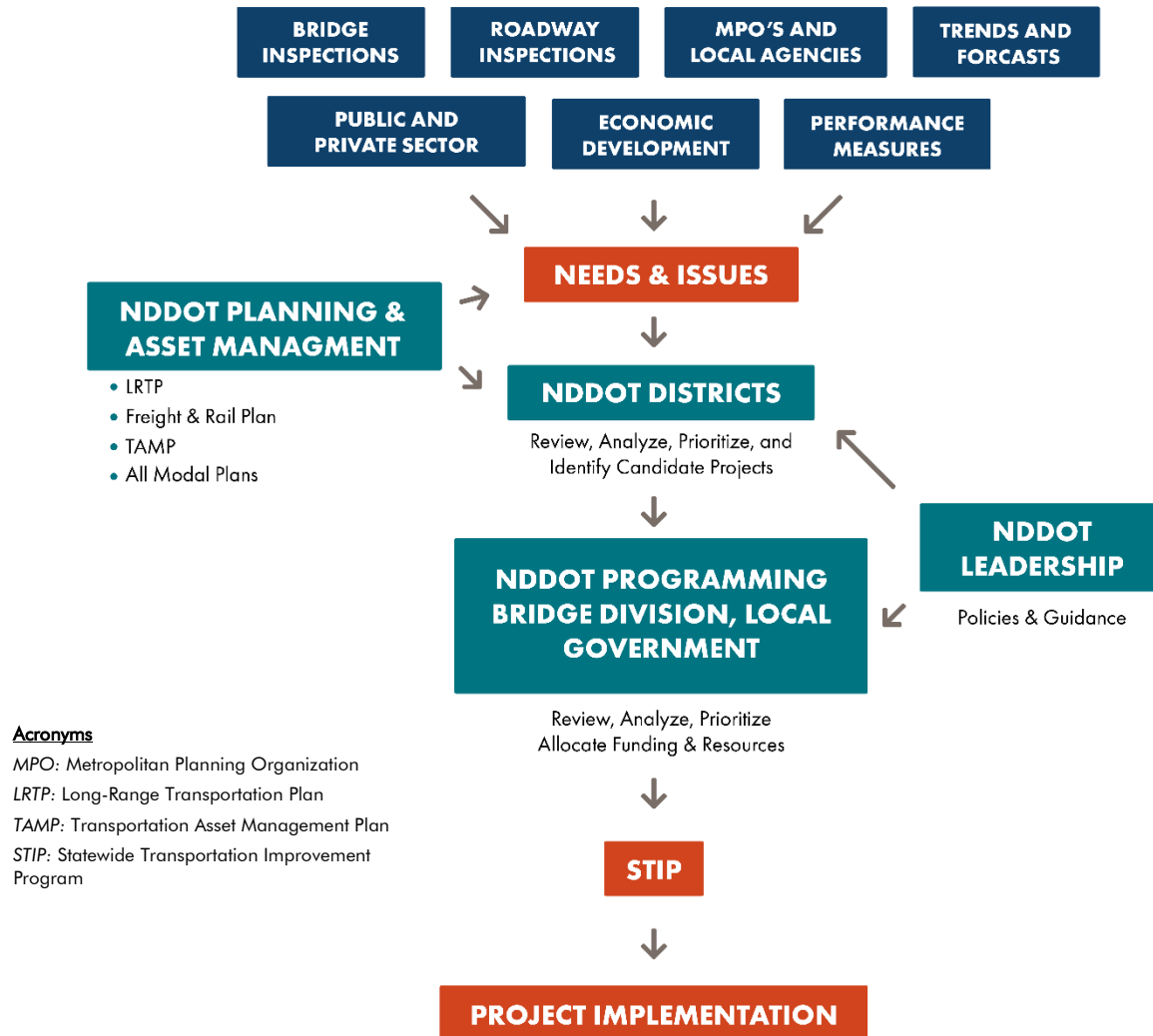
In 1998, NDDOT secured a grant through the FHWA's Coordinated Border Infrastructure Program to conduct a transportation planning study for the Pembina/Emerson Land Port of Entry. Shortly after the study was completed, 9/11 occurred, which postponed implementation of the study's recommendations. In 2008, Manitoba Infrastructure and Transportation reinitiated cross border transportation planning efforts at the port. In 2012, a long-range concept plan addressing traffic and operational requirements to the year 2035 was published. A product of the study was the creation of an Inter-Agency Planning Committee that provided the mechanism for planning long-term enhancements to the port's rail infrastructure at nearby Noyes, Minnesota.

CHAPTER 8: PROJECT IDENTIFICATION, SELECTION AND PRIORITIZATION

INTRODUCTION

This chapter describes NDDOT’s process for identifying, selecting, and prioritizing freight projects. This process employs a step-based method that builds on the needs and issues identified through quantitative and qualitative data analysis, and Freight and Rail Plan goals. Projects are reviewed, analyzed, and supported by ensuring they are consistent with NDDOT statewide and regional planning goals, NDDOT district needs, NDDOT leadership policy responsibilities, and anticipated funding/resource streams.

Figure 8-1: North Dakota Project Identification Process for Freight Projects



PROJECT IDENTIFICATION

USE OF QUANTITATIVE DATA

The use of quantitative data roots project identification in clear facts to identify needs and issues, and potential solutions, to ease the statewide movement of freight. To gain a comprehensive picture within North Dakota, NDDOT has looked at various datasets to understand current needs and implications in selecting and ultimately developing projects, as well as the implications of staying the course without improvements. This diligence provides for an informed decision-making process to make the best use of resources for freight-related improvements.

INSPECTIONS AND SAFETY ANALYSES

Ensuring that the statewide freight system functions safely is NDDOT's overarching priority. The Department's ongoing bridge and roadway inspection programs perform structural analyses, bridge ratings, and damage assessments for roadway and bridge infrastructure on the state highway system. In addition to the safety of the physical infrastructure, operations also play a large part in freight safety and truck-involved crashes. When considering safety in freight projects, NDDOT analyzes high truck crash locations, truck access management, at-grade rail/highway crossings, truck size and weight compliance, truck parking availability, and snow removal performance, etc. with an emphasis on the root cause to better inform potential solutions. The analysis of safety data and documentation helps to identify project locations and solutions that are often smaller in scale but have meaningful magnified impacts.

TRENDS AND FORECASTS

Freight trends and forecasts (Chapter 6) play a large part in determining what transportation infrastructure is a freight priority and to what extent. Those routes with larger freight volumes carry the bulk of the state's freight and economic weight, while lower volume routes may not accommodate a large share of goods but are still critical linkages for rural freight-dependent industries (mining, energy, agriculture, etc.) and multimodal facilities.

In addition, estimating where freight industries are headed (literally and figuratively) is important for planning out the freight infrastructure of the future. Industry and employment trends assist in identifying these areas and the freight infrastructure improvements required to facilitate future freight movement growth.

Like most state DOTs, NDDOT is challenged by multiple freight technologies being developed and adopted for use, which need to be understood to determine its roles and responsibilities in supporting freight carriers' adoption and usage of technologies. Examining these trends assists in identifying projects that support these advances and provide considerations for current projects so that any adoption of technology is not hindered in the future. One example is in autonomous truck operations. Adoption of autonomous vehicles will be a gradual process but over time there is potential to improve efficiency, safety, and lower transportation costs. The identification and adaptation of projects with these uses in mind will set the stage for North Dakota's future.

ECONOMIC IMPACT/DEVELOPMENT

Moving goods and commodities from their point of origin or point of manufacture to the customer requires an orchestration of activities to get the right product, to the right place, at the right time, to the right person, for the right price. This requires companies to produce or extract raw materials, transport raw materials to manufacturers or intermediaries, manufacture the products, transport the products, distribute the products, and ultimately purchase and utilize the products. Producing, moving, and distributing products creates employment, while the purchase of products fulfills consumer needs and wants. Both aspects support economic development and quality of life for residents of North Dakota. Considering and quantifying this impact as part of the project identification process is vital to measuring the benefit of a project relative to its cost.

PERFORMANCE MEASURES

In addition to project performance monitoring, performance measures (Chapter 1) are used in the selection process. Within project identification, performance measures are aligned with an organization's goals and objectives which assist in project selection and prioritization. These measures are based on accurate, reliable quantitative data that can be conveyed and understood by a wide array of stakeholders. Performance measures, including NDDOT's Functional Capacity Measure, are used in the project identification stage to inform the decision-making process. They allow stakeholders to observe the anticipated effects of the proposed project or policy and help determine whether the existing freight infrastructure and policies are meeting the plan's goals or whether adjustments are needed.

USE OF QUALITATIVE DATA

STAKEHOLDER PARTICIPATION

Freight stakeholders have their finger to the pulse of the issues and needs within the state. These public and private representatives of government, economic development and private interests collectively understand the policy, infrastructure, and processes that assist or hinder the movement of goods. From large chokepoints to intersection operations, stakeholders provide insights that cannot be gleaned from data alone. Consultations with these representatives assists in the identification of freight needs and potential solutions that would not otherwise be known from data numbers alone. Opportunities for meaningful customer and stakeholder input, both formal and informal, are available at each step of the freight project development process.

PROJECT SELECTION

The development of freight-related projects is a cyclical and ongoing process. Based on data analysis, potential freight-related improvement projects are identified and reviewed annually by each of the department's eight district engineers who consider freight-related projects as they develop their list of project priorities to preserve and/or enhance North Dakota's freight system. The district engineers submit their prioritized project lists to the department's Programming Division for consideration in the development of the annual STIP. Generally, freight-related projects will typically enhance the State Highway System's functional capacity by eliminating conditions that create freight bottlenecks and delays, improve safety, or expand the operational efficiency of existing infrastructure.

PROJECT PRIORITIZATION

The prioritization of freight projects is an on-going and collaborative process. Once district projects are submitted, they are reviewed to see how well they satisfy specific prioritization criteria related to the following five goal areas described in Chapter 1.

Goal 1 – Keeping You Safe: Transportation safety and security is NDDOT’s top priority. Efforts are taken to plan, design, build and operate a transportation system that allows travelers and freight to move safely and securely. Motorized and non-motorized forms of transportation are considered, conflicts between modes are minimized, and safety partnerships that incorporate engineering, education, emergency services, and enforcement are encouraged. Projects that improve the safety related to the movement of hazardous materials, at conflict points such as highway-rail grade crossings, and support safety along highways such as the use of technologies and the provision of truck parking receive higher priority.

Goal 2 – Caring for What We Have: North Dakota’s freight transportation system is constantly undergoing strategic development...considering long-term investment versus short-term demands. The use of transportation resources is prioritized, and desired levels of service defined, with an emphasis on providing a system that is ‘right-sized’ with an emphasis on preservation and maintenance over new construction. This includes the preservation of rail corridors, maintaining major freight corridors and last-mile connections, and supporting technologies such as truck platooning, that demonstrate more efficient operations and less wear and tear on the state’s freight transportation system.

Goal 3 – Connecting North Dakota: When prioritizing projects, NDDOT looks at priority freight networks as a higher order than local streets. These priority networks include highways, rail lines and other transportation infrastructure and services that enhance North Dakota’s economic competitiveness by providing increased access to international markets, connections to key regional centers, and multiple modes of transportation. Projects that leverage transportation investments to enhance economic opportunities are priorities such as upgrades to short line rail facilities, enhancing cross-border trade opportunities, and expanding the reach of North Dakota businesses through international air cargo service enhancements.

Goal 4 – Helping You Get There: North Dakota’s role in the integrated global economy requires a freight transportation system that is reliable and predictable. Technological advances, more efficient equipment, the evolution of freight rail operations, and “just-in-time” manufacturing emphasize reliability and predictability of travel time and cost. To advance this goal, NDDOT prioritizes those efforts that provide consistent travel time reliability on the freight network. These include improving seasonal maintenance and response times, expanding multimodal freight opportunities, travel information, and reliable transportation for workers in freight-related businesses.

Goal 5 – Investing for the Future: Modernizing the freight transportation system is critical for the vitality of freight-dependent businesses in the future. These investments must be well informed and fiscally responsible while looking at the technologies on the horizon. Priority will be given to those investments that will assist in modernizing services and data within NDDOT, explore collaborative funding opportunities for improved freight movement infrastructure and technology, ensure incorporation of freight mobility, and explore strategic investments to increase efficiency, capacity, and performance. Transportation infrastructure projects that result in multiple use benefits and facilitate freight movement among different modes extend limited resources and broaden benefits for the state. Programs that increase administrative efficiency, expedite implementation, enhance modal efficiencies, harmonize regulations, and promote better system operation are priorities.

Every year, NDDOT reviews transportation projects and updates priorities as circumstances change. Projects are reevaluated through the prioritization process on how well they match up to the prioritization criteria relative to other projects. Those projects that benefit freight are recognized by being given additional consideration for those attributes that address freight-related criteria.

PROJECT IMPLEMENTATION

A freight plan is a blueprint for action that identifies the implementation steps that will address freight needs and issues. To create an actionable plan, NDDOT has developed a pragmatic framework to focus on freight issues and needs and the solutions to improve efficiency, reliability, and safety. Identification of the funding mechanisms, steps for project implementation, and monitoring how well projects and programs are performing is the backbone to improving the state's freight movement and supporting economic development.

FUNDING

Securing funding for freight projects is an obvious need for implementation. However, there are many funding mechanisms that can be used. The first step is to incorporate these projects in the fiscally constrained programs to ensure the funding is available given NDDOT's other funding priorities.

STATEWIDE TRANSPORTATION IMPROVEMENT PROGRAM (STIP)

In addition to its investment strategies and legislative guidance, NDDOT considers numerous factors including available funding, statewide system needs, and workload type to annually develop the STIP. Fiscally constrained projects identified in the STIP are those that have been shown to meet the department's priorities and are ready for engineering, design, and construction.

SECURING FUNDS

The freight funding sources summarized in Chapter 9 provide how projects are resourced. Historically, NDDOT has funded projects through its proportion of federal formula funding from the Highway Trust Fund and the State Highway Tax Fund. These funding sources have provided relatively steady and predictable resources that have allowed NDDOT to plan and implement projects throughout the state. Since the passage of the IJJA, the reliance on competitive discretionary grant funding programs has become of greater importance due to the increased funding within these programs.

Leveraging the federal formula funds and state highway funds, NDDOT will develop and submit discretionary grant applications for projects based on their readiness, applicability to grant criteria, and merit to the particular program. This could provide increased funding and more flexibility for existing funding that would allow more projects to be funded and ultimately implemented. Because of the wide variety of grant programs available and the differences in scope and purpose, applying for funding through these programs will be determined by the language in the Notice of Funding Opportunity (NOFO) when released for each program and the specific goals for the current round of funding.

PERFORMANCE MONITORING

Monitoring how well projects are accomplishing their goals provides invaluable feedback that results in reexamination of resources and better decision-making. For those projects shown to accomplish their goals, information can be gathered to address similar issues in the same manner. Those projects that do not perform as well are able to be reevaluated and potentially modified for better outcomes, and to add to the knowledge base for improved future decisions.

Once constructed, freight-related projects are monitored and evaluated to determine their effectiveness for eliminating freight bottlenecks and delays and improving safety and operational efficiencies. Data generated during the monitoring and evaluation phase is analyzed and incorporated into NDDOT's planning and engineering processes.

Currently, the NDDOT measures the state's highway infrastructure capabilities and bottlenecks via the Highway Performance Classification System (HPCS). Additional data resource analysis includes elements from the Highway Performance Monitoring System (HPMS). The HPCS analysis examines three main components (and combinations thereof): ride, distress, and load carrying capacity (load) on five levels of highways: Interstate, Interregional, State Corridor, District Corridor, and District Collector. The HPCS strives to balance the system's performance while maintaining the infrastructure through an investment strategy differentiated by the level of highway.

The NDDOT has drafted a functional capacity-related performance measure to assess when and where improvements may be necessary to meet the needs of its customers. Functional capacity is an asset class that provides a network measure of roadway functional restrictions. Functional restrictions are defined as factors that impede traffic flow such as load restrictions, high traffic flow, and roadway width, among others.

The measure assesses the state network for restrictions over time and assists the NDDOT in identifying possible treatments to alleviate the restrictions. Using this measure and following trends over time will ultimately provide statistics as to the effects of the implemented improvement on the functional service provided to the system users. This functional capacity measure helps guide future freight-related investment decisions at NDDOT.

CHAPTER 9: INVESTMENTS, FINANCING, AND FUNDING

INTRODUCTION

This chapter describes the funding opportunities available to freight and rail projects in North Dakota. It is recognized that successfully competing for competitive grants and fully utilizing formula funding will be vital to investing in North Dakota's freight system. Furthermore, since the passage of the IIJA,⁴⁴ the reliance on competitive discretionary funding programs has become of greater importance due to the increased funding within these programs. To maximize funding, NDDOT will need to develop and submit discretionary grant applications for projects based on their readiness, applicability to grant criteria, and merit to particular programs.

