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

Presentation to Freight Advisory Committee
Chicago - CMAP
June 17, 2019

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FHWA Freight Fluidity FAC Presentation Focus:

- FHWA Freight Fluidity Program and Objectives
- Freight Fluidity Supply Chain Monitoring Program Industry Inputs
  - Industry sector selection
  - Supply chain inputs
- Freight Fluidity Supply Chain Monitoring Tool

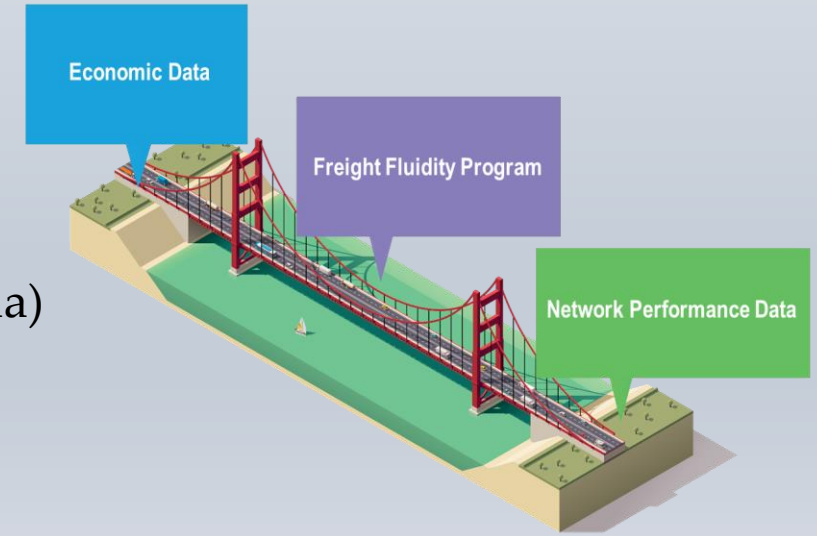
FHWA Freight Fluidity Program

Why?

- Respond to needs for State and regional freight planning as they
  - As they develop multimodal performance measures and freight policy to support statewide and regional freight planning and investment and comply with MAP21 and FAST ACT requirements
- Bring a multimodal perspective to freight performance 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
- Build on example work of other fluidity efforts (e.g. Transport Canada)



National Freight Fluidity Monitoring Program

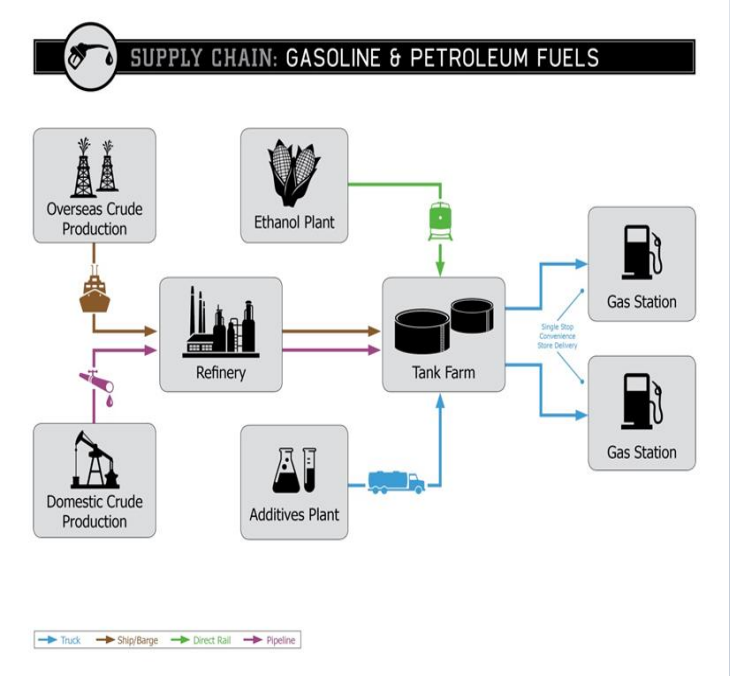
Project Objective:

- 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



FHWA Freight Fluidity Supply Chain Monitoring: National Program

Issues	Approaches
What we are measuring?	Travel time, travel time reliability, transportation cost Domestic movements – truck, rail, air, water Supply-chains (end-to-end across modes) and component segments
How much are we measuring?	Representative sample of critical US supply chains "Dow Jones Index" of key infrastructure, based on actual industries
How are index supply chains being chosen?	Selected for coverage of primary economic sectors and high-growth sectors Use of all modes, coverage of US regions Short and long-haul moves, domestic/cross-border/global supply chains
How is data being collected?	Target industries identified and recruited Industries tell us their primary supply chain (commodity/mode/O-D) patterns • **No exchange of confidential information** Project team assembles data to tabulate metrics for supply chain patterns • **Real data, not models** • Supply chain level, not regional/area level (like FAF or Transearch) • Public and private sources have been identified
What are the outputs?	Initial "National Fluidity *Monitoring* Dashboard" with continuous quarterly updates

