# Cross Border Regional Truck Transportation Commonalities and Differences

NDDOT & UGPTI

# *TransAction*

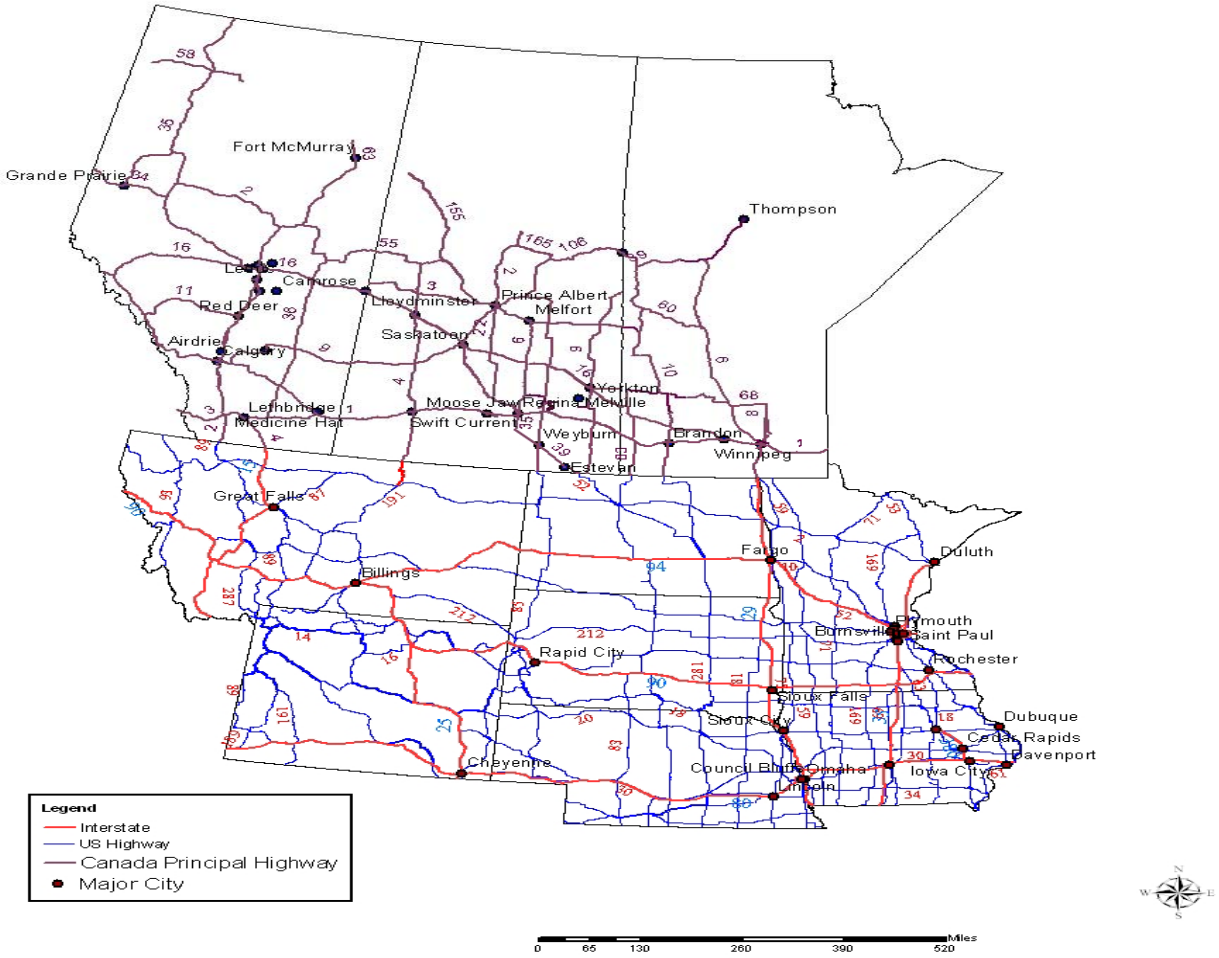
- *Initiative 8: "North Dakota will determine the opportunities for, and the economic impacts of, a regional uniform truck size, weight and permitting system."*

- *"A complex regulatory environment governs tire and axle loads, gross vehicle weights, vehicle heights and widths, trailer and semi trailer lengths, and combination vehicle lengths."*

# Objectives

- To Provide:
  - Information on the impacts of the regional size and weight regulatory system,
  - Information of the differences in size and weight regulations in the region including Alberta, Saskatchewan, Manitoba, North Dakota, South Dakota, Minnesota, Montana, Iowa, Wyoming, and Nebraska,
  - Information for the regional DOTs, policy makers, and others.

# Study Area


Fort McMurray
Grande Prairie
Thompson
Red Deer
Camrose
Lloydminster
Prince Albert
Melfort
Saskatoon
Airdrie
Calgary
Yorkton
Melville
Lethbridge
Medicine Hat
Moose Jaw
Regina
Swift Current
Weyburn
Brandon
Winnipeg
Estevan
Great Falls
Billings
Fargo
Duluth
Rapid City
Plymouth
Burnsville
Saint Paul
Rochester
Sioux Falls
Sioux City
Dubuque
Cedar Rapids
Davenport
Iowa City
Council Bluffs
Omaha
Lincoln
Cheyenne
Legend
Interstate
US Highway
Canada Principal Highway
Major City
Miles
0
65
130
260
390
520