The importance of securing a portion of the new funding available through the IIJA can be illustrated through the NDDOT's projected funding requirements. Funding challenges associated with NDDOT's largest funding sources, the Federal Highway Trust Fund and the State Highway Tax Distribution Fund will contribute to an estimated \$4.4 billion funding gap over the next 20 years.⁴⁵ This shortfall can be attributed to increased fuel efficiency of cars, decreased gas tax revenue, and increased maintenance and construction costs.⁴⁷ The combination of these factors has resulted in reduced revenue and increased expenditures and is anticipated to continue in future years. Managing these assets will likely exceed the Department's budget over the near-to-long-term. For the 2021-2023 period, highway programs including maintenance and construction of new roads represented 83% of \$1.9 billion total expenditures. Federal discretionary grant programs in areas such as highway construction and rehabilitation, in safety improvements, and multimodal freight programs can be leveraged to cover a portion of NDDOT's expenditures on highway programs and reduce the funding shortfall.

This chapter provides an inventory of funding programs, with an emphasis on competitive discretionary grant programs, and highlights key facts associated with each program and application requisites. It also provides a schedule of these future opportunities and identifies strategies to help NDDOT maximize funding from these opportunities. Detailed information regarding these programs has been gathered through the Grants.gov portal, which contains a repository of current and past NOFOs.

⁴⁴ The IIJA is also known as the Bipartisan Infrastructure Law (BIL).

⁴⁵ [NDDOT-By-the-Numbers.pdf](#).

⁴⁶ [ND Transportation Handbook Funding and Performance](#).

INFRASTRUCTURE INVESTMENT AND JOBS ACT FUNDING

SUMMARY

The IIJA provides a generational investment in roads, bridges, transit, rail, ports, airports, and other infrastructure over the next five years. In aggregate, it appropriates over \$257 billion in the nation’s transportation system. The funding will be available to eligible recipients through several targeted discretionary grant programs, each with its own eligibility, merit criteria, funding match and application requirements. A high-level summary of the available funding and focus of these programs is highlighted in Table 9-1 with additional detail provided in summaries for each program.

Table 9-1: Summary of IIJA Funding Programs

	Amount of Funding	Funding Type	Administering Agency	Focus
Bridge Investment Program	\$12.5 billion	Discretionary	FHWA	Replacement or rehabilitation of nationally significant bridges
Competitive Tribal Programs	\$1.1 billion	Discretionary	FHWA – Office of Tribal Transportation (OTT)	Various – includes bridge, safety, and training programs
Congestion Mitigation and Air Quality Program	\$13.2 billion	Formulaic	FHWA	Reducing congestion and improving air quality
Consolidated Rail Infrastructure and Safety Improvements Program	\$320.0 million*	Discretionary	FRA	Improving railroad safety
Federal Lands Access Program	\$1.4 billion	Discretionary	FHWA	Improving federal land access facilities
Federal Lands Transportation Program	\$2.2 billion	Discretionary	FHWA	Improving federal land transportation facilities
Highway Safety Improvement Plan	\$15.6 billion	Formulaic	FHWA	Improving highway safety
National Highway Freight Program	\$7.2 billion	Formulaic	FHWA	Improving highway freight corridors
National Highway Performance Program	\$148.0 billion	Formulaic	FHWA	Funding for construction and maintenance on the NHS
Nationally Significant Multimodal Freight and Highway Projects	\$8.0-14.0 billion	Discretionary	Office of Multimodal Freight Infrastructure and Policy	Nationally significant infrastructure
National Infrastructure Project Assistance	\$10.0-15.0 billion	Discretionary	Office of Multimodal Freight Infrastructure and Policy	

	Amount of Funding	Funding Type	Administering Agency	Focus
Rebuilding American Infrastructure with Sustainability & Equity	\$7.5-15.0 billion	Discretionary	Office of Multimodal Freight Infrastructure and Policy	Local or regional impact of infrastructure
Rural Surface Transportation Program	\$2.0 billion	Discretionary	Office of Multimodal Freight Infrastructure and Policy	Highway and freight infrastructure that impacts rural communities
Surface Transportation Block Grant	\$72.0 billion	Formulaic	FHWA	Improvement in road and rail infrastructure
Rail Crossing Elimination Program	\$2.5-5.5 billion	Discretionary	FRA	Improving railroad safety through grade-crossing elimination
Tribal Transportation Program	\$3.0 billion	Formulaic	FHWA OTT	Improve road and bridge infrastructure on tribal land

*Representative of 2021 only

BRIDGE INVESTMENT PROGRAM

The Bridge Investment Program (BIP) was created in 2021 as part of the IIJA. It is intended to provide funding for various bridge projects, including replacement and rehabilitation of bridges from the NBI. Total funding allocated is \$12.5 billion over the 2022-2026 period; there is no minimum or maximum for awards. No state may receive more than 20% of the total funding, and the grant awarded may not exceed 80% of the eligible project costs; 20% must come from matching non-federal funds.⁴⁸

ELIGIBLE APPLICANTS

- State or group of states
- MPO that serves an urbanized area
- Unit of local government or a group of local governments
- Political subdivision of a state or government
- A special purpose district or public authority with a transportation function
- A federal land management agency
- A Tribal government or consortium of Tribal governments
- A multistate or multijurisdictional group of entities as described above

ELIGIBLE PROJECTS

Projects with total costs less than \$100 million are eligible as Bridge Projects, and those greater than \$100 million are eligible as Large Bridge Projects if they intend to replace, rehabilitate, preserve, or protect one or more bridges on the NBI or includes bridge bundling or culverts. All projects under the BIP must also demonstrate a commitment to ongoing maintenance and accommodations for pedestrians and bicyclists.

⁴⁸ [Bridge Investment Program - Planning, Bridge Projects, and Large Bridge Project](#)

PROJECT OUTCOME CRITERIA

Criterion	Description	Criterion	Description
State of Good Repair	How the project improves (1) the condition of a bridge (2) improving protection, to provide long-term resiliency to extreme weather events, and (3) reducing maintenance costs	Climate Change	How the project will address climate change, improve resiliency, support environmental sustainability, and address environmental justice
Safety	How the project will improve the safety of the bridge and associated sections of roadway	Quality of Life	Considers how the project will improve quality of life at the local, regional, or national level
Mobility & Economic Competitiveness	How the project will improve the mobility, efficiency, and reliability of the movement of people and freight	Innovation	How the project will employ innovative finance, technology, or techniques

PROJECT READINESS CRITERIA

Projects are evaluated through technical assessment, environmental risk, and financial completeness. Environmental Risk is assessed based on the project's National Environmental Policy Act (NEPA) status, a provided project schedule, and all other environmental reviews and permits provided by the applicant. The applicant should demonstrate receipt (or the schedule for anticipated receipt) of State and local approvals on which the project depends, such as State and local environmental and planning approvals, and STIP or TIP funding. Recipients must begin construction within 18 months of the obligation of funds, and funds must be obligated by September 30, 2025. Projects will receive the highest ratings if they satisfy the following criteria.

Environmental Risk	Technical Assessment	Financial Completeness Assessment
The Project has completed NEPA, or it is highly likely that they will be able to complete NEPA and other environmental reviews in the time necessary to meet their project schedule	Confidence in the applicant's capacity to deliver the project in a manner that satisfies federal requirements	The Project's federal and non-federal sources are fully committed and there is demonstrated funding available to cover contingency/cost increases

OTHER REQUIREMENTS

- Grant recipients must complete quarterly progress reports and Federal Financial Reports (form SF-425) to monitor project progress.

COMPETITIVE TRIBAL PROGRAMS

There are several dedicated competitive programs for Tribal Nations. In total, there is approximately \$1.1 billion available through these programs. The programs include:

- Tribal High Priority Projects Program (THPP):** Provides funding to an Indian Tribe or a governmental subdivision of an Indian Tribe whose annual allocation of funding received under the Tribal Transportation Program (TTP) is insufficient to complete the highest priority project of the Tribe. It also applies to any Indian Tribe that has an emergency or disaster occur on a tribal transportation facility that renders the

facility impassible or unusable and which is not eligible under the Emergency Relief for Federally Owned Roads (ERFO) program. Total funding available is \$45.0 million.

- **Tribal Transportation Facility Bridge Program (TTFP):** Provides funding to replace, rehabilitate, preserve, protect, and construct new bridges. This combines funding from the Bridge Formula Program and Bridge Improvement Program, for a total of \$1.0 billion in funding.
- **Tribal Technical Assistance Program (TTAP):** Provides comprehensive transportation training and technical assistance to tribal communities, building skills and expertise to ensure the safety and maintenance of tribal roads. Total funding available is \$17.8 million.
- **Tribal Transportation Program Safety Fund (TTPS):** Provides funding dedicated to preventing and reducing transportation-related injuries and fatalities on Tribal Lands. Total funding available is \$120.4 million.

ELIGIBLE PROJECTS

Tribal High Priority Projects Program	Tribal Technical Assistance Program
Eligible projects must be highest priority, emergency, or disaster-related projects	The TTAP program was established to provide comprehensive transportation training and technical assistance to tribal communities, building skills and expertise to ensure the safety and maintenance of tribal roads
Tribal Transportation Facility Bridge Program	Tribal Transportation Program Safety Fund
Planning, design, engineering, preconstruction, construction, and inspection of new or replacement tribal transportation facility bridges. Must have an opening of 20 ft or more, be classified as a Tribal transportation facility, be structurally deficient or functionally obsolete, and be included in the NBI database	<ul style="list-style-type: none"> • Development and update of transportation safety plans • Crash data assessment, improvement, and analysis • Systemic roadway departure countermeasures

PROJECT CRITERIA

There is no BCA requirement for any of the below programs.

Program	Criteria
Tribal High Priority Projects Program	<ul style="list-style-type: none"> • The existence of safety hazards • The number of years since a Tribe has completed a project with THPP program funding • The readiness to complete the project • Percentage of project costs matched by other funds • The amount of funds requested • The challenges caused by geographic isolation • All weather access for employment, commerce, health, safety, educational resources, or housing

Program	Criteria
Tribal Transportation Facility Bridge Program	<ul style="list-style-type: none"> • See Bridge Improvement Program criteria
Tribal Technical Assistance Program	<ul style="list-style-type: none"> • Not available
Tribal Transportation Program Safety Fund	<ul style="list-style-type: none"> • Included in a Safety Plan or other transportation safety study • Supporting safety data, including the type, severity, and quantity of incidents that directly demonstrate the need for the project • Expected crash reduction

PROJECT READINESS AND APPLICATION CRITERIA

The federal share of project costs for all the competitive Tribal programs is 100%.

Program	Criteria
Tribal High Priority Projects Program	<ul style="list-style-type: none"> • Project scope of work • Project schedule • Amount of funds requested • Project information addressing the ranking criteria or the nature of the emergency or disaster • Documentation that the project is on an eligible facility, official tribal action requesting the project, and authorization for the U.S. Department of the Interior to place the project on a TIP if selected and approved
Tribal Transportation Facility Bridge Program	<ul style="list-style-type: none"> • See Bridge Improvement Program readiness criteria • Bridge Formula Program general criteria: <ul style="list-style-type: none"> ○ Completed application ○ Plans, Specifications, and Estimate (PS&E) document certified by a Professional Engineer ○ Itemized cost list for engineering study/planning projects
Tribal Technical Assistance Program	<ul style="list-style-type: none"> • <i>Not available</i>
Tribal Transportation Program Safety Fund	<ul style="list-style-type: none"> • Completed application form • Project narrative • Project schedule

CONGESTION MITIGATION AND AIR QUALITY IMPROVEMENT (CMAQ)

CMAQ is intended to provide a flexible funding source to state and local governments for transportation projects and programs to help meet the requirements of the Clean Air Act. Funding is available to reduce congestion and

improve air quality for areas that do not meet the National Ambient Air Quality Standards for ozone, carbon monoxide, or particulate matter (nonattainment areas) and for former nonattainment areas that are now in compliance (maintenance areas). There is approximately \$13.2 billion in funding available from 2022-2026. Per U.S. Code 23 Section 120, federal funding may represent up to 80% of CMAQ project funding.⁴⁹

ELIGIBLE APPLICANTS

Funds are apportioned on a formulaic basis for each State. As under the FAST Act, the IIJA directs FHWA to apportion funding as a lump sum for each State then divide that total among apportioned programs.

ELIGIBLE ACTIVITIES

Eligible projects are broadly defined but must exhibit the following criteria:

- The project must be a transportation project
- It must generate an emissions reduction from motor vehicles
- It must be located in, or benefit, a nonattainment or maintenance area

As North Dakota does not contain a nonattainment or maintenance area, CMAQ funding may be used for projects eligible under the Surface Transportation Block Program [23 U.S.C. 149(d)(1)(B)]

PROJECT CRITERIA

As funds are apportioned on a formulaic basis to each State, no Benefit-Cost Analysis (BCA) is required. As such, there are no relevant Project Criteria for the CMAQ program on a nationwide level. Certain states will initiate competitive processes to award funding to local projects from the apportioned CMAQ funding.

CONSOLIDATED RAIL INFRASTRUCTURE AND SAFETY IMPROVEMENTS (CRISI)

CRISI funding is allocated under the IIJA for the years 2022-2026. Approximately \$362.0 million is allocated through this program for the period, focusing on improvements to railroad safety through advanced technologies and provide economic opportunities for underserved communities. There is no minimum or maximum amount for a CRISI grant. No state may receive more than 20% of total funding, and the grant awarded may not exceed 80% of eligible project costs; 20% must come from matching non-federal funds.⁵⁰

ELIGIBLE APPLICANTS

- | | |
|--|--|
| <ul style="list-style-type: none"> • State or group of States • Interstate Compact • Public agency • Amtrak or other rail carriers that provides intercity rail passenger transportation • Class II or III railroad | <ul style="list-style-type: none"> • Any rail carrier or rail equipment manufacturer with another entity previously described • Transportation Research Board • University transportation center • Non-profit labor organization representing employees of rail carriers |
|--|--|

⁴⁹ [Congestion Mitigation and Air Quality Improvement Program - FAST Act Fact Sheets - FHWA | Federal Highway Administration \(dot.gov\)](#)

⁵⁰ [Federal Register:: Notice of Funding Opportunity for Consolidated Rail Infrastructure and Safety Improvements](#)

ELIGIBLE PROJECTS

- Deployment of rail safety technology
- Acquisition, improvement, rehabilitation of railroad equipment, infrastructure, or facilities, or to address congestion challenges
- Highway-rail grade crossing improvement
- Rail lane relocation/improvement
- Improve short line or regional railroad infrastructure
- Preparation of regional rail and corridor service development plans
- Enhance multimodal connections or facilitate service integration with rail

SELECTION CRITERIA

Criterion	Description	Criterion	Description
System and Service Performance	How the project improves (1) the condition of a bridge (2) improving protection, to provide long-term resiliency to extreme weather events, and (3) reducing maintenance costs	Efficiencies from improved integration with other modes	How the project will address climate change, improve resiliency, support environmental sustainability, and address environmental justice
Effects on Safety, Competitiveness, Reliability, etc.	How the project will improve the safety of the bridge and associated sections of roadway	Ability to meet existing or anticipated demand	Considers how the project will improve quality of life at the local, regional, or national level

PROJECT READINESS CRITERIA

Planning and Environmental Readiness must be demonstrated in the application review process. Planning Readiness is assessed through providing information, typically through a planning document, where the project has identified solving a specific existing transportation problem. Environmental Readiness indicates the stage of the NEPA approvals process of the project, and projects with NEPA approvals completed or nearing completion will receive higher Project Readiness scores. Projects must be completed within a twelve-month period per the NOFO. In reviewing applications, additional consideration will be given if the proposed project is consistent with planning guidance and documents set forth by USDOT, including those required by law or SRPs.

OTHER REQUIREMENTS

Grant recipients must complete standard FRA reporting requirements, including quarterly progress reports, quarterly Federal financial reports, and interim and final performance reports.

FEDERAL LANDS ACCESS PROGRAM

The Federal Lands Access Program was established to improve transportation facilities that provide access to, are adjacent to, or are located within federal lands. The Access Program supplements state and local resources for public roads, transit systems, and other transportation facilities, with an emphasis on high-use recreation sites and economic generators. Funds will be allocated among the states using a statutory formula based on road mileage, number of bridges, land area, and visitation. The Program Decision Committees (PDC) request project applications through a call for projects. The frequency of the calls is established by the PDCs. A total of \$1.4 billion in funding is available from 2022-2026. Federal funding matching requirements are flexible and depend on the project pursued; this may range from 50% to 100%.

