

MULTIMODAL TRANSPORTATION SYSTEM ANALYSIS  
ANALYSE DU SYSTÈME DE TRANSPORT MULTIMODAL

Multi-Modal Freight Analysis at Transport Canada

University of Toronto Freight Day  
February 10, 2015



## Transport Canada's Economic Analysis Group (TEA)

### Who we are:

- Part of TC Policy Group
- Evidence-based center of expertise on current and future state of performance, capacity and resilience of the Canadian Transportation System
- 3 key dimensions:
  - Efficiency
  - Safety/Security
  - Sustainable Development

### Analytical framework

- Demand/Supply of transportation
- Multimodal, system based approach (corridors/regions/commodities)
- Current and future state of transportation
- Focus on performance, multi-modal capacity and resilience of the transportation system (identification of the key challenges, bottlenecks and pressures)

## Fundamentals of the System Analysis/Fluidity Project

- Scope – focus on both demand and supply of transportation
- The project focus is not on cost or operational information of stakeholders, it is on creating visibility for Canada's supply chains
- Fluidity metrics are developed with industry on a voluntary basis; external stakeholders also used to validate metrics
- Using a phased approach; phase 1 – import supply chains; phase 2 – export supply chains
- Forward looking approach, while good metrics are key to measuring performance, good information derived from better collaboration is by far the key to planning and managing for improved performance
- Strategic cooperation/collaboration with governments, private sector and academic partners
  - i.e. U of T, MTO, Commodity Supply Chain table

## Complexities of the Analysis

- Defining multi-modal capacity
  - Static vs. dynamic capacity
  - Metrics mean different things to different people
- Access to raw operational data
  - GPS = Big data!
- Keeping pace with reality in a policy environment
  - Dynamic trade flows
  - Some sectors are very adaptive, others are much less flexible
- Transferring results to practical applications
  - Maintaining a policy perspective while using operational data to tell the story

