

AGENDA ITEM 1:

IMPROVED BPM FORECASTING WITH OUT OF REGION ANALYSIS (ORA)

Core BPM and External Models

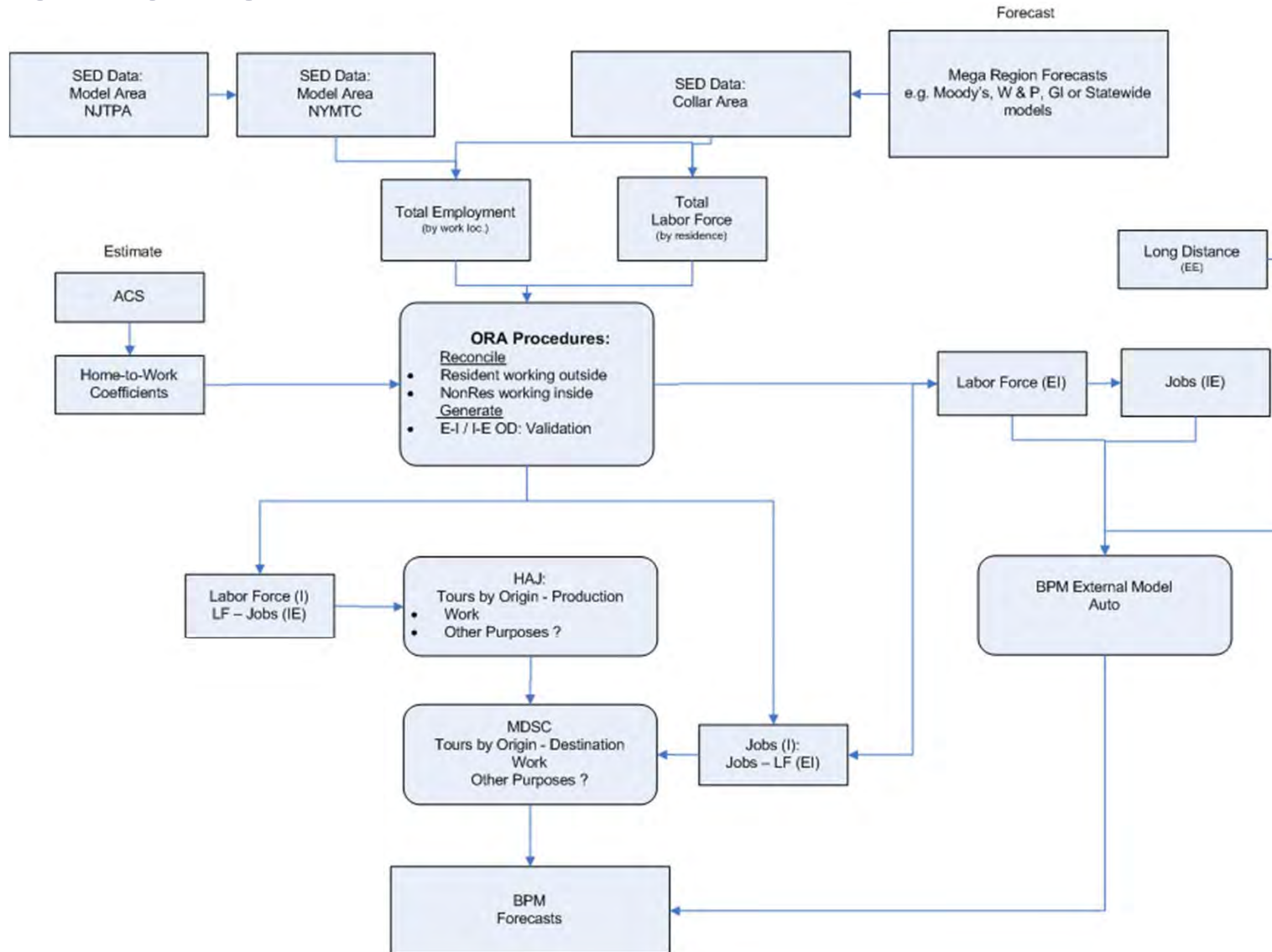
Objectives of ORA for the BPM

- Identify and evaluate data and methods to explicitly account in the NYBPM for the effects of forecasted growth in residential population and employment in the NJ, PA, and NY counties surrounding the 28 county model region.
- The objective is to improve the consistency, sensitivity and accuracy of the several key components of the BPM in response to projected demographic and employment changes in this “collar” of surrounding counties
- To reflect interactions with parts internal to the BPM model area, primarily due to in-commuting by non-residents, and out-commuting by residents of the NYBPM region.
- Main objective: More reliable growth forecasts in major regional commuter corridors, especially Trans-Hudson

