







August 17 Freight Initiatives Committee Agenda






- Roll Call of Members
- Approval of Minutes
- Update on NJTPA Freight Division Activities
- Presentations on Analyzing and Visualizing Critical Supply Chains
- Two-Minute Reports on Freight Activities from Committee Members
- Next Meeting: October 21, 2020
- Adjournment



View Who's Talking   1  

Please use the Chat box to ask questions during the presentations and if requesting credits, please post your name, followed with either AICP or PE with your PE license number 

Please mute yourself when not speaking. 

You are muted.     

Mic Camera Screen Leave

NJTPA Freight Division Update

- Update on Industrial Real Estate
- Truck Driver Survey Report
- September 10 Truck Parking Workshop
- 2050 Freight Industry Level Forecasts Study
- Freight Concept Development Program

Learn more at www.njtpa.org/freight

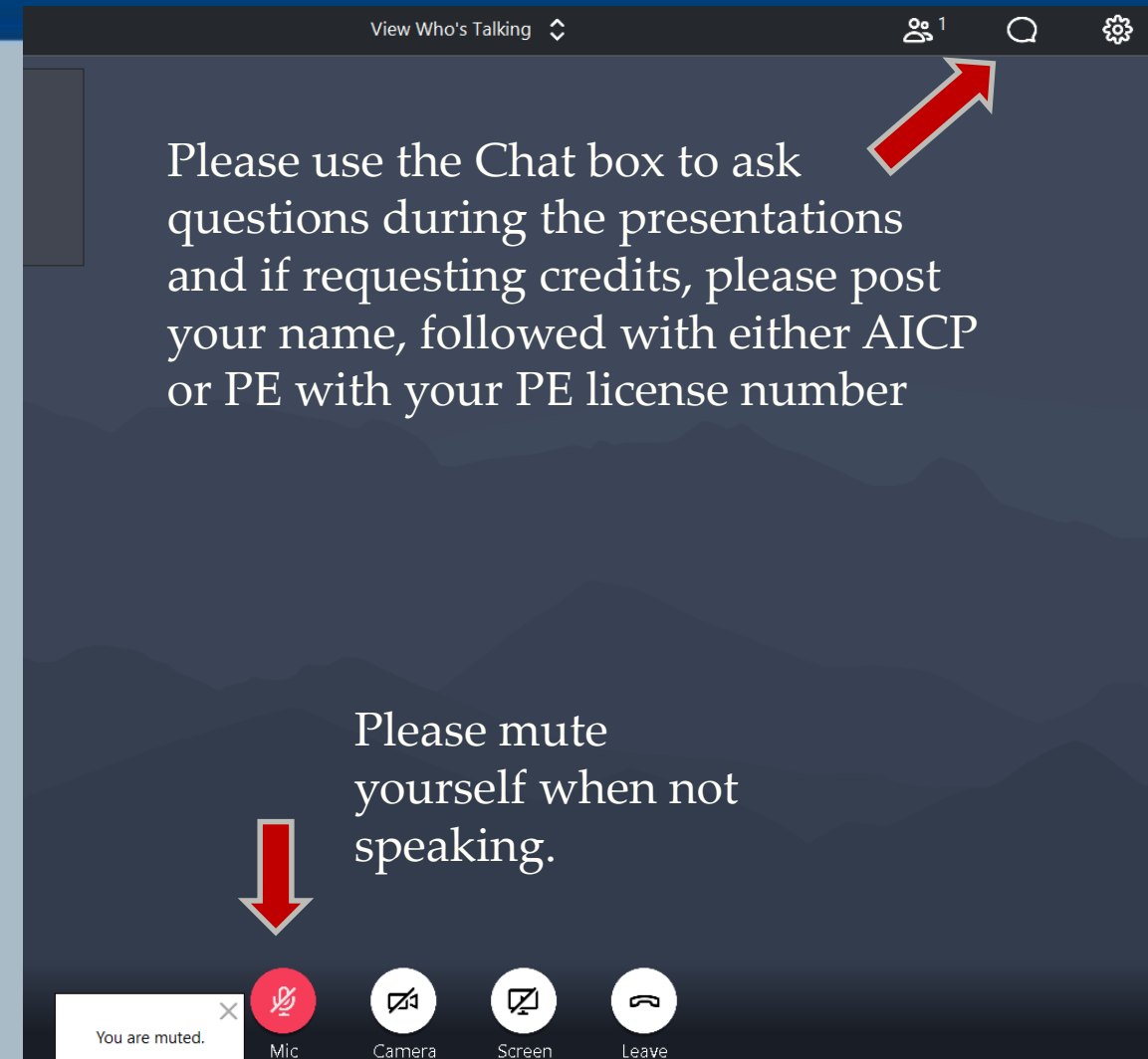


View and download the summary at:
<https://map-forum-njtpa.hub.arcgis.com/pages/freight>



August 17 Freight Initiatives Committee Presentations

- NJTPA 2050 Freight Industry Level Forecasts Study, Jakub Rowinski, Central Staff and Chris Lamm, Cambridge Systematics
- Freight Fluidity Project, Chandra Bonzie, Federal Highway Administration, US Department of Transportation
- FEWSION, Benjamin L. Ruddell, Northern Arizona University



View Who's Talking

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The screenshot shows a Zoom meeting interface. At the top, it says "View Who's Talking" with a dropdown arrow, followed by icons for "1" person, chat, and settings. A red arrow points to the chat icon. The main area contains two instructions: "Please use the Chat box to ask questions during the presentations and if requesting credits, please post your name, followed with either AICP or PE with your PE license number" and "Please mute yourself when not speaking." At the bottom, there is a "You are muted." notification, a "Mic" button with a red slash, and buttons for "Camera", "Screen", and "Leave".

2050 Freight Industry Level Forecasts

Freight Initiatives Committee

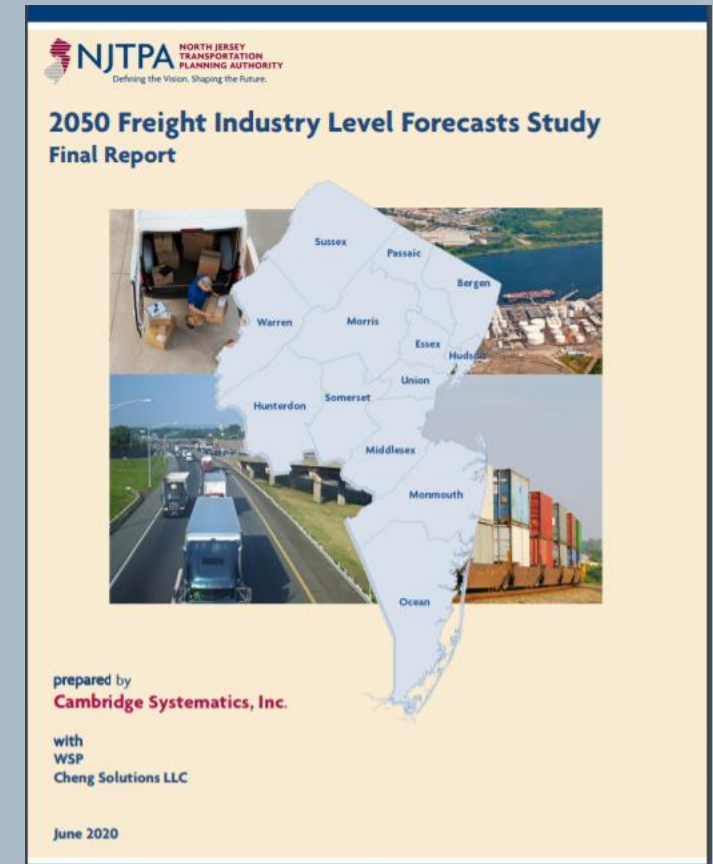
August 17, 2020



Jakub Rowinski, NJTPA
Chris Lamm, Cambridge Systematics, Inc.

Goals and Objectives

1. Develop a clear, accurate and comprehensive picture of current and future regional freight activity out to 2050
2. Update and enhance the NJTPA Freight Forecasting Tool
3. Prepare regional, county, and top commodity profiles



Background

- Previous Studies
 - 2040 Freight Industry Level Forecasts
 - Regional Freight Commodity Profiles
- Key Products
 - Freight Forecasting Tool (FFT)
 - Profiles
- New for the 2050 Study
 - Freight Analysis Framework (FAF)
 - E-Commerce



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NORTH JERSEY TRANSPORTATION PLANNING AUTHORITY

North Jersey Regional Freight Profile

2040 Freight Industry Level Forecasts

ABOUT THIS PROFILE
The NJTPA has developed a set of alternative freight forecasts to support transportation, land use, and economic development decisions. The first step in the study process was to document current baseline conditions. This Freight Profile offers a snapshot of key metrics – Economy and Land Uses, Freight Flows, and Freight Transportation Networks in 2010 and in the forecast year, 2040.

ECONOMY AND LAND USES
With a 2010 population of 6,579,907, the 13 counties of the NJTPA Region contain about three quarters of the State's population in just over half of its land area. North Jersey's population has historically grown more slowly than the State overall, though growth in the 1990s and 2000s has kept pace with the State. Trends in median household income among the Region's thirteen counties have varied in recent years. Hunterdon, Somerset, and Morris counties, which have the highest median household incomes, also experienced the most pronounced changes in income due in part to the recession. Household incomes in Essex, Ocean, Passaic, and Union counties have changed less significantly in recent years.

North Jersey is home to...

- 6.6 million people
- 312,736 businesses that employ 2.85 million people; 32% of these jobs are in businesses that are highly dependent on freight movement
- 6,828 warehousing/distribution buildings and 2,005 manufacturing buildings
- About 473 million tons of domestic freight shipped or received annually
- Interstates, State, and County highways used by tens of thousands of trucks every day
- The East Coast's largest container port
- Major intermodal rail and air cargo terminals

Household Income, Constant 2010 Dollars
Source: U.S. Census Bureau

NJTPA
NORTH JERSEY TRANSPORTATION PLANNING AUTHORITY
Defining the Vision. Shaping the Future.

REGIONAL FREIGHT COMMODITY PROFILE
Food and Beverages

COMMODITY BUNDLE OVERVIEW
The food and beverages commodity bundle consists of five sub-categories of commodities. The food products category includes processed food products, canned foods, and prepared foods. The farm products category includes fruits, nuts, vegetables, and livestock. The beverages category includes soft drinks, mineral water, and alcoholic beverages. Tobacco products include cigars, cigarettes, and chewing tobacco.

The primary data source for commodity flows reported in this profile is NJTPA's Freight Forecasting Tool, which generates commodity freight data and forecasts for a 2010 base year and 2040 forecast year. This profile describes freight flows between domestic origins and destinations.

- 68 million tons in 2010, increasing 42% to 97 million tons in 2040.
- Represents 10% of the goods moved in the region by weight and 4% by value.
- 3,531 business establishments employing 26,257 people send or receive goods in this bundle.
- More than 29 million square feet of warehousing/distribution center space
- 93% moves by truck, 7% by rail, and less than 1% by air or water.

Highlights

Composition

Domestic Tons in 2010

Category	Percentage
Food Products	55%
Beverages	4%
Farm Products	35%
Tobacco Products	1%
Fresh Fish	0%

Total Tons: 68 million
Source: NJTPA Freight Forecasting Tool, 2012

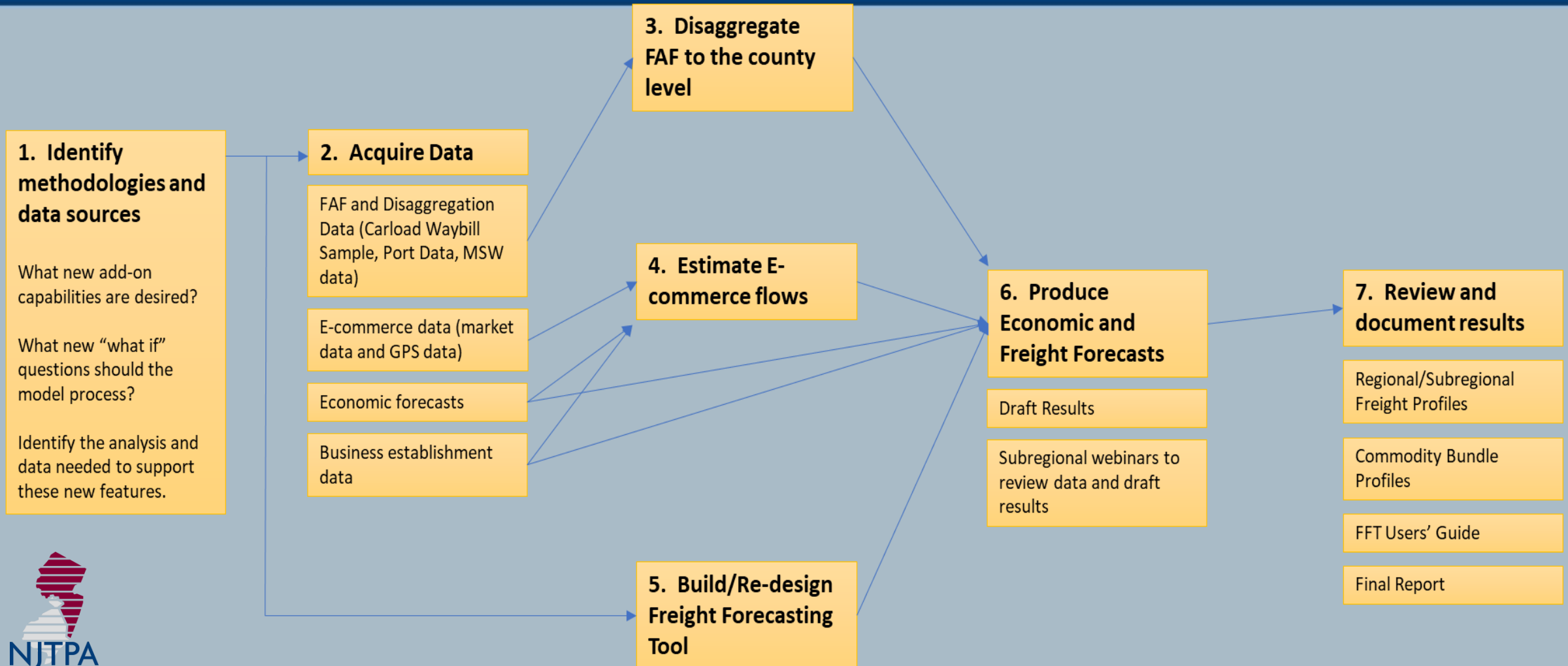
Domestic Value in 2010

Category	Percentage
Food Products	48%
Beverages	18%
Farm Products	2%
Tobacco Products	3%
Fresh Fish	0%

Total Value: \$74 billion
Source: NJTPA Freight Forecasting Tool, 2012

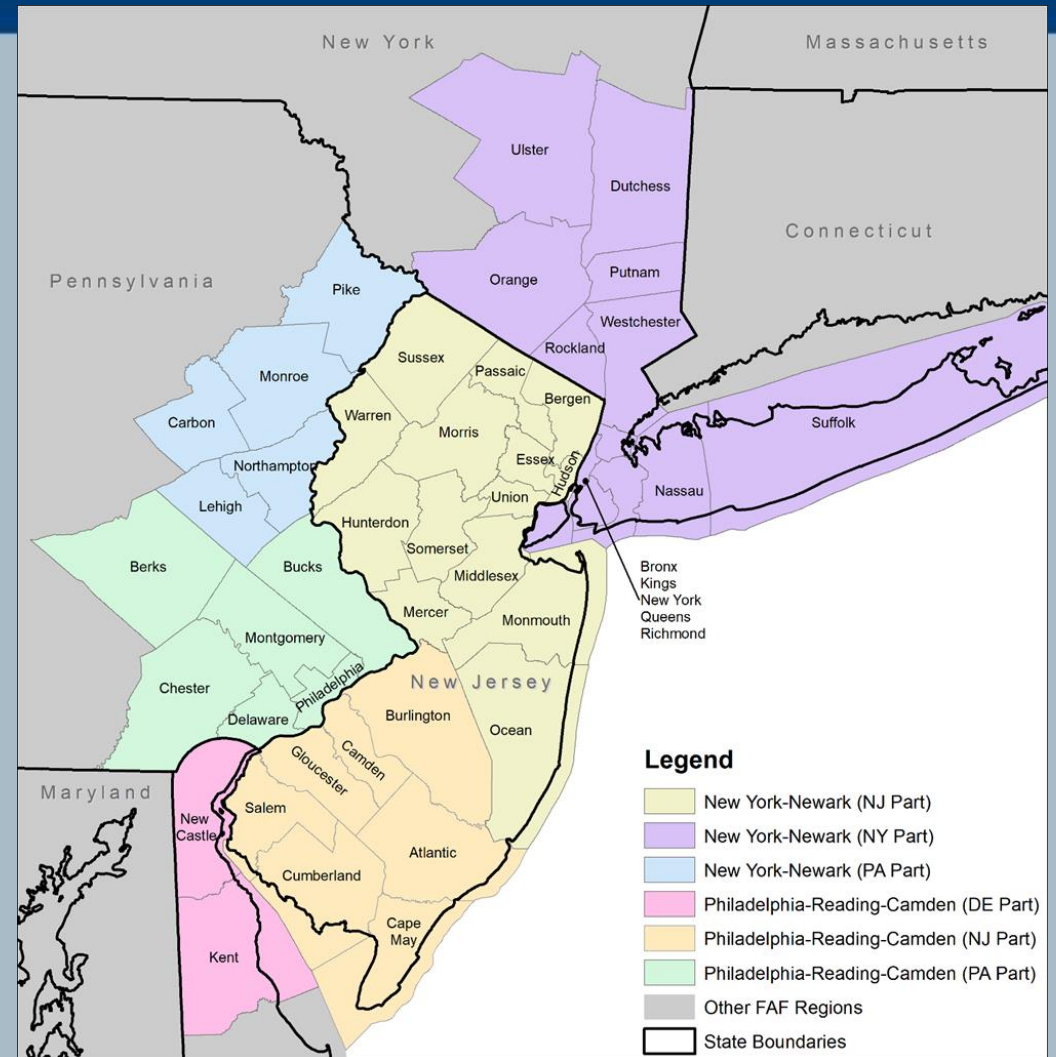
Food products represent the largest sub-group by weight and by value in this commodity bundle. Beverages account for nearly one-quarter of goods by weight and 18% by value. Farm products represent 18 percent of this bundle by weight and 11 percent by value. Tobacco products and fresh fish, each represent less than 1 percent of this bundle by weight.