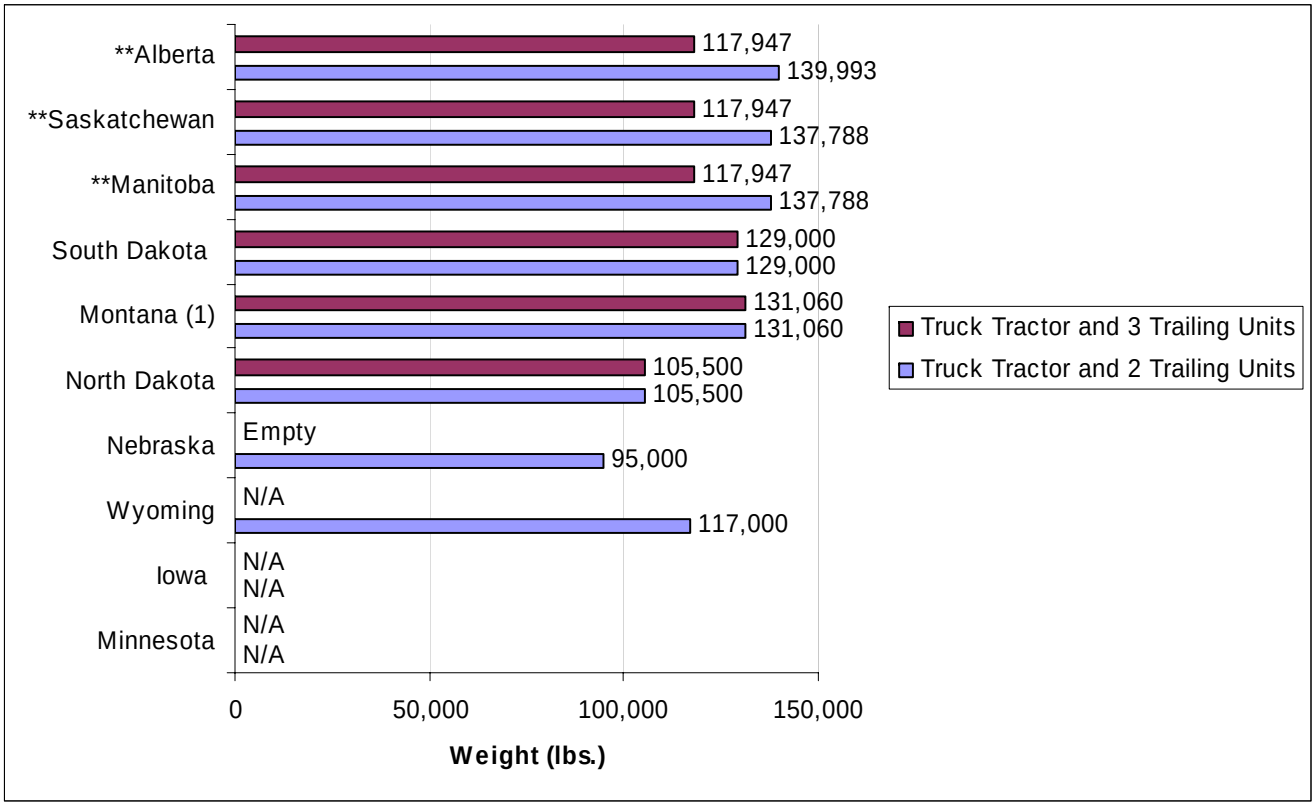
# U.S. Regulations

- U.S. standards currently in place that provide wide spread application and influence in terms of basic limits
  - U.S. Federal Truck Size and Weight Laws (Title 23),
    - define size and weight regulations on the Interstate and National Network (NN).
  - The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)
    - restricts the operation of longer combination vehicles (LCV's) on the Interstate System and commercial motor vehicle (CMV) combinations with two or more cargo carrying units on the NN to the types of vehicles in use on or before June 1, 1991, subject to whatever state restrictions were in effect on that date.
    - Section 1023 of the ISTEA required states to submit to the Secretary of Transportation a complete list of:
      - (1) all operations of LCV's being conducted as of June 1, 1991;
      - (2) state laws, regulations, and any other limitations and conditions, including routing-specific and configuration-specific designations governing the operation of LCV's; and
      - (3) a copy of such laws, regulations, limitations, and conditions. Due to grandfather rights set forth by Title 23 in each state, maximum size and weights for LCV configurations vary.

# Regulations in the Region on Truck Maximum Weight and Dimension

| | Width [1] (inches) | Length[2] | Height | Gross Vehicle Weight Interstate Highways | Maximum Gross Vehicle Weight Other Highways[14] | Single Axle (lbs) | Tandem axle[4] (lbs) | Tridem Axle (lbs)[15] | (**) "Routine" Permit Maximum GVW (lbs) | "Routine" Permit Maximum Single Axle / Tandem Axle | (**) Special Review Permit Highest GVW with sufficient axles |
|---|---|---|---|---|---|---|---|---|---|---|---|
| North Dakota | 102 | 110' | 14'[3] | 80,000 | 105,500 | 20,000 | 34,000 | 48,000 | 103,000 | 24,000/ 45,000 | 150,000 |
| South Dakota | 102 | 110' | 14' | 80,000 | 129,000[12] | 20,000 | 34,000 | 43,000 | 116,000 | 31,000/ 52,000 | Determination on a case by case basis |
| Minnesota | 102[5] | 75' | 13'6" | 80,000 | 80,000[11] | 20,000[7] | 34,000 | 43,000 | 92,000[6] | 20,000/ 40,000 | 144,000 |
| Montana | 102 | 110' | 14' | 80,000 | 131,060 | 20,000 | 34,000 | 46,300 | 105,500[8] | 20,000/ 48,000 | 126,000 |
| Nebraska | 102 | 105' | 14'6" | 80,000 | 95,000 | 20,000 | 34,000 | 42,500 | 99,000 | 20,000/ 40,000 | 110,000 |
| Iowa | 102 | 110' | 13'6" | 80,000[14] | 80,000 | 20,000 | 34,000 | 42,500 | 100,000 | 20,000/ 40,000 | 160,000 |
| Wyoming | 102 | 110' | 14' | 80,000[17] | 117,000 | 20,000 | 36,000 | 42,500 | 85,000 | 25,000/ 55,000 | 135,000 |
| Alberta | 102 | 82' | 13'6" | 87,082[13] | 76,059[13] | 20,062[13] | 37477[13] | 52,910[9] | 139,993[13] | 20,062/ 37,478 Determination on a case by case basis | Determination on a case by case basis |
| Manitoba | 102 | (*) 114'9"/ 75'5" | 13'6" | 87,082[13] | 76,059[13] | 20,062[13] | 37,477[13] | 52,910[9] | 137,788[13] | 20,062/ 37,478 Determination on a case by case basis | Determination on a case by case basis |
| Saskatchewan | 102[10] | (*) 114'9"/ 75'5" | 13'6" | 87,082[13] | 76,059[13] | 20,062[13] | 37,477[13] | 52,910[9] | 137,788[13] | 20,062/ 37,478 Determination on a case by case basis | Determination on a case by case basis |

