FHWA Freight Fluidity:
Measuring Supply Chain Performance
- National and State/Regional Programs

State/Regional Pilot Workshop
NY Metro Region
August 15, 2019

Agenda

10:00 – 10:30 AM	**Agenda, Welcome, Introductions and Workshop Objectives:** *David Behrend, Deputy Executive Director, NJTPA* *Marygrace Parker, I-95 Corridor Coalition (Freight Fluidity Team)* *FHWA - Chandra Bondzie, Office of Freight Management*
10:30 – 11:15 PM	**Freight Fluidity Supply Chain Program - National and State/Regional Overview** *Joe Bryan, WSP USA*
11:15 AM – 12:15 PM	**Using the Freight Fluidity Tool – Interactive Presentation/Discussion -** *Alan Meyers, WSP USA*
12:15 - 12:45 PM	**Working Lunch**
12:45 - 1:30PM	**Using the Freight Fluidity Tool – Interactive Presentation/Discussion - Continued** *Alan Meyers, WSP USA*
1:45 - 2:15 PM	**Informing Supply Chains with FHWA NPMRDS Data** - *Bill Eisele, TTI*
2:15 - 2:45 PM	**Discussion – Participant Feedback/Key Insights** – *Chris Lamm, Cambridge Systematics*
2:45 – 3:00 PM	**Wrap Up/Next Steps** – *Chandra Bondzie, Marygrace Parker*

Welcome to NJTPA and the State/Regional Freight Fluidity Pilot Workshop

David Behrend
Deputy Executive Director
North Jersey Transportation Planning Authority

Freight Fluidity Participant Introductions

- Name
- Agency
- Role in Freight

FHWA Freight Fluidity Program

Chandra Bondzie
FHWA – Office of Freight Management
Freight Fluidity Project Manager

FHWA Freight Fluidity Supply Chain Monitoring Program

Why?

- Meet the requirements in MAP-21 and the FAST Act to develop multimodal performance measures and freight policy to support statewide and regional freight planning
- Bring a multimodal perspective to freight performance measurement to support an economically competitive and resilient system for the movement of goods.
- Support State and regional implementation of fluidity measurement
- Improve information on the performance of supply chains to benefit freight stakeholders
- Stimulate new private sector services and tools to plan and optimize freight trips

How?

- Establish national monitoring of freight fluidity
- Add to the "portfolio" of FHWA analysis tools (FAF, HEPGIS…)
- Build on work of previous FHWA work to measure supply chains

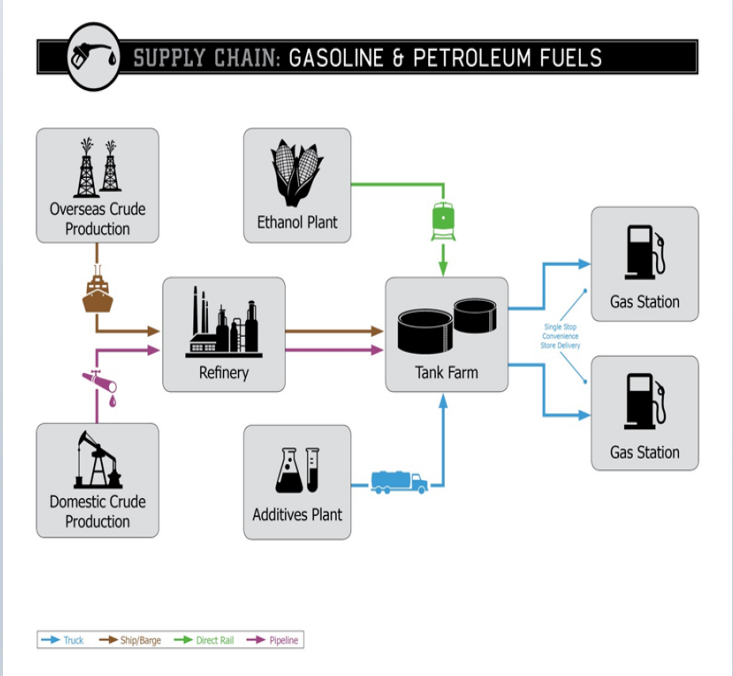
National Freight Fluidity Monitoring Program Implementation

Project Objective:

- Improve the measurement of freight transportation performance using a supply chain perspective
- Move supply chain performance monitoring from theory into real-world applications

Approach - Two Tracks:

1) National supply chain performance monitoring
   - Select a "market basket" of supply chains
   - Establish data sharing and procurement agreements
   - Collect and track three supply chain measures
     - Time, travel time reliability, cost
     - Producing quarterly reports for monitoring
- 2) State /Regional Pilots
   - Testing feasibility of applying national monitoring measures locally
   - Two pilots: metropolitan Chicago and metropolitan New York/New Jersey



State/Regional Pilots

- New York Metro
  - Nation's #1 population center, top consumer market
  - Largest trade gateway in East
  - "Freight focused" region with collaborative efforts on-going
    - "G-MAP" Goods Movement partnership
      - Port Authority of NY/NJ, NYSDOT, NJDOT, NYMTCC, NJTPA, NYCDOT…
    - MAP Forum Activities
      - NY/NJ/Southern CT Planning Organizations and other stakeholders
    - Freight Linkages to Lehigh Valley, Delaware Valley region

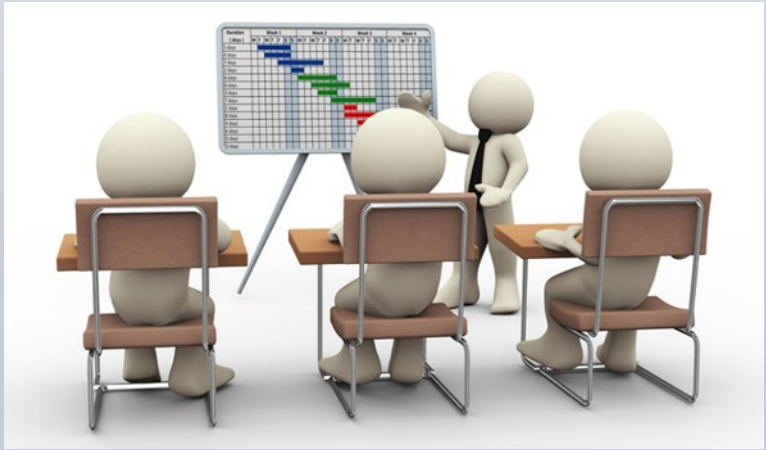
- "Chicagoland"
  - Nation's freight hub
  - #3 population center and global city, major manufacturing megaregion
  - C-MAP and Illinois DOT has strong history of coordinating as partner agencies
  - Successful history of ground-breaking freight projects – e.g., CREATE

State/Regional Workshop Objectives

(1) Provide an overview of the National Freight Performance Supply Chain Monitoring Program and Tool

(2) Show how the Freight Fluidity Monitoring tool can be used by transportation agencies

(3) Gather feedback from workshop participants



Overview of the Freight Fluidity Monitoring Program and Tool

Joe Bryan
Vice President and Manager of Freight and Logistics
WSP USA

FHWA Freight Fluidity Tool – Overview

Goal: a database and visualization/mapping tool to track the cost (price of service), reliability, and travel time for multimodal freight movement, across selected representative national supply chains, on a quarterly basis

Primary Data Sources	Information Obtained	Metrics Developed by Team
30 US companies reflecting major freight-dependent industry sectors	Descriptions of representative supply chains – goods, modes, O/D pairs – not confidential	Flow sequence of key trips Database rows describing trips Slots for performance metrics
NPMRDS	Highway link speeds	Truck metrics for O/D trips: median & mean speed, 95% travel time, Travel Time Index, Planning Time Index
Chainalytics	Commercial data on truck and rail IMX shipment prices	Truck & IMX metrics for O/D trips: cost per move, cost per mile
TransCore	Commercial data on rail travel times, IMX and carload	Rail metrics for O/D trips: median & mean speed, 95% travel time, Planning Time Index
STB Waybill / FRA	Confidential rail costs	Rail carload cost per move, cost per mile
US Army Corps of Engineers	Waterborne shipping navigation system time/delay	Waterborne metrics for O/D trips: 25-50-75% travel time, 75/50% index

Freight Fluidity Tool – Accessing Information

From Companies:

- Identify key supply chains (e.g., parts inbound, finished products outbound, parts for repair and maintenance, etc.)
- For each chain:
  - Is it a single end to end move, or are there different links (e.g. individual trips) in the chain?
  - What is the specific role of each link? (inbound raw materials, outbound goods to warehouses, delivery to customers, etc.)?
  - What is the commodity or commodities being moved?
  - What is the mode or modes you are using for each link?
  - What are origins and destinations for each link? (city-state pairs for each trip)
- NEVER ask about business sensitive information – volumes, customer names, carrier names, performance

From Vendors:

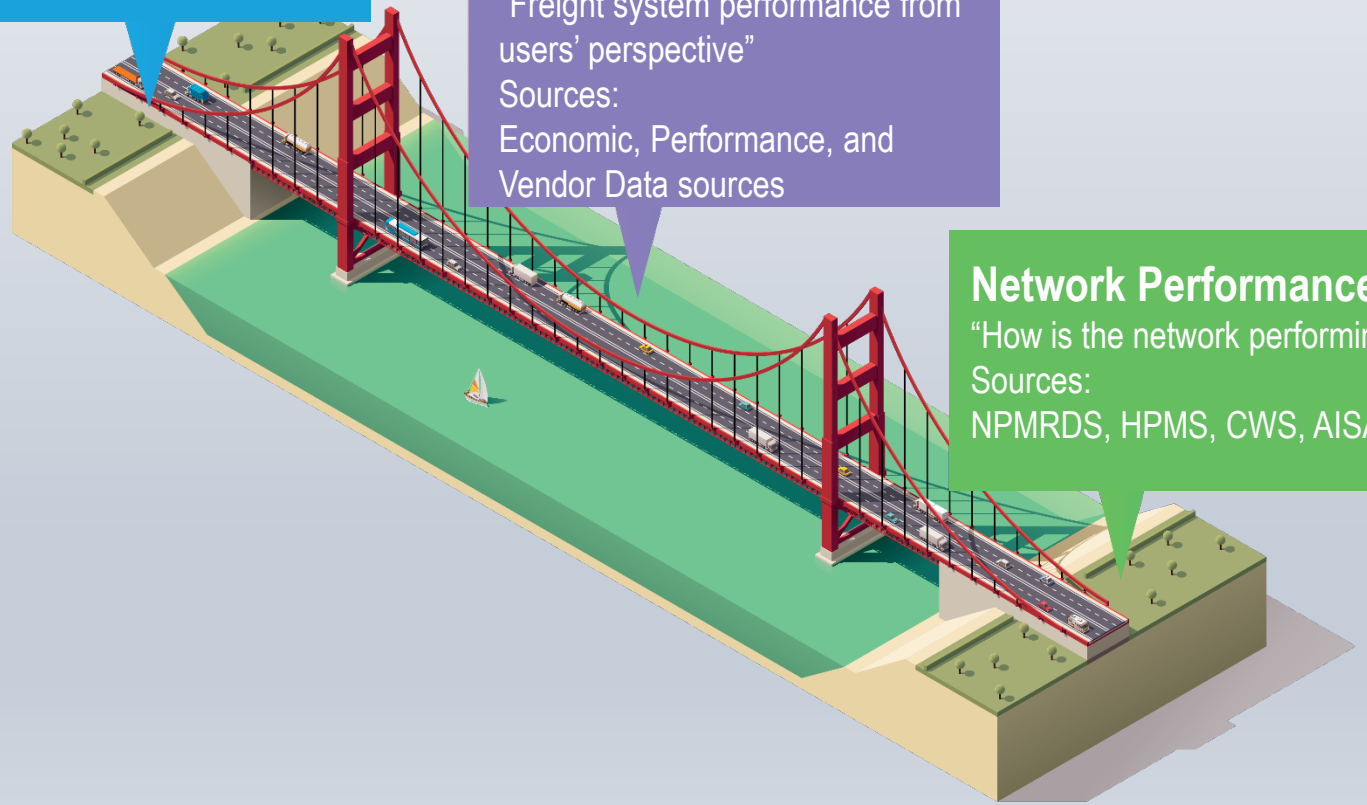
- Circumstances vary by vendor and business purpose
- Chainalytics example:
  - New data source
  - Purpose; benchmarking consortium, not data sales, *but:*
  - Data-driven performance improvement by public agencies benefits their members
  - Relatively small data sample will not compromise members
  - Purchase price defers consortium costs
- Developed model vendor agreement with negotiated price based on data volume, time periods and number of extract requests