Methodological Overview



FAF Disaggregation

- Employment and trip generation by county
- Business-Economic Area Make/Use Tables
- Carload Waybill Sample
- Terminal Locations



E-Commerce Trip Table Development

Two Analysis Components:



Market
Demand



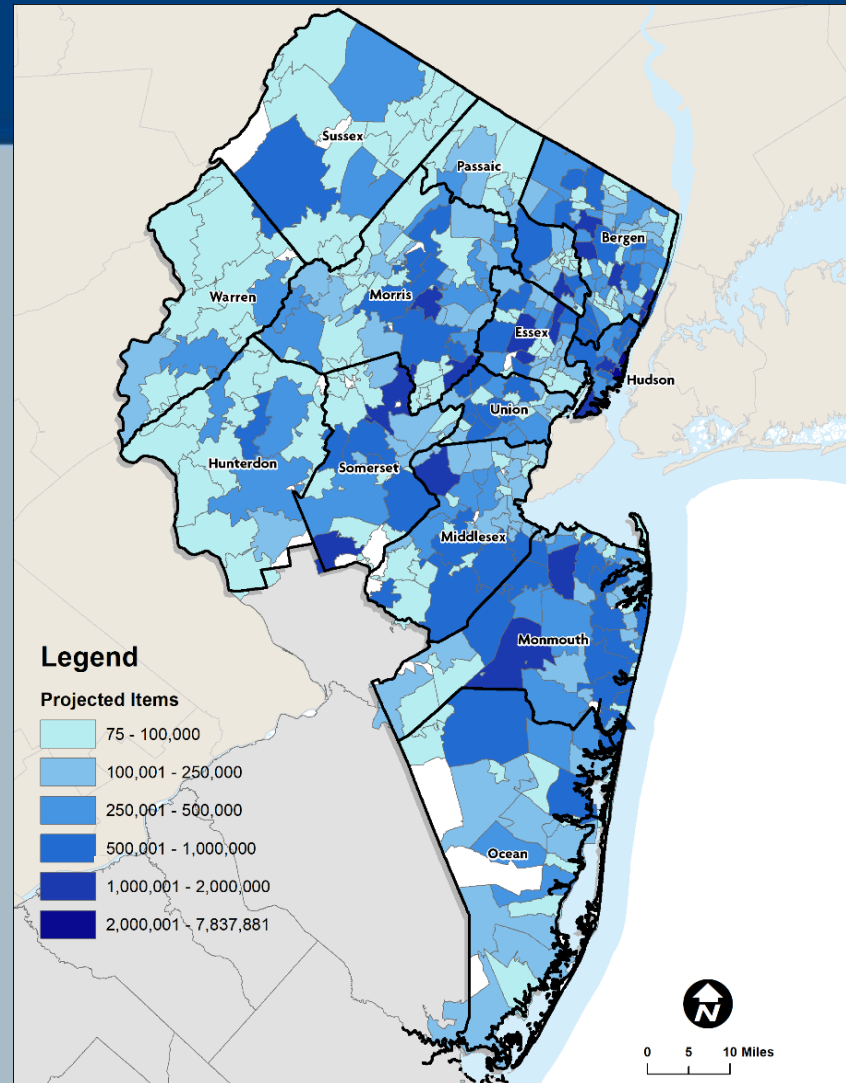
Delivery
Vehicle
Travel
Pattern

E-
Commerce
Delivery
Vehicle Trip
Table

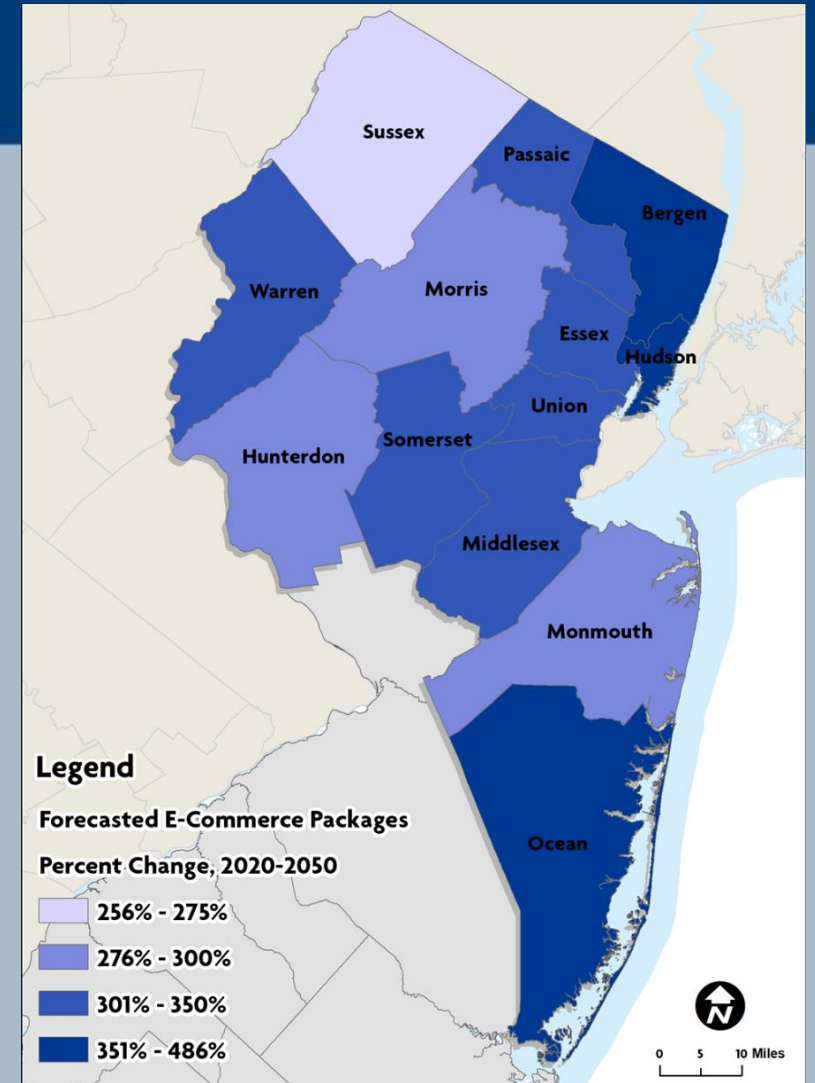
E-Commerce Market Demand

Total packages delivered annually:
88.1M

Total items delivered annually:
126.1M
Avg of 1.4 items per package



Source: Rakuten Intelligence, 2019

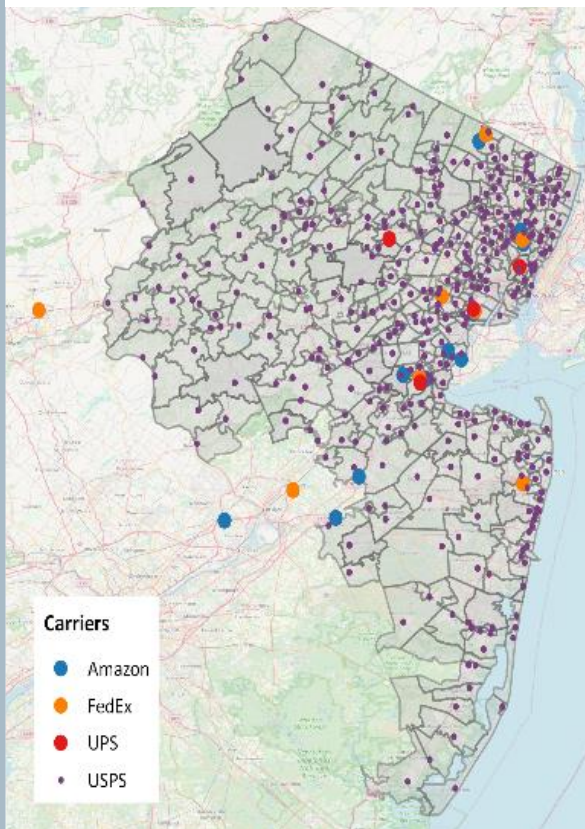


Source: Cheng Solutions and Cambridge Systematics, 2020

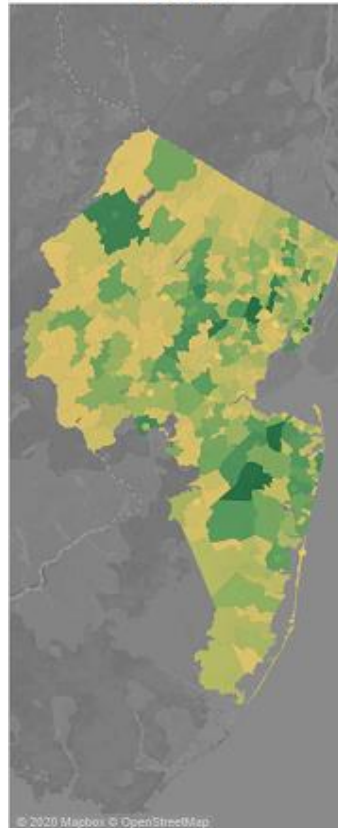
Map Logistics Chains and Facilities

Facility locations and daily delivered packages by zip code and carrier

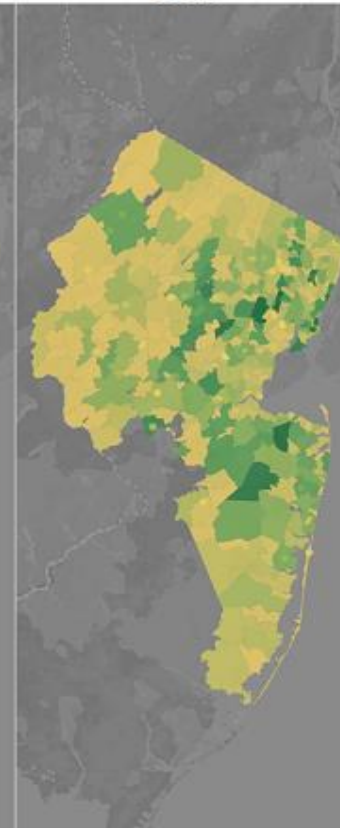
Facility Locations by Carrier



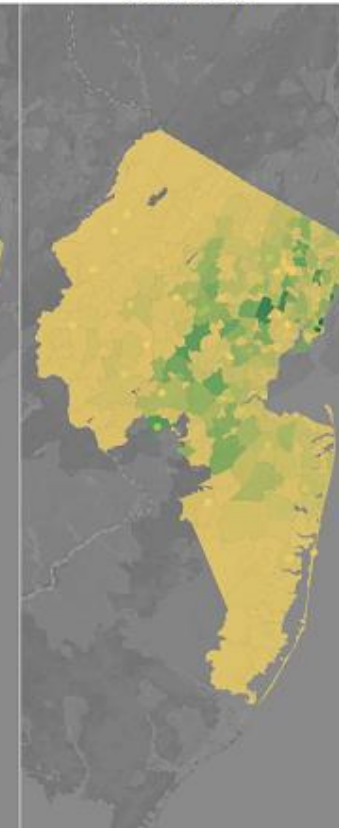
USPS



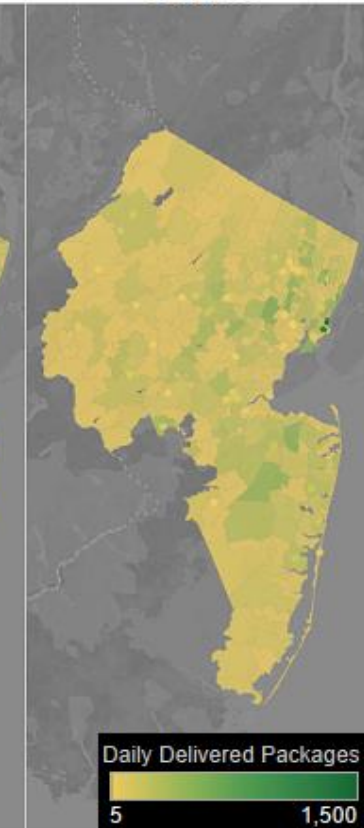
UPS



Amazon

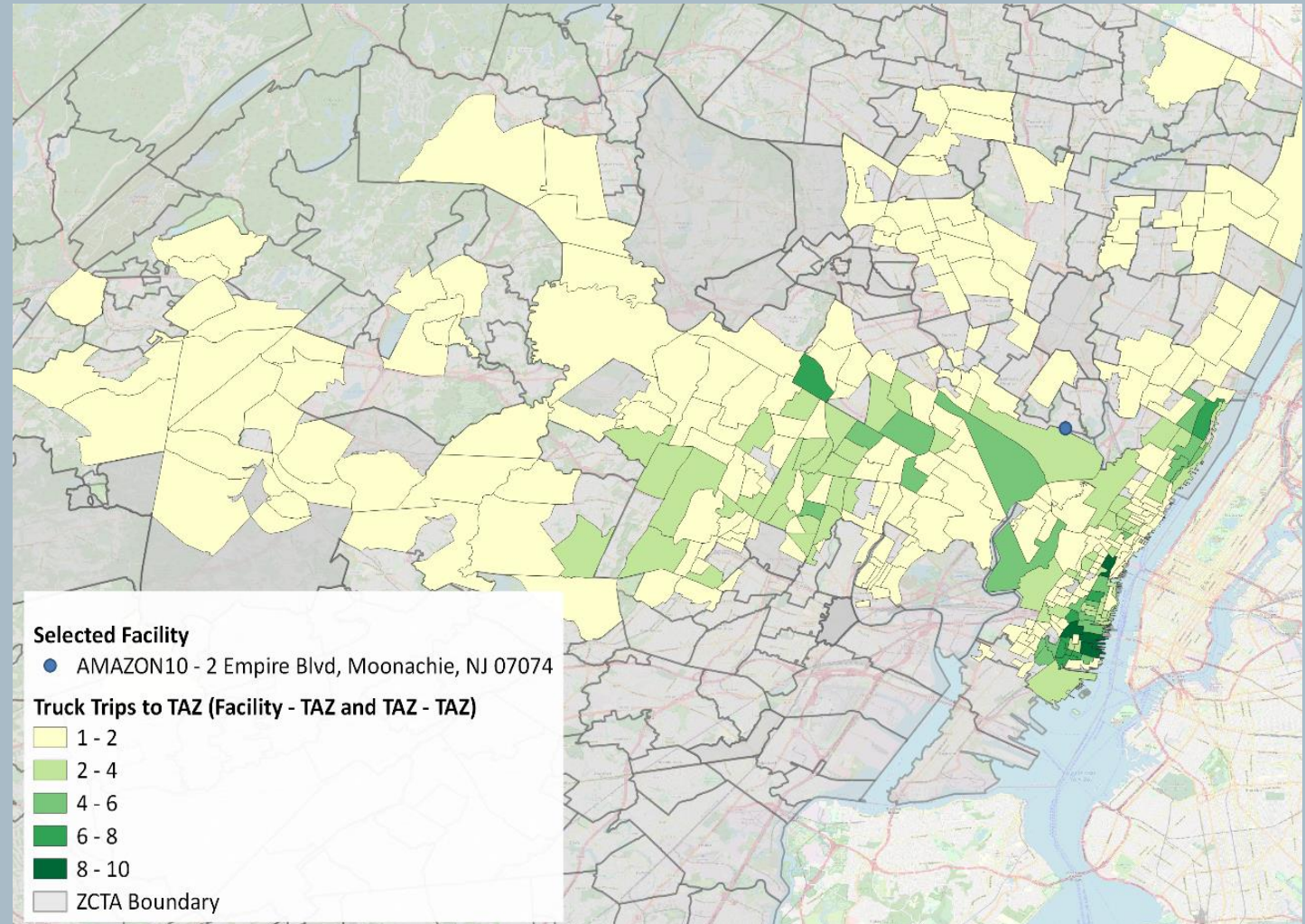


FedEx



Trip Table

Develop carrier-specific load factors and estimate trips from each facility to each Traffic Analysis Zone (TAZ)



FFT Updates

- Produce year 2050 forecast outputs
- “What if” scenario capability
- Streamline data management and processing using R



NJTPA Freight

Run FAF disaggregation

Inputs

- » Basic Model Inputs
- » Productivity Growth
- » Disruptor Scenarios
- » Adjustment Factors
- » RTM Bundle Tonnages

Outputs

- » Summary Tables
- » Charts - Freight Origins
- » Charts - Freight Terminations
- » Maps - Freight Origins
- » Maps - Freight Terminations
- » Selected Visualizations

Select Visualization

Mode

Show Results for:

- 2020
- Forecast Year

Run Model

Enter source directory of files.
Replace all backslashes with forward slashes

D:/alan's files/_alan work/NJ

Basic Inputs page

Modify the inputs below as required

Choose disaggregated FAF version

FAF4.5.1 - Original Model Disaggregation

Forecast Year

2050

Moody's Forecast Scenario

Base

Years to Pause Forecast after 2019

0

Days per year to annualize data - 295 to 312 days per year is typical, with 295 being the recommended value.