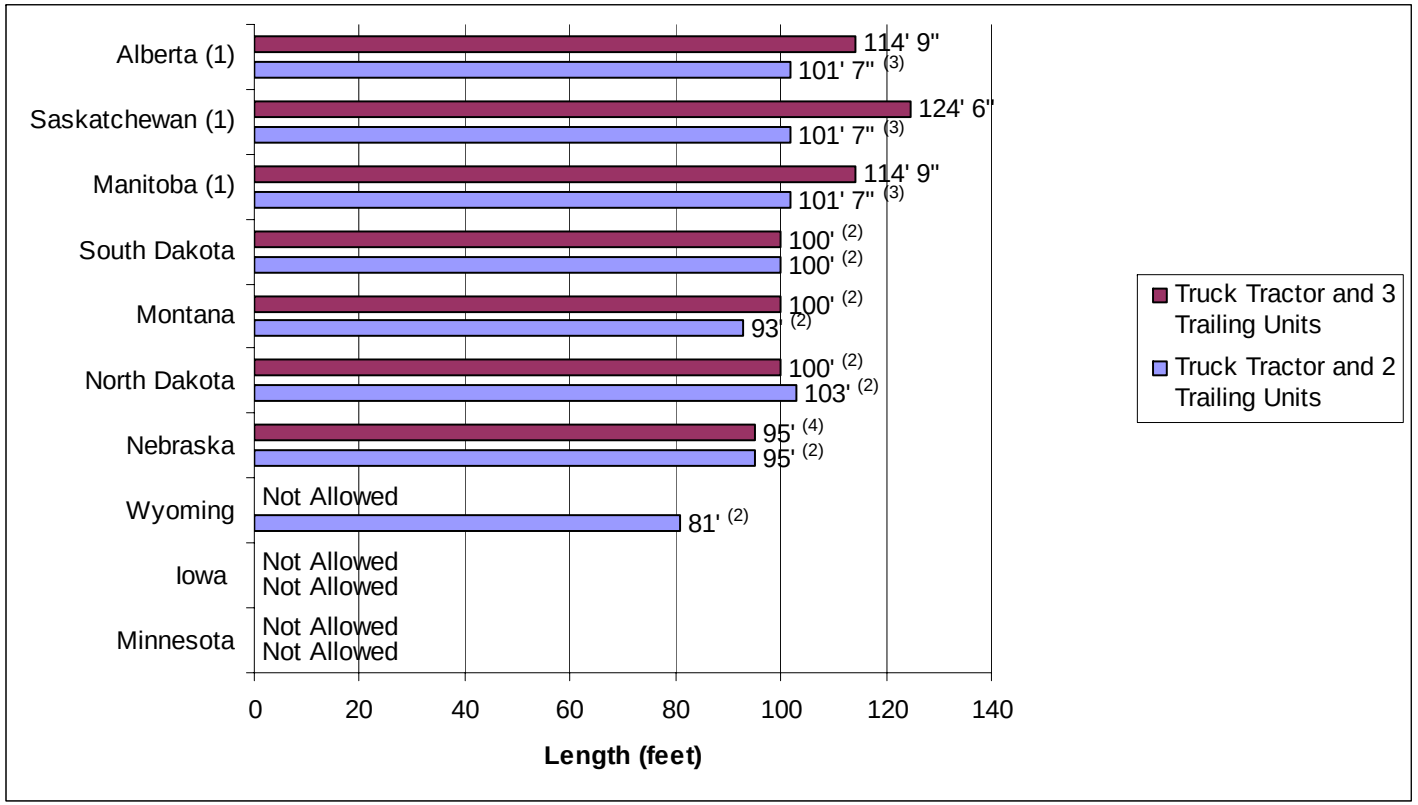
# Maximum Weight for Vehicles Subject to the ISTEA Freeze (LCV's)




** Weight was converted from metric measurement which may include rounding error.

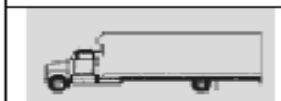
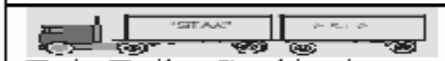
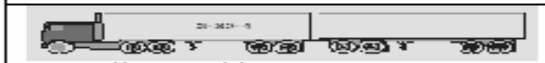
(1) 137,800 pounds for vehicles operating under the Montana/Alberta Memorandum of Understanding (MOU).