Freight Fluidity – A Tool in the FHWA Toolbox

Economic Data
"What and how much freight is moving, and where?"
Sources:
FAF, BEA, CWS

Freight Fluidity Program
"Freight system performance from users' perspective"
Sources:
Economic, Performance, and Vendor Data sources

Network Performance Data
"How is the network performing?"
Sources:
NPMRDS, HPMS, CWS, AISAP



FHWA Freight Fluidity Tool – Software Platforms

- Two integrated platforms, both from existing suite of FHWA freight measurements tools:
  - Tableau database management, analysis and visualization platform
  - FHWA/HOFM GIS data visualization tools, fed from Tableau
- The software platforms meet key criteria:
  - Ability to hold and process large data sets in time series, easily accept updates, and be versatile in use.
  - Accessibility of data to internal and external users, via export into common formats such as spreadsheet software, and directly on the platform without purchase of special tools.
  - Ability to restrict access to certain types or levels of data for certain groups of users.
  - Varied and high quality graphical and cartographical display must be provided, and the displays must be interactive with the data.
  - Stability as a dependable, tested tool.

The New Perspective of Freight Fluidity

- Distinguishing Features:
  - ☑ Focus: Supply chain performance
  - ☑ Key Performance Indicators: Speed, Reliability, Cost
  - ☑ End-to-End: Multimodal, multijurisdictional, flow sequences chained across stages

Current System Performance Capture (Typical)	Freight Fluidity Performance Capture
Travel Time	Travel Time (Industry/Supply Chain)
Travel Time Reliability	Travel Time Reliability (Industry/Supply Chain)
Cost of Wasted Time and Fuel	Transportation Cost (Market Price, Industry/Supply Chain)
Highway Only	Multimodal: Highway, Rail (IMX & Carload), Water

The Value of Freight Fluidity

Monitors Key Performance Indicators (KPIs) comparable to how freight system users monitor themselves

- Keeps public agencies abreast of developments affecting industry
- Anticipates concerns of Freight Advisory Committees and other users

Monitors KPIs that affect industrial competitiveness, supporting economic development and timely response to freight transportation issues

- Performance trends by industry sector
- Operational and investment actions

The Value of Freight Fluidity (continued)

Provides working tool that complements and combines with others in the public agency toolbox

- Fills a gap: supply chain logistics structures and connected links
- Triggers diagnostics from the rest of the toolbox

National platform supplies foundation for state and local agencies to build upon

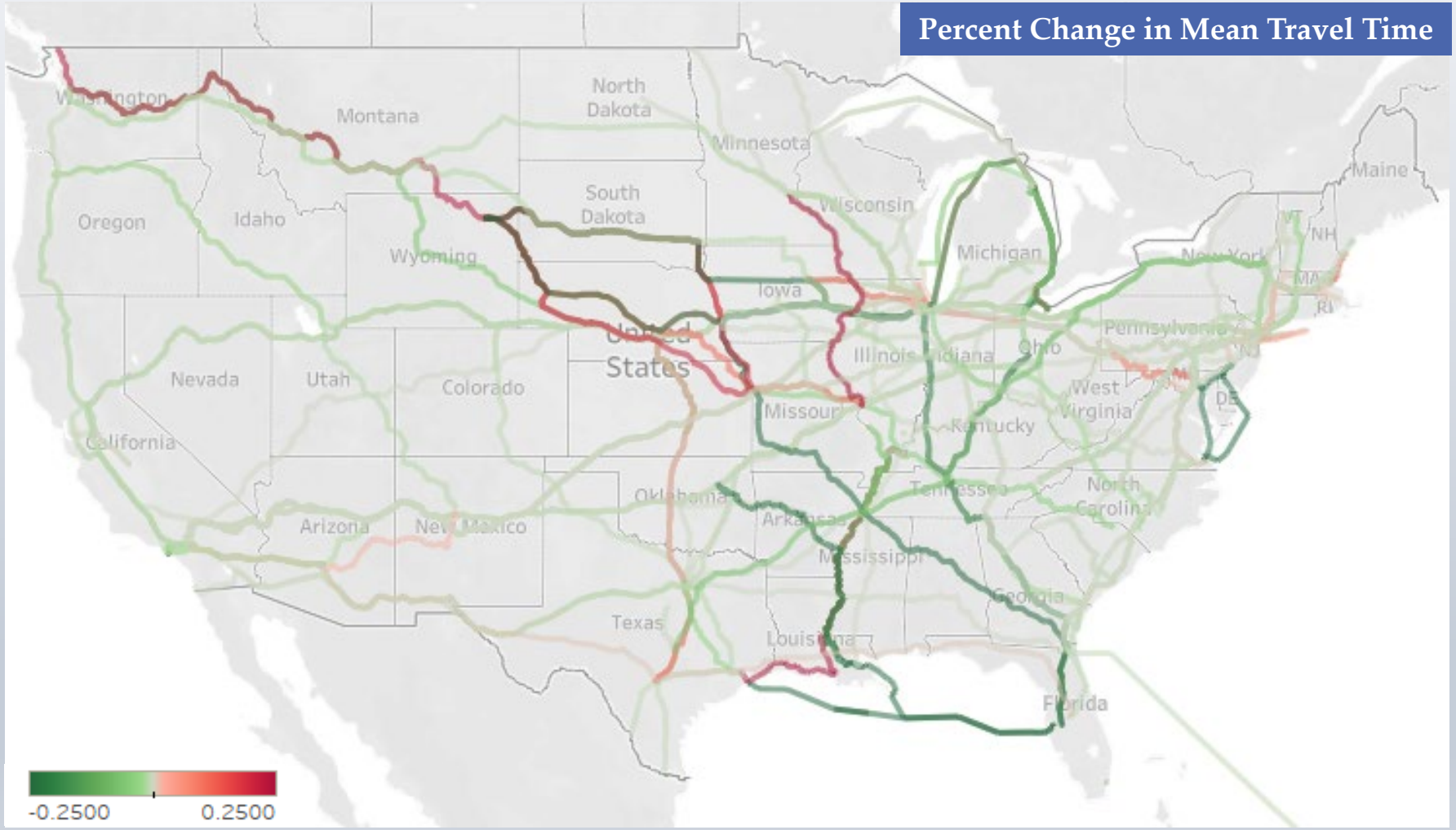
- Additional sectors and companies
- Additional locations

National Trends in Supply Chain Travel Time

Major US Supply Chains End-to-End:

- Multimodal
- Multijurisdictional
- Flow sequences across stages
- 4Q 2017-3Q 2018

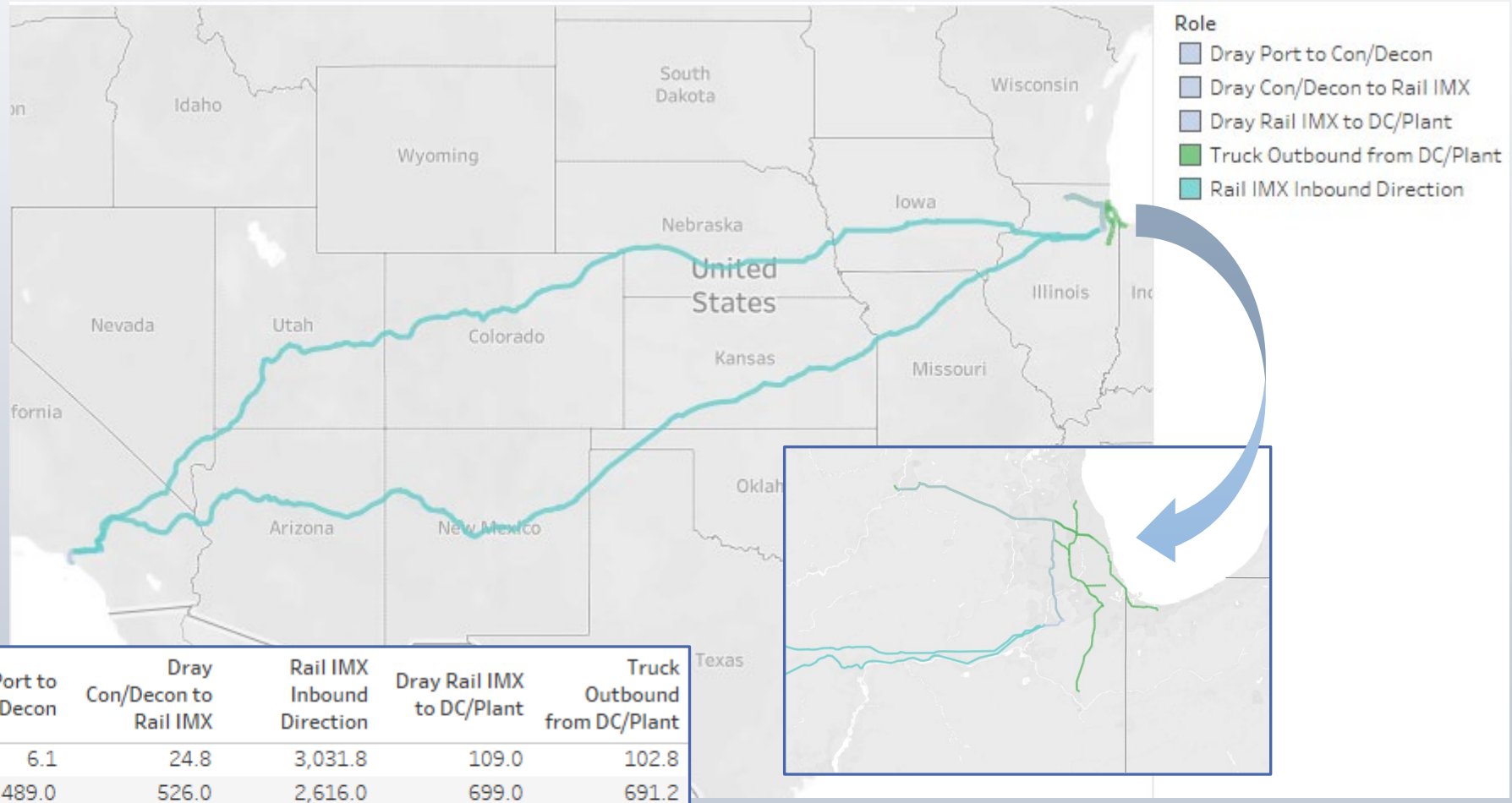
➡ 107 lanes begin and/or end in the NY-NJ-CT-PA region