ELIGIBLE APPLICANTS

Projects applications are submitted by federal land management agencies (FLMA) and are selected by a PDC established in each state.

ELIGIBLE PROJECTS

- Transportation planning, research, engineering, preventive maintenance, of federal land access transportation facilities (FLATF)
- Operations and maintenance of transit facilities
- Rehabilitation, restoration, construction, and reconstruction of FLATFs.

PROJECT CRITERIA

- Before any joint discussion or final programming decision, did the PDC cooperate with the applicable FLMA?
- Does the project improve safety while improving access to a federal facility?
- Is the project endorsed by the pertinent FLMA(s) as a high priority?
- Can the project be realistically completed based on the scope, schedule, and budget proposed?
- Does the project provide access to federal high-use recreation sites or federal economic generators?
- Does the project sponsor have the ability to meet the local match requirements?
- Is the project consistent with the owner's long-range transportation plan and is it consistent with the FLMA and other planning efforts in the State and/or region?

When the PDC makes programming decisions within a State, preference must be given to the projects and facilities that provide access to, are adjacent to, or are located within high-use federal recreation sites or federal economic generators, as identified by the Secretaries of the appropriate FLMAs. FLMAs are responsible for defining and identifying high-use recreation sites and federal economic generators.

PROJECT READINESS

The funds made available under the Access Program will be available for obligation in the fiscal year for which the funds are authorized, plus three additional fiscal years.

Each project receiving Access Program funds is required to have an executed project memorandum of agreement (MOA) among all project partners, with roles and responsibilities that contribute to the successful completion of the project. The project MOA will be executed prior to initiating the environmental review process under NEPA and other project development activities. The MOA may include:

- Scope of work
- Schedule
- Budget
- Roles and responsibilities of all agreement signatories
- Maintenance commitment
- Match requirement.
- Coordination with pertinent FLMAs
- Other requirements included in the Office of Federal Lands Highway's Stewardship and Oversight (S&O) Guidance and Instructions, if applicable

FEDERAL LANDS TRANSPORTATION PROGRAM

The Federal Lands Transportation Program (FLTP) was established to improve the transportation infrastructure owned and maintained by the following federal land management agencies: National Park Service (NPS), U.S. Fish and Wildlife Service (USFWS), USDA Forest Service (Forest Service), Bureau of Land Management (BLM), USACE, Bureau of Reclamation (BOR), and independent federal agencies with land and natural resource management responsibilities. There is a total of \$2.2 billion authorized for the 2022-2026 period. The federal share for FLTP projects is 100%.

ELIGIBLE APPLICANTS

Projects applications are submitted by FLMAs. By statute, the NPS, USFWS and Forest Service receive annual allocations identified in the legislation while the Secretary decides the allocation amounts for the BLM, BOR, USACE, and eligible independent federal agencies based on their applications.

ELIGIBLE PROJECTS

- Program administration, transportation planning, research, and the preventive maintenance of FLTFs
- Engineering, rehabilitation, restoration, construction, and reconstruction of FLTFs
- Capital operations and maintenance of transit facilities

PROJECT CRITERIA

As the FLTP is awarded on a formulaic basis at the state level, no BCA is required. The FLMAs will also submit investment strategies as part of their funding applications.

PROJECT READINESS

The funds made available under this program will be available for obligation for the fiscal year for which they are authorized plus three additional fiscal years.

FHWA will work with partners to execute a Project Agreement for each construction project using FLTP funds. Generally, the agency administering the project will initiate the agreement, and the agreement must be executed prior to starting environmental compliance (e.g., NEPA) and other project development activities. The project agreement will generally include:

- Scope of the project
- Schedule for delivery
- Budget, including funding sources other than FLTP
- Roles and responsibilities
- Staff funding responsibility
- Other project issues worth noting, such as the performance goal(s) supported by the project

HIGHWAY SAFETY IMPROVEMENT PROGRAM

The Highway Safety Improvement Program (HSIP) is a core federal-aid highway program, the purpose of which is to achieve a significant reduction in fatalities and serious injuries on all public roads. The HSIP is a federally funded, state-administered program. Its funding will be used to develop and implement Strategic Highway Safety

Plans to improve highway safety that is consistent with the plans.⁵¹ Generally, federal funding may represent up to 80% of total project costs for HSIP awards. There is a total of \$15.6 billion of funding available from 2022-2026.

ELIGIBLE APPLICANTS

HSIP funding is apportioned to states on a formulaic basis detailed in 23 U.S.C. 148, 23 U.S.C. 150, and 23 U.S.C. 130 and regulated by 23 Code of Federal Regulations (CFR) Parts 924 and 490.

ELIGIBLE PROJECTS

Eligible projects are those that:

- Address a Strategic Highway Safety Plan priority
- Be identified through a data-driven process
- Contribute to a reduction in fatalities and serious injuries

They may be used to fund safety or education programs, or occasionally, if the project introduces a specific safety countermeasure, a location identified through the program of highway safety improvement projects overlaps with a standard road project.

PROJECT CRITERIA

As the HSIP is awarded on a formulaic basis at the state level, no BCA is required. However, the IJA outlines several performance measurement components to ensure states appropriately expend obligated funding. It stipulates that the HSIP funding may be used for:

- Strategic Highway Safety Plan
- Railway-Highway Crossing Program
- Program of Highway Safety Improvement Projects

NATIONAL HIGHWAY FREIGHT PROGRAM

The NHFP was developed to improve the efficient movement of freight on the NHFN and supports several goals. It is authorized to spend a total of \$7.2 billion over the 2022-2026 period. Generally, federal funding may represent up to 80% of the total project costs for NHFP awards.

ELIGIBLE APPLICANTS

As under the FAST Act, the IJA directs FHWA to apportion funding as a lump sum for each State then divide that total among apportioned programs.

ELIGIBLE PROJECTS

Eligible projects include highway, rail, and intermodal freight projects. The program also includes set asides for projects that fall under the criteria for CUFCs or CRFCs. These criteria are assessed based on if the state's population density per square mile is below the national average. In rural areas, under certain conditions, CRFCs may add 600 miles of highways to critical corridors, or up to 150 miles for designated urban corridors. Appendix E details the North Dakota Freight Investment Plan. The Projects listed in this Appendix are eligible for NHFP funding.

⁵¹ [Highway Safety Improvement Program \(dot.gov\)](https://www.fhwa.dot.gov/safety/hsip/)

PROJECT READINESS

Given that the apportionment is on a formulaic basis to each state, there is no BCA or project criteria outlined in the NHFP Guidance issued by FHWA. Certain states may initiate competitive processes to award funding to local projects from the apportioned NHFP funding.

NATIONAL HIGHWAY PERFORMANCE PROGRAM

The NHPP⁵² provides funding for construction and maintenance projects located on the newly expanded NHS, which includes the entire Interstate system and all other highways classified as principal arterials. A total of \$148.0 billion in funding is provided in the 2022-2026 period. Per U.S.C. 23 Section 120, federal matching may represent 80% of total funds under the NHPP program.

ELIGIBLE APPLICANTS

As under the FAST Act, the IIJA directs FHWA to apportion funding as a lump sum for each State then divide that total among apportioned programs.

ELIGIBLE PROJECTS

Certain eligible activities may include:

- Construction, reconstruction, resurfacing, restoration, rehabilitation, preservation, or operational improvement of segments of the NHS
- Construction, replacement (including replacement with fill material), rehabilitation, preservation, and protection (including scour countermeasures, seismic retrofits, impact protection measures, security countermeasures, and protection against extreme events) of bridges on the NHS
- Inspection and evaluation of bridges and tunnels on the NHS

PROJECT CRITERIA

Given that the apportionment is on a formulaic basis to each state, there is no BCA or project criteria outlined in the NHPP Guidance issued by FHWA. Certain states will initiate competitive processes to award funding to local projects from the apportioned NHPP funding.

NATIONALLY SIGNIFICANT MULTIMODAL FREIGHT AND HIGHWAY PROJECTS: INFRA

Infrastructure for Rebuilding America (INFRA) projects, enacted under the IIJA funding program, have a total of a minimum \$8.0 billion, up to a maximum of \$14.0 billion in funding for the period 2022-2026. There is no minimum or maximum grant award amount for these projects in the INFRA program. It is the second track in the Multimodal Project Discretionary Grant program contained in the IIJA. No state may receive more than 20% of total funding, and the grant awarded may not exceed 80% of eligible project costs; 20% must come from matching non-federal funds.⁵³

⁵² [Implementation Guidance for the National Highway Performance Program \(NHPP\) as Revised by the Bipartisan Infrastructure Law \(dot.gov\)](#)

⁵³ [INFRA Grant Program Overview.](#)

ELIGIBLE APPLICANTS

- MPO
- Unit of local government
- Political subdivision of a state
- Special purpose district or public authority with a transportation function
- Federal land management agency
- Tribal government or consortium of Tribal governments
- Multistate corridor organization
- Multistate or multijurisdictional group of entities previously described

ELIGIBLE PROJECTS

- A highway freight project on the NHFN
- Highway or bridge on the NHS
- Intermodal freight, freight rail, or freight project within the boundaries of a public or private freight rail, water, or intermodal facility
- Highway-rail grade crossing or grade separation
- Wildlife crossing
- Project for a marine highway corridor connected to the National Multimodal Freight Network (NMFN)
- Highway bridge or freight project on the NMFN

SELECTION CRITERIA

Criterion	Description	Criterion	Description
Safety	How the project will improve the safety of the bridge and associated sections of roadway	Climate Change	How the project will address climate change, improve resiliency, support environmental sustainability, and address environmental justice
State of Good Repair	How the project improves (1) the condition of a bridge (2) improving protection, to provide long-term resiliency to extreme weather events, and (3) reducing maintenance costs	Quality of Life	Considers how the project will improve quality of life at the local, regional, or national level
Economic Impacts	How the project will improve the mobility, efficiency, and reliability of the movement of people and freight	Innovation Areas	How the project will employ innovative finance, technology, or techniques

PROJECT READINESS CRITERIA

Projects are evaluated through technical assessment, environmental risk, and financial completeness. Environmental Risk is assessed based on the project’s NEPA status, a provided project schedule, and all other environmental reviews and permits received by the applicant.

Environmental Risk	Technical Assessment	Financial Completeness Assessment
The Project has completed NEPA, or it is highly likely that they will be able to complete NEPA and other environmental reviews in the time necessary to meet the project schedule	FHWA is confident in the applicant’s capacity to deliver the project in a manner that satisfies Federal requirements	The Project’s Federal and non-Federal sources are fully committed—and there is demonstrated funding available to cover contingency/cost increases

In addition to completed NEPA status, projects should also demonstrate adequate state and local approvals, including receipt of approval and evidence of sufficient public consultation. This may include, but is not limited to, inclusion in TIP/STIP plans, as appropriate per the guidance in 23 U.S.C. § 134 and § 135. These factors may contribute to the successful application as part of the Project Readiness criteria.

Projects have a statutory obligation deadline of September 30, 2025.

OTHER REQUIREMENTS

Grant recipients must complete an annual Federal Financial Report (form SF-425) on the financial condition and project's progress to monitor the use of federal funds.

NATIONAL INFRASTRUCTURE PROJECT ASSISTANCE: MEGA

Mega grants are part of the IIJA funding program and total \$5.0 billion in funding from 2022-2026. Projects are grouped into two categories: (1) over \$500 million and (2) between \$100 million and \$500 million. The Mega program is one of the broader IIJA funding programs available, and funding may be allocated to projects ranging from highways or bridges to freight intermodal projects. It is the first track in the Multimodal Project Discretionary Grant program contained in the IIJA that seeks to improve surface transportation infrastructure with significant national or regional impact. There is no minimum or maximum amount for awards in the Mega grants program. No state may receive more than 20% of total funding, and the grant awarded may not exceed 80% of eligible project costs; 20% must come from matching non-federal funds.⁵⁴

ELIGIBLE APPLICANTS

- A state or group of states
- MPO
- Unit of local government
- Political subdivision of a state
- Special purpose district or public authority with a transportation function
- Tribal government or collection of Tribal governments
- Partnership between Amtrak and one or more of the groups above

ELIGIBLE PROJECTS

- A highway or bridge project on the National Multimodal Freight Network
- A highway or bridge project on the NHFN
- A highway or bridge project on the National Highway System
- A freight intermodal (including public ports) or freight rail project that provides public benefit
- A railway-highway grade separation or elimination project
- An intercity passenger rail project
- A public transportation project that is eligible under assistance under Chapter 53 of title 49 U.S.C. and is a part of any of the project types described above.

SELECTION CRITERIA

Same Selection Criteria as INFRA program.

PROJECT READINESS CRITERIA

Same Project Readiness Criteria as INFRA program.

⁵⁴ [The Mega Grant Program | US Department of Transportation.](#)

OTHER REQUIREMENTS

Grant recipients must complete an annual Federal Financial Report (form SF-425) on the financial condition and project’s progress to monitor the use of federal funds.

RAILROAD CROSSING ELIMINATION PROGRAM

The Railroad Crossing Elimination Program, enacted as part of the IIJA in 2021, is intended to reduce deaths and injuries associated with highway rail grade crossings or pathway rail crossings. Total funding is about \$573.0 million in 2022, and \$3 billion over the 2022-2026 period. Grants are awarded in amounts of \$1 million and above for Improvement Projects. There is no minimum amount for planning projects. No state may receive more than 20% of total funding, and the grant awarded may not exceed 80% of eligible project costs; 20% must come from matching non-federal funds.⁵⁵

ELIGIBLE APPLICANTS

- A state
- Political Subdivision of a state
- Unit of local government
- Recognized Indian Tribe
- Public port authority
- MPO

ELIGIBLE PROJECTS

- Grade separation or closure
- Track relocation
- Improvement/installation of protective devices, signals, signs, or other measures that improve safety
- Other means to improve safety/mobility of people and goods at highway-rail grade crossings
- Group of related projects previously described
- Planning/environmental review of an eligible project described above

SELECTION CRITERIA

Criterion	Description	Criterion	Description
Safety	Assess the project’s ability to foster a safe transportation system that reduces transportation-related fatalities and serious injuries	Climate Change	How the project will address climate change, improve resiliency, support environmental sustainability, and address environmental justice
Equitable Economic Strength and Improving Core Assets	Assess the project’s contribution to economic progress through job creation and investments in vital infrastructure	Transformation of Our Nation’s Transportation Infrastructure	Assess whether the project increases capacity and existing assets are properly maintained
Equity and Barriers to Opportunity	Assess whether the project increases access to transportation, mitigates safety risks, and expands workforce development and training	Eliminating Crossings and Making Corridor-Wide Improvements	Assesses whether one or more grade crossings are eliminated

⁵⁵ [Railroad Crossing Elimination Grant Program | FRA \(dot.gov\)](https://www.fra.dot.gov).

Criterion	Description	Criterion	Description
Geographic Diversity	FRA will assess the geographic diversity of projects in allocating program funds		

PROJECT READINESS CRITERIA

Project Readiness will be assessed via a Project Implementation and Management Plan and Environmental Readiness analysis. The Project Implementation and Management Plan describes the plan and management arrangements, including contracting, oversight, and risk management. Environmental Readiness assesses the NEPA process of the project and determines the eligibility for funding on that basis, with projects that demonstrate either approval or near approval given more weight. Additional project readiness criteria require demonstrating that the project will result in significant greenhouse gas emissions reductions and the project supports emissions reductions goals in a Local/Regional/State plan.