295

Enter fuel adjustment factor for Union county (as a %). Default of 100% implies fuel tonnages involving Union are not modified

100

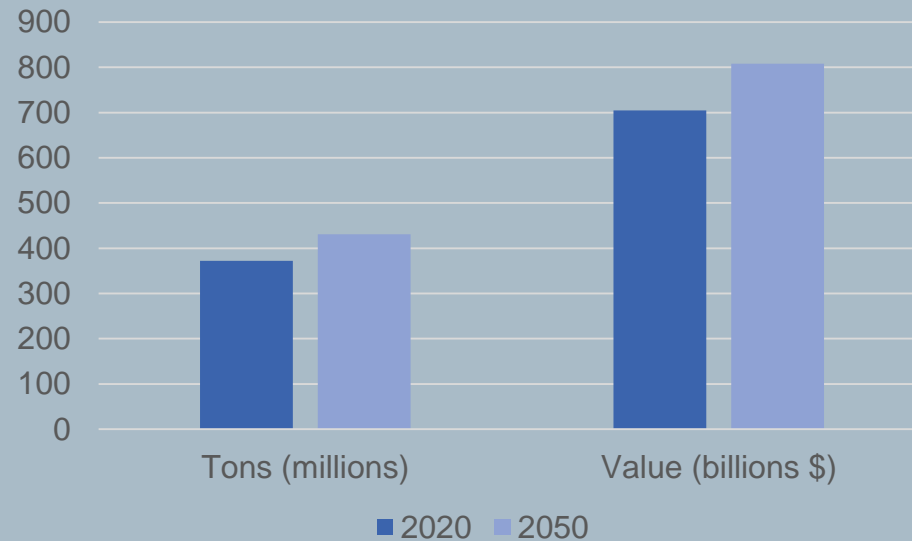
Export RTM-E trip table by TAZ?

No

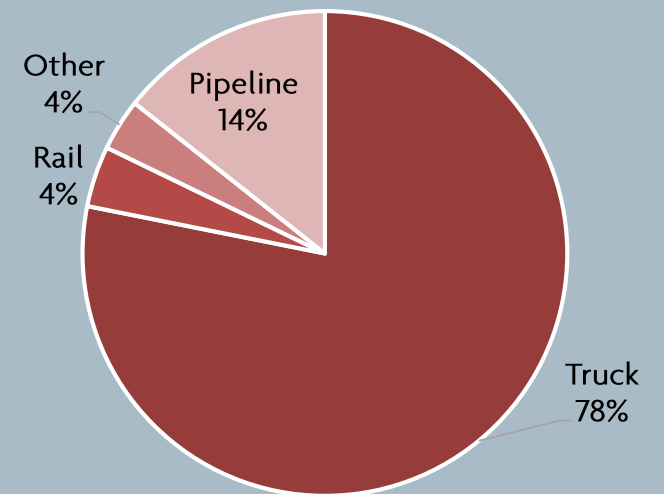
Commodity Flow Output

- 16% growth in tonnage in 2050
- 15% growth in value in 2050
- 78% of tons move by truck

NJTPA Region Freight Flows, 2020 and 2050, by Weight and Value



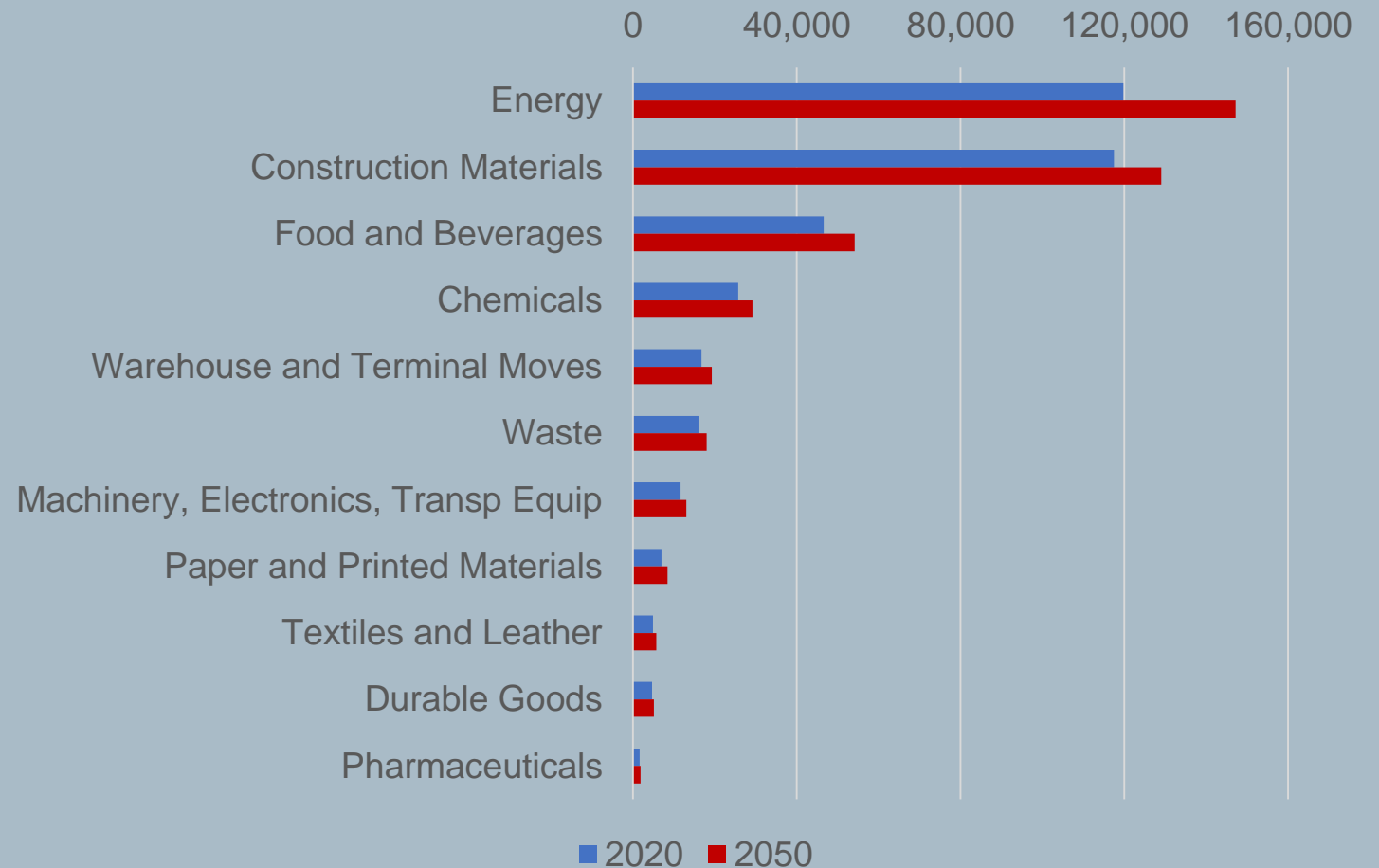
Tons by Mode, 2020



Commodity Flow Output

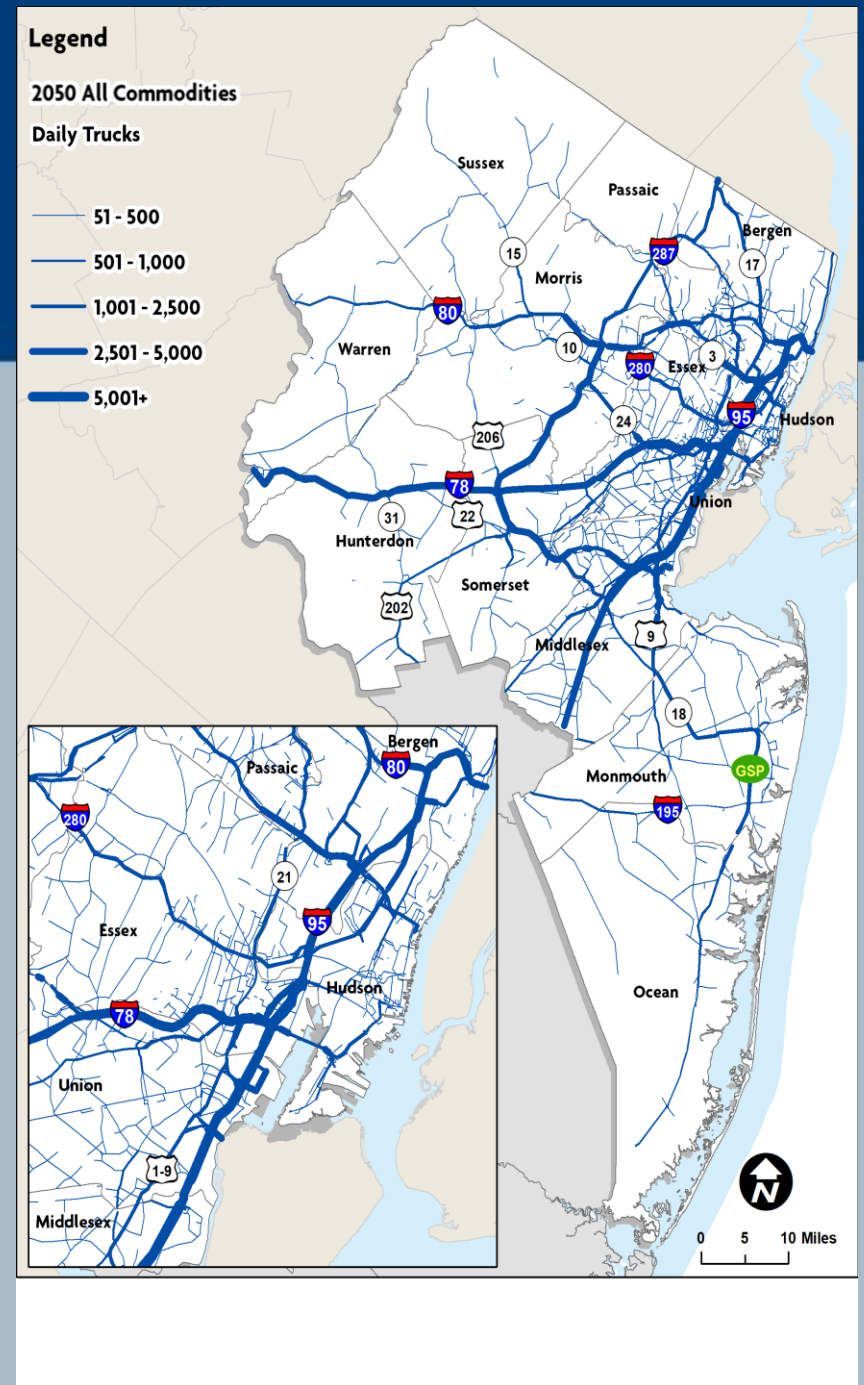
Energy products,
construction materials,
and food and beverages
are the top commodities
by weight

Thousands of Tons by Commodity Group, 2020-2050



NJRTM-E Assignment

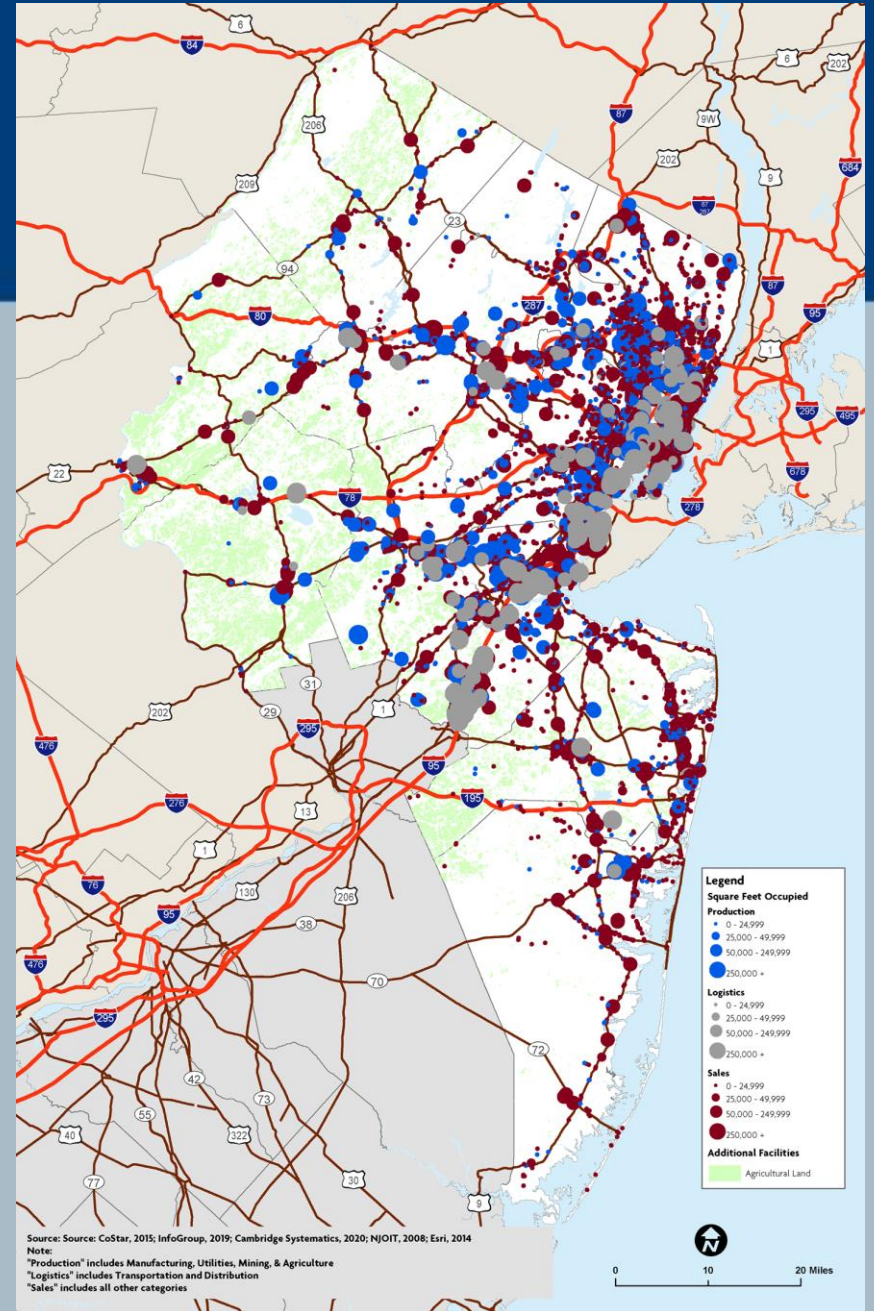
- The commodity trucks were assigned over the NJRTM-E
- Ability to assign all commodity trucks or specific commodity bundle trucks



Subregional Webinars

Meetings covered:

- Study overview
- Data highlights
- Validation (especially business locations)



Study Products

- Regional Freight Profile
- 15 Subregional Freight Profiles
- 12 Regional Commodity Profiles
- Final Report and profiles are on NJTPA's website:

njtpa.org/2050FreightForecasts



REGIONAL FREIGHT COMMODITY PROFILE
E-Commerce Deliveries

COMMODITY BUNDLE OVERVIEW

This bundle represents the movement of a variety of goods that consumers order online for delivery to a specified location, often the consumer's home. Like the warehouse and terminal moves commodity bundle, this bundle consists of shipments of mixed or multiple types of goods, including apparel, food, electronics, instruments, paper products, or drugs. This commodity bundle profile describes the movement of e-commerce shipments as they are making their "last-mile" trip from a fulfillment center, retail store, parcel shipping center, or postal service facility to their ultimate destination. The primary data sources for data reported in this profile include e-commerce consumer data acquired from Rakuten Intelligence and NJTPA's Freight Forecasting Tool, which generates commodity freight data and forecasts for a 2020 base year and 2050 forecast year.