# Maximum Length for Longer Combination Vehicles (LCVs)

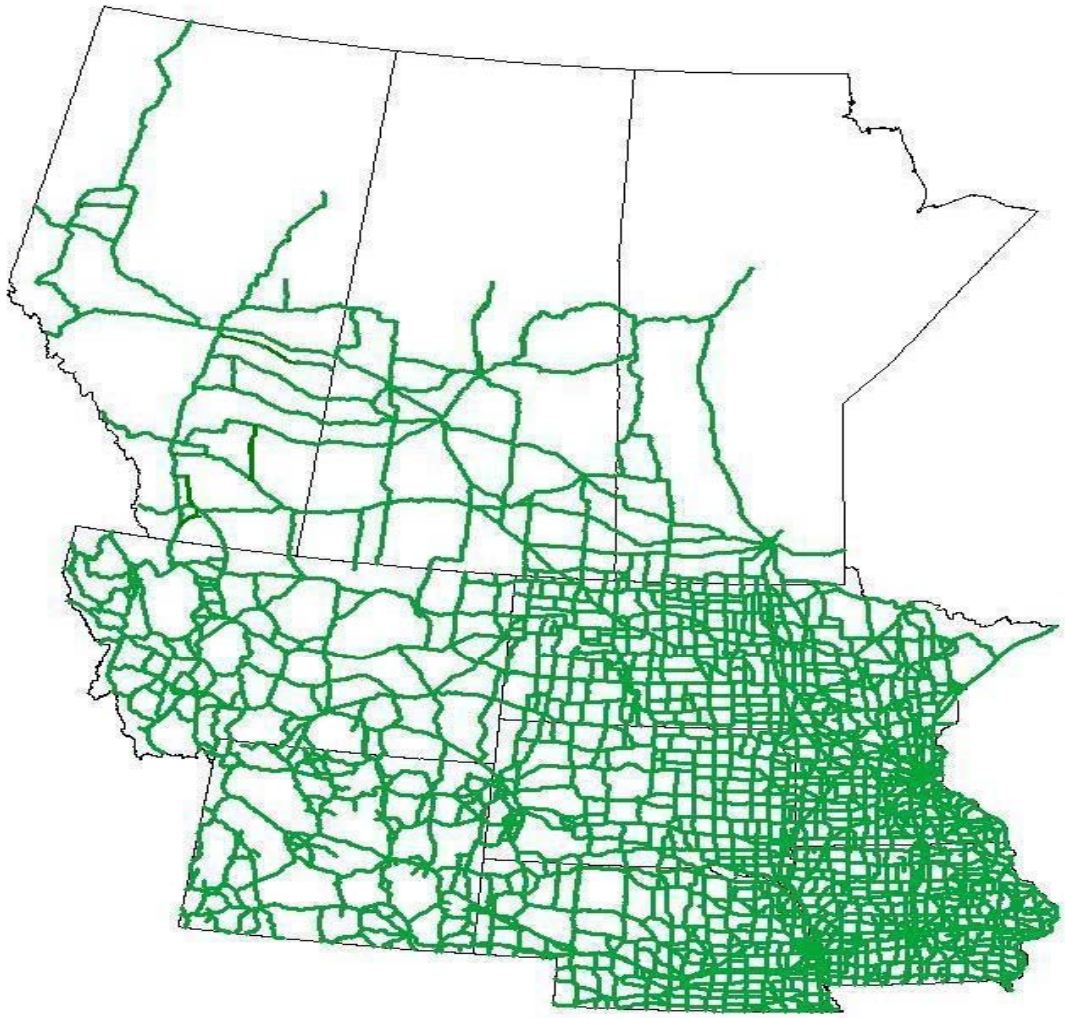



(1) Overall maximum lengths for Canadian Provinces-Roads and Transportation Association of Canada (RTAC).
(2) Combined Trailer Length (CTL).
(3) Rocky Mountain Double configuration overall length. Turnpike Double maximum overall length is 124’ 6” in each Province
(4) Empty trailers only

# Configurations

| Configuration | ND | SD | MN | NE | LA | MT | WY | MB | SK | AB |
|---|---|---|---|---|---|---|---|---|---|---|
|  Straight Truck 2 axles | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
|  Straight Truck 3 axles | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
|  Tractor & Semi-trailer 4 axles | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
|  Tractor & Semi-trailer 5 axles | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
|  Tractor & Semi-trailer 6 axles | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
|  Truck & Tandem Pony | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
|  Truck & Tandem Pony | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
|  Truck & Full Trailer 5 axles | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
|  Truck & Full Trailer 6 axles | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
|  Twin Trailer Combination | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
|  Rocky Mountain Double | ✔ | ✔ | | ✔ | | ✔ | ✔ | ✔ | ✔ | ✔ |
|  Turnpike Double | ✔ | ✔ | | ✔ | | ✔ | | ✔ | ✔ | ✔ |
|  Triple Trailer Combination | ✔ | ✔ | | ✔ | | ✔ | | ✔ | ✔ | ✔ |

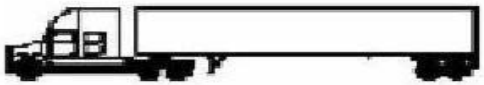
(✔) indicates the configuration can be found in the State or Province