Supply Chain Performance by Stage

Sector: Home Improvement

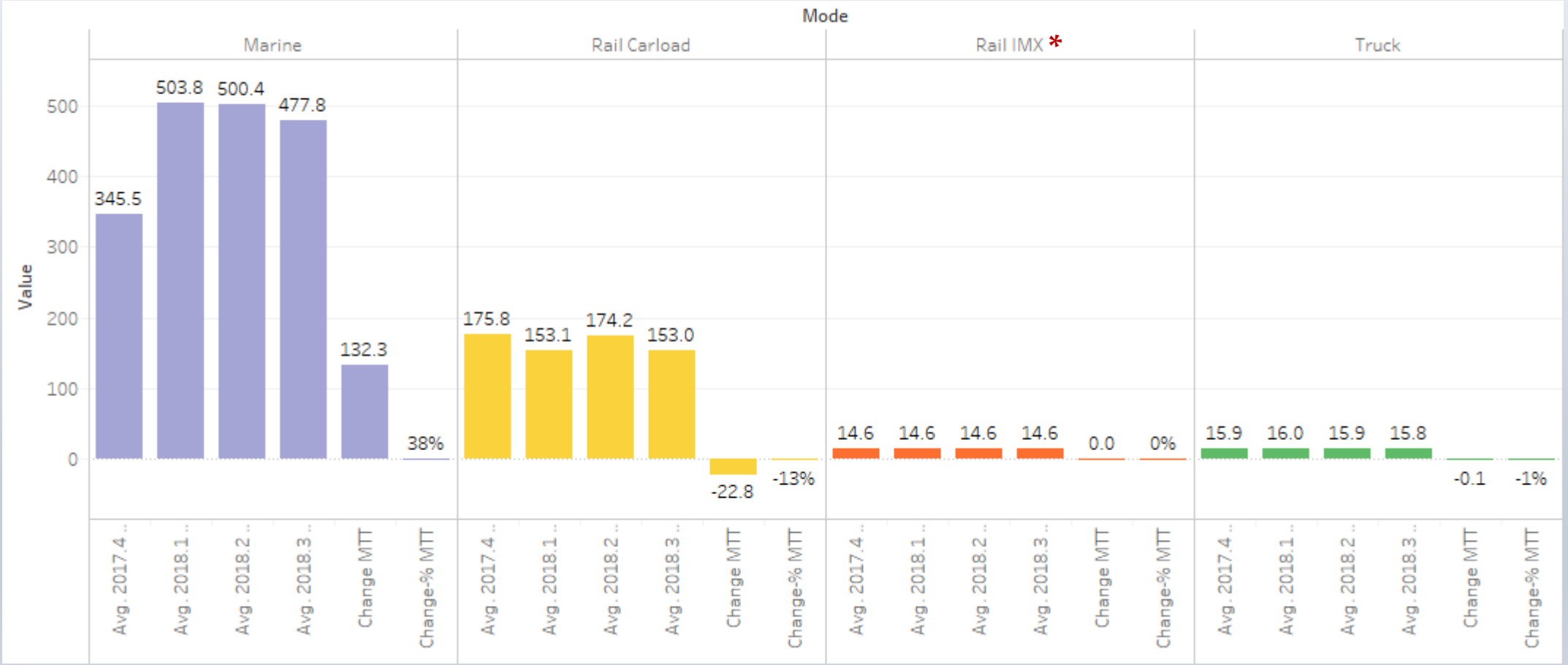
- Multimodal
- 5 stages from port to retail outlet
- Alternate rail routes
- Substantial drayage expense



	Dray Port to Con/Decon	Dray Con/Decon to Rail IMX	Rail IMX Inbound Direction	Dray Rail IMX to DC/Plant	Truck Outbound from DC/Plant
Avg. Adjusted Path Miles	6.1	24.8	3,031.8	109.0	102.8
Avg. 2017.4 Total Cost per Unit	489.0	526.0	2,616.0	699.0	691.2
Avg. 2017.4 Linehaul Cost per Unit	487.0	518.0	2,298.0	659.0	652.9
Avg. 2017.4 Fuel Cost per Unit	2.0	8.0	319.0	40.0	38.3
Avg. 2017.4 Mean or 50% Travel Time (hrs)	0.3	0.7	0.0	1.9	1.8
Avg. 2017.4 Cross Modal Reliability Ratio	1.5	1.6		1.1	1.3

Questions Answered by Freight Fluidity

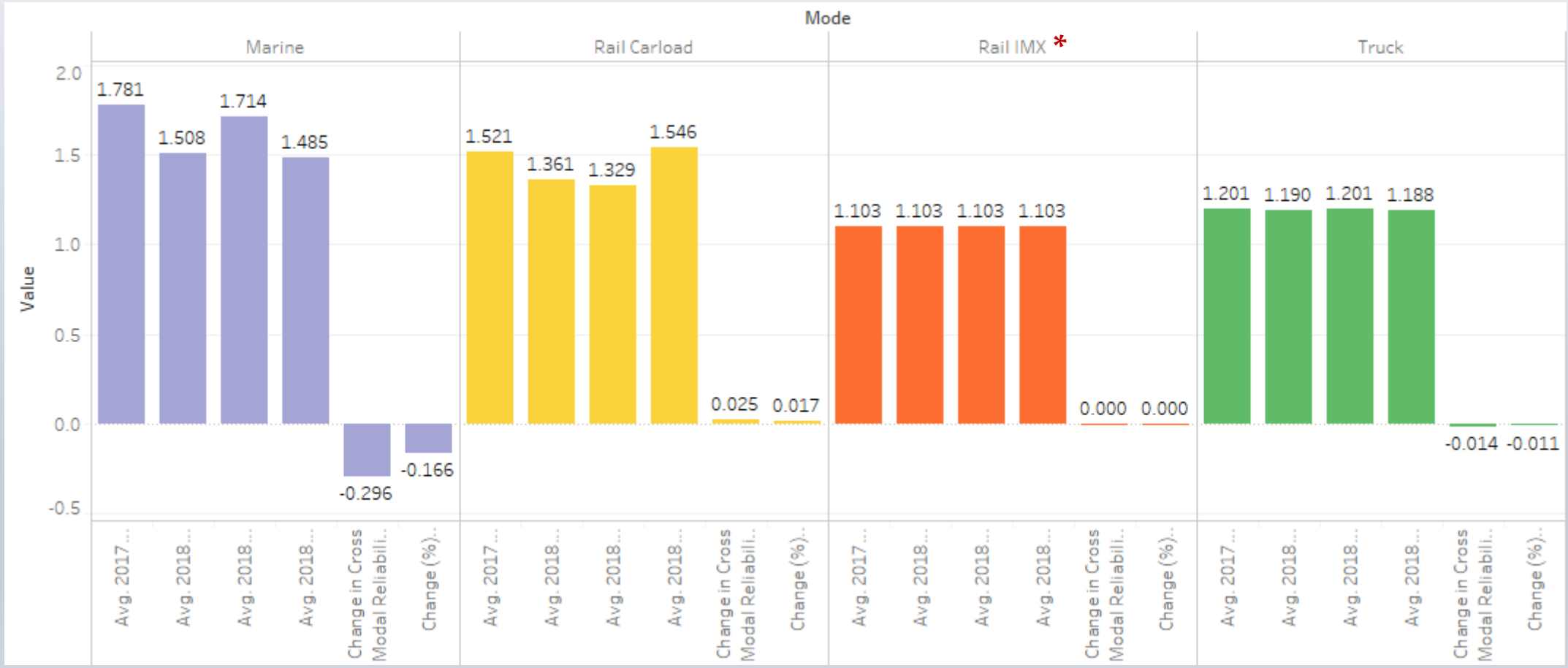
What is travel time by mode and how is that changing over time?



* Limited coverage of transit in IMX lanes

Questions Answered by Freight Fluidity

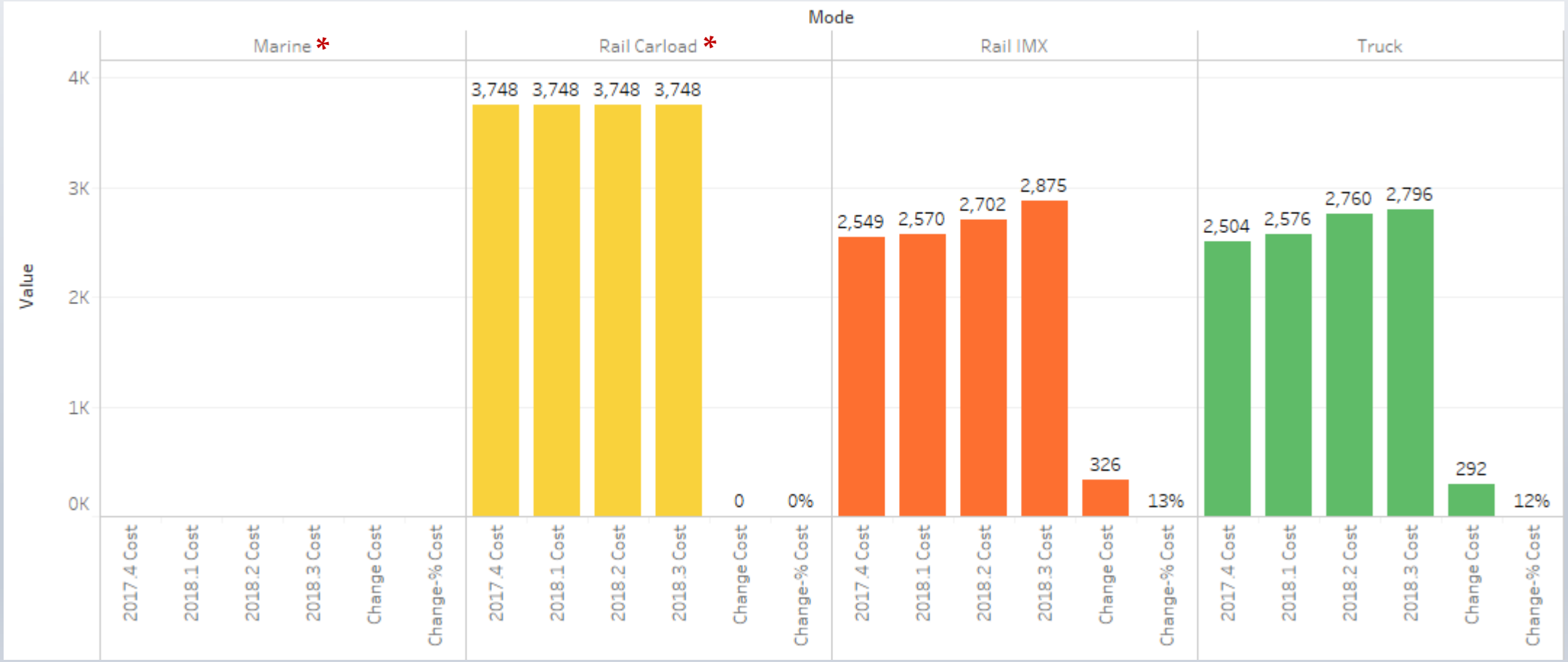
What is reliability by mode and how is that changing over time?