- 88 million e-commerce packages delivered NJTPA region in 2019
- More than 126 million delivered in the NJT in 2019
- Apparel represents third of e-commerce ordered
- Four major carriers: 97 percent of the e packages in the region
- About 1,900 vehicle performing e-commerce daily

Composition

E-Commerce Items by Product Category, 2019
Source: Rakuten Intelligence, 2019

REGIONAL FREIGHT PROFILE
North Jersey Region

ABOUT THIS PROFILE

The North Jersey Transportation Planning Authority (NJTPA) has developed a set of alternative freight forecasts to support transportation, land use, and economic development decisions. This Freight Profile is an update to a previous version published in 2012, and offers a snapshot of key metrics – Economy and Land Uses, Freight Flows, and Freight Transportation Networks in 2020 and in the forecast year, 2050.

ECONOMY AND LAND USES

With a 2018 population of 6.7 million, the 13-county NJTPA region is home to more than three-quarters of the population of New Jersey and just over half of the land area of the state. The population of the state and region have historically grown more slowly than the nation overall. Morris County has the highest median household income in the region (\$13,316 in 2018). Inflation-adjusted median household income has increased since 2010 in 8 of the region's 13 counties.

North Jersey is home to:

- 6.7 million people
- More than 192,000 businesses that employ 2.9 million people; about 32 percent of these jobs are in industry sectors that are highly dependent on freight movement
- About 372 million tons of domestic freight shipped or received annually
- More than 88 million e-commerce packages delivered annually
- Interstate, State, and County highways used by tens of thousands of trucks every day
- The East Coast's largest container port, major intermodal rail and air cargo terminals

Population Growth by Decade

Source: U.S. Census Bureau

2018 Household Income

Source: U.S. Census Bureau

Note: This chart shows median household income for New Jersey and the United States. NJTPA Household Income calculated as a weighted average of median household incomes of member counties. New Jersey and U.S.

Highlights

Thank You!

Defining the Vision. Shaping the Future.



Jakub Rowinski
jrowinski@njtpa.org



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Find Us On
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FHWA FREIGHT FLUIDITY PROGRAM

Chandra Bondzie, FHWA



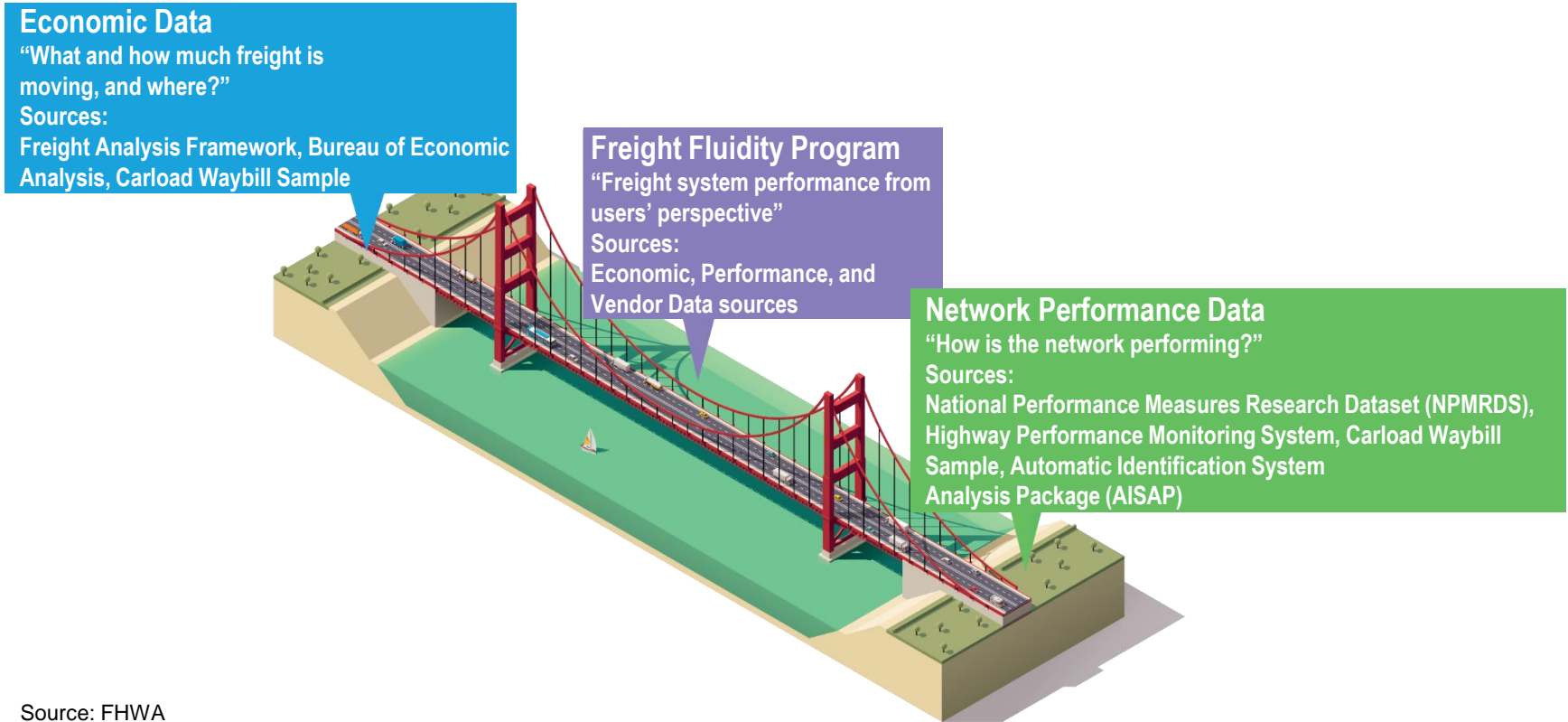
Presentation to North Jersey Transportation Planning Authority
August 17, 2020

U.S. Department of Transportation
Federal Highway Administration

FLUIDITY BRIDGES AND LEVERAGES EXISTING DATA PROGRAMS



U.S. Department of Transportation
Federal Highway Administration



Source: FHWA

Fluidity is a bridge between economic and network data, showing how freight flows and facility measures merge into effects on multi-stage, multimodal industrial performance

THE PRODUCT



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- A new USDOT-owned database of information, with a visualization and mapping tool to record and report three types of performance metrics across multiple modes, scalable to future expansion and enhancement.
- A major advance beyond highway-only metrics, allowing us to measure performance from the supply chain perspective and identify critical flows/connections, bottlenecks and improvement opportunities over the larger multimodal system.

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

Source: FHWA

DATA – SUPPLY CHAIN DEFINITION



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30 major U.S. companies identified to represent a broad cross-spectrum of industry sectors, commodities, modes

- 24 at national level, 6 regionally focused on NY/NJ and Chicago areas
- Through interviews, industries shared “wiring diagrams” of their most critical supply chains, without revealing other business-sensitive information

Contribution to national gross domestic product (GDP) and projected growth among freight-dependent industries

Geographic coverage of U.S.: regions, urban centers, rural areas, gateways, corridors, direction of travel

Contribution to regional GDP and projected growth among freight-dependent industries

Industry importance to resilience of other supply chains and of population

Industry importance to U.S. trade

Modal and travel distance diversity

DATA – PERFORMANCE METRICS



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- Customer Prices:
 - Truck and Rail Intermodal Price data purchased from commercial aggregator
 - Rail Carload Price data estimated by consultant team from Surface Transportation Board (STB) Waybill
- Travel Time (with Reliability measured as variations in travel time)
 - Water data provided by U.S. Army Corps of Engineers Automatic Identification System, with detailed analysis by the Bureau of Transportation Statistics – 25%, 50%, 75% percentiles
 - Rail carload and intermodal travel time data purchased from commercial aggregator – 50% and 95% percentiles -- some routes not available
 - Truck data developed through analysis of FHWA's National Performance Management Research Data Set (NPMRDS)
 - FHWA acquired first NPMRDS in July 2013, second version in April 2017; see https://ops.fhwa.dot.gov/perf_measurement/index.htm
 - Aggregates observed travel times from vehicle-based probes on Traffic Message Channels (TMCs) over five minute intervals, continuously, for freight and passenger vehicles

SOFTWARE PLATFORMS



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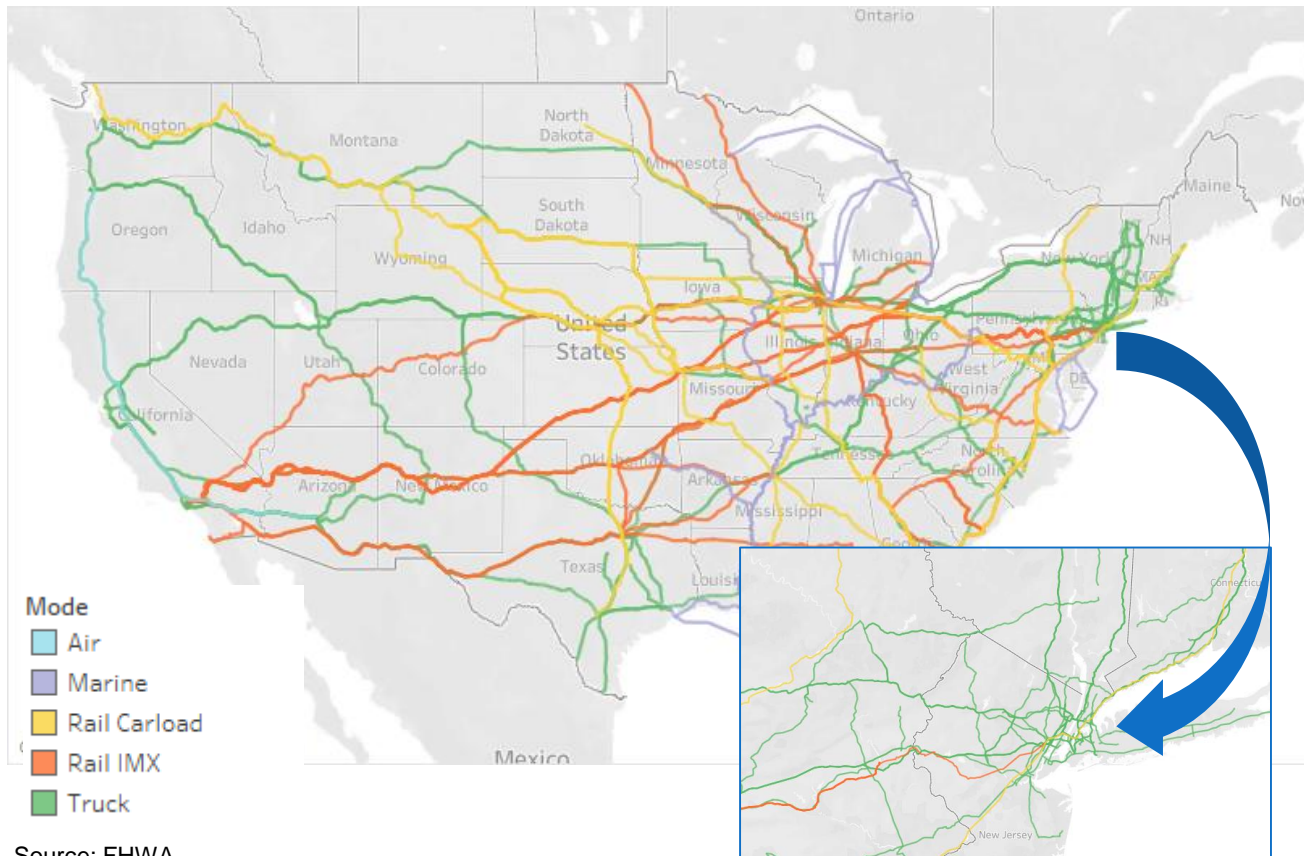
- Two integrated platforms, both from existing suite of FHWA freight measurement tools:
 - Excel database and Tableau data analysis/visualization
 - FHWA/HOFM GIS data visualization tools, fed from database
- The software platforms meet key criteria:
 - Ability to hold and process large data sets in time series
 - 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
 - Varied and high quality graphical and cartographical displays
 - Stability as dependable, tested tools
- Open-ended to support additional industries, travel lanes, modal details, data periods, performance calculations – maintainable, expandable

MODE/ GEOGRAPHY COVERAGE



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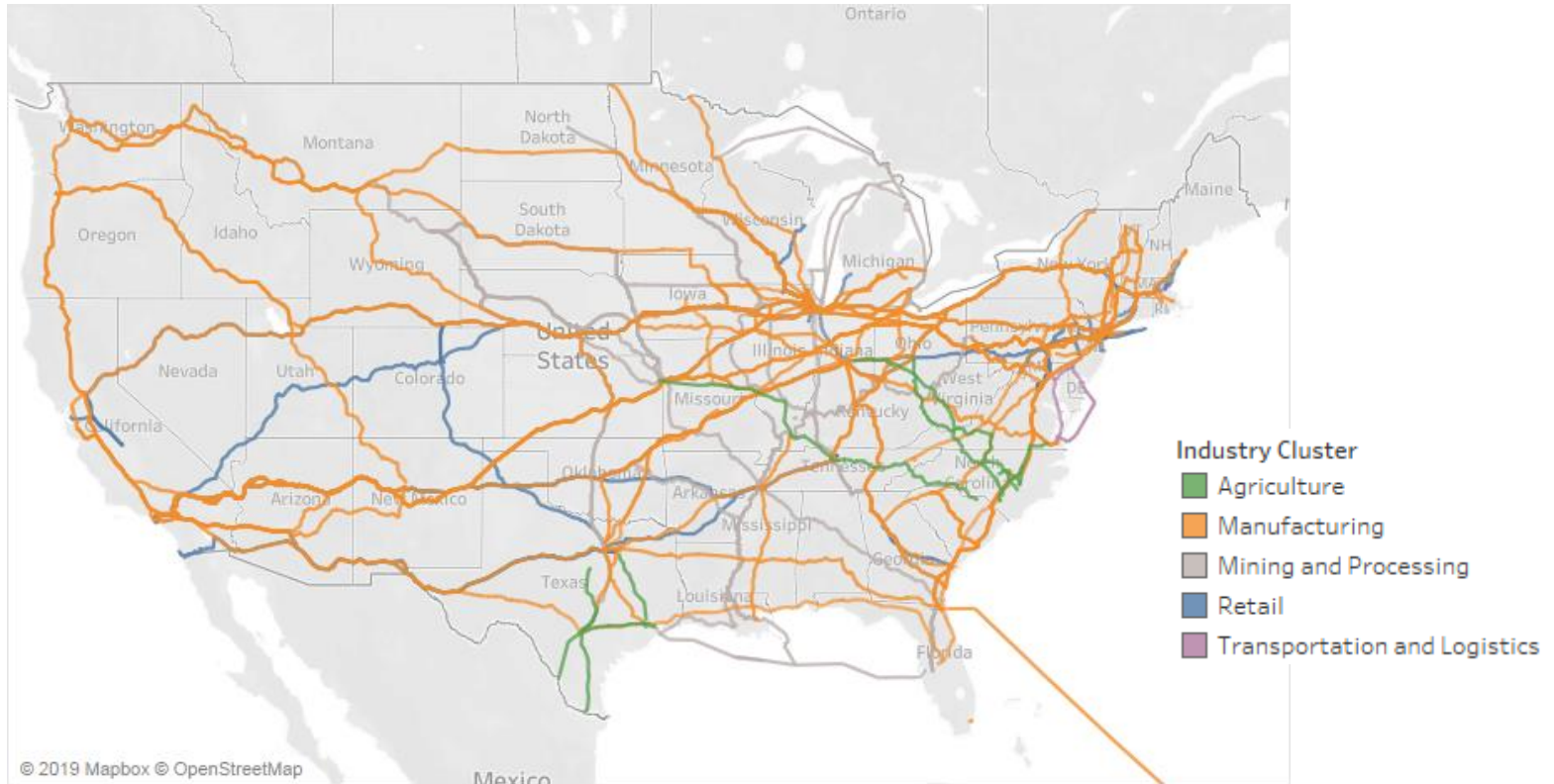
- Each data record has an assigned path including NHS segment, rail network, waterway network that allows any data attribute or value to be displayed at a path level.
- Captures moves in almost every State, most major metro areas, the national highway freight network from the limited 30 industry sample

➔ 417 Mapped Moves: Truck (336), Rail IMX (28), Rail Carload (20), Water (28), Air (1)