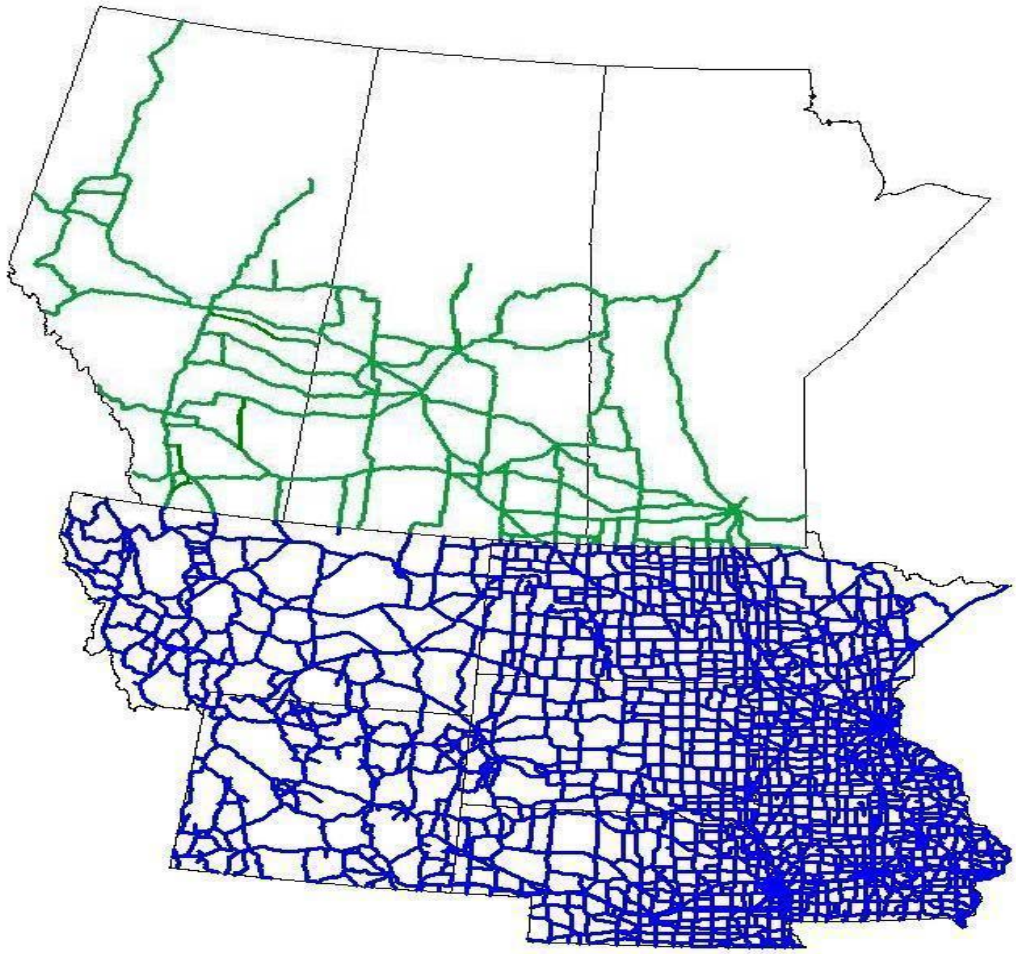
0 70 140 280 420 560 Miles

**Legend**

- Travel allowed without a permit
- Travel allowed with a permit
- Travel not allowed



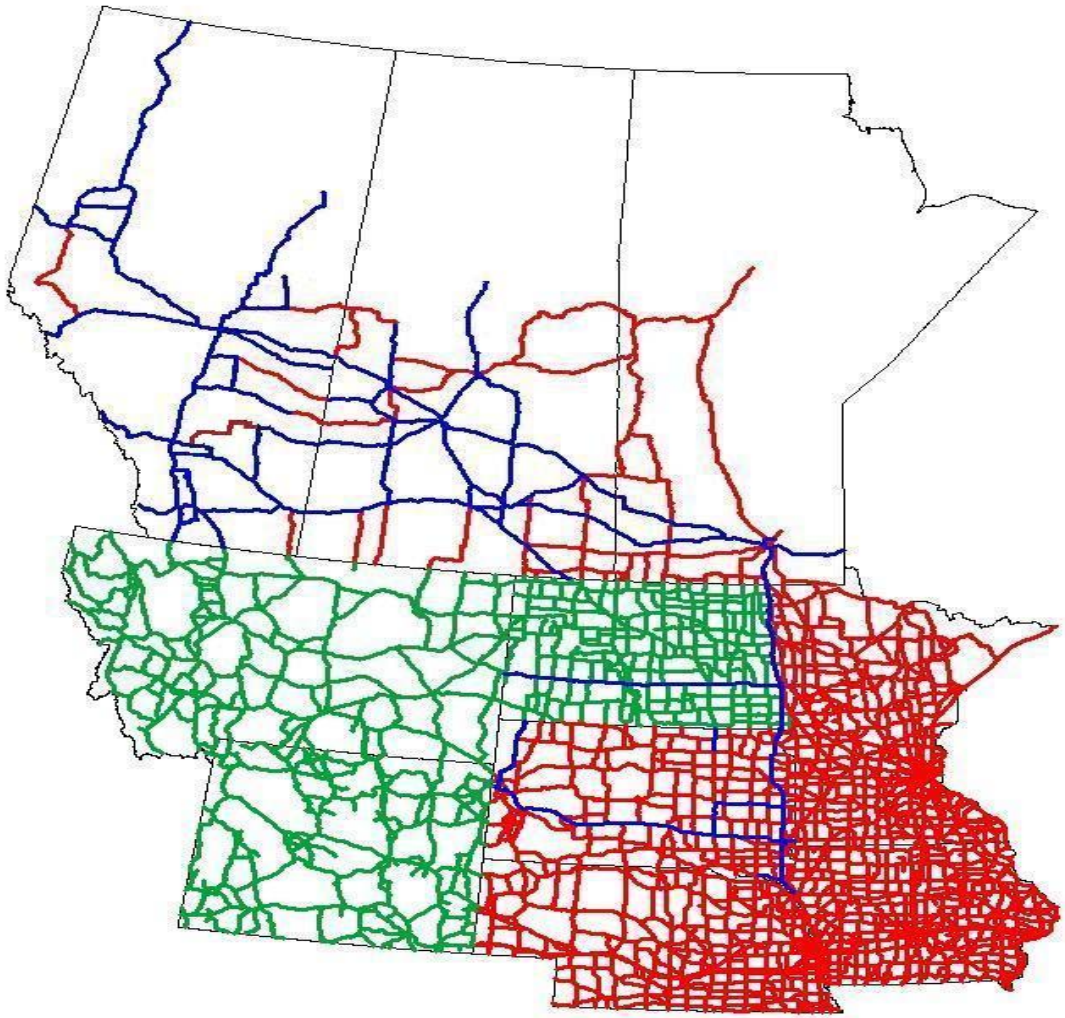
Single trailer, 5 axles, 53' trailer,
80,000 lb GVW
(one 12,000 lb steering axle,
two 34,000 lb tandem axles)