* Limited coverage of transit in IMX lanes

Questions Answered by Freight Fluidity

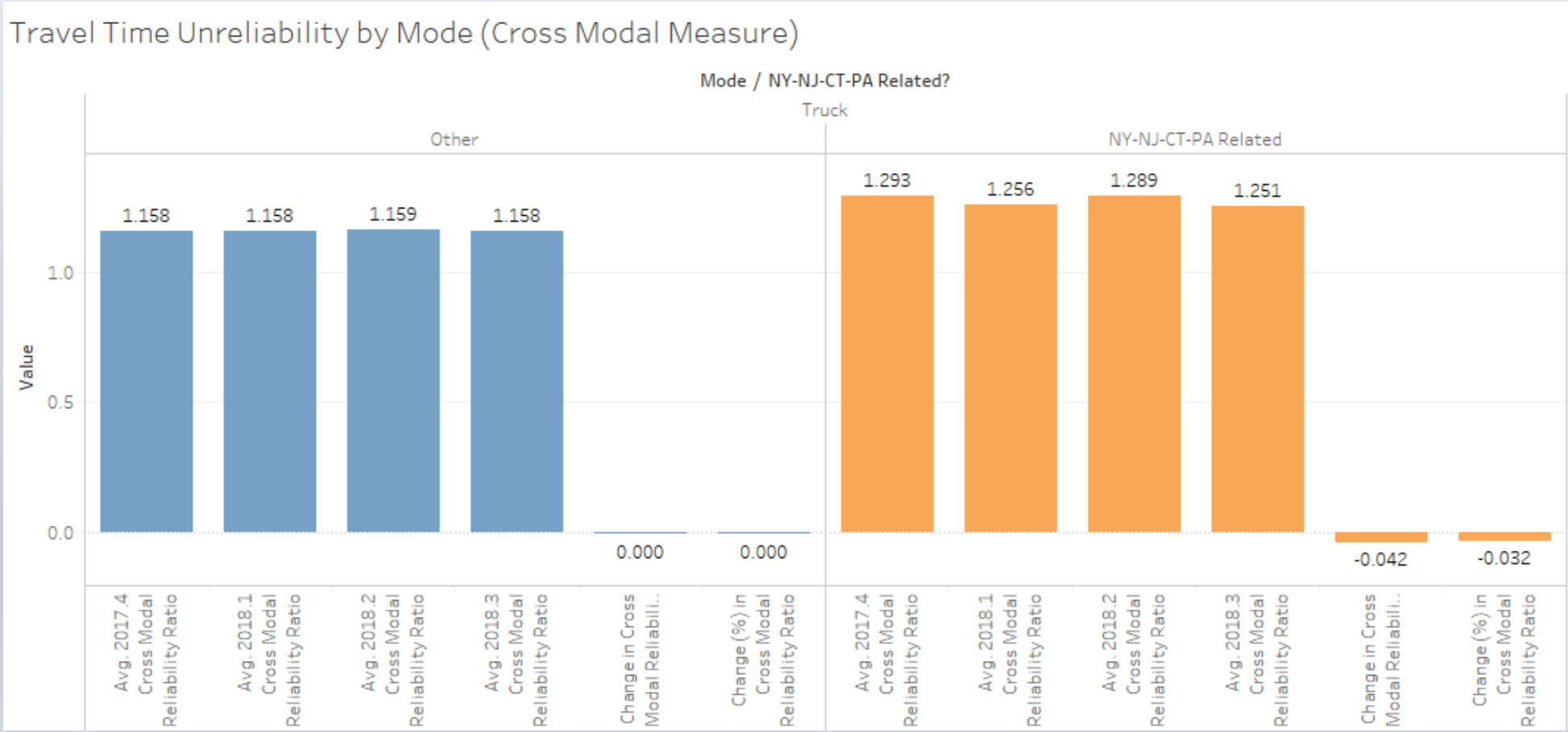
What are the costs by mode and how are they changing over time?



* Marine costs unavailable; carload costs are annual, not quarterly

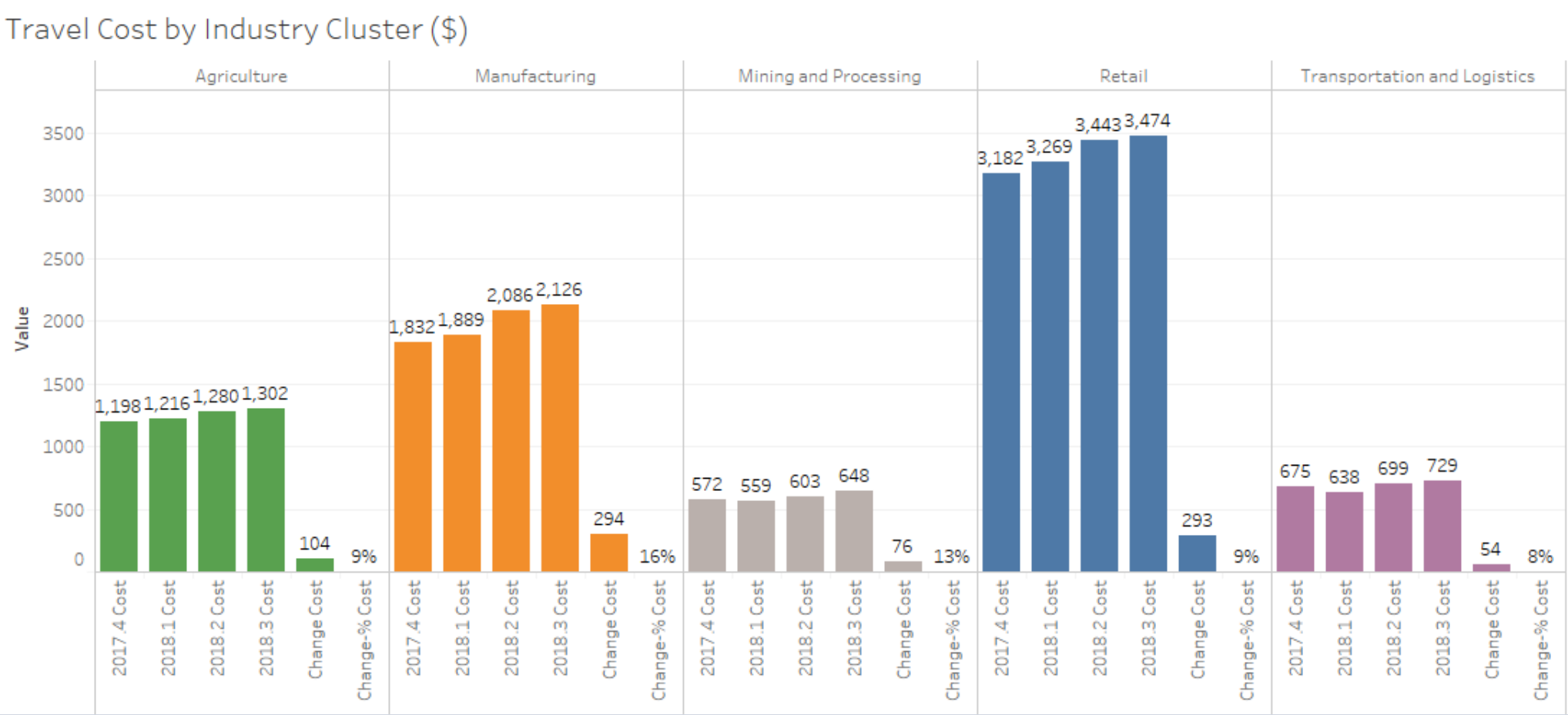
Questions Answered by Freight Fluidity

How do regional performance trends compare to national trends? Are we gaining or losing competitively?



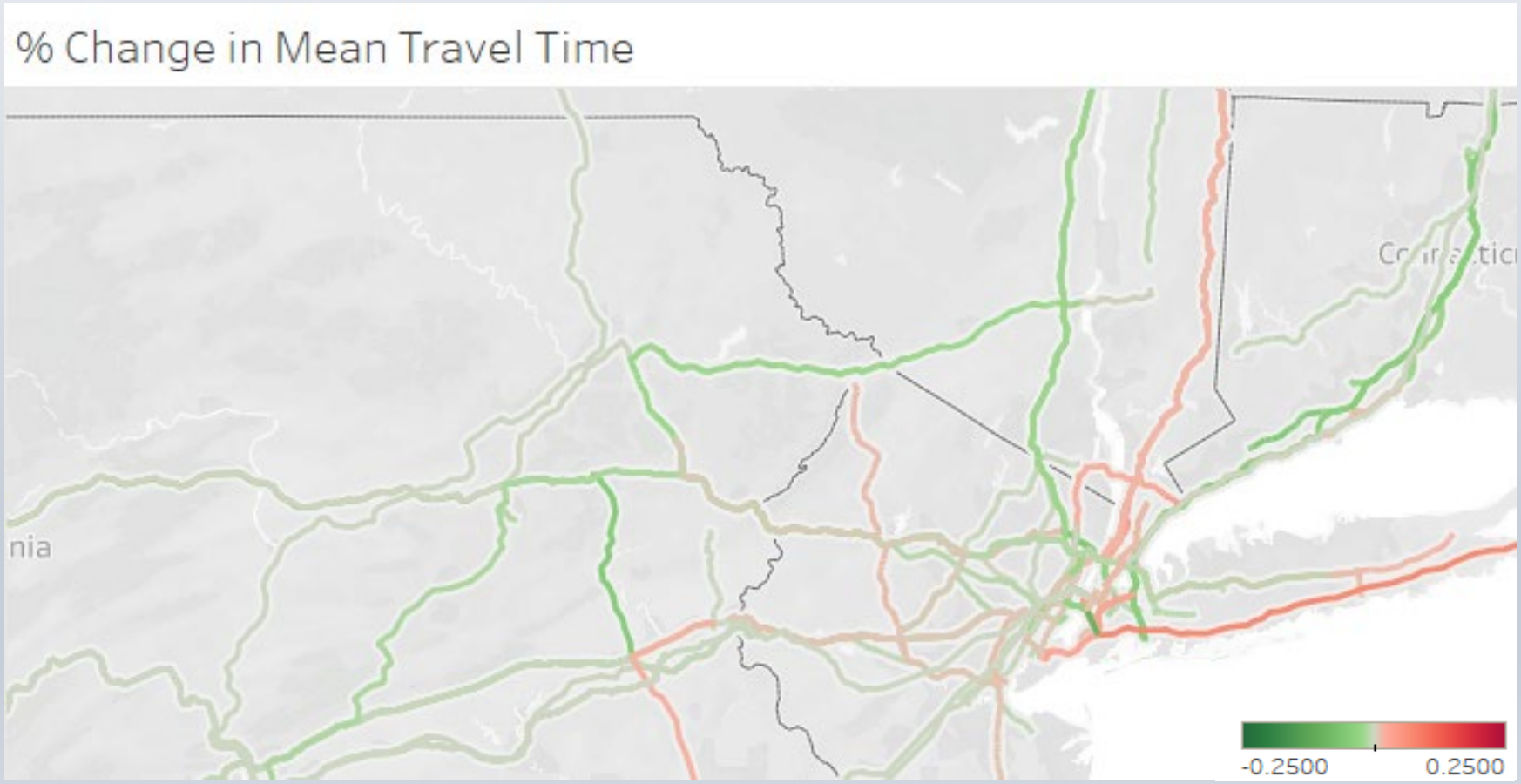
Questions Answered by Freight Fluidity

What is the relative performance by industry and how is it changing over time? Are we taking care of key sectors?



Questions Answered by Freight Fluidity

What is the relative performance by network segment and how is it changing over time? Are we taking care of key regions?



Application of Fluidity in Agency Toolbox

Situation: Supply chain reliability is falling in the Tri-State area. Why?

- Fluidity monitoring triggers the question
- Operational diagnostics available from agency:

• Weather	• Construction locations
• Continuous traffic counts	• Bottleneck locations & performance
• Crash trends by location	• Public events … etc.

How is this affecting retail delivery costs around New York?