INDUSTRY COVERAGE



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Source: FHWA

➔ 30 Industries: 14 Manufacturing, 8 Retail, 4 Mining, 2 Agricultural Production (in addition to food manufacturing), 2 Transportation/Logistics

SYSTEM-LEVEL ANALYSIS



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Dashboard #1 -- Travel Time



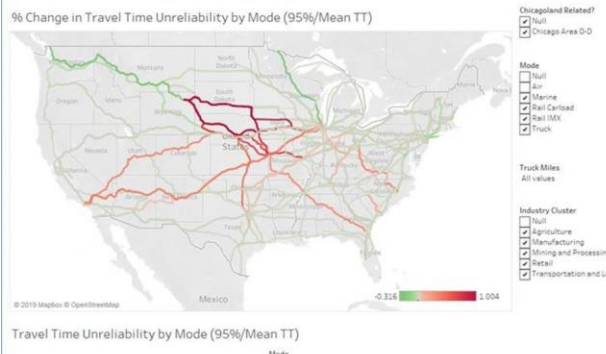
Mean Travel Time by Mode



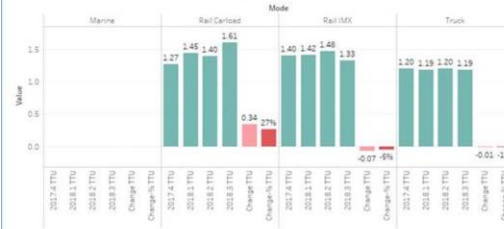
Mean Travel Time by Industry Cluster



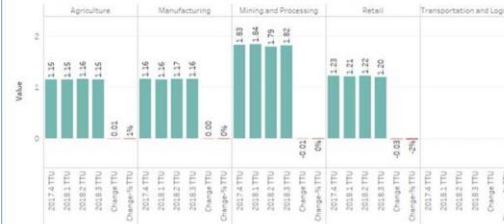
Dashboard #2 -- Travel Time Unreliability



Travel Time Unreliability by Mode (95%/Mean TT)



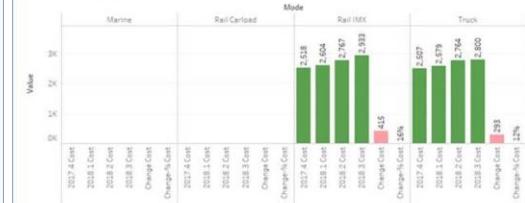
Travel Time Unreliability by Industry Cluster (95%/Mean TT)



Dashboard #3 -- Travel Cost



Travel Cost by Mode



Travel Cost by Industry Cluster



Source: FHWA

Dashboards for Travel Time, Unreliability, and Price by path, mode, and industry cluster; maps showing each quarter or changes; charts showing quarterly data; can filter by mode, industry, geography, etc.

SUPPLY CHAIN-LEVEL ANALYSIS

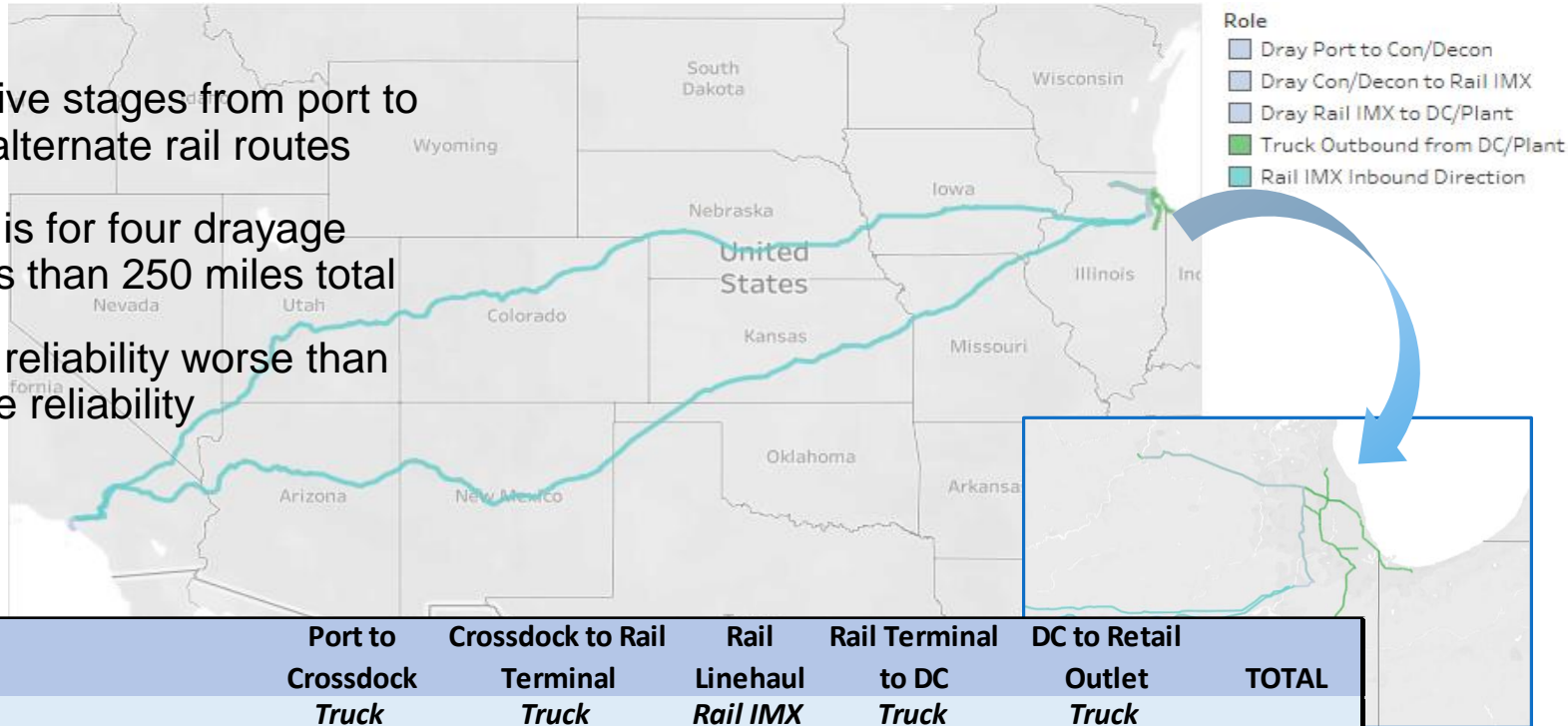


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Industry Example: Home Improvement

- Multimodal; five stages from port to retail outlet; alternate rail routes
- Half the cost is for four drayage stages of less than 250 miles total
- Import stage reliability worse than delivery stage reliability



	Port to Crossdock Truck	Crossdock to Rail Terminal Truck	Rail Linehaul Rail IMX	Rail Terminal to DC Truck	DC to Retail Outlet Truck	TOTAL
Miles	6	25	2200	109	103	2443
2017.4 Total Cost per Unit (\$)	489	526	2616	699	692	5022
2017.4 Linehaul Cost per Unit (\$)	487	518	2298	659	653	4615
2017.4 Fuel Cost per Unit (\$)	2	8	319	40	38	407
2017.4 Mean Truck Travel Time (hrs)	0.3	0.7		1.9	1.8	4.7
2017.4 Cross Modal Reliability (95%/50%)	1.5	1.6		1.1	1.3	

STATEWIDE ANALYSIS



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State Example: Missouri

- Truck, rail intermodal, rail carload, and water flows
- Inbound, outbound, through
- Ability to track multi-state performance metrics for a limited sample of industries
- Opportunity to build on national platform to increase coverage for industries and moves most significant to each State
- Could help states better fulfill FAST-Act mandate to address multi-State freight planning factors



Source: FHWA

OTHER APPLICATIONS



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- **Public Agencies (Federal, State, Metropolitan Planning Organization [MPO]/Regional)**

- Monitor Key Performance Indicators (KPIs), comparable to how freight system users monitor themselves, that have critical impacts on industry competitiveness
 - Supports economic development strategies by identifying transportation connections relied on by critical industries
 - Supports timely response to questions about supply chain disruptions, resiliency and redundancy, alternative service options for critical industries, last mile connectivity, and other freight transportation issues
 - Provides working tool that complements and combines with others in the public agency toolbox

- **Private Sector**

- Potential resource to provide benchmarking data to smaller/rural industries without access to this information



Source: FHWA

Looking Ahead



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Conduct continued outreach to State DOTs, MPOs and others to create awareness of tool and capabilities

- Through Transportation Research Board (TRB), American Association of State Highway Transportation Officials (AASHTO), Association of Metropolitan Planning Organizations (AMPO) event presentations in 2020

Expand Freight Fluidity community

- Webinar series with U.S. and Canadian Freight Fluidity community

FHWA Office of Freight Management and Operations (HOFM) examines adding additional capabilities in tool

- Additional quarters, industry sectors, applications
- Evaluation of new data sources
- Pilot use of tool

MORE INFORMATION



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Chandra Bondzie

FHWA HOFM

chandra.bondzie@dot.gov

202-366-9083

FEWSION supply chain Visual Analysis

For North Jersey Transportation Planning Authority
August 17th, 2020



What is FEWSION?

<https://fewsion.us>

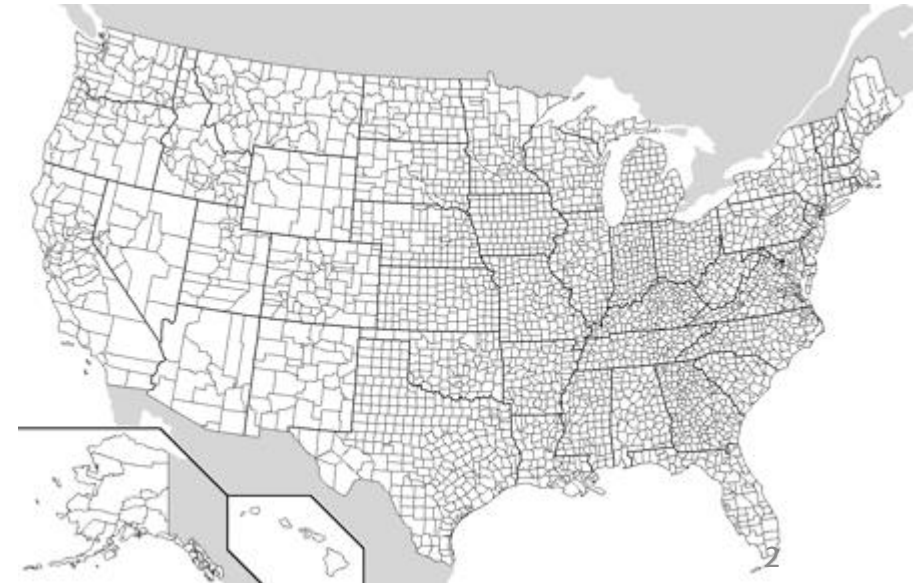


The Big Idea: rapid, local, visual, global, multi-domain / all-hazard supply chain intelligence and visual analysis

NSF/USDA funded basic research: The first complete mesoscale database + visualization of the U.S. supply chains, network vulnerability, and resilience.



ACI-1639529, INFEWS/T1: Mesoscale Data Fusion to Map and Model the U.S. Food, Energy, and Water (FEW) System



FEWSION Core Competencies for Freight Planning

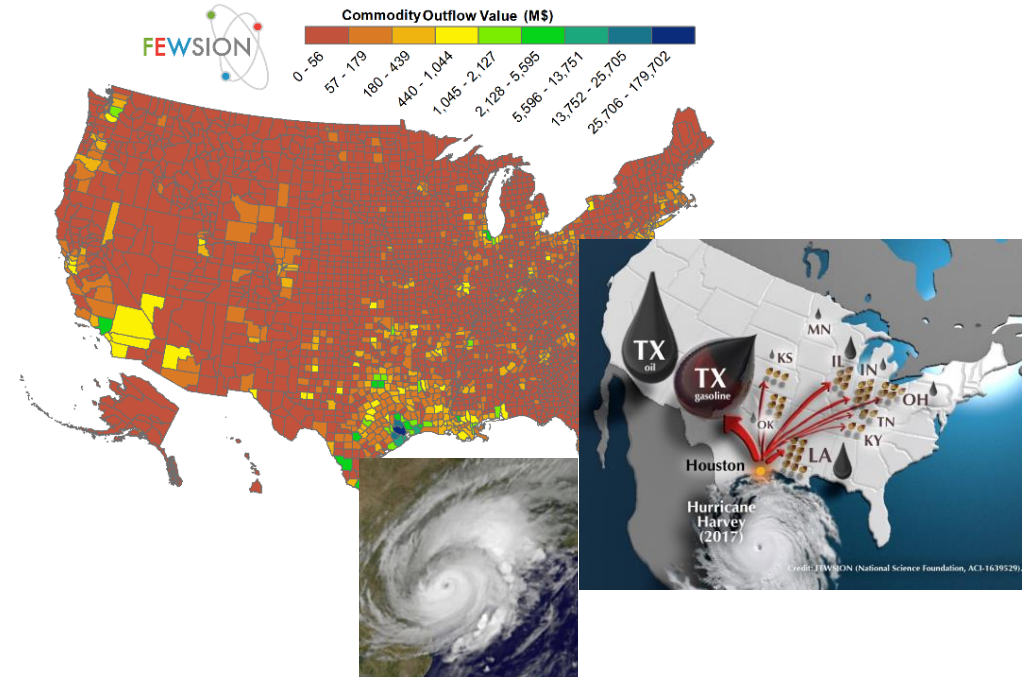


Capabilities

- Identify likely knock-on supply chain impacts
- Identify key distribution hubs, corridors, vulnerabilities
- Identify shifts in supply chain flows
- (pending) link to realtime freight data streams
- (pending) facility-level and routing data
- (pending) rerouting and adaptation gaming

Value Added

- Visualization makes it rapidly accessible
- Expert value added: translation and estimation
- Expert value added: whole-system / multi-domain context



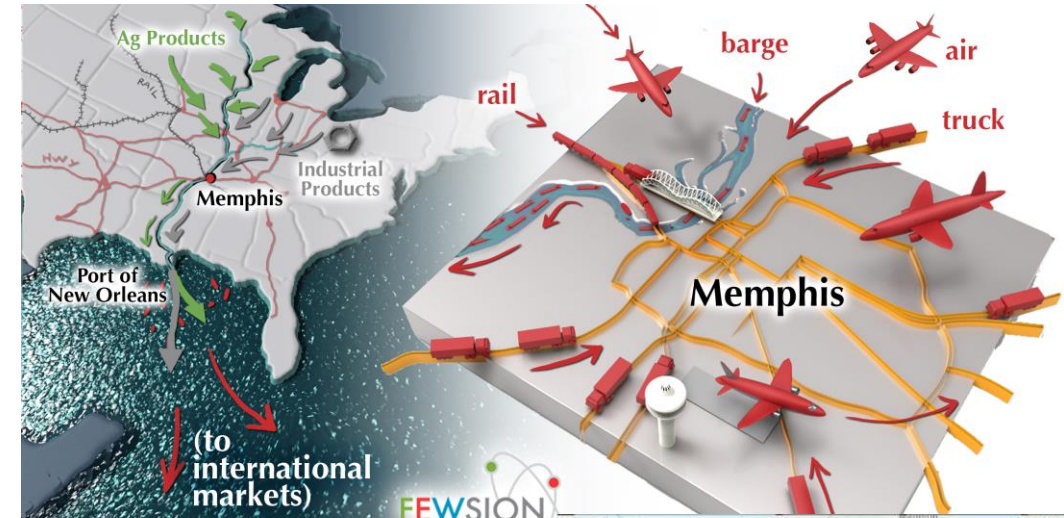
Hurricane Harvey and Harris County, TX (Houston)

*Satellite Image Credits: NASA/NOAA GOES Project,
<https://www.nasa.gov/feature/goddard/2017/harvey-atlantic-ocean>*

FEWSION has already supported FEMA for CONUS Emergency Management Planning and Response