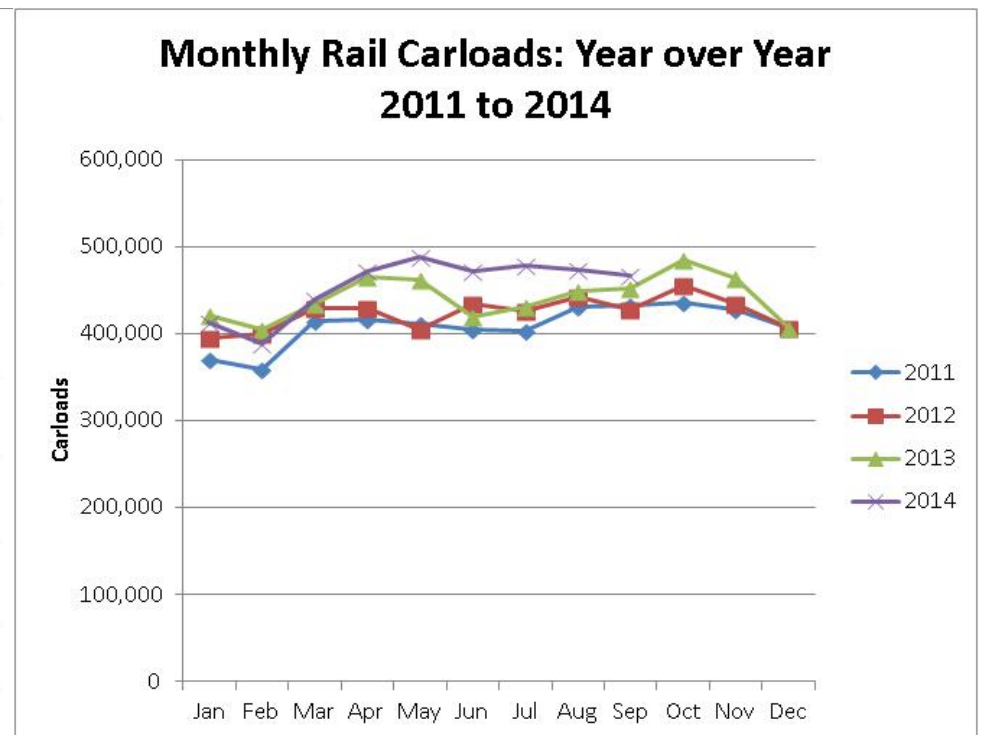
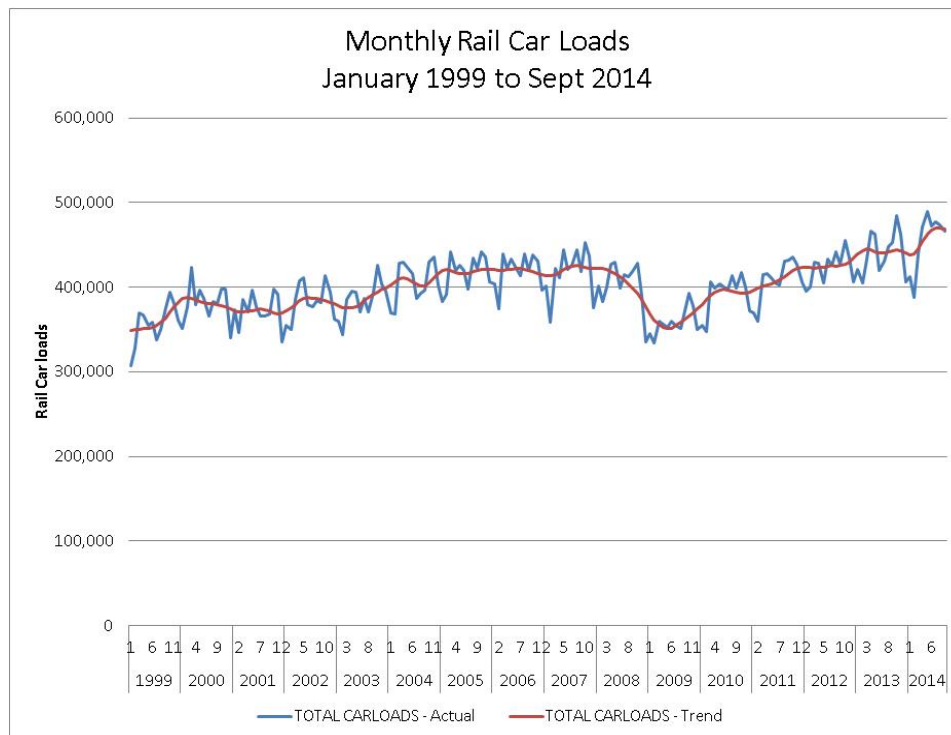
## Overview and Examples of TC Analysis

- Demand for key Canadian commodities and pressures on accessibility and fluidity of Canadian transportation system infrastructure for specific commodities
- Performance of the system
  - Measuring/Analyzing the reliability and variability in transit times
  - Identification of bottlenecks/impediments
  - Immediate and residual impacts of disruptions to the transportation network
  - Estimating border wait times