REBUILDING AMERICAN INFRASTRUCTURE WITH SUSTAINABILITY AND EQUITY (RAISE)

The Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant program, which falls under the IIJA, has approximately \$2.3 billion in funding over the 2022-2026 period for projects that will have a significant local or regional impact. Depending on the funding track chosen, various minimum grant amounts apply. There is a \$5 million minimum for an urban planning grant, \$1 million for a rural planning grant, and a maximum grant award of \$25 million under IIJA funding. No state may receive more than 20% of total funding, and the grant awarded may not exceed 80% of eligible project costs; 20% must come from matching non-federal funds.⁵⁶

ELIGIBLE APPLICANTS

- States
- Unit of local government
- Public agency
- Transit agency
- Special purpose district or public authority with a transportation function
- Multi-state or multijurisdictional group of entities that are otherwise eligible

ELIGIBLE PROJECTS

Capital Project:

- Highway, bridge, other roads
- Public transportation
- Port infrastructure improvements

Planning Project:

- Related to the planning, preparation, or design of eligible surface transportation capital projects above

SELECTION CRITERIA

Criterion	Description	Criterion	Description
Safety	How the project will improve known safety problems based on reduced crashes, serious injuries, or fatalities	Climate Change	How the project will reduce air pollution and emissions of greenhouse gases from transportation

⁵⁶ [RAISE Discretionary Grants | US Department of Transportation.](#)

Criterion	Description	Criterion	Description
State of Good Repair	How the project restores or modernizes core infrastructure assets based on current or future system vulnerabilities	Quality of Life	Considers how the project will improve equity and accessibility for travelers
Economic Competitiveness and Opportunity	How the project will improve the mobility, efficiency, and reliability of the movement of people and freight	Innovation Areas	How the project will employ innovative finance, technology, or techniques
Mobility and Community Connectivity	The project increases mobility and connectivity for all users, particularly non-motorized travelers	Partnership and Collaboration	How the project will engage local communities and demonstrates equity considerations

PROJECT READINESS CRITERIA

Projects are evaluated through technical assessment, environmental risk, and financial completeness. Environmental Risk is assessed based on the project’s NEPA status, a provided project schedule, and all other environmental reviews and permits received by the applicant.

Environmental Risk	Technical Assessment	Financial Completeness Assessment
The Project has completed NEPA, or it is highly likely that they will be able to complete NEPA and other environmental reviews in the time necessary to meet the project schedule	FHWA is confident in the applicant’s capacity to deliver the project in a manner that satisfies Federal requirements	The Project’s Federal and non-Federal sources are fully committed—and there is demonstrated funding available to cover contingency/cost increases

In addition to completed NEPA status, projects should also demonstrate adequate state and local approvals, including receipt of approval and evidence of sufficient public consultation. This may include, but is not limited to, inclusion in TIP/STIP plans, as appropriate per the guidance in 23 U.S.C. § 134 and § 135. These factors may contribute to the successful application as part of the Project Readiness criteria. RAISE funds are only available through September 30, 2026.

OTHER REQUIREMENTS

Grant recipients must complete quarterly Federal Financial Reports (form SF-425) on the financial condition and project’s progress to monitor the use of federal funds.

RURAL SURFACE TRANSPORTATION GRANT PROGRAM

The Rural Surface Transportation Grant Program is allocated a total of \$2.0 billion for the period 2022-2026. It is the third track in the Multimodal Project Discretionary Grant program contained in the IJA that seeks to improve surface transportation infrastructure with significant national or regional impact. 90% of awards in this program are awarded for grant amounts greater than \$25.0 million. No state may receive more than 20% of total funding, and

the grant awarded may not exceed 80% of eligible project costs; 20% must be sourced from matching non-federal funds.⁵⁷

ELIGIBLE APPLICANTS

- A state
- Regional transportation planning organization
- Unit of local government
- Tribal government or consortium of Tribal governments
- Multijurisdictional group of above entities

ELIGIBLE PROJECTS

- Highway, bridge, tunnel projects eligible under the NHFP, the Surface Transportation Block Grant, or the Tribal Transportation Program
- Highway freight program under NHFP
- Highway safety improvement project

BCA/MERIT CRITERIA

Same BCA/Merit Criteria as INFRA program.

PROJECT READINESS CRITERIA

Same Project Readiness Criteria as INFRA program

OTHER REQUIREMENTS

Grant recipients must complete an annual Federal Financial Report (form SF-425) on the financial condition and project's progress to monitor the use of federal funds.

SURFACE TRANSPORTATION BLOCK GRANT PROGRAM

The Surface Transportation Block Grant (STBG) Program was initially enacted as part of the FAST Act and extended through the BIL. It is intended to serve as a flexible mechanism for funding State and municipal level infrastructure projects. It promotes flexibility in funding for State and local transportation needs. It has \$13.8 billion in funding for the 2022 fiscal year, and \$72.0 billion over the 2022-2026 period.⁵⁸ Generally, STBG has an 80% federal matching requirement for applicable projects.

ELIGIBLE APPLICANTS

As under the FAST Act, the IIJA directs FHWA to apportion funding as a lump sum for each State then divide that total among apportioned programs. The IIJA also stipulates certain sub-allocations of the apportioned funding on the following basis:

- 55% of funds must be allocated across the following categories, in proportion to state population:
 - Urban areas with a population of at least 200,000
 - Urban areas with a population of at least 50,000 but no more than 200,000
 - Urban areas with a population of at least 5,000 but no more than 49,999
 - Areas with a population of less than 5,000

⁵⁷ [The Rural Surface Transportation Grant | US Department of Transportation.](#)

⁵⁸ [Bipartisan Infrastructure Law - Surface Transportation Block Grant \(STBG\) Fact Sheet | Federal Highway Administration \(dot.gov\).](#)

- The remaining 45% of the State's STBG apportionment may be obligated in any area of the State

ELIGIBLE PROJECTS

Eligible projects may include:

- Construction of highways, bridges, and tunnels
- Ferry boats and terminal facilities, subject to certain conditions
- Infrastructure-based intelligent transportation systems (ITS)
- Border infrastructure projects eligible for funding

PROJECT CRITERIA

As funds are apportioned on a formulaic basis to States, there is no nationwide consensus on the apportionment of funds within a state. U.S.C. 23 Section 133 stipulates the States or MPOs are required to develop a competitive process to allow eligible entities to submit projects for funding.

TRIBAL TRANSPORTATION PROGRAM

The purpose of the Tribal Transportation Program (TTP) is to provide safe and adequate transportation and public road access to and within a tribal nation. A prime objective of the TTP is to contribute to the economic development, self-determination, and employment of Native Americans. The Tribal Transportation Program is funded by contract authority from the Highway Trust Fund and is subject to Federal aid obligation limitations. There is a total of \$3.0 billion authorized for the 2022-2026 period. The federal share of this funding may represent 100% of costs.

ELIGIBLE APPLICANTS

Eligible applicants include Indian reservations, Indian lands, and Alaska Native Village communities.

ELIGIBLE PROJECTS

Tribes can use these funds for eligible transportation activities such as planning, design, construction, and road and bridge maintenance.

PROJECT CRITERIA

Funds are allocated among Tribes using a statutory formula based on tribal population, road mileage and average tribal shares of the former Tribal Transportation Allocation Methodology (TTAM) formula.

As the program is based on a formulaic apportionment, there are no merit criteria associated with the program.

OTHER FEDERAL FUNDING

SUMMARY

In addition to IIJA funding, there are also several other funding programs available for freight and rail projects through federal authorizations and appropriations. These are summarized in Table 2 with additional detail provided in summaries for each program.

Table 9-2: Summary of Non-IIJA Federal Funding

	Amount Of Funding	Administering Agency	Focus
Airport Improvement Program	\$622.0 million**	FAA	Improvements to passenger and air cargo infrastructure
Diesel Emission Reduction Act Grants	Not available	EPA	Diesel emissions reduction
Economic Development Administration Economic Adjustment	\$500.0* million	Economic Development Administration (EDA)	Improve economic outcomes in disadvantaged communities
High Priority Grant Program	\$45.2 million*	FMCSA	Assistance for commercial vehicle safety plans, and maintain innovative technology
Motor Carrier Safety Assistance Program	\$463.0 million**	FMCSA	Reduce the number and severity of crashes involving commercial vehicles
Metropolitan Planning Program	\$966.0 million†	FTA	Provide funding for state and metropolitan planning related to transportation
Railroad Rehabilitation & Improvement Financing	\$3.05 billion	FRA	Extend credit assistance to eligible rail (RRIF) and infrastructure (TIFIA) projects
Transportation Infrastructure Financing and Innovation Act	\$1.3 million	FRA	
Transportation Alternatives Program	\$7.2 billion	FHWA	Develop user-based funding systems for the National Highway Trust Fund

*-Representative of 2021 only

** - Representative of 2022 only

† - Includes metropolitan, state, and nonmetropolitan planning

AIRPORT IMPROVEMENT PROGRAM (AIP)

The Airport Improvement Program (AIP) provides discretionary grants to public agencies — and, in some cases, to private owners and entities — for the planning and development of public-use airports. For large and medium primary hub airports, the grant covers 75 percent of eligible costs (or 80 percent for noise program implementation). For small primary, reliever, and general aviation airports, the grant covers a range of 90-95

percent of eligible costs, based on statutory requirements. A total of \$622.0 million in AIP grants were awarded in 2022.⁵⁹

ELIGIBLE APPLICANTS

Eligible applicants include public-use airports that:

- Are open to the public and are publicly owned
- Privately owned but designated by the Federal Aviation Administration (FAA) as a reliever airport
- Privately owned but has scheduled service and at least 2,500 annual enplanements

ELIGIBLE PROJECTS

Eligible projects may include:

- Runway construction/rehabilitation
- Taxiway construction/rehabilitation
- Apron construction/rehabilitation
- Airfield lighting
- Airfield signage
- Airfield drainage
- Weather observation
- Planning studies
- Environmental studies

PROJECT CRITERIA

All projects that request more than \$10.0 million in AIP discretionary funds must submit a BCA. Per the AIP Notice of Funding Opportunity, applications are ranked and assigned a National Priority Status score between 0 and 100 to determine a prioritization order for receiving funding. The National Priority Status score is calculated with a formula that weights:

- Safety and security projects
- Projects that maintain existing airport infrastructure
- Projects that maintain the capacity of existing facilities to accommodate increasing passenger and cargo demand

Projects must demonstrate that they justify some or a combination of these categories in order to receive funding.

PROJECT READINESS CRITERIA

Per the AIP Handbook, projects must satisfy various environmental, schedule, and budget readiness criteria in order to receive approval and funding obligation from the FAA. The AIP Handbook defines the requisite period of performance as four years from the date of the grant execution.

Environmental Risk	Technical Assessment	Financial Completeness Assessment
Per the AIP Handbook, grants may not be approved for projects that do not have completed NEPA approvals	Projects must be planned such that they adhere to current FAA standards. An AIP grant will not be awarded to a project if the FAA is aware of circumstances that will unreasonably delay project completion	The FAA will complete a comprehensive evaluation that includes an assessment of cost eligibility and the reasonableness of planned expenditures

⁵⁹ [Federal Register :: FY 2022 Competitive Funding Opportunity: Airport Improvement Program Discretionary Grants](#)

In addition to the standard NEPA requirements, eligible project sponsors are required to demonstrate sufficient intergovernmental review by state and local authorities and airport user consultation as part of the grant submission process.

EPA DIESEL EMISSION REDUCTION ACT (DERA) NATIONAL FUNDING ASSISTANCE PROGRAM

The EPA Diesel Emission Reduction Act (DERA) National Funding Assistance program is intended to reduce diesel emissions through targeted grants. The annual funding available is approximately \$46.0 million, and an applicant may request between \$1 - \$3 million for a given project. Matching or cost sharing stipulations depend on the type of project pursued. For example, a Drayage Truck Replacement project has a mandatory cost share of 50%, while an EPA Verified Engine Upgrade Retrofit has a 0% cost share requirement. Thus, funding requirements will vary widely by the type of project pursued.

ELIGIBLE APPLICANTS

- Regional, state, local, or tribal agencies
- Port authorities with jurisdiction over transportation or air quality
- Nonprofit organizations or institutions that represent or provide pollution reduction or educational services to persons or organizations that own or operate diesel fleets

ELIGIBLE PROJECTS

- Diesel reduction projects
- Equipment

SELECTION CRITERIA

Criterion	Description	Criterion	Description
Benefits to the Community	How the project will improve known safety problems based on reduced crashes, serious injuries, or fatalities	Environmental Results	How the project will reduce air pollution and emissions of greenhouse gases from transportation
Community Engagement and Partnerships	How the project restores or modernizes core infrastructure assets based on current or future system vulnerabilities	Programmatic Capability	Considers how the project will improve equity and accessibility for travelers
Project Sustainability	How the project will improve the mobility, efficiency, and reliability of the movement of people and freight	Budget	How the project will employ innovative finance, technology, or techniques

PROJECT READINESS CRITERIA

Grant applications submitted for approval must consider environmental, technical, and financial feasibility guidance as set out in the NOFO. The EPA expects most projects to be complete within 24 months of the grant award, though projects of up to 36 months will be allowed where justified by the activities, timeline, and milestones detailed in the workplan. Per the NOFO, EPA expects most projects to begin within 12 months of grant award.

Environmental Assessment	Technical Assessment	Financial Completeness Assessment
The applicant must demonstrate that the project is aligned with the EPA’s goals of emission reduction and sufficiently quantifies performance measures are in place to capture these results	The applicant must demonstrate that they meet the technical and organizational competence to complete the project as described in the workplan, on the basis of past performance, experience, and staff expertise	The extent and quality to which costs are reasonable to accomplish the proposed goals, objectives, and measurable environmental outcomes

OTHER REQUIREMENTS

- Emissions Reduction Calculation: applicants should quantify the expected reduction in emissions from the successful implementation of the project.
- Quarterly progress reports and a detailed final report will be required.

U.S. DEPARTMENT OF COMMERCE ECONOMIC ADJUSTMENT GRANTS

The U.S. Department of Commerce EDA Economic Adjustment Grants are intended to provide economically distressed communities with resources to address a variety of economic needs. Average awards range from \$600,000 to \$3 million. Generally, the amount of an EDA Economic Adjustment grant may not exceed 50 percent of the total cost of the project, though this is scaled by the unemployment rate in an applicant’s region.

ELIGIBLE APPLICANTS

- A District organization
- Indian Tribe or consortium of Indian Tribes
- State, county, city, or other political subdivision of a state
- An Institution of higher education or consortium of higher education institutions
- Public or private non-profit organization or association acting in cooperation with officials of a political subdivision of a state

ELIGIBLE PROJECTS

Numerous project categories are eligible under this funding program. Pursuant to the goal of this section, funding for freight and rail-related projects may comprise:

- Projects that support the creation of new businesses or jobs in a variety of sectors, including transportation
- Projects that will strengthen or develop existing or emerging industry clusters
- Projects that facilitate and promote market access for goods and services created and manufactured by businesses in the impacted community or region

SELECTION CRITERIA

Projects are chosen based on the EDA’s investment priorities:

- Equity
- Recovery & Resilience
- Workforce Development
- Manufacturing
- Technology-based Economic Development
- Environmentally Sustainable Development

- Exports & Foreign Direct Investment (FDI)

PROJECT READINESS CRITERIA

The EDA Economic Adjustment grant NOFO does not detail specific project readiness criteria. However, the application package includes several items present in other grant programs' project readiness areas. This includes an Environmental Narrative that details the proposed project's NEPA process, a Budget Narrative, and documents such as a Preliminary Engineering Study to demonstrate a project's technical feasibility and workplan.

Typically, economic recovery strategy grants and non-construction implementation projects may range in duration from 12 to 24 months. Implementation grants involving construction of project facilities and infrastructure generally are expected to range from 12 to 48 months. Performance under the award may extend to no later than September 30, 2027.

OTHER REQUIREMENTS

Grant recipients are required to submit financial, performance, and impact reports at least on a semi-annual basis.

METROPOLITAN PLANNING PROGRAM (MPP)

Provides funding and procedural requirements for multimodal transportation planning in metropolitan areas and states. Planning needs to be cooperative, continuous, and comprehensive, resulting in long-range plans and short-range programs reflecting transportation investment priorities. The federal share is not to exceed 80% of total project costs funded under the program. Total funding for metropolitan, statewide, and non-metropolitan funding over the 2022-2026 period is \$966.0 million.

ELIGIBLE APPLICANTS

State DOTs and MPOs are eligible. Federal planning funds are first apportioned to state DOTs. State DOTs then allocate planning funding to MPOs.

ELIGIBLE PROJECTS

Funds are available for planning activities that:

- Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency
- Increase the safety of the transportation system for motorized and nonmotorized users
- Increase the security of the transportation system for motorized and nonmotorized users
- Promote efficient system management and operations
- Increase the accessibility and mobility of people and freight
- Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns
- Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight
- Emphasize the preservation of the existing transportation system

SELECTION CRITERIA

Funds are apportioned to states by a formula that includes each state's urbanized area population in proportion to the total urbanized area population for the nation, as well as other factors. States can receive no less than 0.5

percent of the amount apportioned. These funds, in turn, are sub-allocated by states to MPOs by a formula that considers each MPO's urbanized area population, their individual planning needs, and an appropriate distribution of funding.