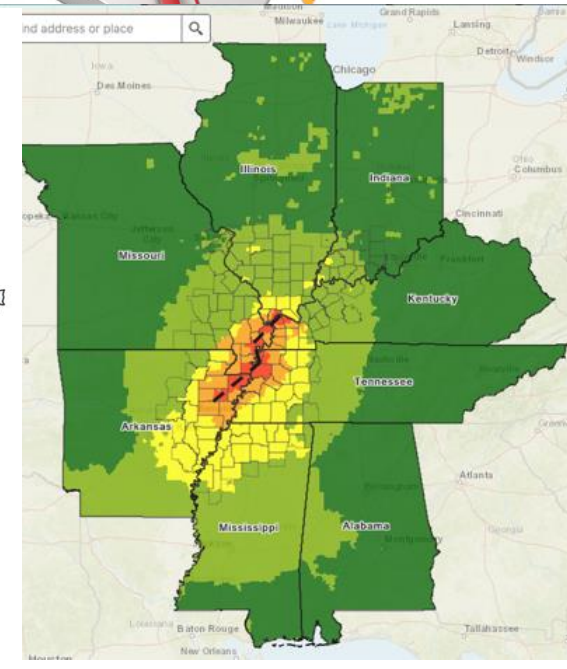
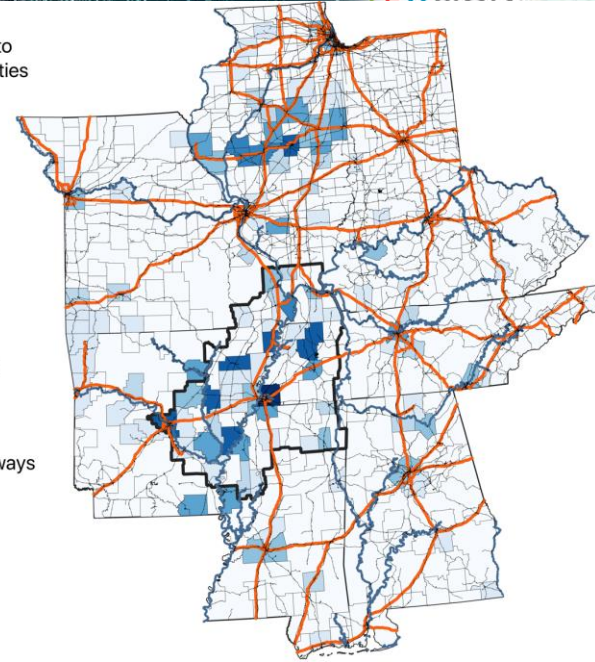
- New Madrid “Shake and Fury” 2019
- Hurricane Harvey
- Hurricane Florence
- LA “ShakeOut” 2018
- Wasatch 2020
- Hurricane Irma power outage in Florida
- Seattle, Chicago, Houston, DC CRTE w/ANL



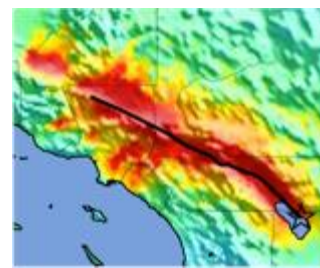
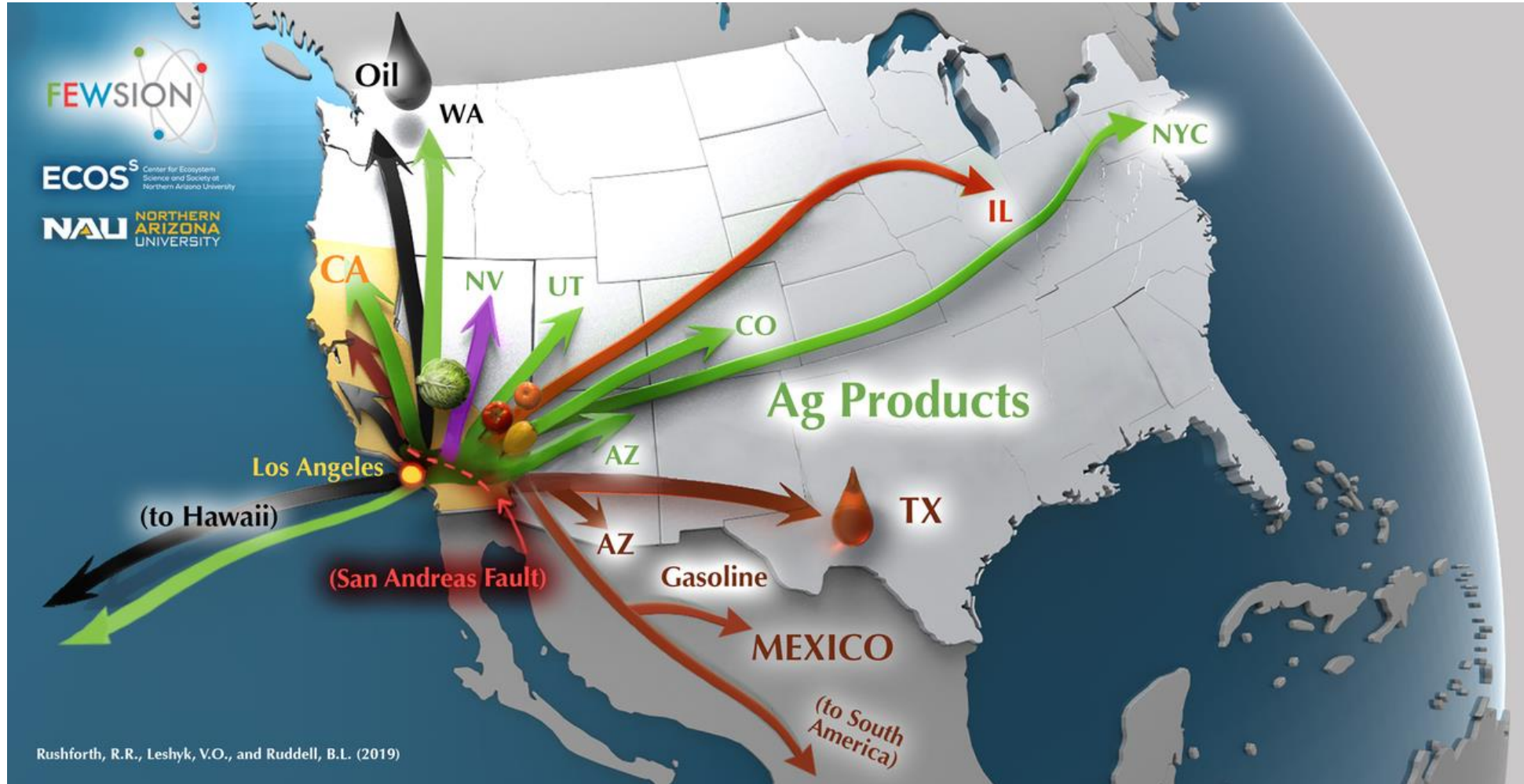
County Food Sources to Severely Affected Counties Within NMSZ States (% of Total)

0.00% - 0.08%
0.08% - 0.28%
0.28% - 0.50%
0.50% - 0.93%
0.93% - 1.71%
1.71% - 2.56%
2.56% - 6.24%
6.24% - 10.06%

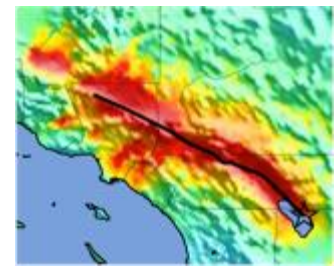
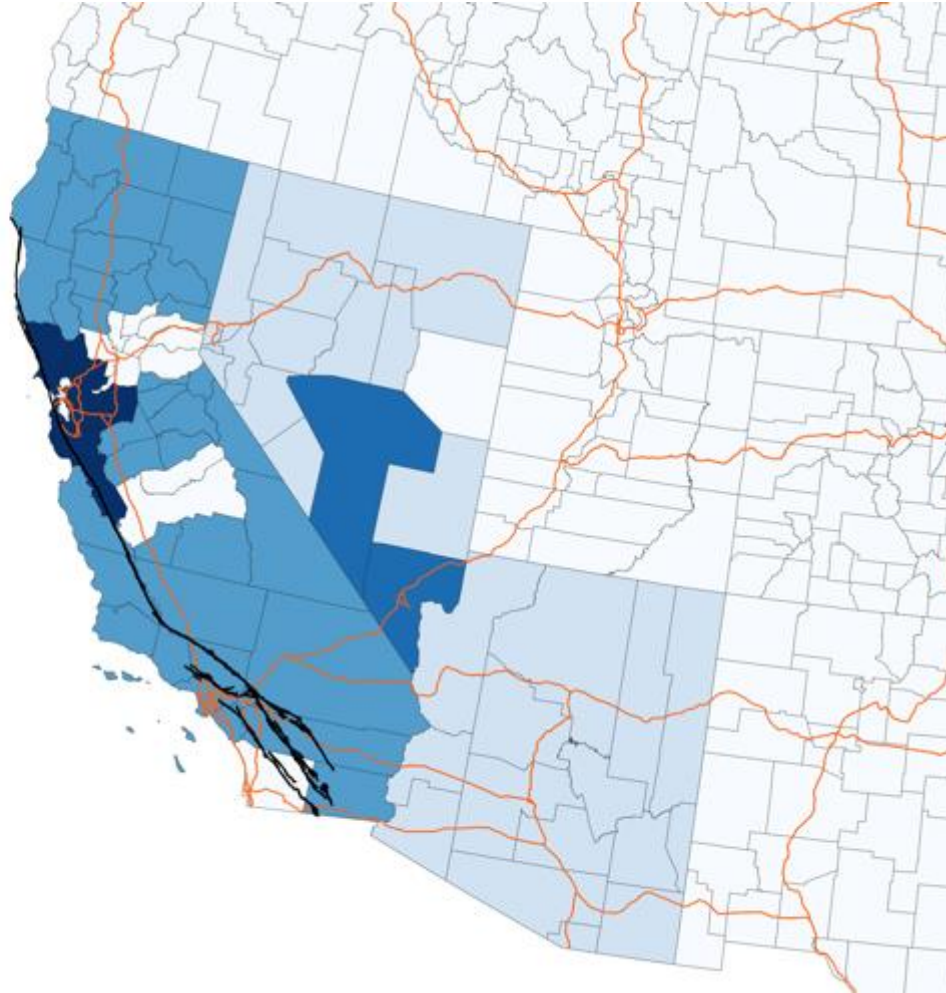
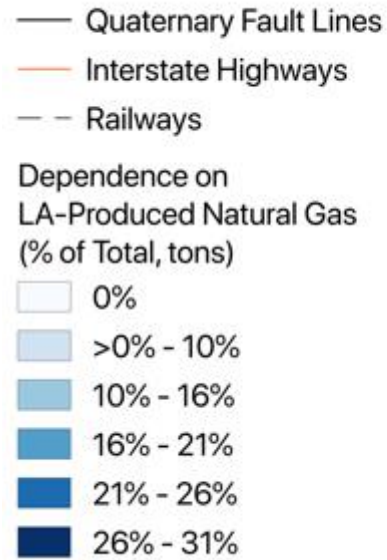
— Interstates
— Railways
— Navigable Waterways



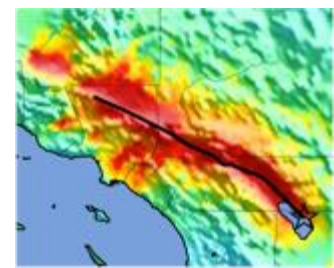
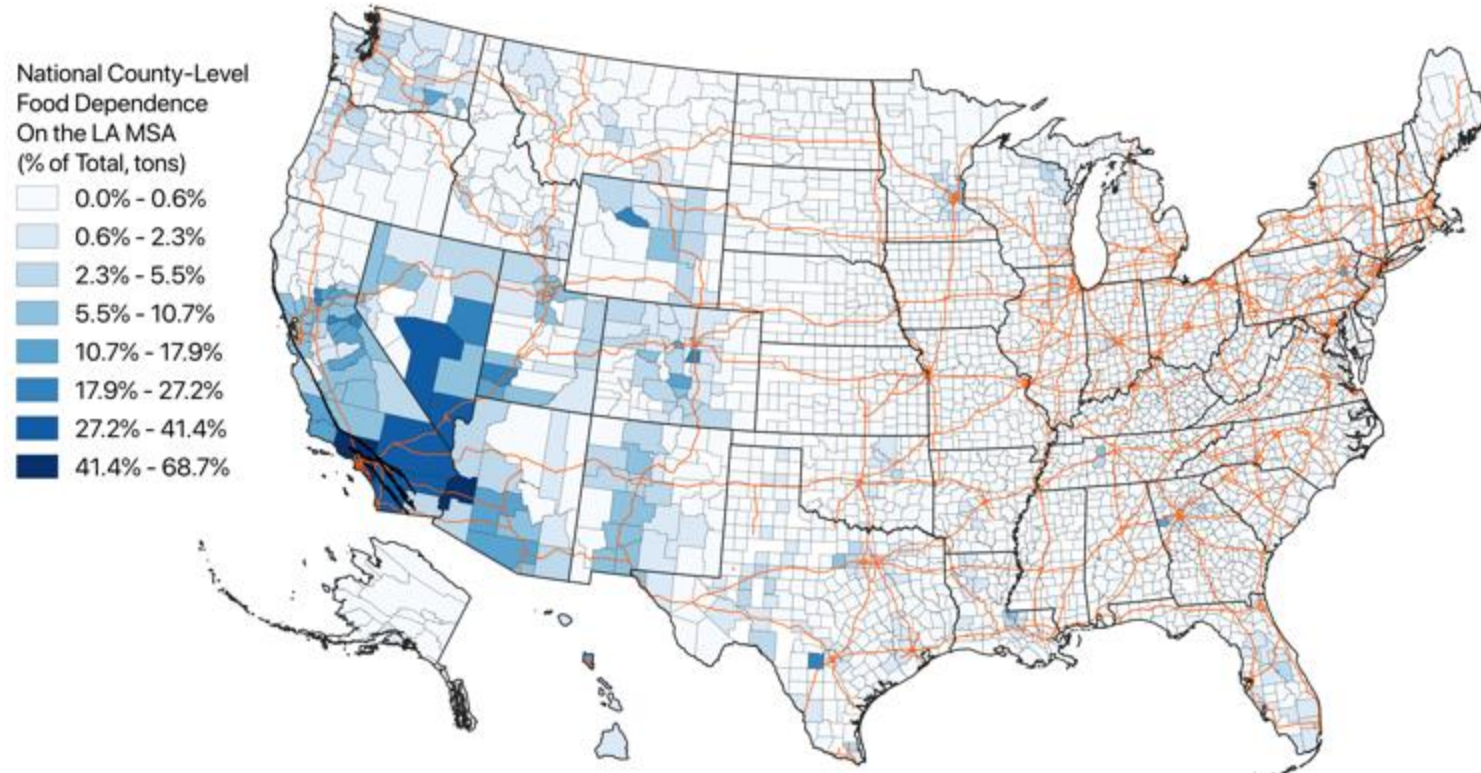
Example: Southern California ShakeOut (Southern San Andreas 8.7 Scenario)



Dependency on LA-sourced Natural Gas



National Dependence on Food Commodities FROM the LA Metropolitan Area



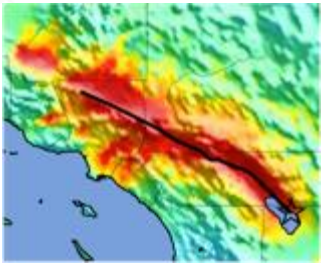
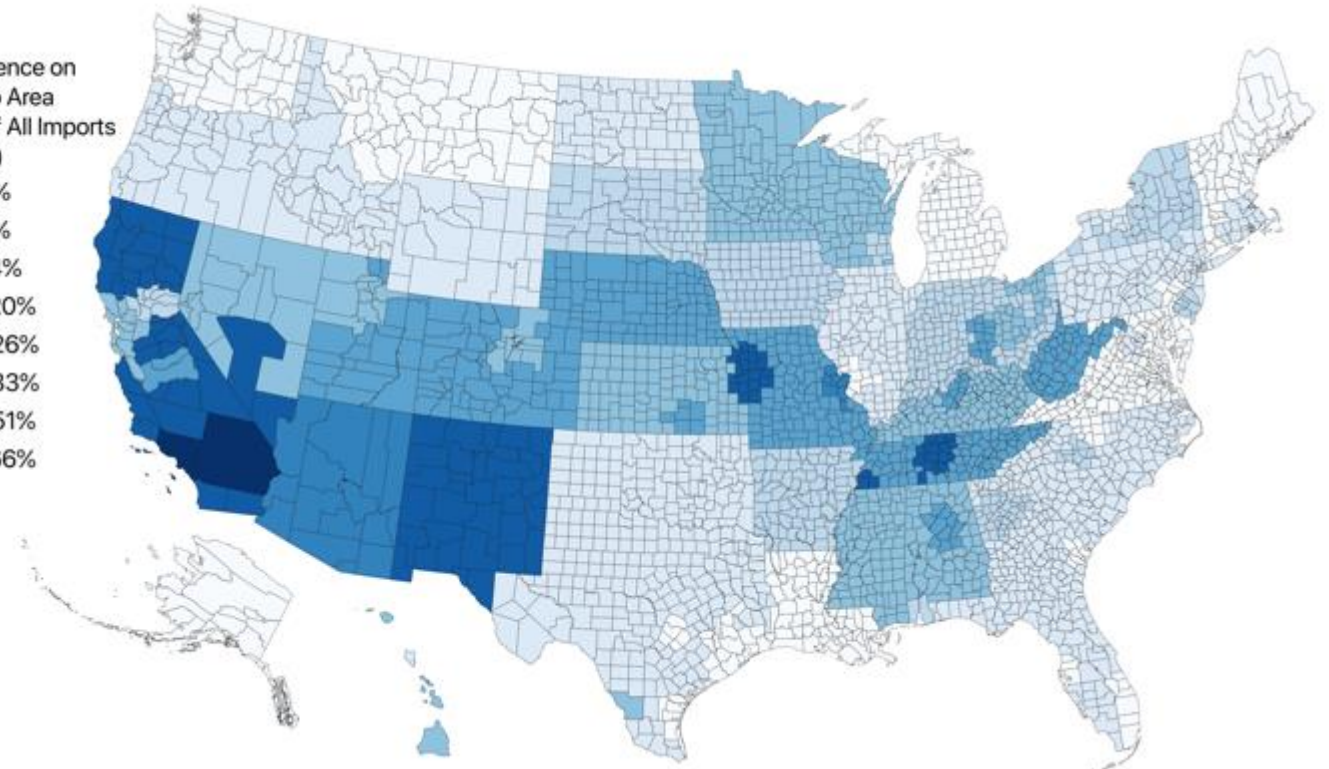
Dependency of US counties on IMPORTS through LA (via Port of Los Angeles)