Freight Fluidity - Supply Chain Selection Criteria

- Data-driven analysis of national "market basket" candidates, identifying industry sectors and candidate firms
- Criteria:

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

Geographic coverage of US: 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 in US trade

Modal and travel distance diversity

FHWA Freight Fluidity Project – Industry Sectors

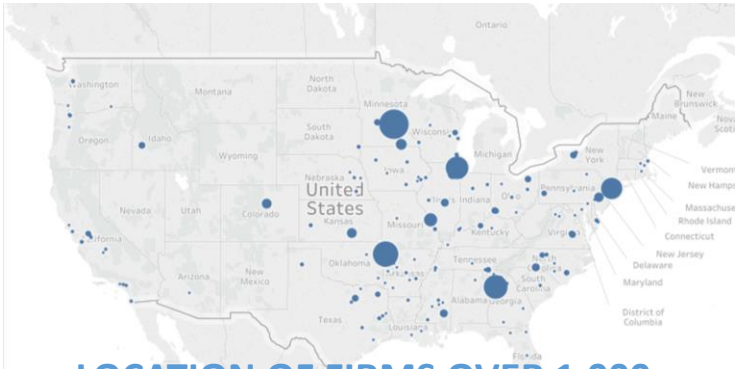
#	Industry Sector	Candidate Companies
1	Oilseed & Grain Farming and Production	ADM, Perdue, Cargill, ConAgra
2	Oil & Gas Extraction	Conoco Philips, EOG, Andarko, Pioneer, BP, Shell
3	Coal, Metal Ores, and Nonmetallic Minerals	Peabody, Arch, Cloud Peak, Powder River Basin LLC, Alliance
4	Food Products Manufacturing	Anheuser-Busch, Coca-Cola, Perdue, General Mills, Tyson
5	Dairy Products Manufacturing	Nestle, Kraft, Land O'Lakes, Cabot
6	Paper Manufacturing	Georgia Pacific, Weyerhauser, Int'l Paper
7	Petroleum and Coal Products Manufacturing	Exxon Mobil, Chevron, BP, Atlantic Richfield
8	Organic Chemicals Manufacturing	Mosaic, Monsanto, CF Industries, DuPont, BP
9	Resins and Synthetics Manufacturing	Dow, Lyondell, BASF
10	Pharmaceuticals Manufacturing	Eli Lilly, Merck, Johnson & Johnson
11	Plastics & Rubber Manufacturing	Goodyear, Dart Container, Newell (Rubbermaid)
12	Nonmetallic Minerals Manufacturing	Vulcan, Martin Marietta, Holcim, Cemex, Lafarge, Corning
13	Steel & Fabricated Metals Manufacturing	Arcelor, Nucor, Valmont
14	Construction/Industrial Machinery Manufacturing	Caterpillar, John Deere, Volvo
15	Computers/Electronic Products Manufacturing	Intel, Samsung, Qualcomm, Panasonic, GlobalFoundries, Cisco
16	Motor Vehicles & Parts Manufacturing	GM, Ford, Fiat/Chrysler, Toyota, Honda
17	Aircraft/Other Transportation Manufacturing	Boeing, Northrup Grum[illegible] Lockheed Ma[illegible]
18	Medical Instruments Manufacturing	Sie[illegible]
	[illegible] Service & Wholesale	

- Sectors included: Retail, technology, e-commerce, energy, chemicals, transportation equipment and machinery, etc.
- Major, recognizable companies targeted and recruited