**Legend**

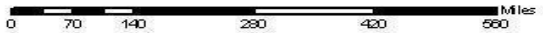
- Travel allowed without a permit
- Travel allowed with a permit
- Travel not allowed


Single trailer, 5 axles, 53' trailer,
88,000 lb GVW
(one 12,000 lb steering axle,
two 38,000 lb tandem axles)

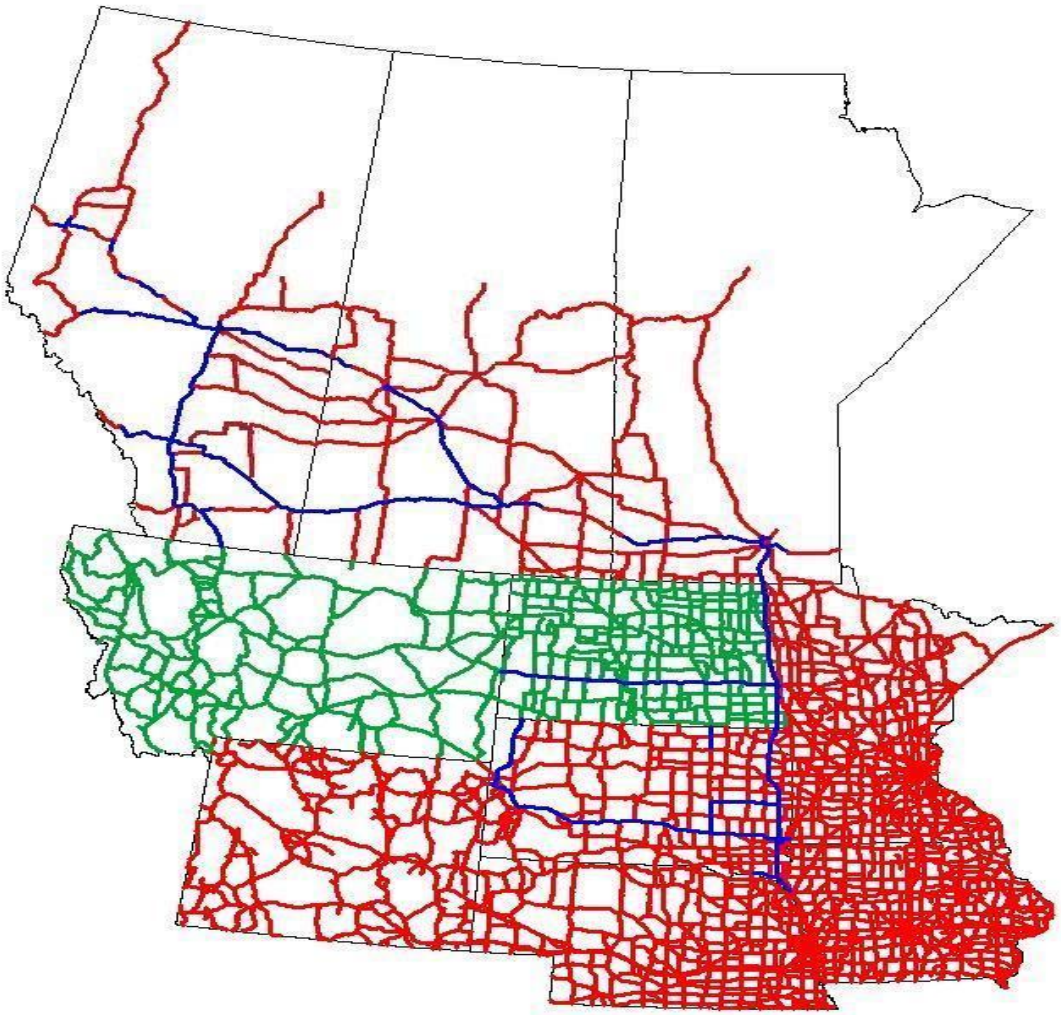



**Legend**

- Travel allowed without a permit
- Travel allowed with a permit
- Travel not allowed



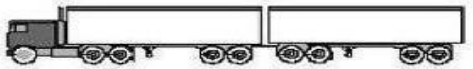

Rocky Mountain Double, 7 axles, 45' and 26' trailers, 105,500 lb GVW
(12,000 lb steering axle, two 30,000 lb tandem axles, two 16,750 lb single axles)



**Legend**

- Travel allowed without a permit
- Travel allowed with a permit
- Travel not allowed

0 70 140 280 420 560 Miles



Turnpike Double, 9 axles, two 45' trailer, 105,500 lb GVW (12,000 lb steering axle, four 23,375 lb tandem axles)

# Case Study: Using the Ratio of Payload by Truck Type

| | 5 Axle Semi | 6 Axle Semi | RMD | Turnpike Double |
|---|---|---|---|---|
| Payload | 53,200 | 65,700 | 67,900 | 97,800 |
| Tare Weight | 26,800 | 28,300 | 37,600 | 40,000 |
| GVW | 80,000 | 94,000 | 105,500 | 137,800 |
| Ratio of Payload | 1 | 1.23 | 1.28 | 1.84 |