MOTOR CARRIER SAFETY ASSISTANCE PROGRAM (MCSAP)

The MCSAP is a federal grant program that provides financial assistance to States to reduce the number and severity of crashes and hazardous materials incidents involving CMVs. The goal of the MCSAP is to reduce CMV-involved crashes, fatalities, and injuries through consistent, uniform, and effective CMV safety programs. The MCSAP is FMCSA's largest grant program that supports State and local law enforcement agencies to utilize over 12,000 enforcement officers to increase enforcement and safety activities nationwide. In order to be eligible to receive MCSAP grant funding, the State MCSAP lead agency must maintain a certain level of expenditure, in addition to the required 15% matching share of a MCSAP grant award. Total funding in 2021 was equal to \$357.0 million, and \$463.0 million in 2022. ⁶⁰

ELIGIBILITY

All States, the District of Columbia, the Commonwealth of Puerto Rico, the Commonwealth of the Northern Mariana Islands, American Samoa, Guam, and the U.S. Virgin Islands, are eligible to apply for MCSAP grants. The MCSAP grants are provided annually to the State's MCSAP lead agency.

PROJECT CRITERIA AND PROCESS

MCSAP awards are made on a formulaic basis. Basic funds are distributed proportionally to the States using the following four, equally weighted (25%), factors:

- 1997 Road miles (all highways) as defined by FHWA
- All vehicle miles traveled (VMT) as defined by FHWA
- Population—annual census estimates as issued by the U.S. Census Bureau
- Special fuel consumption (net after reciprocity adjustment) as defined by FHWA

A State lead MCSAP agency may qualify for Incentive Funds if it can demonstrate that its CMV safety program has shown improvement in any or all of the following five categories:

- Reduction in the number of large truck-involved fatal accident
- Reduction in the rate of large truck-involved fatal accidents or maintenance of a large truck-involved fatal accident rate that is among the lowest 10 percent of such rates for MCSAP recipients and is not higher than the rate most recently achieved
- Upload of CMV accident reports in accordance with current FMCSA policy guidelines
- Verification of CDLs during all roadside inspections
- Upload of CMV inspection data in accordance with current FMCSA

MERIT AND PROJECT READINESS CRITERIA

While no BCA is required, all projects are subject to:

- A Technical Review provides the technical or programmatic merit of an application
- A Suitability Review provides a risk assessment on the applicant's organization

⁶⁰ [Motor Carrier Safety Assistance Program \(MCSAP\) Grant | FMCSA \(dot.gov\).](#)

- A Past Performance Review evaluates whether previous funding recipients successfully completed prior year awards on-time
- A Budget/Cost Analysis evaluates the feasibility of costs, proposed allowable costs, and the feasibility of the schedule

The period of performance for MCSAP formula awards will include the fiscal year in which the grant award is approved and the next fiscal year, beginning on October 1, even if the award is granted after that date.

The project must designate a lead State agency responsible for administering the commercial vehicle safety plan (CVSP) throughout the State and give satisfactory assurances that the State will devote adequate resources to the administration of the CVSP including the enforcement of compatible State laws, regulations, standards, and orders throughout the State.

HIGH PRIORITY (HP) PROGRAM

The HP program is a competitive discretionary grant program administered by the FMCSA. It is designed to provide federal financial assistance to enhance MCSAP CVSP activities, maintain innovative technology and/or new project(s) not included in the CVSP that will have a positive impact on CMV safety. All costs must be directly related and necessary to HP project activities proposed in the application and may not pay for general CMV enforcement equipment and supplies. HP recipients are required to provide a 15% program match.⁶¹ A total of \$45.0 million in HP funding was awarded in 2021, the most recent year for which data is available.

ELIGIBLE APPLICANTS

Eligible Applicants may include:

- A state agency
- Local government
- Non-profit organization
- For-profit entities
- Institution of Higher Education

ELIGIBLE PROJECTS

Eligible projects may include:

- Increase public awareness and education on CMV safety and related issues
- Target unsafe driving of CMVs and non-CMVs in areas identified as high-risk crash corridors
- Improve the safe and secure movement of hazardous materials
- Improve safe transportation of goods and persons in foreign commerce
- Demonstrate new technologies to improve CMV safety
- Enhance data collection and quality

PROJECT CRITERIA

While no BCA is required, all projects are subject to the following reviews:

- A Technical Review provides the technical or programmatic merit of an application
- A Suitability Review provides a risk assessment on the applicant's organization
- A Past Performance Review evaluates whether previous funding recipients successfully completed prior year awards on-time

⁶¹ High Priority (HP) Grant - Overview | FMCSA (dot.gov)

- A Budget/Cost Analysis evaluates the feasibility of costs, proposed allowable costs, and the feasibility of the schedule

The period of performance begins and ends on the date indicated in the grant agreement notice of grant award. Recipients are eligible to request project extensions from FMCSA, provided that the total period of performance does not exceed the fiscal year of award plus two fiscal years.

The project must designate a lead State agency responsible for administering the CVSP throughout the State and give satisfactory assurances that the State will devote adequate resources to the administration of the CVSP including the enforcement of compatible State laws, regulations, standards, and orders throughout the State.

RAILROAD REHABILITATION & IMPROVEMENT FINANCING (RRIF)

The Railroad Rehabilitation & Improvement Financing (RRIF) program is administered by the USDOT's National Surface Transportation and Innovative Finance Bureau with total funding of \$35.0 billion in loans and loan guarantees. Under the RRIF program, the loan may be up to 100% of project cost. However, preference may be given by the Bureau to projects that contribute equity to the project.

ELIGIBLE APPLICANTS

- Railroads
- State and local governments
- Government sponsored authorities and corporations
- Joint ventures that include at least one railroad
- Limited option freight shippers (who intend to construct a new rail connection)

ELIGIBLE PROJECTS

- Acquire, improve, or rehabilitate rail-related intermodal equipment or facilities
- Acquire, improve, or rehabilitate rail equipment or facilities
- Refinance outstanding debt incurred for the purposes of previously listed projects
- Develop or establish new rail-related intermodal or railroad facilities

SELECTION CRITERIA

The program does not require a Benefit-Cost Analysis, and thus does not have specific Selection Criteria. Applicants must submit a Letter of Interest to participate in the RRIF program that is evaluated by the following criteria.

- Statutory eligibility of the applicant and the project
- The creditworthiness of the borrower including the present and probable demand for rail services
- The extent to which the project will enhance safety
- The significance of the project on a local, regional, or national level in terms of generating economic benefits
- The improvement of the environment either directly or indirectly
- Improvement in service or capacity of the rail system

PROJECT READINESS CRITERIA

Along with the selection criteria above, the FRA conducts an Environmental Review, Engineering Review, and Safety Review to determine the project's ability to move forward.

- Environmental Review: confirms that the RRIF project has a complete environmental analysis and NEPA compliance process. The NEPA process must be completed before a final application can be accepted for review.
- Engineering Review: review of projected costs and scope to ensure the technical feasibility of the project, and likelihood of the proposed project benefits.
- Safety Review: reviews of the proposed project to analyze hazards and ensure compliance with FRA safety regulations.

The maximum repayment period for an RRIF loan is 35 years from the date of the execution of the loan agreement. Beyond the NEPA approvals process, there is no requirement outlined in the NOFO for additional state or local approvals required to proceed with the project or RRIF application process.

OTHER REQUIREMENTS

- Subsequent to submitting a Letter of Interest, the Bureau will conduct a high-level feasibility assessment before proceeding with the creditworthiness process.

SURFACE TRANSPORTATION SYSTEM FUNDING ALTERNATIVES PROGRAM (STFSA)

The Surface Transportation System Funding Alternatives (STFSA) Program is funded for \$20.0 million in 2022 and can issue awards up to \$4.5 million in value. The projects funded by this grant program are intended to develop alternative revenue mechanisms that utilize a user fee structure to maintain the long-term solvency of the Highway Trust Fund. Federal funding may not represent more than 50% of project costs.

ELIGIBLE APPLICANTS

- State agencies
- Multistate partnerships established to develop regional or national proposals

ELIGIBLE PROJECTS

- | | |
|---|--|
| <ul style="list-style-type: none"> • Advanced traveler information systems • Advanced transportation management technologies • Infrastructure maintenance, monitoring, and condition assessment • Advanced public transportation systems • Electronic pricing and payment systems • Advanced mobility and access technologies | <ul style="list-style-type: none"> • Transportation system performance data collection, analysis, and dissemination systems • Advanced safety systems • Technologies associated with autonomous vehicles • Integration of intelligent transportation systems with Smart Grid |
|---|--|

SELECTION CRITERIA

The program does not require a BCA, and thus does not have specific Selection Criteria according to which a BCA is assessed. Projects are prioritized under this funding program based on the following criteria:

- Equity concerns
- Harmonizing collection programs across states
- Combination of user-based alternative revenue systems with other policy goals
- Enforcement and auditing of collections

- Collection methods or combinations of collection methods that encompass all system users

Projects are also assessed based on Technical Merit, including:

- Reasonable likelihood that the project will result in a viable alternative funding mechanism
- Maturity or readiness of the technology to apply for the proposed revenue mechanism
- Scalability or portability of the proposed demonstration mechanism

Evidence of State Legislative support for the demonstration, if currently available, will also contribute to the success of the application. The time period for the applicant’s project will be determined based on the proposed work tasks outlined in the work plan. A period of performance shall not exceed five years.

OTHER REQUIREMENTS

The recipient must submit annual reports to the USDOT that describes:

- The activities carried out with grant funds that meet the objectives described in the application.
- Lessons learned for future deployment of alternative revenue mechanisms that utilize a user fee structure.

TRANSPORTATION INFRASTRUCTURE FINANCE AND INNOVATION PROGRAM (TIFIA)

The Transportation Infrastructure Finance and Innovation Program (TIFIA) provides funding under the FAST Act. The FAST Act authorizes funding to public and private applicants for eligible surface transportation projects. Annual funding is approximately \$300.0 million, and is distributed through loans, lines of credit, and loan guarantees for eligible projects. The maximum amount for a TIFIA secured loan is 49% of eligible project costs. For a TIFIA line of credit, the maximum amount is 33%.

ELIGIBLE APPLICANTS

- | | |
|------------------------------|--|
| • States | • Special authorities |
| • State infrastructure banks | • Local governments |
| • Private firms | • Transportation improvement districts |

ELIGIBLE PROJECTS

- | | |
|--|---|
| • Highway projects | • ITS |
| • Passenger rail projects | • Surface transportation projects eligible for Federal assistance under Title 23 of the U.S. Code |
| • Private rail facilities providing public benefits | • International Bridges and tunnels |
| • Surface transportation infrastructure modifications within a port terminal | • Intercity passenger bus or rail facilities |
| • Related improvement projects grouped together | |

SELECTION CRITERIA

The program does not require a Benefit-Cost Analysis, and thus does not have specific Selection Criteria. The applicant issues a Letter of Intent to USDOT. If the project is determined to be eligible, USDOT will inform the applicant that they may submit a full application. Subsequent to the application, they may then be selected to make an oral presentation to the USDOT, which will be evaluated on the following criteria:

- National or regional significance

- Creditworthiness
- Private participation
- Use of new technologies
- Consumption of budget authority
- Environmental benefits
- Reduced Federal grant assistance

PROJECT READINESS CRITERIA

Once applications have been completed and meet the Selection Criteria above, there are several approvals processes that must be completed prior to the award of funds:

- Following the oral presentation to the DOT, the project must be approved for inclusion in the STIP as part of the loan approval process.
- The final maturity date of a TIFIA direct loan resulting from a draw on a TIFIA line of credit must be no later than 35 years after the date of substantial completion of the project or the useful life of the project, whichever is less.

OTHER REQUIREMENTS

As part of the applicant’s creditworthiness review, the project sponsor must submit \$250,000 to the USDOT to cover the legal and financial advisors engaged to conduct the creditworthiness review.

STATE FUNDING PROGRAMS

Outside of the major federal freight and rail funding programs, there are also funding opportunities available through the state government, or sub-state entities. Two programs available from NDDOT are the Freight Rail Improvement Program and the Local Rail Freight Assistance program, described further below.

Table 9-3: Summary of North Dakota Freight and Rail Funding Programs

	Amount of Funding	BCA Required?	Administering Agency	Focus
Bank of North Dakota Legacy Infrastructure Loan	N/A	No	Bank of North Dakota (BND)	Provide funding assistance to eligible infrastructure projects to cover shortfall in other federal and state funding
Bank of North Dakota Revolving Infrastructure Loan Fund	N/A	No	BND	
Freight Rail Improvement Program	Not available	Yes	NDDOT	Extend credit assistance to eligible regional/local rail infrastructure projects
Local Rail Freight Assistance	Not available	Yes	NDDOT	

FREIGHT RAIL IMPROVEMENT PROGRAM AND LOCAL FREIGHT RAIL ASSISTANCE

The Freight Rail Improvement Program (FRIP) is operated by NDDOT and is delivered via loans and loan agreements. The Local Rail Freight Assistance (LRFA) program provides similar assistance to local and regional rail freight participants. Maximum loan amounts are dependent on the type of project pursued. Loans of up to 80% of the rail-related project costs may be obtained for System Critical and Infrastructure Development projects, while up to 70% of rail-related project costs may be covered for Economic Development projects.

ELIGIBLE APPLICANTS

- Cities
- Counties
- Railroads
- Other current/potential users of freight railroad service
- Class I railroads are not eligible participants

ELIGIBLE PROJECTS

- System Critical: Projects that are considered critical to a railroad’s existence.
- Infrastructure Improvement: These projects may include structure repairs, tie and ballast replacement, among others.
- Economic Development: Projects could include new sidings, extensions, upgrades, switches, loop and ladder tracks, and access roads.

SELECTION CRITERIA

Criterion	Description	Criterion	Description
Benefit/Cost Ratio	The BCR will evaluate efficiency, transportation, and economic benefits	Carloads per Mile	This criterion is intended to represent the scale of total project benefits
System Connectivity	Connectivity is measured by the presence of direct connections between different route line segments of the applicant’s system	Enhancing North Dakota’s Economy	This criterion considers the project’s impact through, e.g., job gains, urgency, improved business viability, and attractiveness for new business

PROJECT READINESS CRITERIA

- Applicants must begin construction within 18 months of an executed contract or loan offer
- Applicants must present a description of the project, budget narrative, cost and work method, benefit and cost items, and public involvement in the process
- NDDOT shall solicit public input for each project that is accepted. NDDOT will place a legal notice in the official newspaper(s) of record for the county or counties in which the proposed project is to be done, giving a notice of opportunity to request a public hearing and/or submit comments on a proposed amendment to the State Freight and Rail Plan

BANK OF NORTH DAKOTA FUNDING OPPORTUNITIES

The Bank of North Dakota (BND) offers two loan opportunities that may be used for freight and rail infrastructure projects. These are BND Legacy Infrastructure Loans and the BND Infrastructure Revolving Loan Fund.

BND assists communities and the state by addressing infrastructure needs. BND loans are administered in compliance with requirements established by the State Legislature.

ELIGIBLE APPLICANTS

Eligible applicants are identical under both programs: the BND Infrastructure Revolving Loan Fund and Legacy Infrastructure Loans programs provide loans to political subdivisions, the Garrison Diversion Conservancy District, and the Lake Agassiz Water Authority.

ELIGIBLE PROJECTS

Infrastructure Loans:

- Road, bridge, and airport infrastructure

Revolving Loan Fund:

- Repair, replacement, and new road, bridge, and airport projects

Ineligible funding includes that for routine operations and maintenance, or the re-financing of existing debt.

OTHER CRITERIA

The maximum term of a loan is the lesser of thirty years or the useful life of the project. The maximum term includes both the construction and permanent financing period. The maximum amount for a loan is \$40.0 million, and the fixed interest rate is 2%.

In order to qualify for these funds, the community must access other state and federal government funding options first. This loan may be used to provide gap funding if the full project cost cannot be met through other funding sources or if there are no other funding sources available. BND will take into consideration timing and the opportunity to maximize funding sources.

Applications for both types of funding may be submitted through the North Dakota grants website.⁶²

FEDERAL AND STATE HIGHWAY FUNDS

Although funding percentages can vary from year to year, of the total annual State Highway Tax Fund revenue in 2020, 61.3% was available for NDDOT to use statewide, 22% was allocated to counties, 12.5% was allocated to cities, 2.7% was allocated to townships, and 1.5% was allocated to transit.

Of the total annual funding provided to North Dakota through the Federal Highway Trust Fund, 72.4% is available for NDDOT to use statewide, 16% is allocated to cities, 8.1% is allocated to counties, and 3.5% is allocated to transit.

FUNDING DETAILS

As both the Federal Highway Trust Fund and State Highway Fund programs are based on formulaic apportionment and are funded by the gas tax, there is no requirement for formal applications or project criteria. Funds are proportionally used for various programs by the NDDOT between statewide, county-level, and municipal-level funding programs.