LA Imports tend to be Asian-sourced commodities such as:

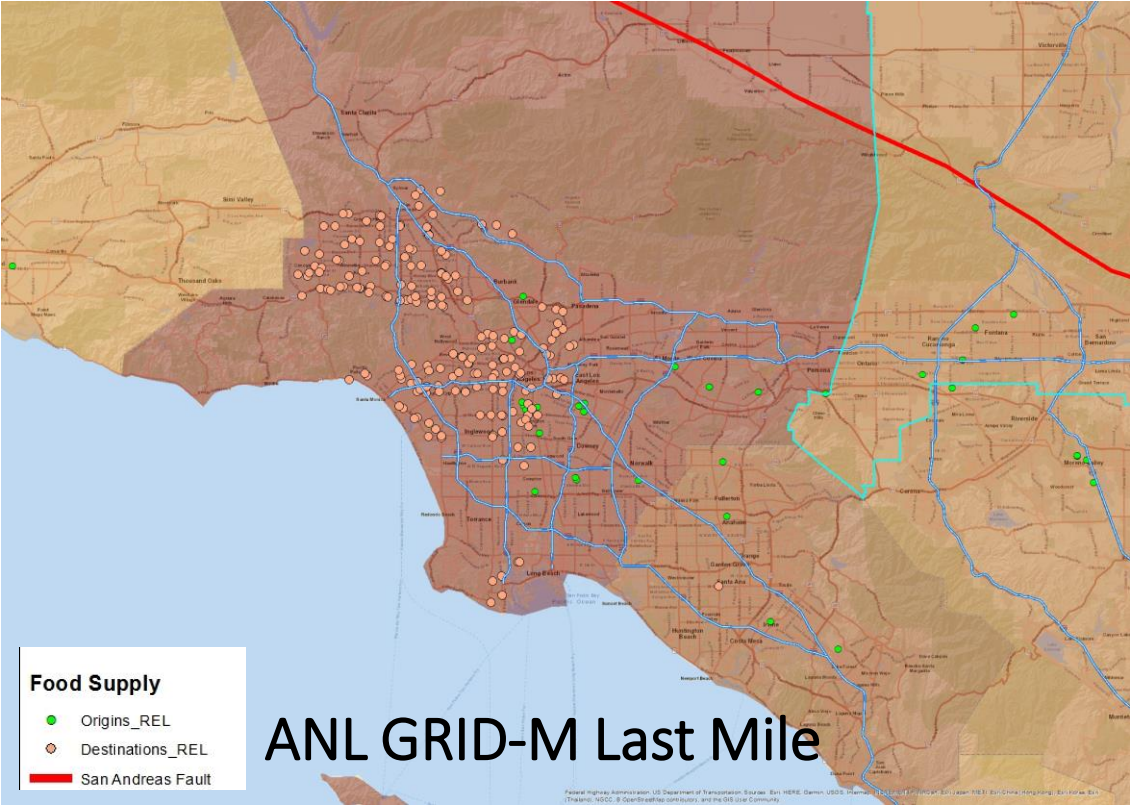
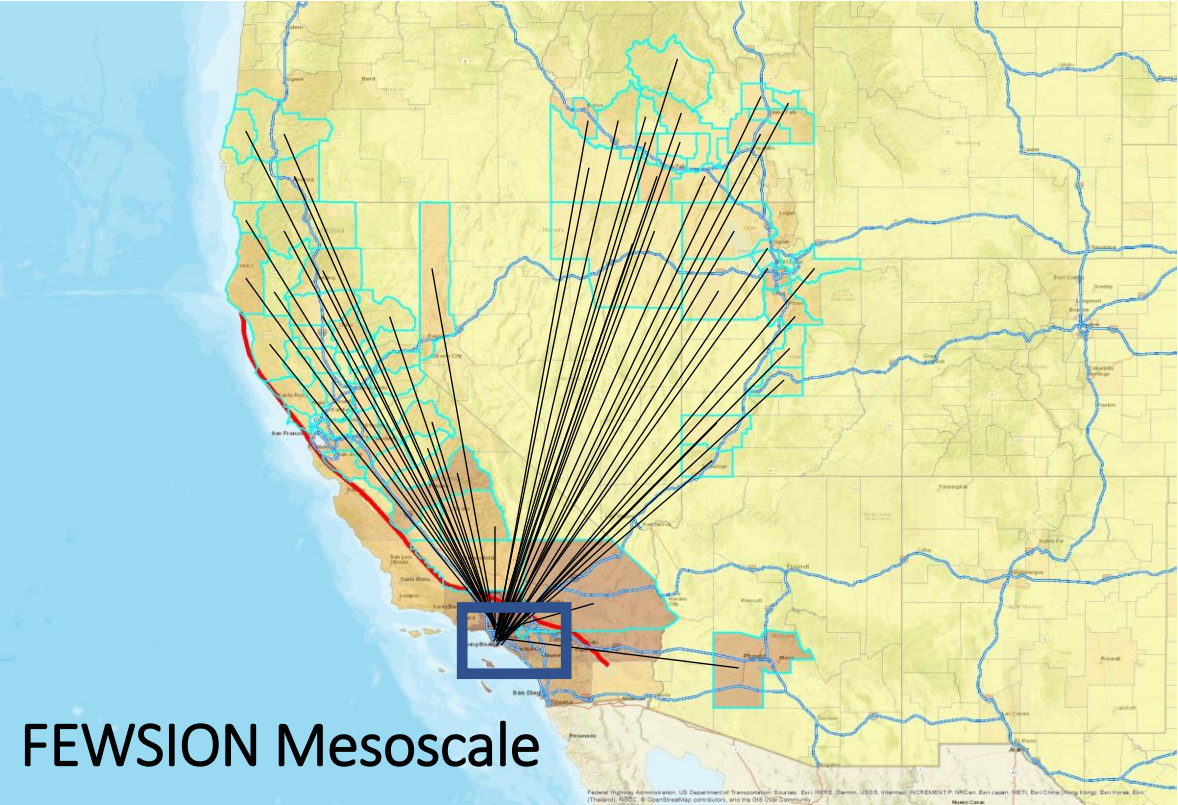
Top 3 Imports (tons)	Top 3 Imports (\$MM)
Electronics	Crude petroleum
Textiles/leather	Electronics
Motorized vehicles	Textiles/leather

U.S. Dependence on the LA Metro Area
LA Imports of All Imports (% of Total, \$)

- 0% - 3%
- 3% - 8%
- 8% - 14%
- 14% - 20%
- 20% - 26%
- 26% - 33%
- 33% - 51%
- 51% - 66%



Regional and Last-Mile datasets can be aligned (LA Grocery Example)

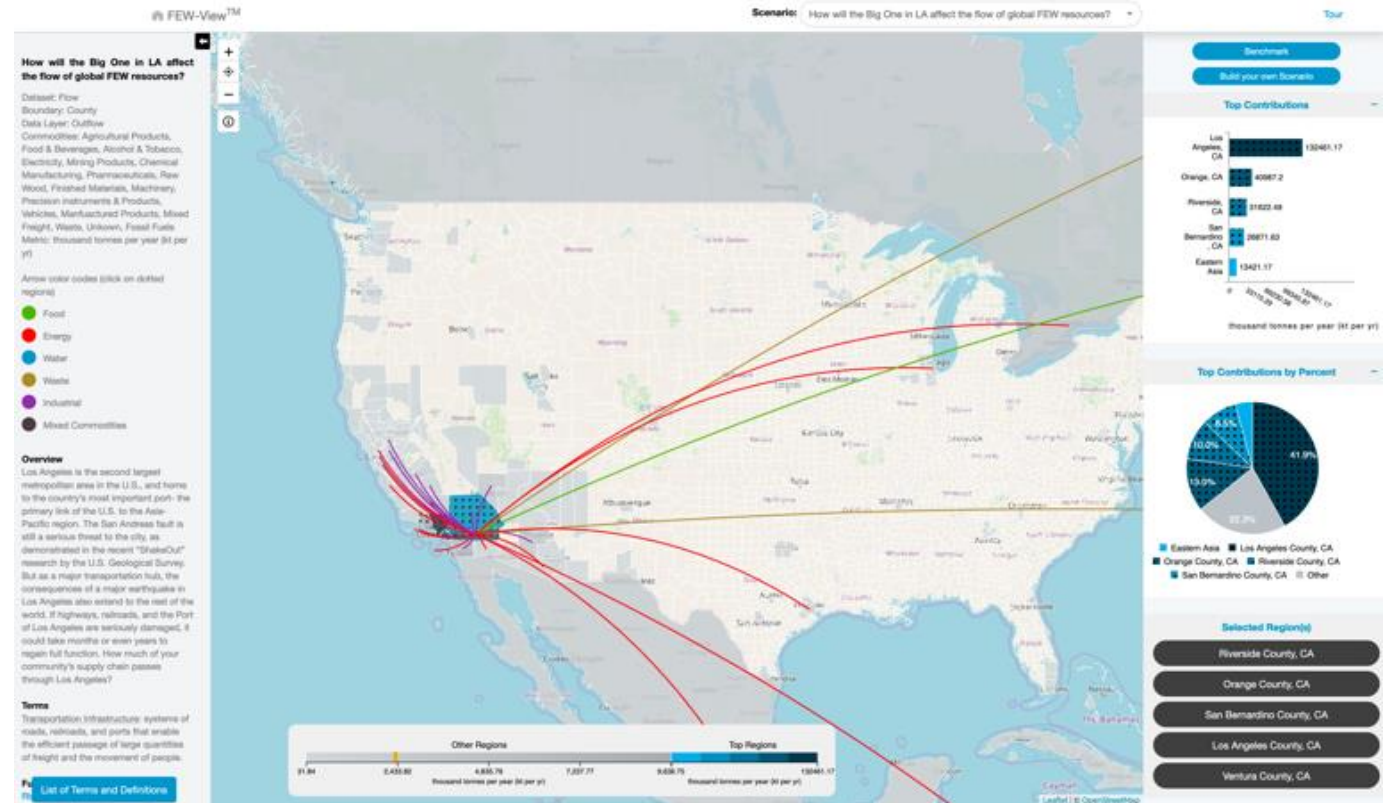


How do you view US FEWSION data?



<https://fewsion.us/FEW-View>

- FEW-View™ is an interactive data portal to interact with FEWSION data.
- Users can generate custom supply chain maps on-the-fly to suit their current needs
- This public portal accesses only a small fraction of the FEWSION database at present (v1)...



Questions?



Benjamin L. Ruddell, Ph.D., P.E.
Northern Arizona University
Director, School of Informatics, Computing, and Cyber Systems
Director, FEWSION Project, <https://fewsion.us>



Appendix

FEWSION Source Databases

County Data

- U.S. Census Population Data
- U.S. Census Economic Census
- Bureau of Labor Statistics
- U.S. Geological Survey
- U.S. Department of Agriculture National Agricultural Statistics
- U.S. Department of Agriculture Economic Research Service

Metro Area Data

- U.S. Census Commodity Flow Survey
- Oak Ridge National Laboratory/ U.S. Department of Transportation Freight Analysis Framework