# MULTIMODAL TRANSPORTATION SYSTEM ANALYSIS ANALYSE DU SYSTÈME DE TRANSPORT MULTIMODAL

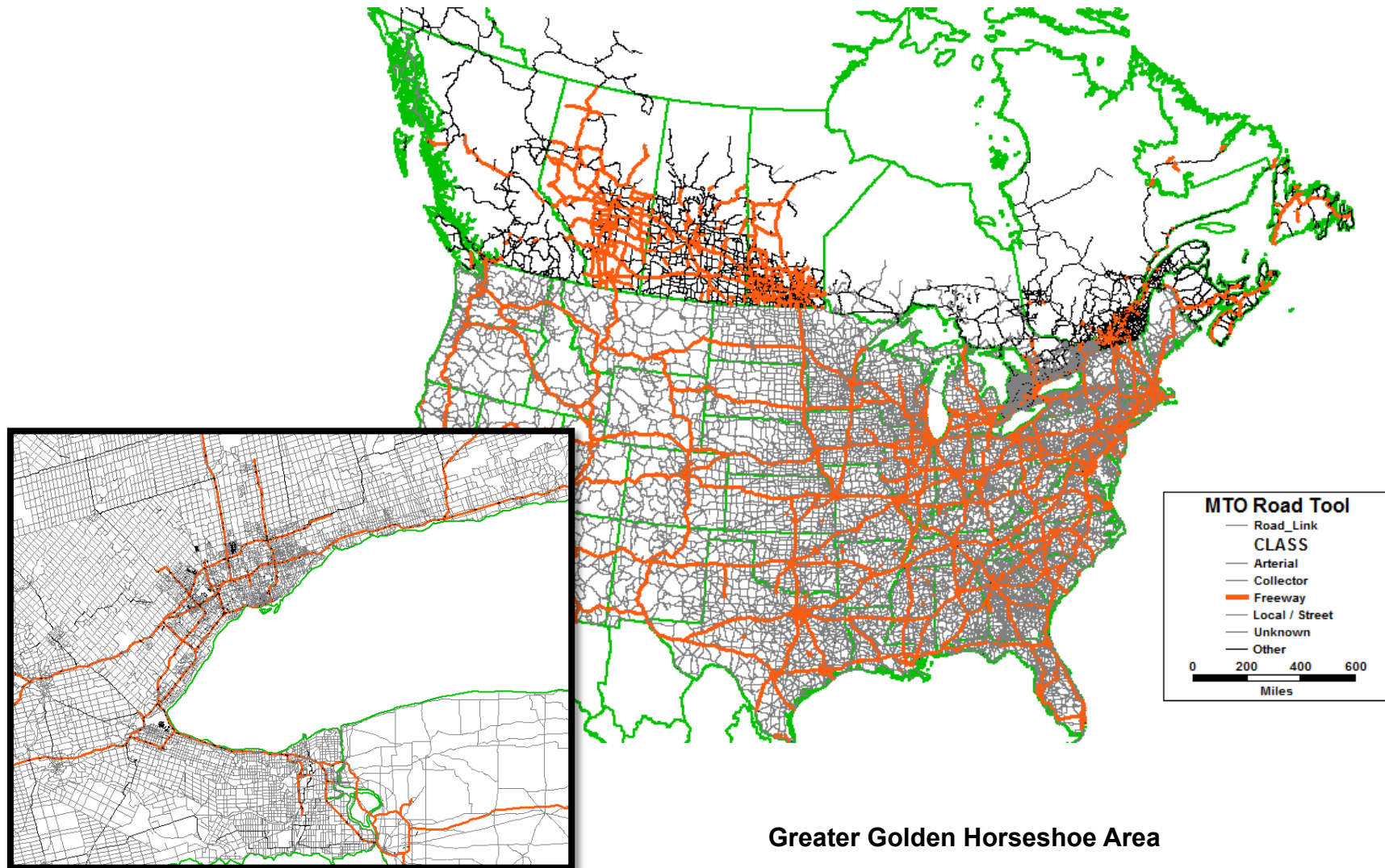
## Capacity Measures - Rail

- There is predictable and identifiable seasonality in railcar loadings.
- Seasonality is present in aggregate, by commodity and by corridor.
- This can cause strain on the network as capacity can be reached at different times of the year and at different places on the network.
- Capacity will be tested further with a growing economy, as volumes are starting to surpass historical highs.