## Case Study: Ton-Mile Costs for Different Truck Configurations

| **GVW (pounds)** | **80,000** | **94,000** | **105,500** | **137,800** |
|---|---|---|---|---|
| | 5 axle | 6 axle | RMD | Turnpike Double |
| **Variable Costs** | | | | |
| Fuel | $0.0104 | $0.0090 | $0.0093 | $0.0072 |
| Labor | $0.0126 | $0.0100 | $0.0097 | $0.0067 |
| Tires | $0.0018 | $0.0018 | $0.0020 | $0.0029 |
| Maintenance | $0.0043 | $0.0038 | $0.0040 | $0.0034 |
| **Total Variable Costs** | **$0.0291** | **$0.0246** | **$0.0251** | **$0.0203** |
| **Fixed Costs** | | | | |
| Equipment Cost | $0.0102 | $0.0082 | $0.0062 | $0.0060 |
| License Fees and Taxes | $0.0012 | $0.0009 | $0.0005 | $0.0003 |
| Insurance | $0.0027 | $0.0022 | $0.0021 | $0.0015 |
| Management and Overhead | $0.0041 | $0.0033 | $0.0032 | $0.0022 |
| **Total Fixed Costs** | **$0.0183** | **$0.0146** | **$0.0120** | **$0.0101** |
| **TOTAL COSTS** | **$0.0473** | **$0.0392** | **$0.0371** | **$0.0304** |

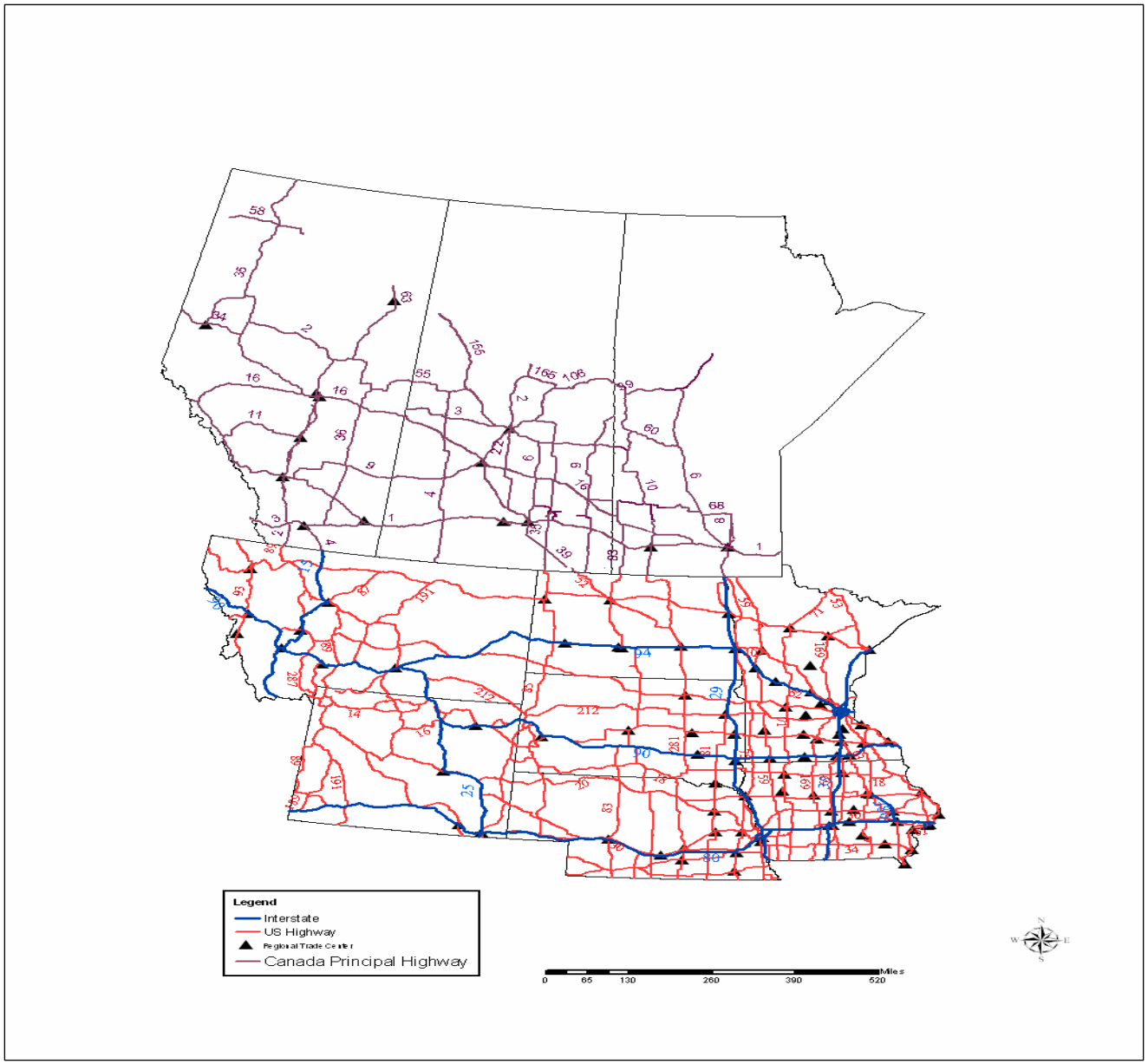
# Equivalent Single Axle Load by Truck Type for 10,000 Tons Moved 250 Miles

| | 5 Axle Semi | 6 Axle Semi | RMD | Turnpike Double |
|---|---|---|---|---|
| GVW | 80,000 | 94,000 | 105,500 | 137,800 |
| Gross ESAL Flexible | 2.37 | 2.30 | 3.08 | 3.44 |
| Gross ESAL Rigid | 4.07 | 4.67 | 4.36 | 5.93 |
| Tare ESAL Flexible | .06 | .06 | .07 | .07 |
| Tare ESAL Rigid | .07 | .07 | .08 | .07 |
| | | | | |
| Number of Trips (Max Payload) | 376 | 305 | 295 | 205 |
| Number of Trips (Tare Weight) | 376 | 305 | 295 | 205 |
| Total Trips (Max Payload and Tare Weight) | 752 | 610 | 590 | 410 |
| | | | | |
| Gross Total ESALS Flexible per 10,000 Tons Moved 250 Miles | 222,744 | 175,038 | 226,804 | 175,869 |
| Gross Total ESALS Rigid per 10,000 Tons Moved 250 Miles | 382,519 | 355,403 | 321,060 | 303,170 |
| | | | | |
| Tare Total ESALS Flexible per 10,000 Tons Moved 250 Miles | 5,639 | 4,566 | 5,155 | 3,579 |
| Tare Total ESALS Rigid per 10,000 Tons Moved 250 Miles | 6,579 | 5,327 | 5,891 | 3,579 |
| | | | | |
| Combined Gross and Tare ESALS Flexible | 228,383 | 179,604 | 231,959 | 179,448 |
| Combined Gross and Tare ESALS Rigid | 389,098 | 360,731 | 326,951 | 306,748 |