- Fluidity monitoring provides topline answer
- Probe data tools (e.g. ATRI, INRIX, StreetLight, etc.) add breadth and detail:
  - *Is the distance trucks can travel from FCs and DCs on same day at 95% reliability declining?*

Freight Sectors in the Fluidity Platform

Number of Records by Industry

Industry Sector	Grand Total	Other	NY-NJ-CT-PA Rel..
Agriculture: Animal Products	11	11	
Agriculture: Dairy Products	9	9	
Manufacturing: Agricultural and Consumer Machinery	34	25	9
Manufacturing: Aircraft and Aerospace	5	5	
Manufacturing: Automotive	6	6	
Manufacturing: Beverages	5	5	
Manufacturing: Construction Machinery	23	23	
Manufacturing: Consumer and OEM Electronics	17	17	
Manufacturing: Food Products	24	6	18
Manufacturing: Organic Chemicals (Plastics et al)	9	8	1
Manufacturing: Paper Products	12	12	
Manufacturing: Pharmaceutical, Medical, and Consumer Products	58	44	14
Manufacturing: Recreational/Commercial Transport Equipment	22	21	1
Manufacturing: Speciality OEM Electronic Components	12	9	3
Mining and Processing: Cement and Rock	31	31	
Mining and Processing: Coal	9	9	
Mining and Processing: Fertilizers	12	12	
Retail: Apparel Store	7	7	
Retail: Department Store	14		14
Retail: Home Improvement	12	12	
Retail: Major National	4	4	
Retail: Personal Care Products	27	8	19
Retail/Wholesale/Distribution: Grocery, Food, Beverage	38	23	15
Transportation and Logistics	16	3	13
Grand Total	417	310	107

- 30 companies in 24 sectors provided flow sequences for 417 freight movements by origin-destination zip code, commodity, mode, and logistics purpose
  - 14 = Manufacturing
  - 8 = Retail
  - 4 = Mining
  - 2 = Agriculture
  - 2 = Transportation
- Scalable
  - Original national program identified 7 industries with NY-NJ-CT-PA flows; 4 of these were “expanded” with additional regional flows
  - Three additional regional industries interviewed and added in consultation with regional partners
  - Result: 107 regional movements
  - Similar addition/expansion for Chicago
- Initially, four quarters of data for each data record
  - Data can be updated/maintained at moderate cost

Multimodal Routes in the Fluidity Platform

417 Mapped Freight Movements by Truck, Rail IMX, Rail Carload, Water

- Each record in the database has an assigned path – NHS segment, rail network, waterway network
- Allows any data attribute or value to be displayed at a path level in the Tool, in addition to table/chart summaries
- Links to FHWA/HOFM GIS tools for integration with other USDOT products
- More supply chains and lanes can be added to this foundation

Questions/Discussion

- (these will be prompts and noted on a whiteboard for later discussion/follow up)
- *Do these "value proposition" points on why Fluidity/this tool can be of value hold true to you?*
  - *Are there others you are looking for? Believe these can add to?*
- *Looking at the questions Fluidity can answer and the Applications in Agency Toolbox*
  - *Do these sound correct, are there others?*
    - *Recommend they think about these as they look at how the tool is actually used in the next session*

Using the Freight Fluidity Tool
Interactive Demo

Alan Meyers
Freight and Logistics Principal
WSP USA

Proceedings

- Data Sources
- “Lessons Learned”
- Live Demo

About the Data Sources

Key Sources

- Costing
  - Truck, Rail IMX = Chainalytics
  - Rail Carload = STB Waybill
  - Marine = TBD
- Travel Time
  - Truck = NPMRDS analysis by CS and TTI
  - Rail IMX, Rail Carload = Transcore
  - Marine = BTS analysis of USACE AIS
- Travel Time Reliability
  - Team analysis of travel time metrics

Ability to Update Data

- Commercial acquisition
  - Chainalytics , Transcore
  - Specify and purchase
- Public sources
  - NPMRDS, Waybill, AIS – refresh

Ability to Update Tools

- Update cells and/or add records to Excel
- Import refreshed Excel table to Tableau
- Everything updates – only need modifications (very minor) when new time periods are added

Some Lessons Learned

- Completeness of data
  - NPMRDS limited to NHS, some shorter trips not covered
  - Rail IMX travel time limited, water cost data not included
  - High variabilities in rail travel times and water data, mostly from small trip sample sizes
  - Some data not available for separate quarters
  - Some transborder trips combine US and non-US cost and time, not separable
- Data processing demands
  - Lower effort: Chainalytics, Transcore
  - Moderate effort: Waybill
  - Higher effort: NPMRDS, AIS
- Travel time reliability metrics
  - Different modes have different propensities for “outlier” values
  - Suggested Cross Modal Metric is 99^{th}/Mean for truck, 95^{th}/Mean for rail, 75^{th}/Mean for water
  - Mean vs 50^{th} percentile – 50^{th} preferred for rail and water to minimize outlier effects

Some Lessons Learned (cont.)

- Level of aggregation
  - Had planned to report results by NAICS and SCTG code
  - Not enough coverage from 30 industries to support high level of detail
  - Sufficient for modal and industry cluster-level conclusions
- Segmentation
  - Data must be collected and documented by individual segment, then manually associated as end-to-end chains with unique identifiers – in progress, but then you get both
- It works -- successful proof of concept
  - Robust, stable method and tools
  - Platform for expansion and improvement to address identified limitations

Freight Fluidity Tool Demonstration

- Excel Spreadsheet
- Tableau Tool
  - National Level
  - Regional Focus
- Q and A, discussion

Informing Supply Chains with FHWA NPMRDS Data

Bill Eisele, Texas A&M Transportation Institute

Overview

- What is NPMRDS and how do I get the data?
- How did we put these data on the supply chains?
  - An example supply chain application
- Data cautions (and opportunities)

National Performance Management Research Data Set

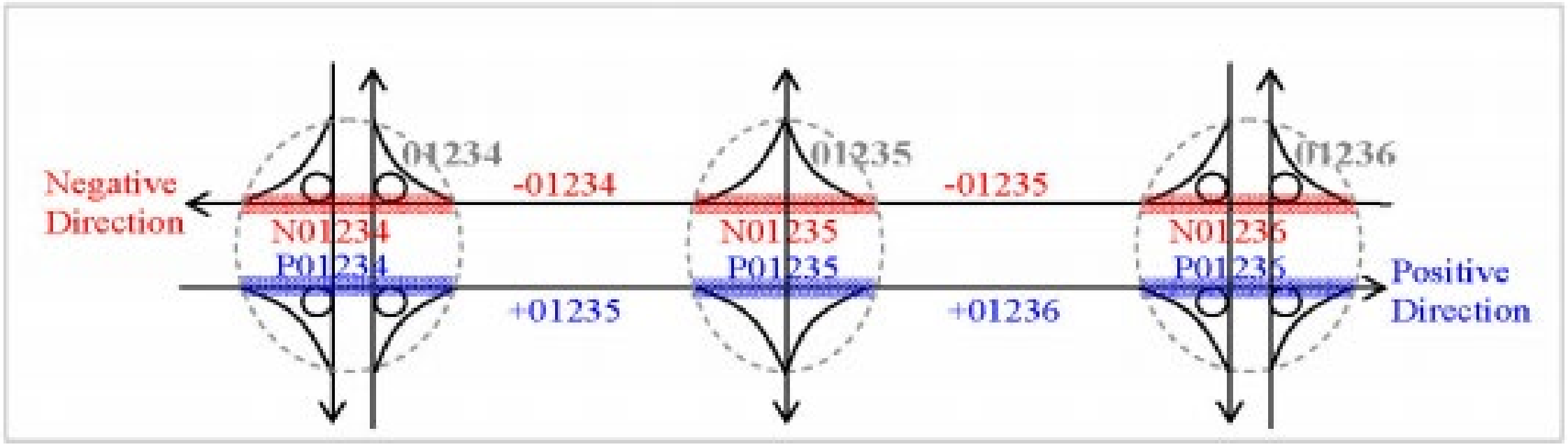
- FHWA acquired the first NPMRDS back in July 2013; and second version in April 2017
- Observed travel times from vehicle-based probes on Traffic Message Channels (TMC)
- Average travel times every 5 minutes on the National Highway System (when available) delivered every month
- Passenger, Freight, and "All Traffic" average travel times

Link to more NPMRDS information: https://ops.fhwa.dot.gov/perf_measurement/index.htm

National Performance Management Research Data Set

- Free to use for State DOTs, MPOs and their contractors for performance management activities
- Includes selected Highway Performing Monitoring System (HPMS) attributes conflated from state HPMS submissions

Depiction of TMCs



Link to more NPMRDS information: https://ops.fhwa.dot.gov/perf_measurement/index.htm

National Performance Management Research Data Set

- Information available in NPMRDS for each road segment (TMC)

Travel Time Items
tmc_code
measurement_tstamp
speed
average_speed *(historical)*
reference_speed
travel_time_seconds
data_density

Items of Note

Sample travel time output from NPMRDS

Metadata Item	Metadata Item(con't)
tmc	f_system
road	urban_code
direction	faciltype
intersection	structype
state	thrulanes
county	route_numb
zip	route_sign
start_latitude	route_qual
start_longitude	altrtename
end_latitude	aadt
end_longitude	aadt_singl
miles	aadt_combi
road_order	nhs
timezone_name	nhs_pct
type	strhnt_typ
country	strhnt_pct
tmclinear	truck
frc	isprimary
border_set	active_start_date
	active_end_date

Sample TMC metadata from NPMRDS

How to Get the NPMRDS Data

1. Sign the data sharing agreement
   - https://npmrds.ritis.org/dsa

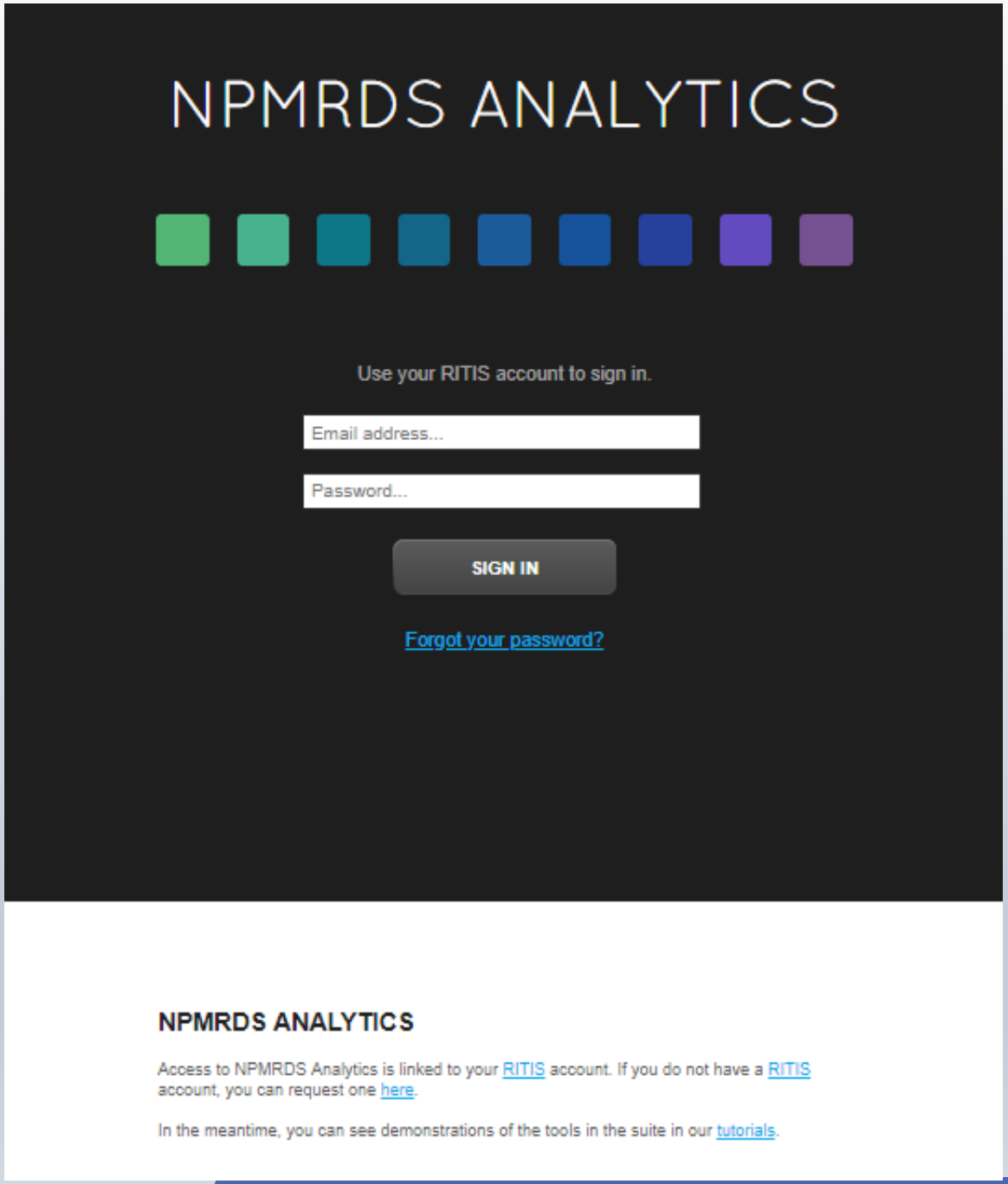
2. Create a RITIS Account
   - https://www.ritis.org/register/