# Transportation Infrastructure Layers - ROAD

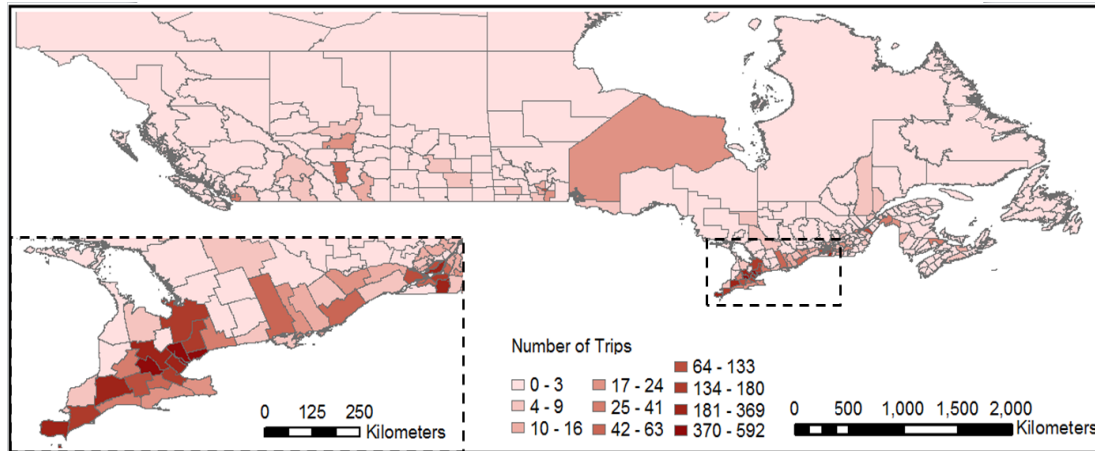
Example: Linking production points to the transport network  
Trucking