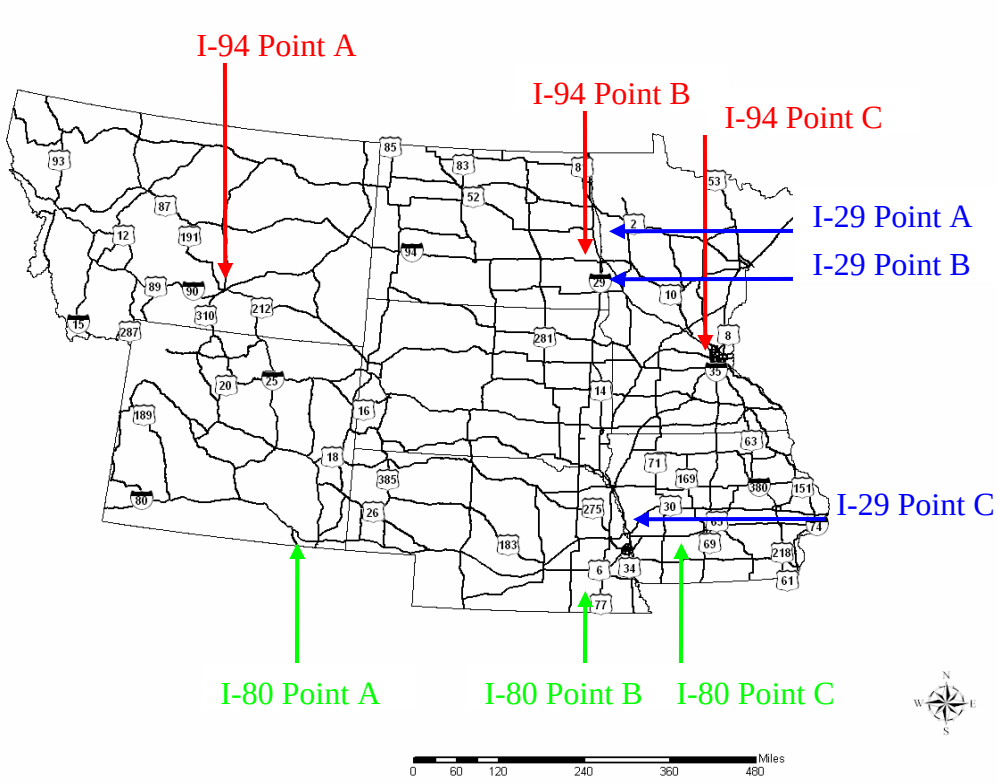
# Summarizing Regulations, Costs and Pavement Impacts of Trucking

- Regional Differences Restrict Payloads and May Reduce Commerce Based on Travel Scenarios
- Larger Trucks Provide Efficiency Based on Ton-Mile Costs
- Larger Trucks May Do Less Road Damage based on ESAL Factor Results
- Less Traffic for Set Amount of Freight

# Regional Trade Centers and Highways



# Average Daily Trucks on a Identified Highway Segments for Estimated and Projected Years




| | Estimated | Projected | |
|---|---|---|---|
| **Year** | **1998** | **2010** | **2020** |
| **I-94** | | | |
| Point A (near Billings) | 800 | 1,156 | 1,522 |
| Point B (near Fargo) | 1,801 | 2,344 | 2,860 |
| Point C (near St. Paul) | 5,050 | 4,889 | 6,384 |
| **I-29** | | | |
| Point A (near Grand Forks) | 2,239 | 3,272 | 4,235 |
| Point B (near Fargo) | 2,308 | 3,358 | 4,333 |
| Point C (near Omaha) | 2,780 | 3,934 | 4,938 |
| **I-80** | | | |
| Point A (near Cheyenne) | 8,827 | 12,828 | 17,037 |
| Point B (near Lincoln) | 6,619 | 10,211 | 13,483 |
| Point C (near Des Moines) | 7,238 | 10,469 | 13,647 |

# Findings

- With the advent of ISTEA in 1991, many federal and state planning documents have since called for more uniformity in truck size and weight regulations.
- Due to inconsistencies in size and weight regulations, problems exist for seamless freight transportation
- State and provincial truck size and weight regulations and permitting processes are complex, difficult to define, and provide for a less than amicable business environment.
- Projections indicate increased freight volumes throughout the region.
- State and provincial truck size and weight regulations are continually evolving.

# Findings

- System of harmonization may reduce truck numbers and create efficiencies for businesses throughout the region.
- A truck freight transportation system that allows larger trucks may reduce trips and congestion resulting in overall cost savings.
- In some cases, larger trucks, with the correct number and spacing of axles, may do less road damage than smaller trucks.
- Inefficiencies exist because of the differences between state and provincial permitting processes.
- Increasing volume of regional trade.

# Most Importantly

- Cooperation among states, provinces, and private and public sector leaders is needed to bring about a plan for uniform regulations and a seamless truck freight transportation system that enhances commerce within the region.

# Thank you