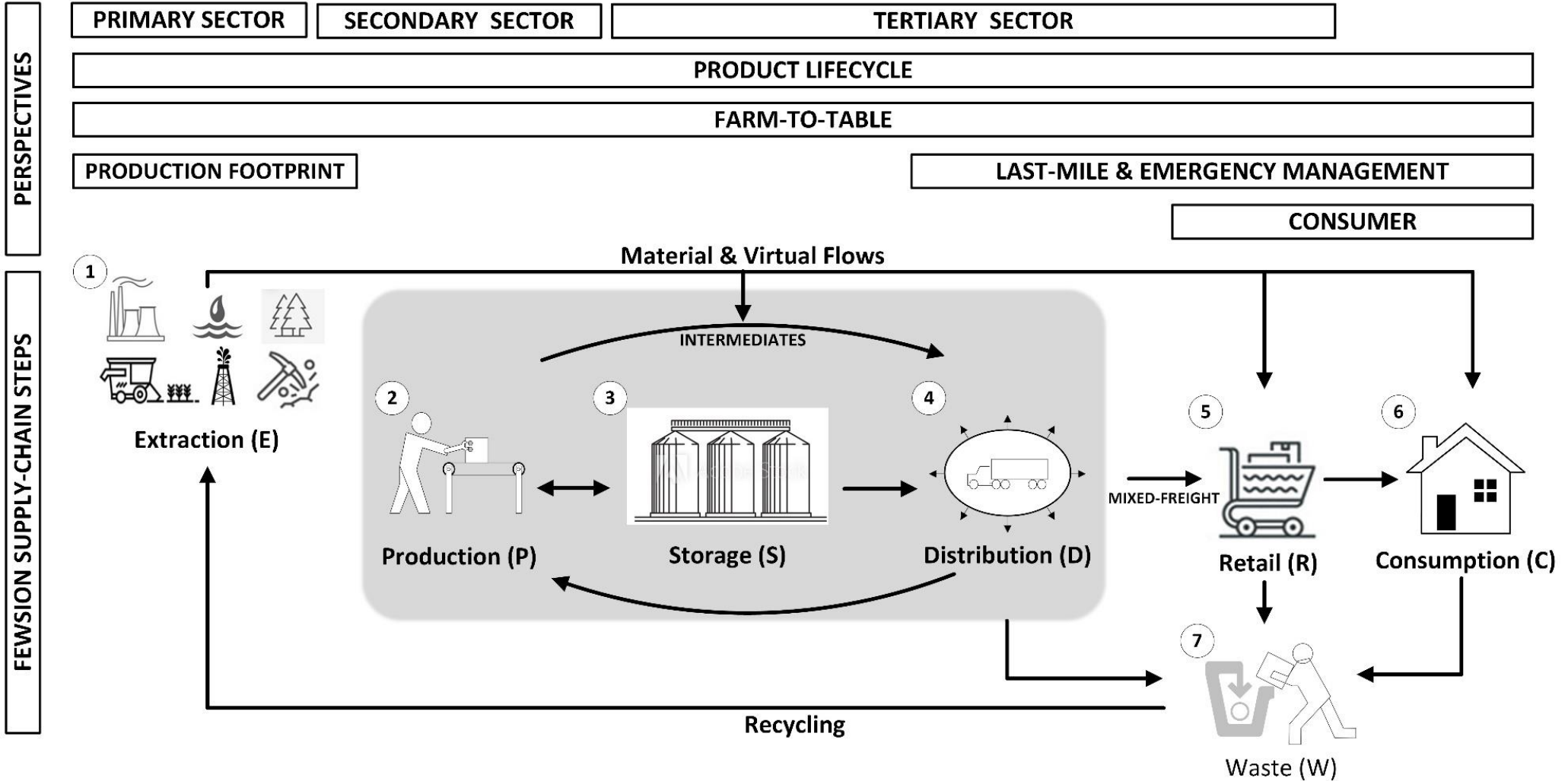
Point Data

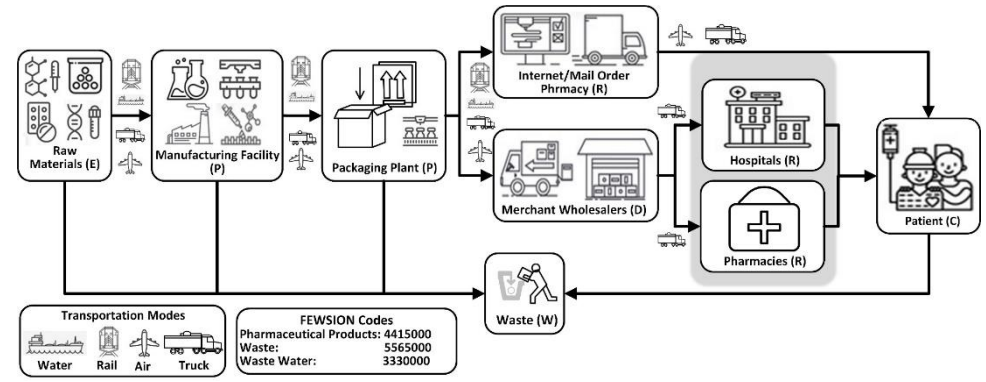
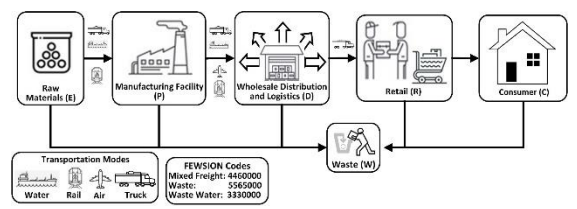
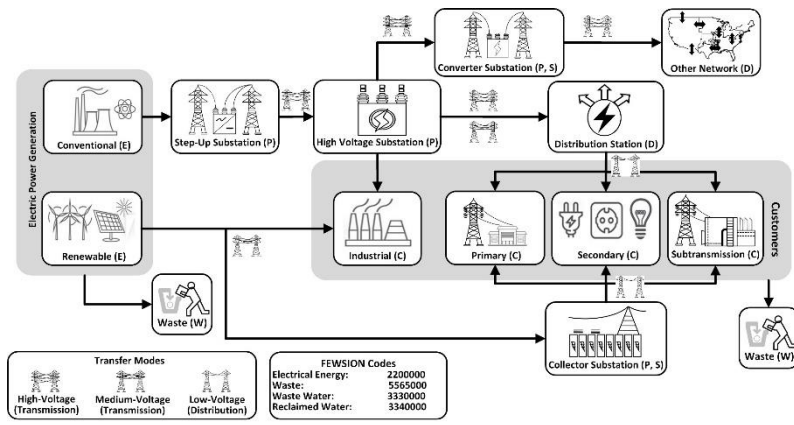
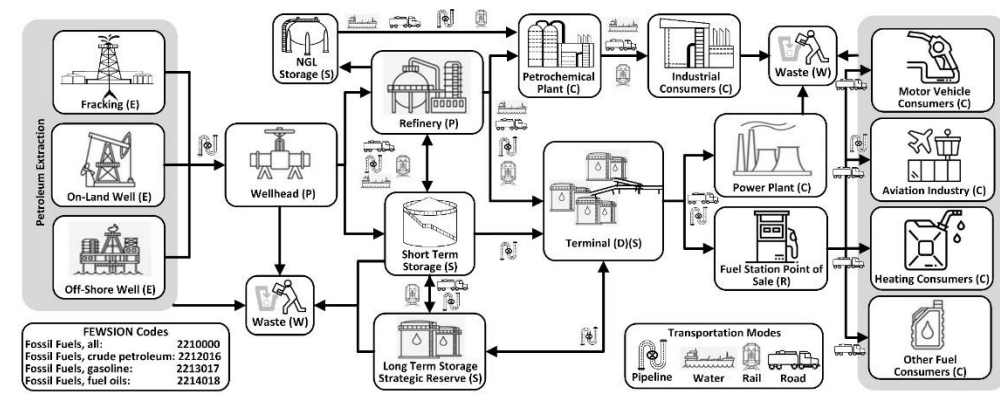
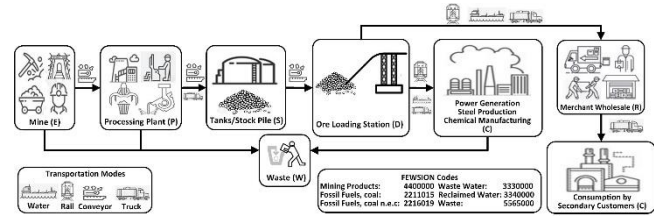
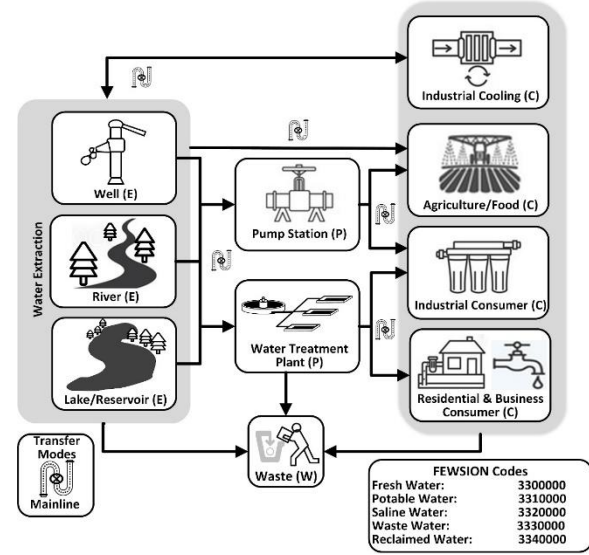
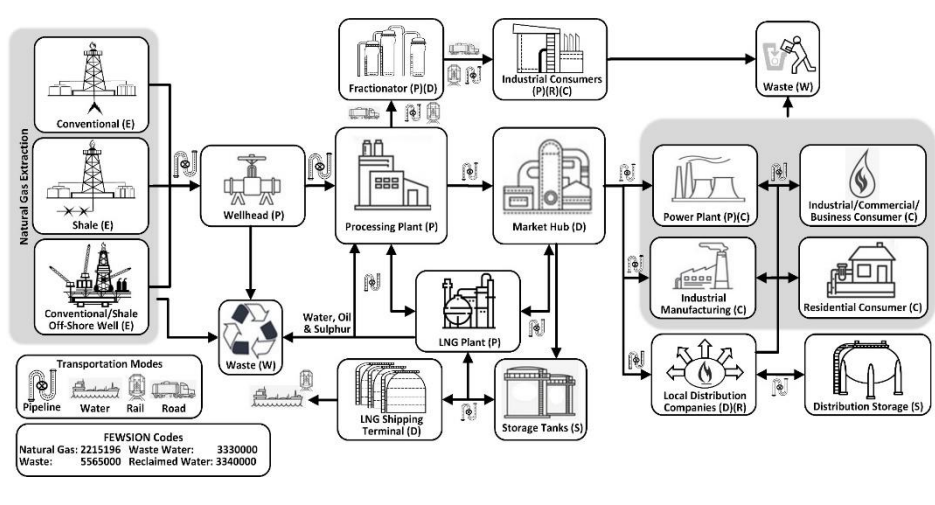
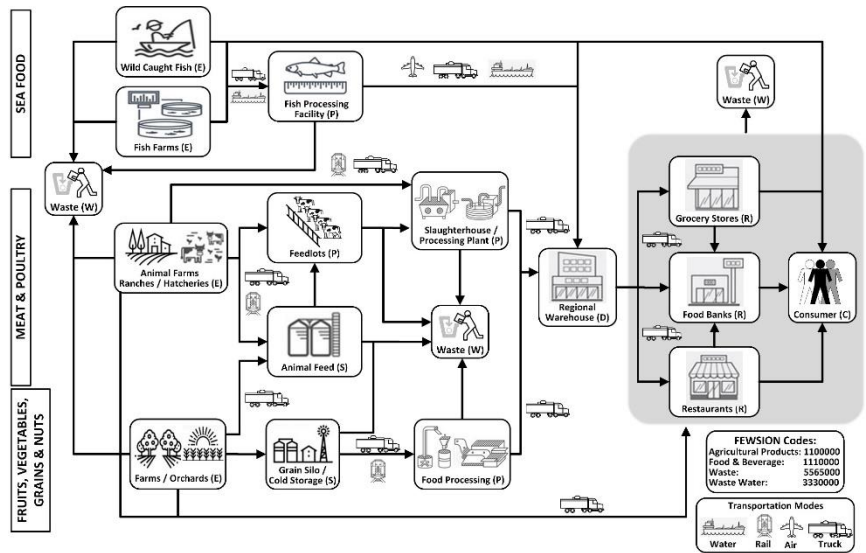
- U.S. Energy Information Administration
- U.S. Environmental Protection Agency
- U.S. Department of Homeland Security
- U.S. Department of Agriculture CropScape

Other Data

- DHS HIFLD Open Data
- National Renewable Energy Laboratory ReEDS Energy & Power Flow Data
- National Renewable Energy Laboratory ReEDS Water Withdrawal and Consumption Data
- U.S. Foreign Trade Data
- Global Water Productivity Data
- Water Footprint Network

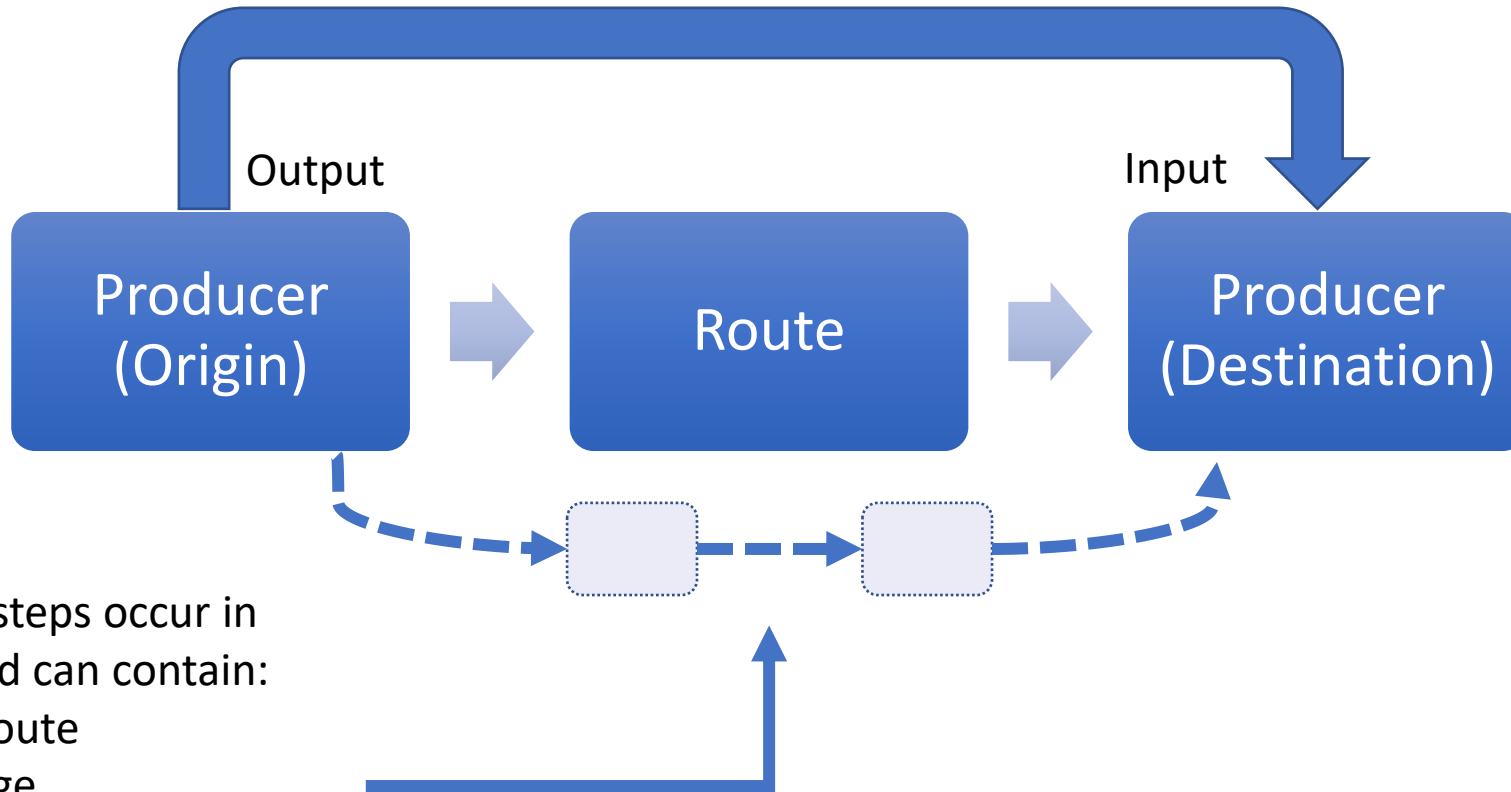
FEWSION Standard Supply Chain





FEWSION Supply Chain Data Model

Commodity / Supply Chain Flow



Examples:
 Manufacturer,
 Snowpack,
 Distributor,
 Farm

Examples:
 Retailer,
 Manufacturer,
 Refinery,
 Distributor

Route may include n steps occur in parallel and series and can contain:

- Transport mode/route
- Distribution/storage
- Transport Mode
- Retail/Sale
- Capacity and Utilization

FEWSION Database™ 1.0: Comprehensive Commodity Flow Mapping for the United States



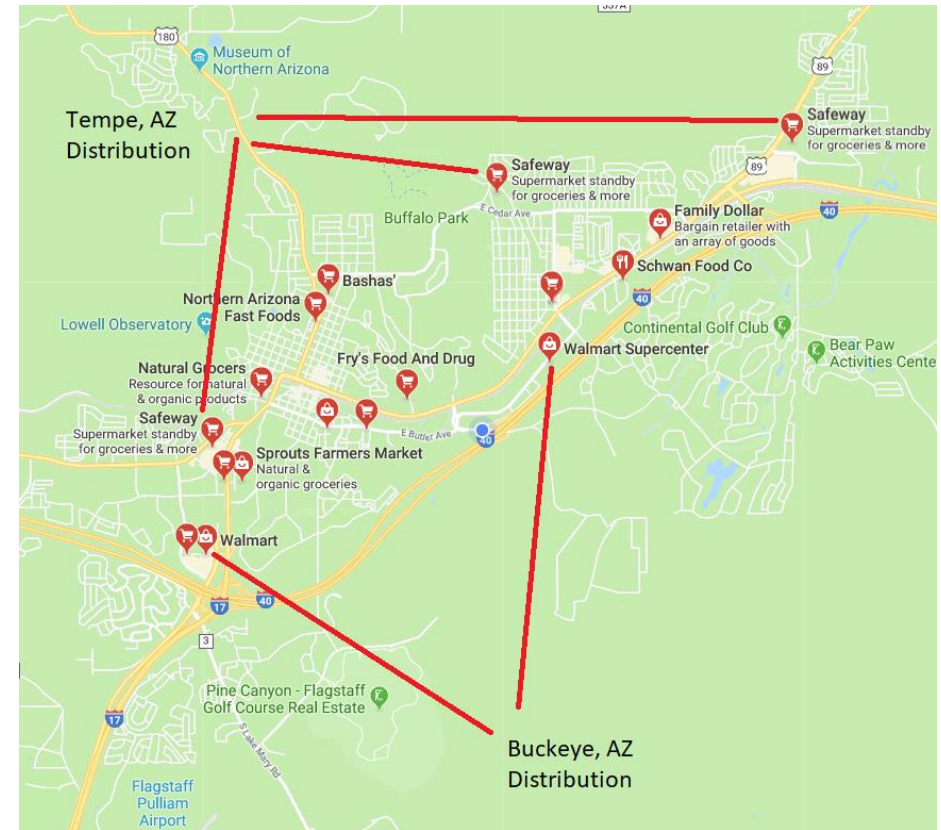
- 46 Commodity categories (SCTG+FEWSION)
 - Food
 - Pharmaceuticals
 - Fuels (Natural Gas, Diesel, Gasoline, Coal)
 - Electricity
 - Water
 - ... and everything else as well
- 3,143 Counties and 8 Foreign Regions
- 7 transportation modes (Pipeline, Electric Grid, Rail, etc.)
- 2012 annual data

FEWSION for Community Resilience (F4R™)



<https://fewsion.us/f4r/>

- Participatory last mile mapping process (including students & volunteers, but also emergency managers)
- What facilities and people are responsible for those flows indicated by FEWSION data?



Flagstaff, Arizona Grocery Retail and Distribution (last mile)

August 17 Freight Initiatives Committee Agenda

- Roll Call of Members
- Approval of Minutes
- Update on NJTPA Freight Division Activities
- Presentations on Analyzing and Visualizing Critical Supply Chains
- Two-Minute Reports on Freight Activities from Committee Members
- Next Meeting: Wednesday October 21, 2020 on the Pharma and Food/Beverage Supply Chains
- Adjournment

Thank you. Stay healthy and safe.

A screenshot of a Zoom meeting interface. At the top, it says 'View Who's Talking' with a dropdown arrow, a '1' next to a person icon, a chat icon, and a settings gear icon. A red arrow points from the text 'Please use the Chat box to ask questions...' to the chat icon. The main text reads: 'Please use the Chat box to ask questions during the presentations and if requesting credits, please post your name, followed with either AICP or PE with your PE license number'. Below this, another red arrow points from the text 'Please mute yourself when not speaking.' to the 'Mic' button in the bottom toolbar. The toolbar includes a 'You are muted.' notification, 'Mic', 'Camera', 'Screen', and 'Leave' buttons.

View Who's Talking 1

Please use the Chat box to ask questions during the presentations and if requesting credits, please post your name, followed with either AICP or PE with your PE license number

Please mute yourself when not speaking.

You are muted. Mic Camera Screen Leave