3. Access the data
   - https://npmrds.ritis.org

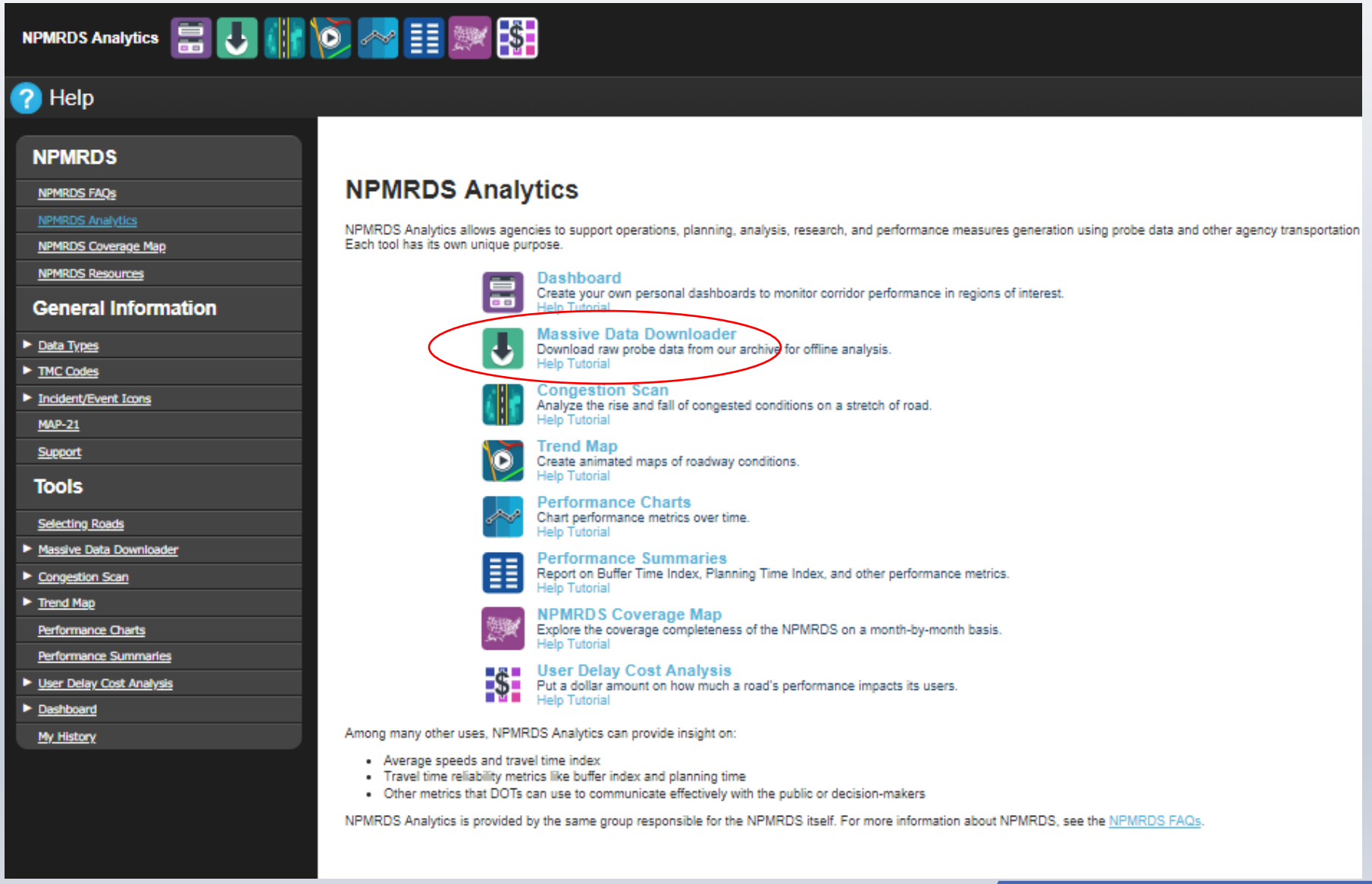
- A quick start guide can be found here: https://npmrds.ritis.org/static/help/docs/NPMRDSquickstart.pdf
- Tutorials can be found here: https://npmrds.ritis.org/analytics/tutorials/
- For additional questions, e-mail/contact: npmrds@ritis.org

NPMRDS

- How to extract data from the NPMRDS interface (available after you have registered)
  - https://npmrds.ritis.org/analytics/

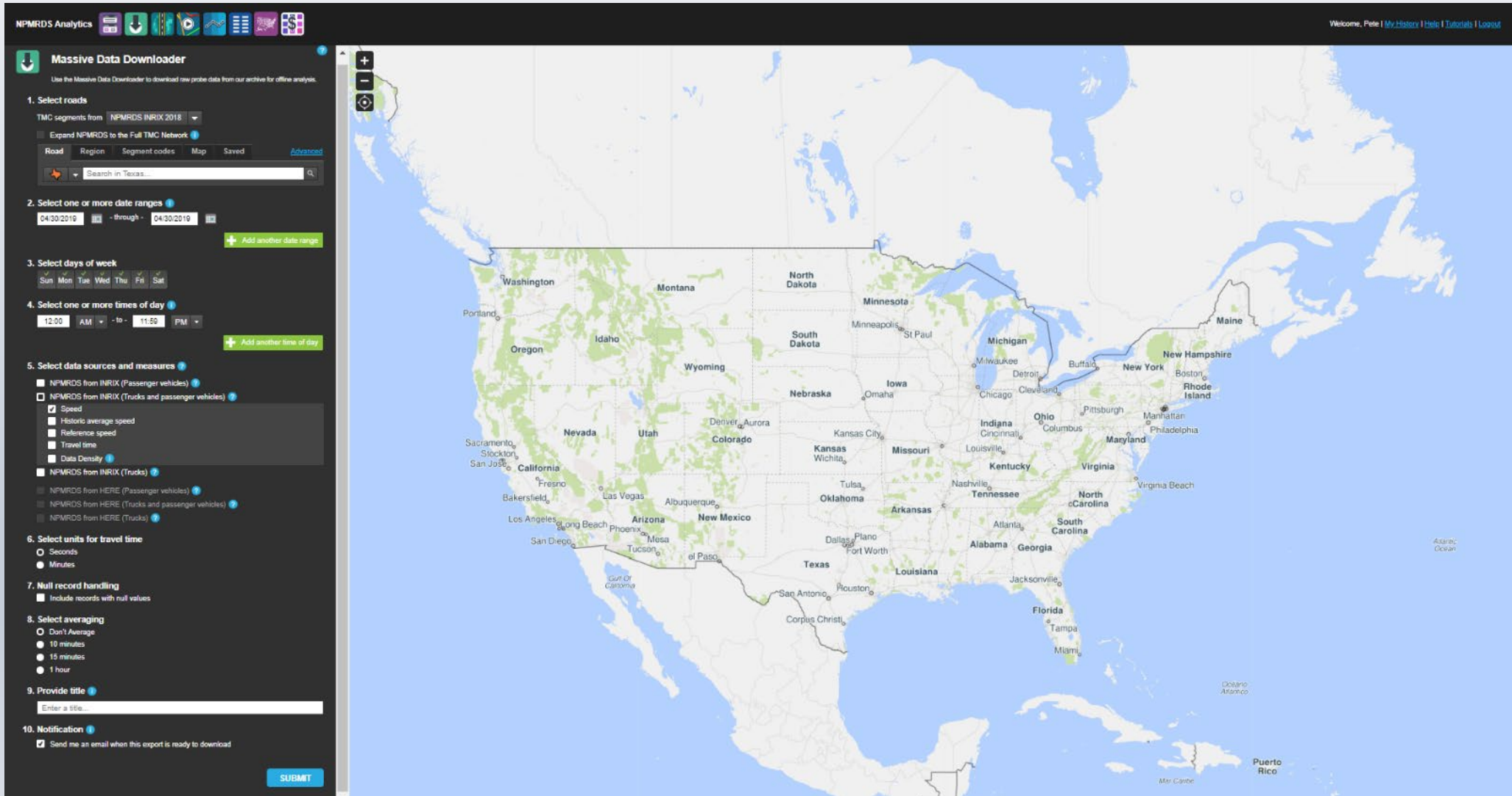


NPMRDS Massive Data Downloader



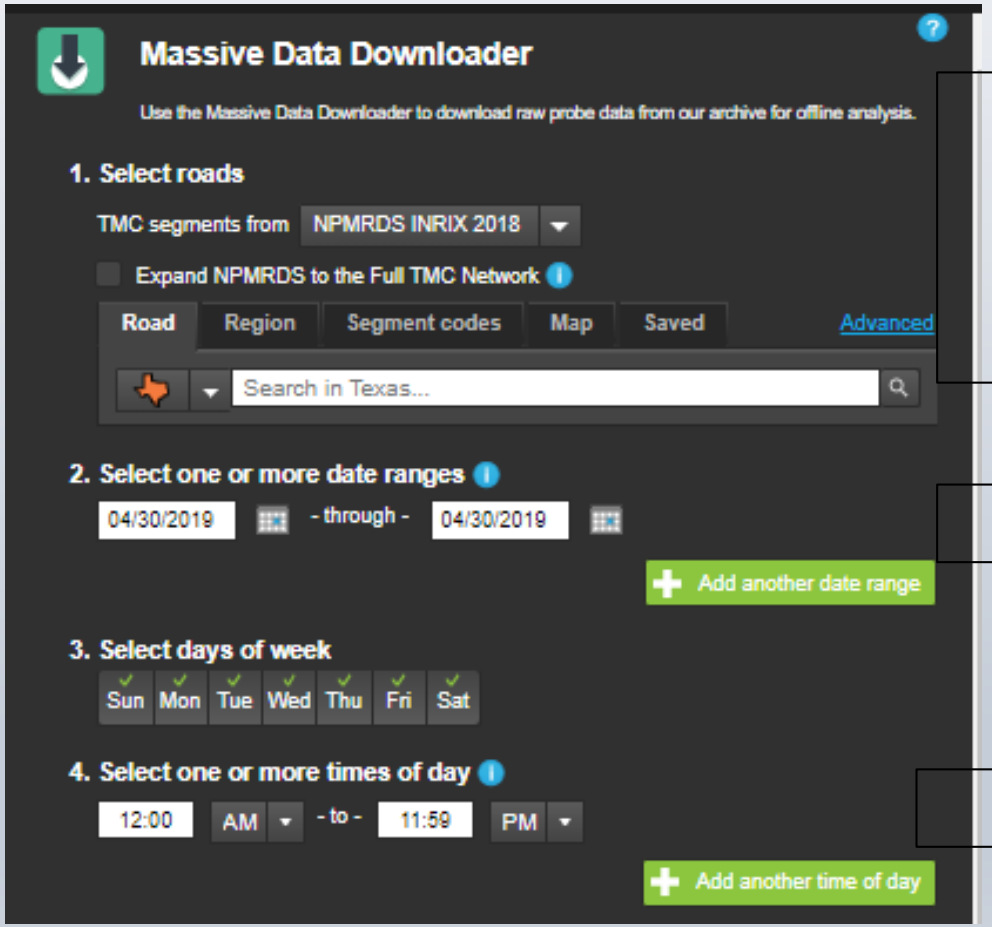
NPMRDS Massive Data Downloader

- Massive Data Downloader uses the interface along the left side of the screen to interact with the data