⁶² [WebGrants - North Dakota \(nd.gov\)](https://webgrants.nd.gov)

Per North Dakota Code 24-02-37, the primary use of the State Highway Tax Fund is for the ongoing maintenance of existing highways, or the construction or reconstruction of new highways necessary to match other federal aid funding.

In the case of the State Highway Fund, a political subdivision or state agency may request funds from the special road fund by applying to the committee. The special road fund is funded through the interest payments on income earned by the general state fund. The committee may require the political subdivision or state agency to contribute to the cost of the project as a condition of any expenditure authorized from the special road fund. Any money in the fund that is not obligated by the special road committee by June 30th of each odd-numbered year must be held for an additional two years after which the funds revert to the state highway fund.

An additional opportunity with respect to North Dakota highway funding was introduced in 2017 through an addition to the ND Century Code. While Public-Private Partnerships (P3s) are prohibited, per ND Century Code 20-02-45.1, the NDDOT may enter an agreement with a private entity for construction of infrastructure that will benefit the public. This is subject to several conditions. Critically, the cost share of the private partner to the agreement must be paid into the State Highway Fund in advance of the initiation of construction by the Department. If, rather than construction assistance, engineering or contracting services are required, then these services may be procured per 24-02-07.3. Should the amounts be greater than \$20,000 in value, then the Department must conduct a competitive bidding process in order to appropriate the funds, per 24-02-17.

SCHEDULE OF KNOWN/PLANNED FUNDING OPPORTUNITIES

The schedule in Table 9-4 contains the 2022 schedule for discretionary grant awards for 2022. Future discretionary grant programs may follow a similar schedule.

Table 9-4: Schedule of Funding Opportunities, 2022

Month	Grant/Stage
January	RAISE NOFO (60 day), DERA NOFO (60 day)
February	
March	INFRA, Mega, and Rural NOFO (60 day), Tribal Technical Assistance Program (est.)
April	
May	
June	Bridge Improvement Program (60 day), Tribal Transportation Safety Fund (60 day)*
July	Railroad Crossing Elimination Program, EDA Economic Adjustment (>90 day)
August	Motor Carrier Safety Assistance/HP (approximate), Surface Transportation System Funding Alternatives (60 day), CRISI
September	
October	
November	Local Rail Freight Assistance/Freight Rail Improvement Program (February 15 due)
December	

*Applications open in October for all future years

Table 9-5: Summary of IIJA Funding Programs

	Eligible Projects	Criteria	Timing	Annual Funding Available, 2022
Bridge Investment Program	Replace, rehabilitate, preserve, or protect one or more bridges on the NBI	<ul style="list-style-type: none"> • State of good repair • Safety • Environment • Economic Competitiveness • Innovation 	Projects must begin construction within 18 months of award	\$2.4 billion
Competitive Tribal Programs	Various – includes infrastructure, safety, and planning assistance for Tribal governments	Varies by funding program	Varies by funding program	\$212.8 million
Congestion Mitigation and Air Quality Program	Fund transportation projects that reduce emissions in Clean Air Act non-attainment areas	N/A	State grant awarded on a formulaic, annual basis.	\$2.5 billion
Consolidated Rail Infrastructure and Safety Improvements Program	Acquisition, improvement, rehabilitation of railroad equipment, infrastructure, or facilities, or to address congestion challenges	<ul style="list-style-type: none"> • System reliability • Efficiency • Ability to meet current/future demand 	Projects must be completed within a 12-month period	\$362.0 million
Federal Lands Access Program	Transportation planning, research, engineering, preventive maintenance, of federal land access transportation facilities	N/A	Funds must be within 4 years of grant award	\$270.0 million
Federal Lands Transportation Program	Transportation planning, research, engineering, preventive maintenance, of federal land access transportation facilities	N/A	Funds must be within 4 years of grant award	\$422.0 million
Highway Safety Improvement Plan	Address a Strategic Highway Safety Plan priority through data-driven processes	N/A	State grant awarded on a formulaic, annual basis.	\$3.0 billion
National Highway Performance Program	Funding for construction and maintenance projects located on the NHS	N/A	State grant awarded on a formulaic, annual basis	\$28.4 billion

	Eligible Projects	Criteria	Timing	Annual Funding Available, 2022
Nationally Significant Multimodal Freight and Highway Projects	Highway freight, rail, or intermodal infrastructure projects on the national intermodal/highway freight networks	<ul style="list-style-type: none"> • State of good repair • Safety • Environment • Economic Competitiveness • Innovation 	Statutory obligation deadline of September 30, 2025	\$8.0 billion
National Infrastructure Project Assistance	Highway freight, rail, or intermodal infrastructure improvement or replacement	<ul style="list-style-type: none"> • State of good repair • Safety • Environment • Economic Competitiveness • Innovation 	No statutory obligation deadline, but USDOT favors projects that will begin construction by September 30, 2025	\$5.0 billion
Rebuilding American Infrastructure with Sustainability & Equity	Transportation infrastructure that emphasizes local and regional impacts	<ul style="list-style-type: none"> • State of good repair • Safety • Environment • Economic Competitiveness • Innovation • Mobility • Partnership & Communication 	RAISE funds are only available through September 30, 2026	\$1.5 billion
Rural Surface Transportation Program	Highway freight or rail freight transportation infrastructure that impacts non-urbanized areas and has significant local or regional impacts	<ul style="list-style-type: none"> • State of good repair • Safety • Environment • Economic Competitiveness • Innovation 	Statutory obligation deadline of September 30, 2025	\$2.0 billion
Surface Transportation Block Grant	State and municipal highway, bridge, tunnel projects + others	N/A	State grant awarded on a formulaic, annual basis.	\$13.8 billion
Rail Crossing Elimination Program	Grade separation, track relocation, or improved signaling to reduce fatalities at at-grade rail crossing.	<ul style="list-style-type: none"> • Eliminating crossings • Economic competitiveness • Safety 	<i>Not available</i>	\$573.0 million

	Eligible Projects	Criteria	Timing	Annual Funding Available, 2022
		<ul style="list-style-type: none"> Transforming Infrastructure Climate Change 		
Tribal Transportation Program	Road and bridge planning, safety, construction, or rehabilitation projects	N/A	Funds must be expended by the end of the 3 rd fiscal year that funds are appropriated	\$578.0 million

Table 9-6: Non-IIJA Federal Funding Programs

	Eligible Projects	Criteria	Timing	Annual Funding Available, 2022
Airport Improvement Program	Runway, taxiway, or apron construction or rehabilitation	<ul style="list-style-type: none"> Safety and security Maintenance of existing airports Capacity maintenance of existing airports 	Funds must be used by 4 years after grant award	\$622.0 million
Diesel Emission Reduction Act Grants	A variety of diesel reduction technology or equipment purchases	<ul style="list-style-type: none"> Benefits to the community Community & Partnerships Sustainability Programmatic capability Budget 	24-36 months from time of grant award	\$46.0 million
Economic Development Administration Economic Adjustment	Support the development of new industries or clusters or creating new jobs	<ul style="list-style-type: none"> Equity Recovery & resilience Workforce development Technology-based economic development Manufacturing Exports & FDI 	Typical project completion is 12-24 months from date of award	<i>Not available</i>

	Eligible Projects	Criteria	Timing	Annual Funding Available, 2022
Metropolitan Planning Program	Planning programs that support the economic vitality, safety, and efficiency of transportation projects	N/A	State grant awarded on a formulaic, annual basis	\$438.0 million
Motor Carrier Safety Assistance Program	Projects that reduce the incidence or severity of CMV crashes	N/A	Funds are available the year obligated and the next full fiscal year	\$463.0 million
High Priority Grant Program	Improve the safety of CMV freight, especially of hazardous materials	<ul style="list-style-type: none"> • Reduction in the number of fatal crashes • Improvement in safety of hazardous materials transportation <ul style="list-style-type: none"> • Upload of CMV accident reports 	Funds are available the year obligated and the next two full fiscal years	\$185.0 million
Railroad Rehabilitation & Improvement Financing	Acquire, improve, or rehabilitate rail or rail-related intermodal equipment or facilities	<ul style="list-style-type: none"> • Creditworthiness • Anticipated safety benefits • Economic benefits • Environmental benefits 	The maximum term for an RRIF loan is 35 years	<i>Not available</i>
Transportation Infrastructure Financing and Innovation Act	A variety of highway, rail, and intermodal projects	<ul style="list-style-type: none"> • National or regional significance • Creditworthiness • Private participation • Use of new technologies • Consumption of budget authority • Environmental benefits • Reduction in federal grant assistance 	The maximum term for a TIFIA loan is 35 years	\$275.0 million

	Eligible Projects	Criteria	Timing	Annual Funding Available, 2022
Surface Transportation Alternatives Funding Program	Traveler information, transportation intelligence, or other innovations to improve the solvency of the Highway Trust Fund	<ul style="list-style-type: none"> • Equity concerns • Harmonizing collection across states • Combine user-based funding with policy goals • Enforcement and auditing • Maximize reach to all system users 	The estimated period of performance for awards is up to five years	\$20.0 million

Table 9-7: Summary of State Funding Programs

	Eligible Projects	Criteria	Timing	Annual Funding Available, 2022
Bank of North Dakota Infrastructure Revolving Loan Fund	Rail, freight, highway, and airport infrastructure projects	<ul style="list-style-type: none"> The community must access other state and federal government funding options first This loan may be used to provide gap funding if the full project cost cannot be met through other funding sources or if there are no other funding sources available 	The maximum loan term is the lesser of 30 years and the useful life of the project	Not available
Legacy Infrastructure Loan Fund				Not available
Federal Highway Trust Fund	Highway construction, rehabilitation, and maintenance	N/A	N/A	\$14.2 billion*
Freight Rail Improvement Program	Critical, infrastructure, and economic development rail loans for regional railroads	<ul style="list-style-type: none"> Benefit-Cost Ratio Carloads per Mile System Connectivity Enhancing North Dakota's economy 	Projects must begin construction within 18 months. The maximum term for a loan is 10-15 years	Not available
Local Rail Freight Assistance	Critical, infrastructure, and economic development rail loans for local railroads			Not available
State Highway Fund	Highway construction, rehabilitation, and maintenance	N/A	N/A	\$1.4 billion**

*Nationally, as of June 2022

Table 9-8: Summary of Funding, 2023-2026

Program	2023	2024	2025	2026
Bridge Investment Program	\$600.0 million	\$650.0 million	\$675.0 million	\$700.0 million
Competitive Tribal Programs	\$235.6 million	\$238.1 million	\$240.5 million	\$243.1 million
Congestion Mitigation and Air Quality Program	\$2.6 billion	\$2.6 billion	\$2.7 billion	\$2.7 billion
Consolidated Rail Infrastructure and Safety Improvements Program	\$1.0 billion	\$1.0 billion	\$1.0 billion	\$1.0 billion
Federal Land Access Program	\$270.0 million	\$270.0 million	\$270.0 million	\$270.0 million
Federal Land Transportation Program	\$430.0 million	\$439.0 million	\$448.0 million	\$456.0 million
Highway Safety Improvement Plan	\$3.0 billion	\$3.1 billion	\$3.2 billion	\$3.3 billion
National Highway Freight Program	\$1.4 billion	\$1.4 billion	\$1.5 billion	\$1.5 billion
National Highway Performance Program	\$29.0 billion	\$29.5 billion	\$30.2 billion	\$30.7 billion
Nationally Significant Multimodal Freight and Highway Projects	\$2.7 billion	\$2.8 billion	\$2.8 billion	\$2.9 billion
National Infrastructure Project Assistance	\$1.0 billion	\$1.0 billion	\$1.0 billion	\$1.0 billion
Rebuilding American Infrastructure with Sustainability & Equity	\$1.5 billion	\$1.5 billion	\$1.5 billion	\$1.5 billion
Rural Surface Transportation Program	\$350.0 million	\$400.0 million	\$450.0 million	\$500.0 million
Surface Transportation Block Grant	\$14.1 billion	\$14.4 billion	\$14.7 billion	\$15.0 billion
Rail Crossing Elimination Program	\$500.0 million	\$500.0 million	\$500.0 million	\$500.0 million
Airport Improvement Program	\$3.2 billion	<i>Not available</i>		
Metropolitan Planning Program	\$446.9 million	\$456.0 million	\$465.0 million	\$474.0 million
Motor Carrier Safety Assistance Program	\$304.0 million	<i>Not available</i>		
Transportation Infrastructure Financing and Innovation Act	\$275.0 million	\$275.0 million	\$275.0 million	\$275.0 million
Tribal Transportation Program	\$590.0 million	\$602.0 million	\$613.0 million	\$628.0 million

FUNDING APPLICATION STRATEGY

The following section provides some strategies for maximizing the funding for freight and rail projects in North Dakota through competitive discretionary grant programs. The funding or financing strategy excludes the practices and protocols already established through North Dakota's STIP and is described in Chapter 8. The development of the 2023-2026 STIP includes consideration of elements and policies contained in North Dakota's LRTP. The funding strategy section is focused on securing funds through the available discretionary grant programs through federal IJA and non-IJA funding.

Table 9-5 and Table 9-6 provided a short synopsis of the funding inventory previously presented noting the key attributes of each program – the eligible projects, the merit criteria, the funding available and the timelines involved.

PROJECT PRIORITIZATION – IDENTIFYING THE BEST CANDIDATE PROJECTS FOR GRANT FUNDING

One of the critical steps in maximizing the potential of discretionary grant funding is selecting the right project to put forth for a particular funding program. In some instances, it may make sense to submit the same project to multiple funding programs, while in other instances different projects may be submitted for different programs in any one year.

Similar to NDDOT's annual project prioritization process described in Chapter 8, a similar prioritization process should be followed to rank and identify which freight and rail projects provide NDDOT the best opportunity for securing discretionary grant funding. The general process to identify the best projects for potential discretionary grant funding is outlined below.

STEP 1: SCREEN OUT PROJECTS THAT DO NOT MEET SPECIFIC MANDATORY REQUIREMENTS

Each discretionary grant program requires certain criteria to be met to ensure that the project is technically ready (e.g., "Project Readiness Review") to be constructed should funding be provided. Generally, these requirements relate to environmental permitting, technical readiness, and financial completeness.

Each project can be screened across the various requirements under each program:

- Is the project an eligible⁶³ project under the program requirements?
- Is the project technically ready to be considered under this discretionary grant proposal?
 - What is the history of the project proponent delivering a project of this scope and scale?
 - Are the required environmental and other permits in place or will be in place by the time specified in the grant program requirements?
 - Is the project ready to start construction and/or be completed in the time specified?
 - Is at least the minimum funding match available as specified under the program?
 - Is the project part of the STIP (if a requirement)?

The projects that pass all of the screening mechanism can move on to Step 2. Projects that are screened out can still be considered for discretionary grants in future years as the project planning and environmental processes are further developed.

⁶³ There are applicant eligibility requirements as well. However, state DOTs are generally eligible applicants for all programs.

STEP 2: ASSESS PROJECTS RELATIVE TO THE PROGRAM MERIT CRITERIA

All remaining projects should be assessed relative to the merit or evaluation criteria for the program(s). The merit criteria are broadly consistent across the discretionary grant programs although some programs have quite specific areas of focus (e.g., the Grade Crossing Elimination Program or the Bridge Investment Program for example) and different levels of emphasis on the various merit criteria. Furthermore, some programs have quite prescriptive project evaluation criteria (e.g., RAISE) while others have more general requirements.

Regardless, each project should be evaluated against the merit criteria for the program(s). As an example, for RAISE in 2022 the merit criteria were:

- Safety
- Environmental Sustainability
- Quality of Life
- Mobility and Community Connectivity
- Economic Competitiveness
- State of Good Repair
- Partnership and Collaboration
- Innovation

Each project should be qualitatively assessed relative to the merit criteria to ensure that there is strong alignment. In the RAISE example,⁶⁴ a high score on 5 of the 8 criteria would indicate that the project would be highly rated for the program.

STEP 3: QUANTITATIVE ASSESSMENT – WHAT EVIDENCE IS AVAILABLE TO SUPPORT OUR QUALITATIVE RANKINGS

In the prior step, projects were assessed relative to the merit criteria. A critical next step is assessing what evidence can be put forth to support that the project scores well relative to the merit criteria. One of the common pitfalls of grant applicants is the lack of evidence provided to support a claim that the project will provide significant safety or economic competitiveness benefits. It is critical that for each of the merit criteria with a favorable score that the evidence is there to support the claim.

For example, for safety:

- Are recent accident statistics available for the facility that is to be improved?
- Are accident rates on the facility relatively high?
- Is there evidence that the specific project improvement will improve safety, either from existing studies or evidence related to Crash Modification Factors?