## Performance Measures: Trucking

- Origin and destination of trips using GPS trucking data

Origin trips using the Ambassador Bridge by Census Division

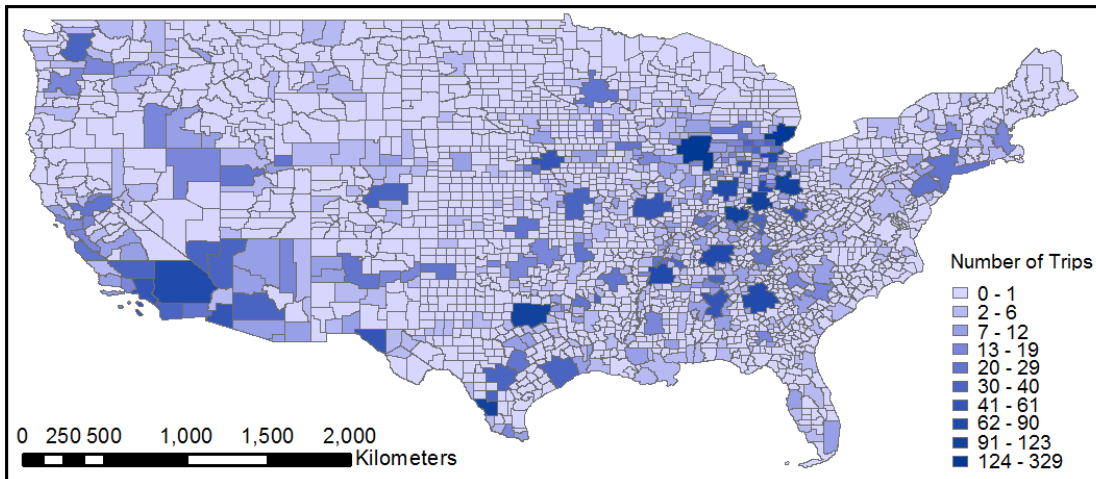


University  
of Windsor



CROSS-BORDER  
INSTITUTE

Destination trips in US zones through the Ambassador Bridge

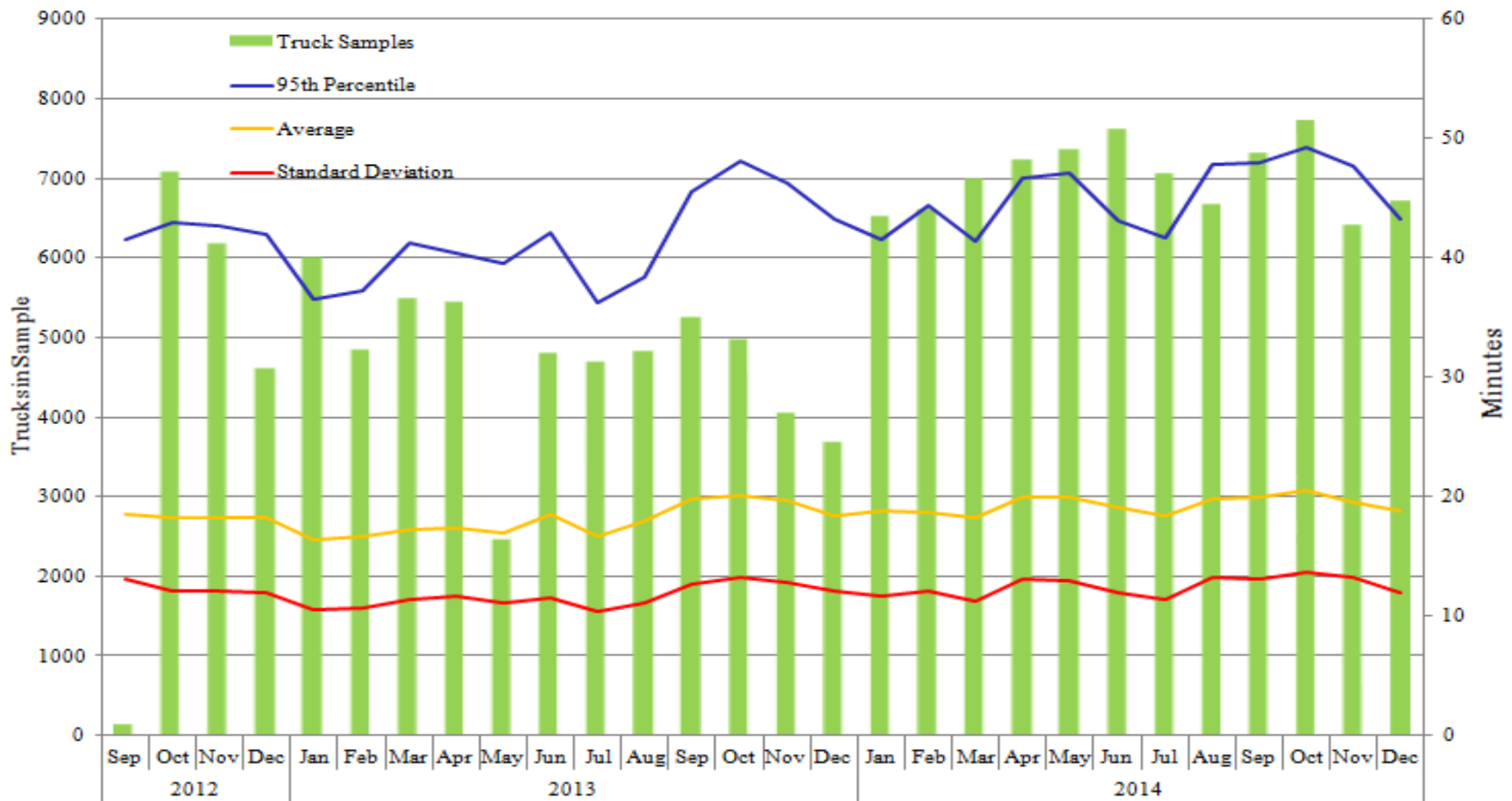




**Performance Measures: Trucking**

- Transit time measurements to investigate the variability through corridors.
- Research to attribute wait times to specific industries to estimate commodity specific wait times