NPMRDS Massive Data Downloader

- The Interface



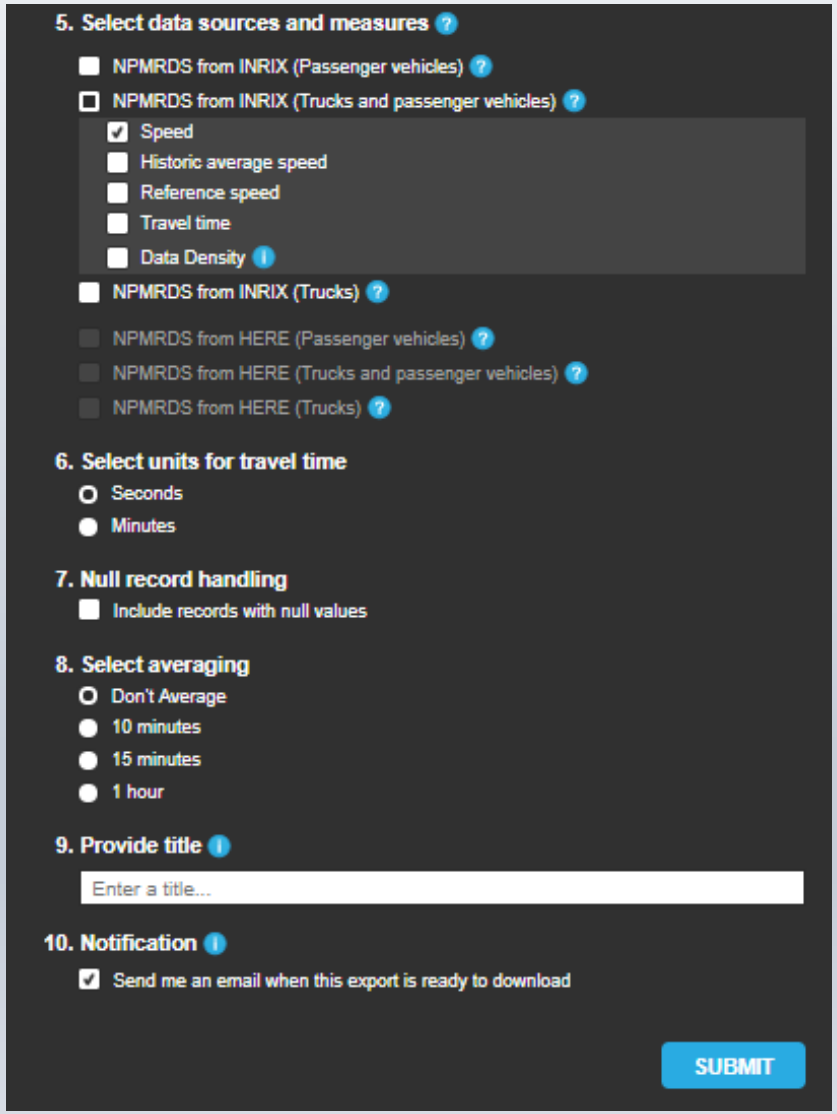
Four options for selecting roads and a way to save your query
-Road by name
-Region (State, county, zip, direction functional class)
-Individual TMC code
-Interactive map

Ability to select date range or multiple date ranges

Ability to select days of the week and specific times if necessary

NPMRDS Massive Data Downloader

- The Interface



Options for selecting speed and travel time data
-Passenger vehicles
-Trucks and passenger vehicles
-Trucks

Travel time can be presented in seconds or minutes

Time intervals can be selected from the following
-5 minute (Don't average)
-10 minute
-15 minute
-60 minute (one hour)

Email notification when submission is complete

Example #1 - Supply Chain Application

When Superstorm Sandy pummeled the east coast, it caused severe damage in New Jersey, New York, Connecticut and far beyond. Food supply was impacted.

As a simple example, public officials may ask about the performance of a supply chain of food supplies between a distribution center and a local grocery store in the region.

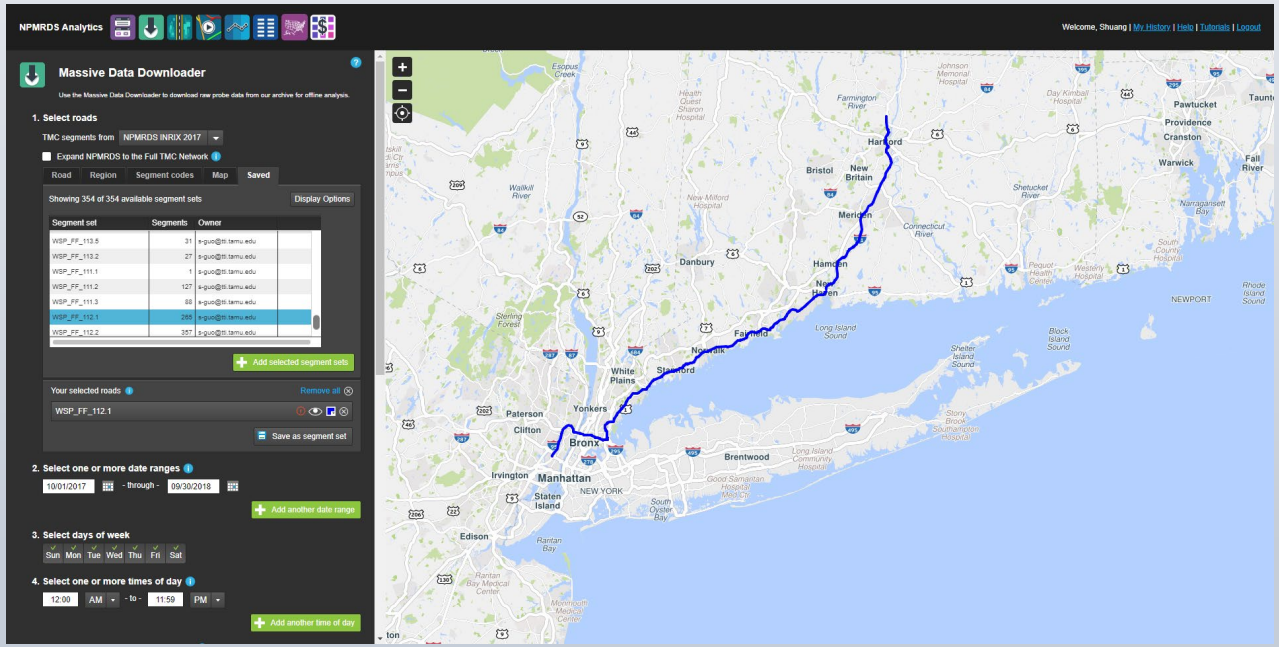
Example #2 - Supply Chain Application

Higher demand for Caribbean foods is expected leading up to the Taste of the Caribbean & Jerk Festival and the West Indian Independence Celebrations in Hartford, Connecticut.

Public officials want to ensure adequate food supply chain performance for these events; therefore, a supply chain from Bergen, New Jersey warehouses to a distribution center in Bloomfield, Connecticut is of interest.

Example Supply Chain Application

- Applying NPMRDS to a specific example of food supplies
- Collect observed travel times on NHS roadway network from the NPMRDS interface



Flow 112.1 N Bergen, NJ 07047 to Bloomfield, CT 06002

Road Segment | Time | Speed | Reference Speed | Travel Time

	A	B	C	D	E
1	tmc_code	measurement_tstamp	speed	reference_speed	travel_time_seconds
2	120+05618	10/1/2017 0:00	62.5	67	51.89
3	120+05618	10/1/2017 0:15	75	67	43.24
4	120+05618	10/1/2017 0:30	61.99	67	52.32
5	120+05618	10/1/2017 0:45	61	67	53.17
6	120+05618	10/1/2017 1:00	61.46	67	52.77
7	120+05618	10/1/2017 1:15	60.33	67	53.76
8	120+05618	10/1/2017 1:30	57.38	67	56.52
9	120+05618	10/1/2017 1:45	62.98	67	51.49
10	120+05618	10/1/2017 2:00	60.66	67	53.46
11	120+05618	10/1/2017 2:15	54.74	67	59.25
12	120+05618	10/1/2017 2:30	58.78	67	55.18
13	120+05618	10/1/2017 2:45	51.72	67	62.7
14	120+05618	10/1/2017 3:00	63	67	51.48
15	120+05618	10/1/2017 3:15	62.66	67	51.76
16	120+05618	10/1/2017 3:30	64.29	67	50.45
17	120+05618	10/1/2017 3:45	61.39	67	52.83
18	120+05618	10/1/2017 4:00	57	67	56.9
19	120+05618	10/1/2017 4:15	60.85	67	53.3

Sample travel time output from NPMRDS

Example Supply Chain Application

Procedures to Calculate Statistics and Measures

1. Line up road segments (TMCs) from origin to destination zip codes using NPMRDS roadway inventory
2. Using this virtual routing, calculate travel times for a trip starting every 15 minutes throughout a quarter ("traces")

Example Supply Chain Application

- Procedures to Calculate Statistics and Measures (cont.)

  3. Record the time it takes to travel the route (O-D) for each starting time and day in the quarter then calculate the following statistics and measures

  - <u>Statistics:</u>
    - 50th percentile travel time (median),
    - Average travel time,
    - Free-flow travel time (15th percentile travel time),
    - 95th percentile travel time,
    - 99th percentile travel time
    - Average speed (distance/average travel time)
  - <u>Measures:</u>
    - TTI (50th percentile travel time / Free-flow travel time)
    - PTI (95th percentile travel time/ Free-flow travel time)
    - Average Delay (50th percentile travel time – Free-flow travel time)

Example Supply Chain Application

Results for Flow 112.1 N Bergen, NJ 07047 to Bloomfield, CT 06002

		Statistics				Measures			
Year-Qtr	Flow Route	Free Flow Travel Time (hrs)	50% Travel Time (hrs)	95% Travel Time (hrs)	99% Travel Time (hrs)	Average Speed (mph)	Travel Time Index (50%/FF)	Planning Time Index (95%/FF)	Avg Delay (hrs) (50% TT-FF TT)
2017Q4	112.1	2.153	2.366	3.592	4.351	49	1.10	1.67	0.213
2018Q1	112.1	2.125	2.285	3.345	3.987	51	1.08	1.57	0.161
2018Q2	112.1	2.139	2.436	3.797	4.552	48	1.14	1.78	0.297
2018Q3	112.1	2.147	2.426	3.679	8.106	47	1.13	1.71	0.279

(Performed same process for all 68 NY/NJ regional flows)

For the specialty food delivery of this supply chain (example), this method/tool:
1. Provides baseline data…
2. Can/will provide trend data…
3. Is good for planning purposes…

Example Supply Chain Application

- Produced shapefiles for integration with Tableau and into the tool
  - Shapefiles can be downloaded from NPMRDS and filtered to the desired TMCs for a route