Another criterion that is key in many discretionary grant applications is “partnership and collaboration”. The willingness of project stakeholders to demonstrate their commitment to the project is critical. Additionally, committed monetary support from partners demonstrates the local importance to the project and the commitment to the project of stakeholders. Projects that demonstrate this broad-based financial support tend to score well under discretionary grant programs.

If there is strong evidence to support the merit criteria ratings, then these projects could be considered for potential submission under the program(s). If the evidence does not exist at the time, then NDDOT may want to consider

⁶⁴ Other programs would have different evaluation metrics.

collecting additional data or studies to develop the evidence for the project – for the current year program or a future year program.

STEP 4: HIGH LEVEL BENEFIT-COST ANALYSIS (BCA)

For the programs that require it, it is advisable to use the quantitative data from Step 3 and conduct a high level or a “back-of-the envelope” BCA. Most of the discretionary grant programs require a BCA to be submitted as part of the grant funding application. Generally,⁶⁵ to secure discretionary grant funding, the project should be able to demonstrate a BC Ratio of at least 1.0.

The high-level BCA analysis would monetize some of the highly rated benefits where the quantitative data exists and assess what the monetary value of the benefits would likely be relative to the project cost. Where the data seems to support a favorable BCA outcome, the project would be a good candidate for a discretionary program grant.

Through the prioritization process described above in Steps 1 to 4, the projects that rank highest are good candidates to be considered for a discretionary grant program. Projects that:

- Satisfy project readiness review – Environment, Technical, and Financial
- Rate highly relative to the merit criteria.
- Have strong quantitative evidence to support the project benefits
- Will likely have a BC Ratio of greater than 1.0

should be considered for a discretionary grant application.

The number of these projects to be actually submitted will be further narrowed down based on the funding that NDDOT is able to commit or limited by number in the NOFO.

GRANT APPLICATION DEVELOPMENT

For projects that have been short listed to be submitted under an upcoming discretionary grant funding application, the pre-submission activities including the development of a compelling grant application, are important.

Some of the key activities project sponsors should initiate/complete before the NOFO is announced:

- Share information about the project to ensure local support – have discussions about the project and its benefits with key stakeholders, potential project partners, and your Congressional delegation, etc. These stakeholders can be asked to develop letters of support for the project that can be included in the grant application itself.
- Have discussions with federal agency regional representatives and USDOT on the project. If the project was submitted previously and was unsuccessful, request a debrief to understand how the appropriate federal agency viewed the application, where it rated highly, and where it did not. Many projects that ultimately secure funding are not successful on the first submission. If this is the first submission for the project, discussions with federal counterparts can provide useful information and perspectives for subsequent grant submissions.
- Be prepared for when the NOFO is expected to be published.

⁶⁵ There are some exceptions but generally to be competitive projects require a BCA of at least 1.0. It is mandatory for some programs.

The period from NOFO to submission can be as short as 60 days. As such, having the resources lined up to prepare the full grant application – the 30-page narrative, the BCA write-up and model, letters of support, supporting technical evidence, etc. – is essential. In developing the actual grant submission:

- Ensure that the overall grant application is compliant with the current program requirements as they can change from year to year and program to program. USDOT has a variety of resources available after the NOFO is released including webinars, BCA Guidance documents, etc.
- Make the grant narrative compelling; telling a story as to why the project should receive funding. The content must be summarized in only 30 pages (potentially less than that with some grants). It is important for the merit criteria that the project ranks highest, and the evidence is provided in the narrative to support that claim – as opposed to any technical appendix like the BCA appendix. Furthermore, if the project does not score well on any given requirement, don't waste space in the narrative trying to justify it. Easy to read text, graphics and maps can help make the narrative effective.

Given the magnitude of transportation funding available through IIJA, a well-structured prioritization and grant development strategy is essential for securing discretionary grant funding.

CHAPTER 10: RECOMMENDATIONS AND IMPLEMENTATION

INTRODUCTION

This chapter identifies policies, plans, and other initiatives that support the state in achieving its Freight and Rail Plan goals. The potential recommendations are also aligned with the goals of the state's LRTP, *Transportation Connection*. Other plans, such as the NDDOT 2022 *Transportation Asset Management Plan*, the 2018 *North Dakota Vision Zero Plan Strategic Highway Safety Plan Update 2018-2023*, and the 2014 *North Dakota State Aviation System Plan*, already include a multitude of projects and initiatives that support the goals of the Freight and Rail Plan. Where applicable and necessary to support the narrative of this plan, those initiatives may also be referenced in this Freight and Rail Plan.

Appendix E details the North Dakota Freight Investment Plan. The Projects listed in this Appendix are eligible for NHFP funding.

The Plan also recognizes that MPOs within the state have their own freight plans, detailing strategies and solutions that are unique to their region.

RECOMMENDATIONS



KEEPING YOU SAFE

Safety is reflected in
everything we do.

Goal 1 – Keeping You Safe.

Safety is reflected in everything we do.

Analysis of crash data in Chapter 4 identified the oil producing region, and in particular, the counties of Williams, Mountrail, McKenzie, and Dunn, as having a high concentration of both fatal and injury-related truck crashes. Building upon the initiatives within the 2018 *North Dakota Vision Zero Plan Strategic Highway Safety Plan Update 2018-2023*, the NDHP oil field strike force and the historic MOU signed between the Three Affiliated Tribes and the NDHP, it is recommended to establish a specific task force to focus on and seek to eliminate truck crashes in this region. Recognizing that many different entities, including State agencies, local government, BIA, tribal nations, law enforcement agencies, and private industry all have a role to play, this task force would be a partnership coordinating resources and seeking where applicable access to grant funding (such as High Priority Funds) for the deployment of solutions such as virtual weigh-in-motion systems, and infrastructure improvements. Other initiatives under this program would be enhancing the data collection associated with truck crashes to better understand causes of truck crashes, as well as education and information initiatives and working with the Commercial Vehicle Safety Center at the UGPTI.

The 2018 *North Dakota Vision Zero Plan the Strategic Highway Safety Plan Update 2018-2023* identified several safety measures and strategies to reduce Heavy Vehicle crashes. This included improving truck parking in the state. Analysis of parking demand to capacity ratios identifies several counties with high ratios, including McHenry, Golden Valley, Morton, Burleigh, Barnes, Billings and Dunn. The vast majority of truck parking spaces in the state

(95%) are provided by the private sector and it is anticipated that the private sector will continue to lead the introduction of new parking facilities.

Wildlife crossing highways present significant safety hazards. NDDOT will continue to support programs such as the Wildlife Carcass Collection Program, to monitor and inform mitigation solutions aiming to reduce the number of collisions involving wildlife and freight vehicles.

Rail safety is of critical importance to the state. Actions to protect vehicles and pedestrians, including trespassers from encounters with trains is a high priority. Also, shipments of crude oil and other hazardous materials present risks to areas served by the railroads. To continue North Dakota's success in improving rail safety, several ongoing initiatives should be continued and additional one's introduced:

- Continue track inspection programs to reduce derailments by ensuring railroad lines are maintained according to regulatory standards
- Continue to work with the NDDDES and local authorities to improve the capability to respond to rail-related hazardous material incidents; continue coordinating with railroads to share knowledge on hazardous materials shipped by rail through the state
- Continue implementing roadway and pedestrian rail safety crossing improvements including advanced innovative communications technologies such as WAZE advisories as well as more traditional approaches such as grade separations
- Continue participation in programs such as Operation Lifesaver
- Provide education and awareness of consequences of land uses adjacent to railroad rights-of-way



**CARING FOR
WHAT WE HAVE**

*Fixing what we have
is our priority.*

Goal 2 – Caring for What We Have.

Fixing what we have is our priority.

Analysis in Chapter 4 identified that 52% of bridges on the Freight Level 1, 2 and 3 corridors had a NHPP rating of good, 45% rated Fair and only 3% rated Poor. NDDOT will continue to rehabilitate and replace bridges throughout the state in a cost-effective manner and where applicable to remove constraints on freight transportation. The process of considering investments to improve a non-condition deficiency such as a freight constraint is already included in the investment priorities process.

Although the number of overhead bridge strikes by trucks and their associated cargo is relatively low, the impacts are wide-ranging, including damage to infrastructure and its associated costs and the safety of truck drivers and other road users. It is recognized that several bridges in the state create freight-related restrictions and bottlenecks and can result in lengthy detours for OSOW loads. Raising the height of these bridges would be beneficial on these oversize corridors and would support improved freight mobility and also reduce the risk of being struck. However, it is recognized that availability of funding for raising existing bridges is limited and that bridge raising or removal of over-height obstructions is more cost-effective when aligned with bridge replacement/rehabilitation projects. Acknowledging that this is an extremely long-term action, NDDOT and other municipalities with ownership on heavily used freight routes, such as the ND Freight level 1 corridors, will explore adopting a vertical clearance policy for these routes with an 18 feet 6 inches clearance. Consideration may also be given to installing over height detection and alert systems at bridges that are regularly struck.

Continue the research and work with partners to expand the Wise Roads (Weather Information System to Effectively Reduce Oilfield Delays and Disruption) to improve frost law policy. Data from roadbed sensors will be used to better determine when frost or load restrictions need to be placed on roads and when those restrictions can be lifted, supporting more informed decision-making to improve freight mobility and preserving the integrity of highway surfaces.

Strategic planning with other agencies, including NDDDES, USACE, FEMA, FHWA, and Tribal and County Emergency Managers, will assist in identifying priorities and focus resources to address freight resiliency issues within the state, including those associated with extreme weather and natural disasters. Snow and ice also impact the resiliency of freight movement in winter months and presents challenges to safe driving. NDDOT and its partners will continue to identify advancements in snow clearing techniques and equipment to ensure the highway network can continue to support freight movement.

Partner where possible with public sector agencies and the freight industry to scope projects and seek funding to decrease the impacts of freight movement on local air pollution such as increasing the use of battery electric trucks and supporting the development and implementation of charging and alternative fueling infrastructure e.g. hydrogen to support longer range trucks.

Railroad track infrastructure is owned by the freight railroads along with the responsibility of maintaining a state of good repair. Passenger station structures are owned by BNSF and in some instances by Amtrak. Station platforms are owned by BNSF. Although the state has no ownership stake, NDDOT still plays an important role in the condition of the state’s infrastructure:

- Support, through funding or grant sponsorships, the upgrading of rail lines to industry weight standards permitting use of efficient, high-capacity freight cars and a minimum 25 mph track maximum speed limit
- Work with the railroads and other state and federal agencies to identify actions to improve resiliency of the railroad network



**CONNECTING
NORTH DAKOTA**

*Transportation
matters.*

**Goal 3 – Connecting North Dakota.
Transportation Matters.**

Efficient movement of cross border freight is vital not only to North Dakota’s businesses and economy but also other states and their economies, with nearly one-third of tonnage using North Dakota’s freight system crossing the border to or from Canada. NDDOT will continue to work with other agencies and entities to support the introduction of technology, modernization and enhancements to highway and freight rail connections to expedite the movement of freight while maintaining critical border security functions to safeguard the country’s borders.

As stated in Goal 1, infrastructure restrictions impede freight movement, impact reliability, and increase transportation costs. NDDOT will continue to identify projects and enhancements that improve highway freight mobility within the STIP process. Other agencies and entities across the different modes have also identified infrastructure enhancements and capacity expansions over the coming years, subject to planning, financing, and other decision-making considerations.

Currently planned or proposed air cargo projects in North Dakota include:

- Rehabilitation of Jamestown’s Primary Runway 13/31 is currently planned to be bid in 2023 and constructed in 2024
- Bismarck has plans to consider rehabilitation of its Crosswind Runway 3-21 and associated parallel taxiway D. Additionally, Bismarck is looking to rehabilitate the section of the main parallel taxiway C that is showing distress. The timing of these projects is most likely to occur within the 2024-2027 window
- Minot has a planned rehabilitation of its crosswind runway 8-26 and associated taxiway B in years 2024-2025
- Dickinson will complete the construction of its new 7,300ft x 150ft primary runway by the Fall 2022. The airport is also planning a rehabilitation of its general aviation/cargo apron that is most likely to occur within the 2024-2027 window
- Williston is considering an air cargo apron expansion within the 2024-2027 window that would separate air cargo operations from general aviation activity if air cargo operations continue to increase

The private sector is also expected to deliver infrastructure capacity enhancements according to their own schedule and investment decision-making. One example is the Bridger South Bend Pipeline which would transport crude oil from Johnson’s Corner Terminal, North Dakota to Montana.

Measuring and monitoring the performance of the freight transportation system is critical in identifying future needs and targeting limited resources where they are needed the most. NDDOT intends to use the Functional Capacity Performance Measure as its key freight metric. However, NDDOT will explore what elements should be used for establishing thresholds associated with this performance measure. Other plans and strategies have their respective measures and where applicable, these are also used to inform and assess the performance of the freight network in the state.

The efficient freight system provides connectivity among all economic sectors and geographic areas, both within North Dakota and beyond its borders. NDDOT rail initiatives are:

- NDDOT to work with railroads and economic development agencies to facilitate rail-related economic development
- Promote and support the development of rail’s role in North Dakota’s emerging industries
- Identify opportunities for transload facilities to provide rail access to industries without direct connections
- Continue to support freight rail access to smaller communities by funding short line rail improvements
- Support the expansion of rail access to industrial or commercial sites
- Working with CP Rail and North Dakota shippers, identify rail opportunities offered by the prospective CP Rail-KCS merger
- Discuss new passenger rail initiatives with groups promoting ventures such as the Big Sky Passenger Rail Authority
- Work with CBP, CBSA, Manitoba, and Saskatchewan to enhance rail border crossing opportunities



**HELPING YOU
GET THERE**

*Transportation
should be easy.*

Goal 4 – Helping You Get There.

Transportation should be easy.

Improving the communication of information associated with road and travel conditions helps the freight industry to plan and prepare for unexpected events, maintain service levels, and manage customer expectations. Promoting the use of the existing NDDOT Road Conditions information service could help inform drivers of weather and traffic conditions and Border Crossing wait times.

Work with partners to assess the severity of impacts and develop strategies to reduce the impacts of extreme weather and natural disasters on freight mobility.

North Dakota experiences a significant number of OSOW movements that support the state's agricultural, energy extraction, and renewable energy industries. Agencies and jurisdictions across the state have worked together to reduce the administrative burden associated with permitting processes. A notable example is the LoadPass system that has been made available to all North Dakota counties. Opportunities to streamline and enhance the OSOW permit processes should be explored.

Many of the initiatives already identified also improve mobility. Other initiatives affecting mobility include:

- Support the elimination of rail bottlenecks and capacity constraints, and other barriers to improve the efficiency of the rail system
- Support infrastructure projects that reduce rail transit times and make passenger and freight rail more competitive with other forms of transportation
- Encourage NDDOT and Amtrak communities to work together to establish or improve modal connectivity at stations
- Expand the availability of rail travel information to promote passenger rail transportation



**INVESTING FOR
THE FUTURE**

*We work
for you.*

Goal 5 – Investing for the Future.

We work for you.

The IIJA increased the number of highway miles that North Dakota can designate as CRFCs to 600 miles. NDDOT and its partners should explore the designation of corridors as CRFCs and if applicable, apply for designation according to the prescribed process. CUFCs were reviewed by the MPOs in 2022 and no changes were identified.

North Dakota has many competing needs for the constrained funding associated with its freight-related infrastructure, inclusive of transportation connections and freight facilities. NDDOT will cooperate with its partners

to maximize opportunities associated with competitive grant funding programs and the increase in funding available through the IIJA.

Ensure freight-related infrastructure projects evaluate measures to reduce flooding and stormwater runoff and reduce the impact upon wildlife habitat.

Recognizing that there are continued advancements in freight-related technology such as autonomous trucks and alternative fuels, NDDOT and its partners will keep a watching brief on the evolution of these technologies and what implications they will have on the State's various programs and responsibilities.

The railroad industry has invested significantly in technology: automated track inspection systems, smart track sensors, use of artificial intelligence to predict track failures, smart crossings, dispatching, and customer interfaces among others. The railroads are also focused on the environment. Initiatives to meet this goal:

- Promote railroad implementation of advanced technologies: track condition, crossing warnings, environmental
- Evaluate feasibility of technology transfer to the state's smaller railroads
- Establish partnerships to collaboratively advance rail technology
- Continually evaluate state rail-related institutional structures, programs, and policies for effectiveness in the future
- Identify any adverse environmental, cultural, and social impacts of rail transportation paying particular attention to disadvantaged populations

IMPLEMENTATION OF HIGHWAY PROJECTS

North Dakota's 2023-2026 Draft STIP is a four-year approved program of projects for fiscal years 2023, 2024, 2025 and 2026. The financial budget for these projects is financially constrained based on the projected federal funding levels provided by the IIJA. The federal apportionment is estimated at \$384, \$391, \$397, and \$404 million for fiscal years 2023 through 2026, respectively.