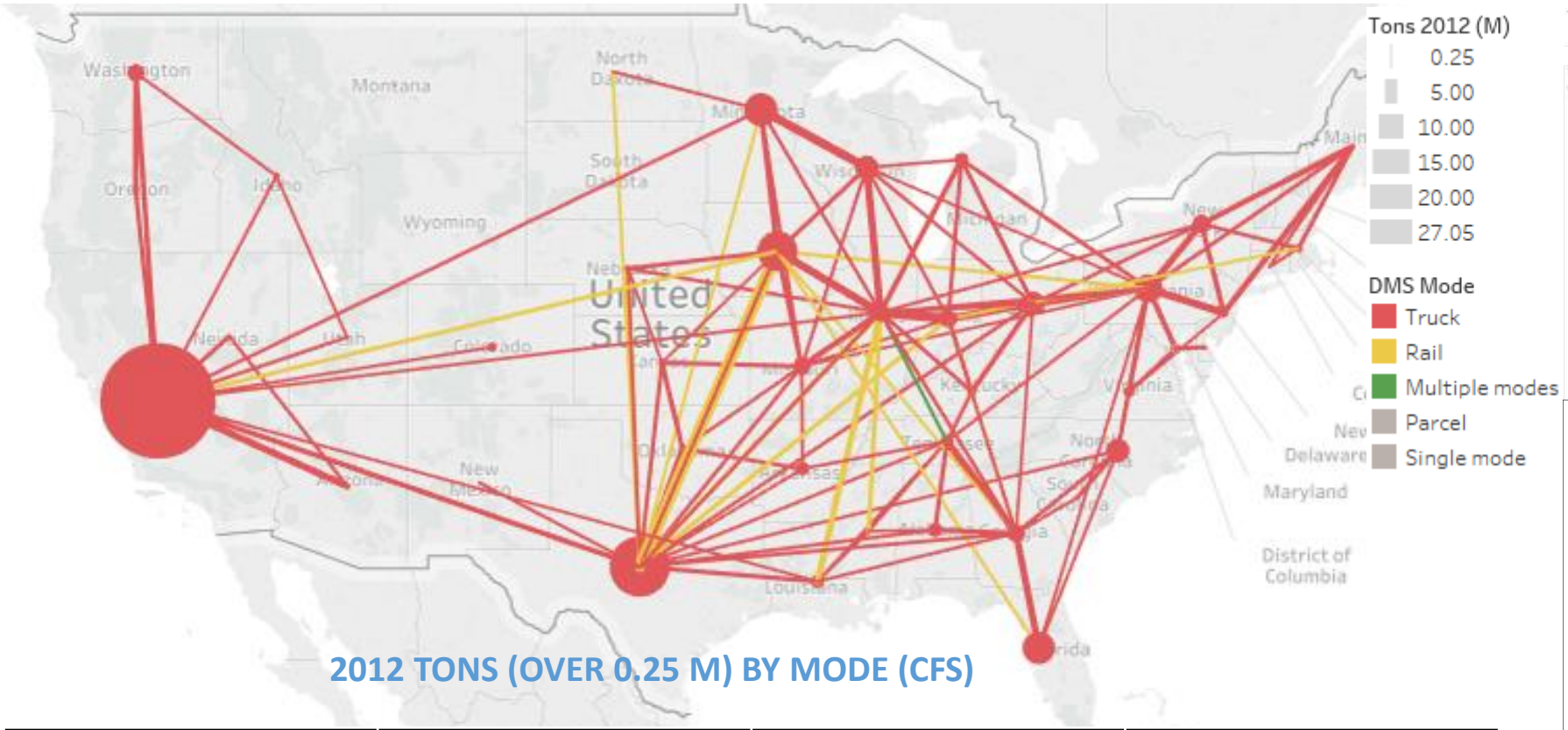
Industry Sector Example: Food Products Manufacturing

- Definition: NAICS 311-2
- Typical Commodities: fresh, frozen, or processed meats, poultry, fish, fruits, vegetables; milled grains/oilseeds; sugars; baked goods; beverages
- Representative Supply Chains: Anheuser-Busch, Coca-Cola, Perdue, General Mills

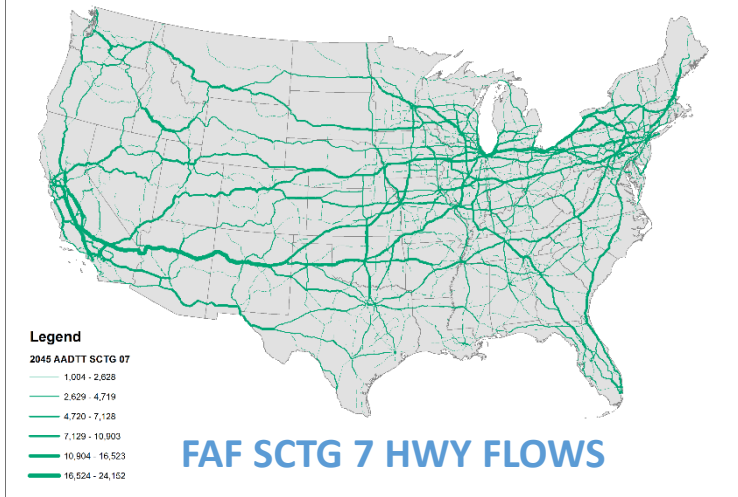
EMPLOYMENT BY NAICS (CBP)



LOCATION OF FIRMS OVER 1,000 EMPLOYEES BY NAICS (INFO USA)