1. Download shapefile from NPMRDS

NPMRDS Shapefiles

NPMRDS INRIX Shapefiles

For use with NPMRDS INRIX data

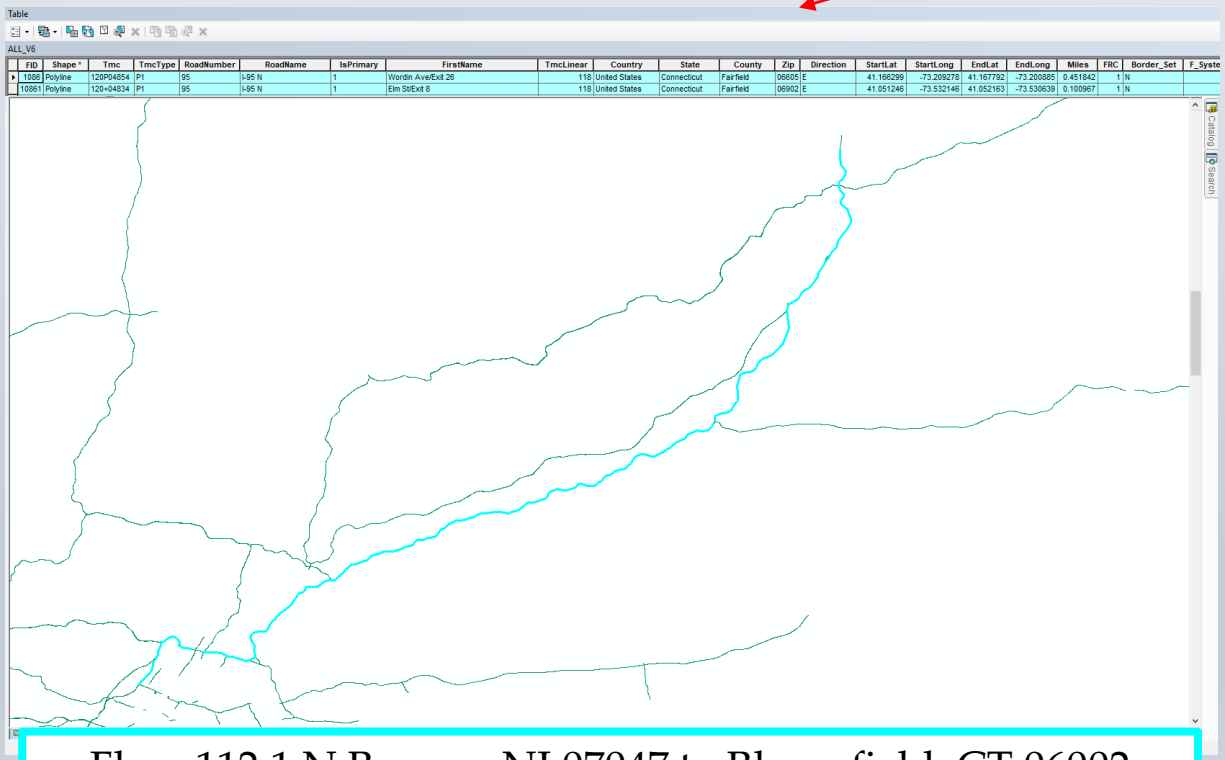
Statewide Shapefiles

State	Conflation year		
	2017 (January 1, 2017 - December 31, 2017)	2018 (January 1, 2018 - December 31, 2018)	2019 (January 1, 2019 - present)
Alabama	Download (3.8MB)	Download (3.6MB)	Coming in Summer 2019
Alaska	Download (1.8MB)	Download (1.7MB)	Coming in Summer 2019
Arizona	Download (2.3MB)	Download (2.2MB)	Coming in Summer 2019
Arkansas	Download (2.4MB)	Download (2.4MB)	Coming in Summer 2019
California	Download (18.2MB)	Download (17.2MB)	Coming in Summer 2019
Colorado	Download (3.7MB)	Download (3.7MB)	Coming in Summer 2019
Connecticut	Download (2.8MB)	Download (2.3MB)	Coming in Summer 2019
Delaware	Download (518.8KB)	Download (517.4KB)	Coming in Summer 2019
District of Columbia	Download (363.2KB)	Download (307.8KB)	Coming in Summer 2019
Florida	Download (9.3MB)	Download (8.3MB)	Coming in Summer 2019
Georgia	Download (7.6MB)	Download (6.9MB)	Coming in Summer 2019
Hawaii	Download (568.1KB)	Download (642.7KB)	Coming in Summer 2019
Idaho	Download (1.4MB)	Download (1.3MB)	Coming in Summer 2019
Illinois	Download (6.8MB)	Download (6.5MB)	Coming in Summer 2019
Indiana	Download (3.8MB)	Download (3.1MB)	Coming in Summer 2019

https://npmrds.ritis.org/analytics/shapefiles

2. In GIS: Find your route

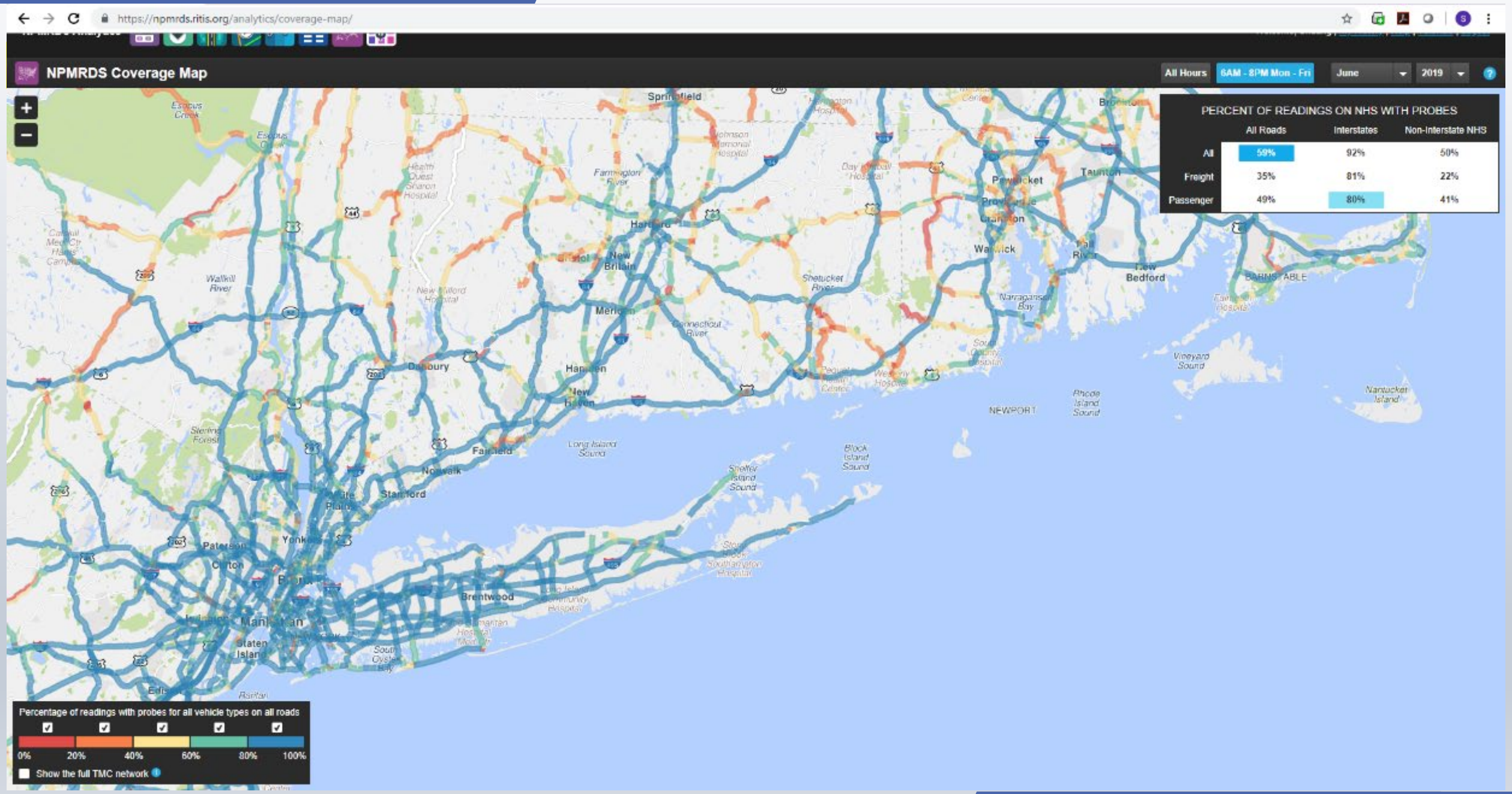
Route TMC info



Flow 112.1 N Bergen, NJ 07047 to Bloomfield, CT 06002

NPMRDS Considerations/Cautions

- NPMRDS is discontinuous (a non-navigable network).
- NHS only and contains observed travel time / speed readings (no estimates)
  - To fill in beyond NHS - compatible data coverage can be purchased from other data providers (e.g., ATRI, INRIX, HERE, StreetLight, etc.)
- Freight coverage is generally lower than passenger vehicles (because that's reality)
- Coverage is lower when there is less traffic (obviously) like overnights and weekends.
- HPMS meta data are typically lagging by two years (e.g., 2018 NPMRDS data contains 2016 HPMS data).


https://npmrds.ritis.org/analytics/coverage-map/
NPMRDS Coverage Map
All Hours
6AM - 8PM Mon - Fri
June
2019
PERCENT OF READINGS ON NHS WITH PROBES
All Roads
Interstates
Non-Interstate NHS
All 59% 92% 50%
Freight 35% 81% 22%
Passenger 49% 80% 41%
Percentage of readings with probes for all vehicle types on all roads
0% 20% 40% 60% 80% 100%
Show the full TMC network
Springfield
Hartford
New Britain
Meriden
Waterbury
New Haven
Danbury
Norwalk
Stamford
Fairfield
Bridgeport
Brentwood
Manhattan
Staten Island
Paterson
Yonkers
Providence
Warwick
Fall River
New Bedford
Taunton
NEWPORT
BARNSTABLE
Nantucket Island
Long Island Sound
Block Island Sound
Rhode Island Sound
Narragansett Bay
Vineyard Sound
Connecticut River
Shetucket River
Farmington River

Example NPMRDS Uses/Activities

- FHWA Urban Congestion Quarterly/Annual Reports
  - https://ops.fhwa.dot.gov/perf_measurement/ucr/
- FHWA Freight Mobility Measures (and Tableau visualization)
  - National freight roadway bottlenecks (and ports, borders, airports, intermodal areas)
- FHWA Pooled Fund (Mobility Measurement in Urban Transportation)
  - Spatial and temporal coverage
  - Performance measure calculations & sensitivity analyses, etc.
- NPMRDS Technical Assistance Webinars
  - https://ops.fhwa.dot.gov/perf_measurement/index.htm

Discussion (and Contact Information)

- Questions on the data?
- …..the uses?
- …..the opportunity?
- Other?

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Discussion: Feedback/Key Insights

Workshop Participants
Chris Lamm (Facilitator)

Discussion Questions

1. How do you envision using this tool to support the activities you do within your organization?
2. In what ways could this tool add value to cross-jurisdictional or megaregional conversations and planning for freight here in the NY-NJ-CT-PA megaregion?
3. Describe challenges that you might expect to encounter when using this tool
4. Is there anything missing?
5. Would your organization build upon this tool?
6. To what extent would you want your organization to be involved in updates/enhancements?
7. Other recommendations?

Discussion Exercise

- Write your responses onto the post-it notes provided
- Post your responses on the appropriate boards

Discuss the Responses

1. How do you envision using this tool to support the activities you do within your organization?
2. In what ways could this tool add value to cross-jurisdictional or megaregional conversations and planning for freight here in the NY-NJ-CT-PA megaregion?
3. Describe challenges that you might expect to encounter when using this tool
4. Is there anything missing?
5. To what extent would you want your organization to be involved in updates/enhancements?
6. Other recommendations?

Next Steps

- Collect/document feedback from this and Chicago workshop
  - Provide any additional comments to: mgparker@i95coalition.org
- Finalize/complete tool content
- Complete development of and provide Guidance Documents
- FHWA HOFM makes Freight Fluidity Quarterly Monitoring Data/tool available as resource
  - Complements other FHWA data tools for freight and system performance analysis