Analysis of the 2023-2026 Draft STIP identifies those projects on highways associated with North Dakota Strategic Freight System Index (Levels 1, 2 and 3). The designated Level One corridors are determined to be the most critical freight corridors. Some projects that aren't relevant to freight mobility are excluded from the analysis as are those statewide improvements that are identified in the STIP, but no specific project locations are identified. Figure 10-1 identifies the location of these projects on the respective Freight Levels. Projects that are less than 2 miles in length are shown as points and the projects that are 2+ miles in length are depicted as lines. Table 10-1 identifies the value of the 2023-2026 Draft STIP projects across the different highway freight levels.

Figure 10-1: Location of Projects in the 2023-2026 Draft STIP

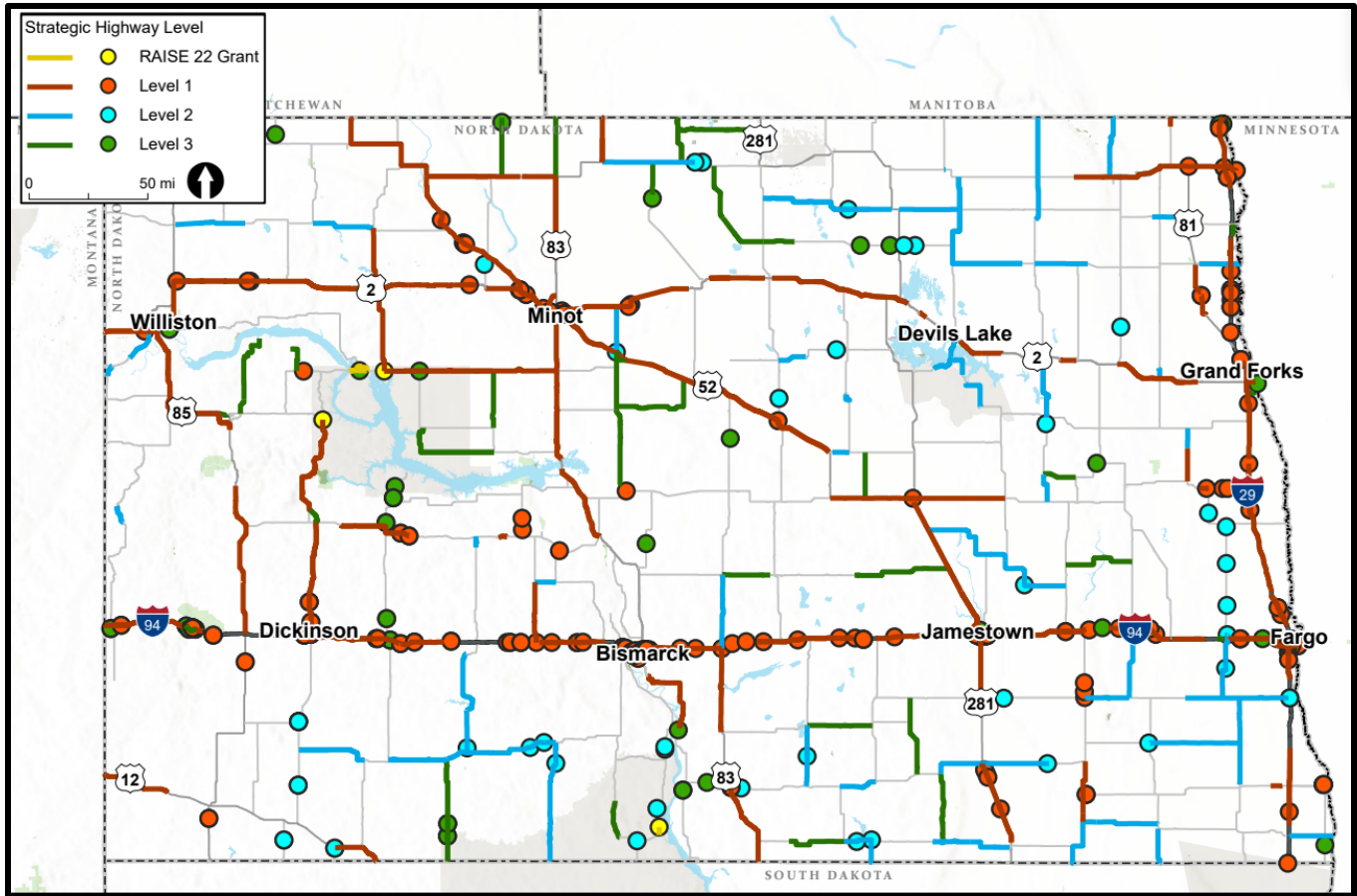


Table 10-1: 2023-2026 Draft STIP Projects Funding Assigned across Highway Freight Levels⁶⁶

Freight Level Highway	Miles	Freight Level Mileage %	Total Projects Value (\$)	% of Projects Value
Level 1	4,218.3	49.1%	\$1,017,200,458	64.3%
Level 2	2,860.1	33.3%	\$352,062,585	22.3%
Level 3	1,518.6	17.7%	212,239,590	13.4%

This table reflects the importance placed on the Level 1 highways and the need to conduct both minor and major rehabilitation projects, undertake preventative maintenance, maintain highway surfaces, and implement safety initiatives on these key highways to facilitate freight movement to, from, and within North Dakota.

RAIL SERVICE INVESTMENT PROGRAM

The Rail Service Investment Program (RSIP), a requirement of SRPs, outlines the planned investment in rail transportation over the next 20 years. The RSIP identifies projects that support the state’s rail transportation goals.

RAIL TRANSPORTATION GOALS

⁶⁶ Excludes 2022 RAISE Grants

The goals of the SFRP are drawn from the state’s long-range transportation plan, *Transportation Connection*. As the SFRP is a multimodal plan inclusive of all freight modes, the goals are applicable to freight rail transportation in the state and are adopted as the rail system goals.

PROPOSED NORTH DAKOTA RAIL IMPROVEMENTS

For purposes of describing the RSIP, the rail projects are categorized as:

- Class I railroad projects
- Class II and Class III railroad projects
- Section 130 crossing improvement projects

CLASS I FREIGHT RAIL PROJECTS

Class I railroad improvements comprise 32 BNSF projects shown in Table 10-2. Twenty-five projects are targeted to be undertaken in the near term. Over the last fifteen years, BNSF invested heavily in capacity improvements in North Dakota. Consequently, its current program is focused on safety. These near-term projects are crossing improvements, a new overpass, grade separation, and a crossing roadway approach alignment. The five projects identified for development in the long-term are all overpass construction projects. BNSF had no cost estimates available.

Table 10-2: Proposed Class I Railroad Projects

Railroad	Time Frame	Project	Location	Goal	Cost	Federal Funding
BNSF	1-4 Years	Crossing Resurfacing	21 Various	Safety	TBD	TBD
		Crossing Equipment Update	4 Various	Safety	TBD	TBD
		Overpass	Hettinger	Safety	TBD	TBD
		Grade Separation	Grand Forks	Safety	TBD	Yes
		Roadway Realignment	Karlsruhe	Safety	TBD	TBD
	5-20 Years	Overpass	Minot	Safety	TBD	TBD
		Overpass	Berthold	Safety	TBD	TBD
		Overpass (2)	Manitou	Safety	TBD	TBD
		Overpass	Trenton	Safety	TBD	TBD

Note: Project costs not provided by BNSF; need for Federal funding and amount of funding to be determined at inception of project development **Source: BNSF**

CP Rail advised it had no projects for inclusion in the Rail Plan. More detail on each project is provided in Appendix D Rail Projects.

PROPOSED SHORT LINE FREIGHT RAIL PROJECTS

Two of the four smaller railroads operating in the state—DMVW and RRVW—identified a combined eight improvement projects under consideration at this time. The three DMVW projects are rail replacement projects for the next four years. One project is a replacement of worn rail while two are upgrades to heavier rail. Total estimated cost is \$3.1 million planned for the next four years (Table 10-3).

Table 10-3: Proposed Projects on North Dakota Short Line Railroads-DMVW

Railroad	Time Frame	Project	Location	Goal	Cost	Federal Funding
DMVW	1-4 Years	Relay Curve Rail - .5 mile	Wilton	Safety	\$150.0K	No
		Replace 85lb Rail with 100lb Rail - 5.5 miles	Wilton	Safety	\$2.0M	No
	5-20 Years	Replace 85lb Rail with 115lb Rail - 3 miles	Coleharbor	Reliable Service	\$1.0M	No

Note: Decision regarding Federal funding may change at inception of project development **Source: DMMV**

The RRVW is planning a significantly more expansive program at an estimated cost of \$146.5 million as shown in Table 10-4. The near-term project is the replacement of 14.5 miles of old, jointed rail with continuous welded rail. The long-term projects also involve older rail replacement (156.2 miles) and also a complete 46.5-mile line rebuild.

Table 10-4: Proposed Projects on North Dakota Short Line Railroads-RRVW

Railroad	Time Frame	Project	Location	Goal	Cost	Federal Funding
RRVW	1-4 Years	Replace older jointed rail with new heavy CWR – 15.4 miles	Oakes to Independence	Reliable Service	\$9.6M	\$6.7M
	5-20 Years	Replace older lighter rail with heavier CWR – 27.9 miles	Gwinner to Oakes	Reliable Service	\$15.8M	TBD
		Eliminate rail joints – 34.6 miles	Wahpeton to Kindred	Reliable Service	\$6.5M	TBD
		Replace older jointed rail with new heavy CWR – 93.7 miles	Jamestown to Maddock	Reliable Service	\$56.9M	TBD
		Rebuilding of track after severe flood damage and subgrade failure - 46.5 miles	Jamestown to LaMoure	Reliable Service	\$57.7M	TBD

Notes: Oakes to Independence track upgrade awarded an FY21 CRISI grant; need for Federal funding and amount of funding for future projects to be determined at inception of project development **Source: RRVW**

GRADE CROSSING IMPROVEMENT PROGRAM

NDDOT administers the North Dakota share of the federal Section 130 grade-crossing program. The current allotment is \$4.7 million per year, however the combined railroad Section 130 allocation is \$5.2 million as shown in Table 10-5 and Table 10-6 which also show the distribution of Section 130 funds among the state’s railroads. As shown in Table 10-5, the DMVW is the largest beneficiary of hazard elimination funds with \$632,852 followed by BNSF with \$511,700.

Table 10-5: Section 130 Crossing Funding: Hazard Elimination Projects FY2022

Railroad	Sec 130 Funding	Total Cost
BNSF	\$571,200	\$1,028,805
CP	\$234,021	\$248,690

Railroad	Sec 130 Funding	Total Cost
DMVW	\$632,852	\$626,176
DNR	\$346,584	\$336,385
NPR	\$307,109	\$296,909
RRVW	\$210,803	\$200,603
Program Study	\$45,000	\$50,000
Total	\$2,347,069	\$2,787,567

BNSF is the largest beneficiary of funds for signal improvements followed by CP as shown in Table 10-6.

Table 10-6: Section 130 Crossing Funding: Signal Projects FY2022

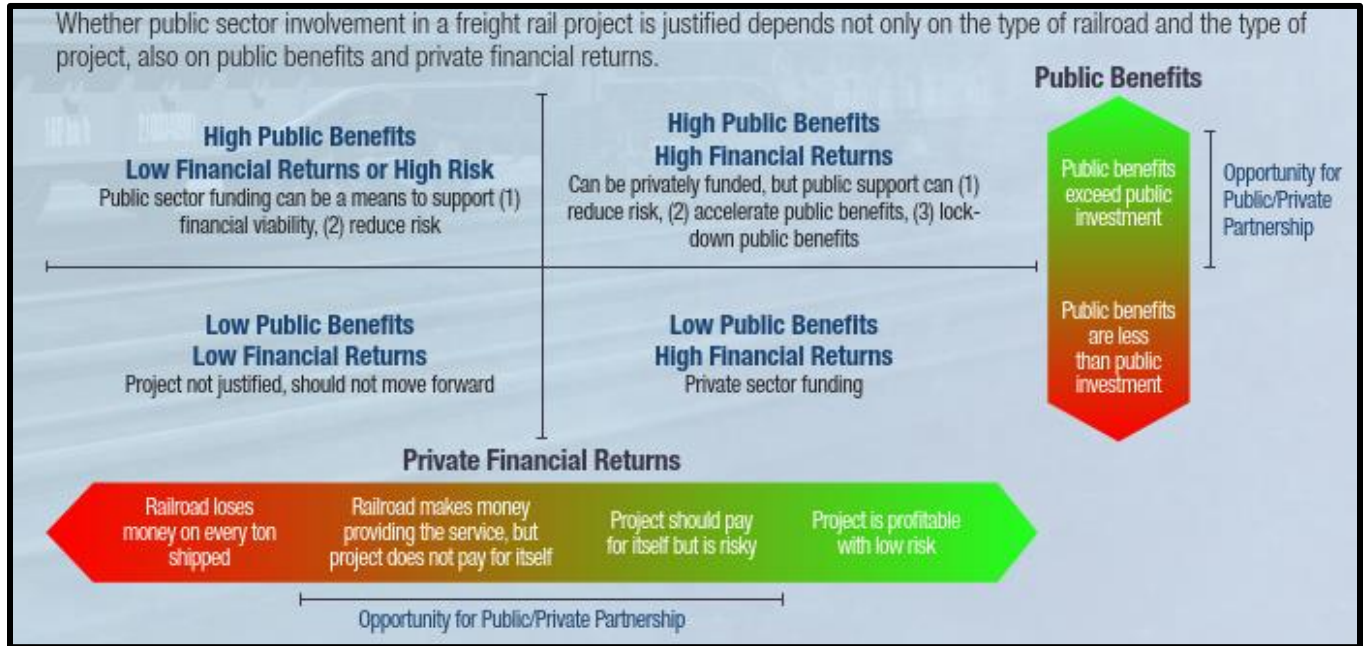
Railroad	Sec 130 Funding	Total Cost
BNSF	\$1,243,987	\$1,947,800
CP	\$752,424	\$836,026
DMVW	\$250,035	\$250,035
DNR	\$121,810	\$121,810
NPR	\$237,893	\$237,893
RRVW	\$202,319	\$202,319
Preliminary Engineering	\$11,700	\$13,000
Conceptual Engineering	\$13,950	\$15,500
Total	\$2,834,117	\$3,624,383

FUNDING

Funding alternatives are described in Chapter 9. The public sector, principally the federal government, plays an important role in rail project development. A railroad will invest in assets when a project is expected to produce acceptable financial returns at an acceptable level of risk. Public investment in railroad assets can improve those returns, whether as a sole investor or through a funding relationship with the railroad. Opportunities for public and private sector involvement lie where public benefits are significant and where the railroad partner would not earn its required return from the affected service or would incur unacceptable levels of risk without assistance in funding the asset.

Figure 10-2 illustrates where the opportunities for public and private sector involvement lie. The area in the upper half of the graphic, close to the vertical center line offers the most favorable opportunity for public sector investment. Public benefits are high, while the private sector needs assistance due to low returns or significant risk.

Figure 10-2: Public Involvement in Freight Rail Projects



Source: AASHTO Freight Rail Study, August 2018

NDDOT is restricted in its ability to participate in public-private partnerships or to invest directly in privately-owned rail infrastructure. NDDOT, however, participates in financing rail infrastructure improvements through its loan programs and sponsoring federal grant applications. The decision criteria shown in Figure 10-2 equally apply.

PROGRAM IMPACTS

The freight rail program presented will have several benefits. They are as follows:

Safety and Security

Rail transportation is a safe mode. The numbers of accidents, injuries, and fatalities per ton-mile moved over the railroad system is less for rail than for highway travel.

The RSIP has projects specifically aimed at improving the safety of the rail network, including highway-rail grade crossing improvements and grade separations. Other projects reduce train accidents by maintaining infrastructure in a condition that will make derailments less likely.

More broadly the RSIP will lead to increased usage of rail transportation, reducing less safe truck travel.

System Condition

Much of the RSIP consists of capital projects that will serve to maintain or bring North Dakota’s rail network to a state of good repair.

Mobility

The RSIP includes projects that will preserve rail as a competitive alternative for moving North Dakota freight. Among the projects are infrastructure improvements that will improve reliability and increase train speeds, reducing delays on smaller railroads.

The Economy

The RSIP promotes North Dakota's competitiveness through improved freight rail service for the state's principal industries, especially those that are essential to the rural economy such as agriculture and energy.

RAIL AGENCIES

The NDDOT Planning/Asset Management Planning and Rail Section does not anticipate major organizational changes.