**Estimated Wait Time Statistics of Ambassador Bridge Crossing**

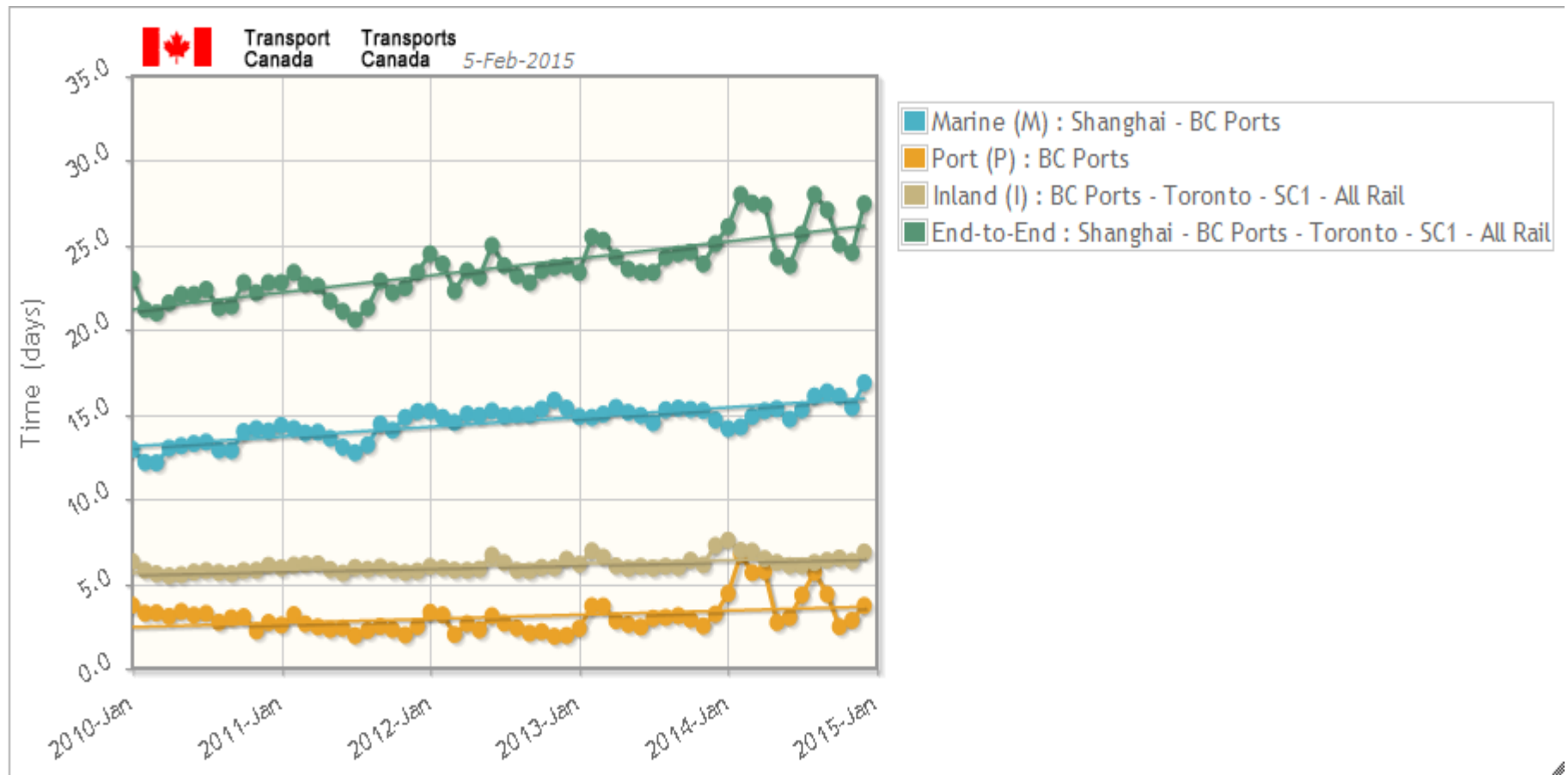


Source: Transport Canada, estimated using satellite-tracking data of commercial trucking fleets

# MULTIMODAL TRANSPORTATION SYSTEM ANALYSIS ANALYSE DU SYSTÈME DE TRANSPORT MULTIMODAL

## Performance Measures: Multi-modal (Fluidity)

- Transit time measurements to investigate the variability through corridors.
- Investigation of bottlenecks for multi-modal movements and determining the impact of individual segments on the aggregate trip time.



Source: Transport Canada Fluidity Data Portal