2012 TONS (OVER 0.25 M) BY MODE (CFS)

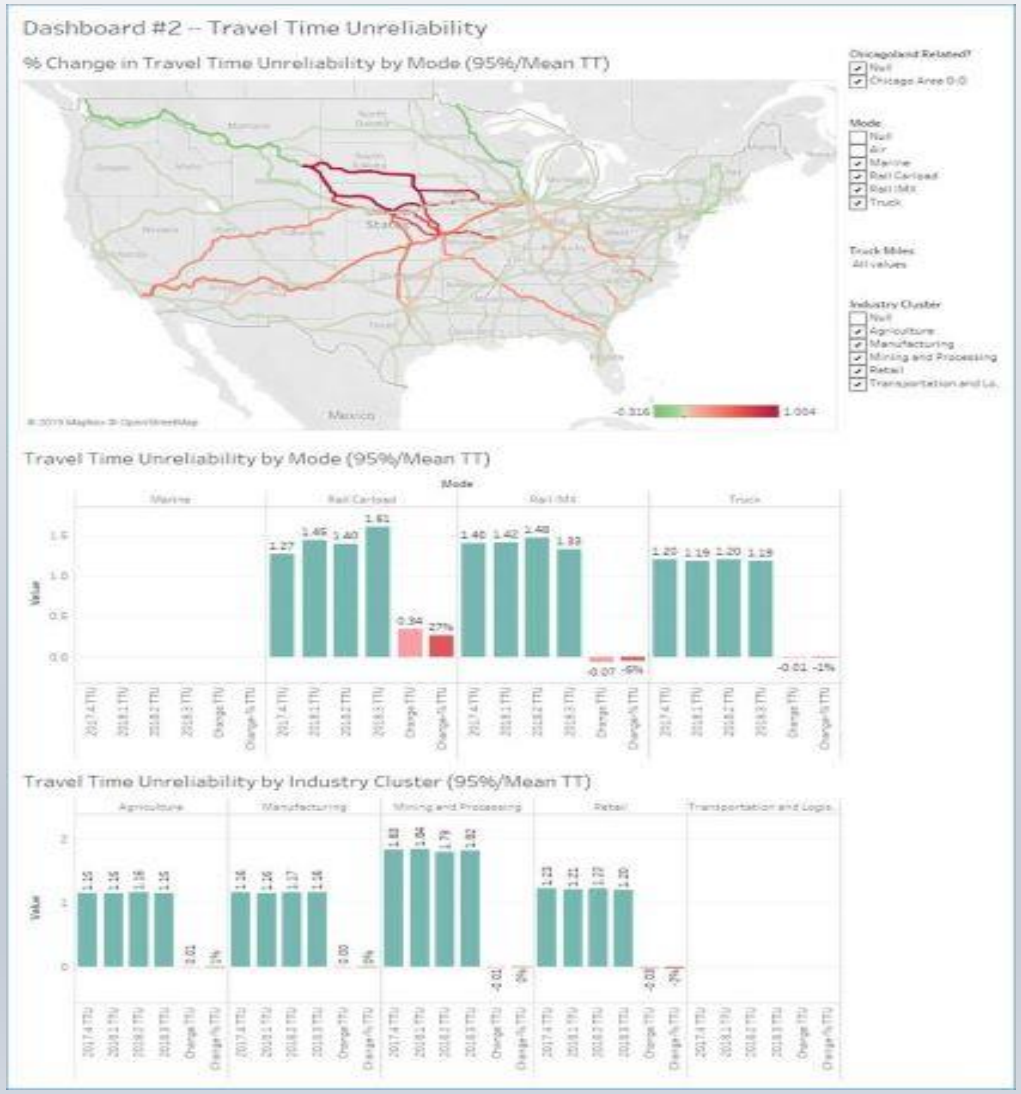


FAF SCTG 7 HWY FLOWS

NAICS GDP	Trade Share (CFS Value)	D Modes (CFS Ton-Miles)	Tons and Avg Dist (CFS)
$493 B	4% E, 96% D or I	68% T, 20% R, 12% O	706 M tons, 440 miles

FHWA Freight Fluidity Tool - Dashboard

- Dashboard concept
  - Database listing each supply chain and component, structured to allow performance metrics to be appended over time
  - Dashboard visualization platform
  - Integration with FHWA HEP-GIS" and other existing display systems
- Contains travel time, travel time reliability and cost data
  - Cost data: "truck trip" not just fuel/time savings
  - Cost data sources (Chainalytics, waybill, carload…)



FHWA Freight Fluidity - Next Steps

- Collect/document feedback from this workshop today
  - And from workshop in NY/NJ Metro region (August 15, 2019)
- Finalize/complete tool content
  - AIS Water Data, feedback from workshops
- Develop 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

Questions/Discussion

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