Model Components

- **SED data:** Jobs and Workers (LF) - Estimation of total employment estimates for internal zones, with segmentation by jobs held by “internal” and “external” workers, and workers by in/out of region workplaces
- **HAJ and Destination Choice Model** – work journey productions and OD flows
- **External Model:** Use the developed ORA methods to adjust or drive the External Auto model, providing a better consistency with the internal modeling, and better sensitivity to forecast demographic changes and developments in the out-of-region halo.

Framework



SED Data Issues

- 28 County Regional Forecasts
 - NYMTC
 - Principal county level forecasting process
 - Allocation and transformation for TAZ inputs to BPM
 - NJTPA
 - Extent and level to be incorporated by NYMTC for BPM
 - Consistency of SED items and definition/units
- Collar Counties Forecasts
 - Commercial sources: Global Insight, Moody's, Woods & Poole, etc.
 - Public – NY, NJ, PA, and CT
 - Demographic forecasts
 - Statewide models – e.g NYS

Next Steps

- Determine availability and select data to be used
- Refine approach for estimating relationships and implementing improved models
 - Review PANYNJ's "interim employment availability" methods being used for the TH-TDFM 2010
 - BPM Core models – for internal travel forecasts
 - External Auto model

AGENDA ITEM 2:

TASK 14: TRUCK MODEL UPDATE – BPM 2010

Pascal Volet, Rolf Moeckel



Relevance of Freight Modeling

- 2 percent of all trips, but 15% of all VMT
- Most freight flows travel long-distance
- Employment is only a poor substitute for truck trip generation
- Goods shipments explain most truck traffic, but some trucks travel empty
- Mode share is based on long-term contracts
- Highly limited data availability

Overview

- **Current Commercial Models:**
 - Commercial Vans
 - Trucks
- **Planned Update Approach:**
 - Existing TFEM (Truck Flow Estimating Model)
 - Update of Trip Generation rates
- **Possible Improvement Implementation:**
 - QFRM and FAF³
 - Expand categories

Current Commercial Van Model

- Defined as non freight carrying commercial vehicles
 - 2 axles and 4 tires
 - With or without commercial markings
 - Similar to SOV, higher VoT
- Initial ODME (origin-destination matrix estimation)
 - TFLOWS Method (1996)
 - Few data sources, fewer classified counts
- Forecast uses different method
 - Trip Generation Rates (HH, EmpRet, EmpOff, EmpOth)
 - Multiply original TFLOWS Os & Ds by TG growth rates
 - Gravity Model Distribution impedances
 - $\text{Time} + \text{AutoToll} * .005 + \text{Length} * .575$
 - Assumes 120\$/h VoT and \$1.15/mile VOC (1996)

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Current Truck Model

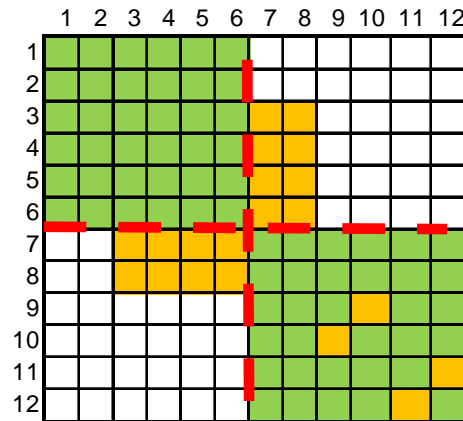
- Defined as freight carrying commercial vehicles
 - 2 axles and 6 tires and above in one category
 - Same methodology as CV for Internal Trips
 - Different TG rates (both methods have Manhattan fix)
- Forecast uses same method as Commercial Vans
- External truck flow forecasts
 - E-E, I-E and E-I based on original ODME flows, then
 - Growth factors at external stations, FRATAR

Original Data Sources

- O-D surveys that were considered:
 - *1991 PANYNJ Truck O-D Survey*
 - 1992 PANYNJ Regional Truck Cordon Survey, Ph. 1
 - 1993-4 PANYNJ Regional Truck Cordon Survey, Ph. 2
 - *1997 MTA Bridges & Tunnels O-D Survey*
 - 1989 East River Truck Crossing Survey

Current Commercial Vans Model Issues

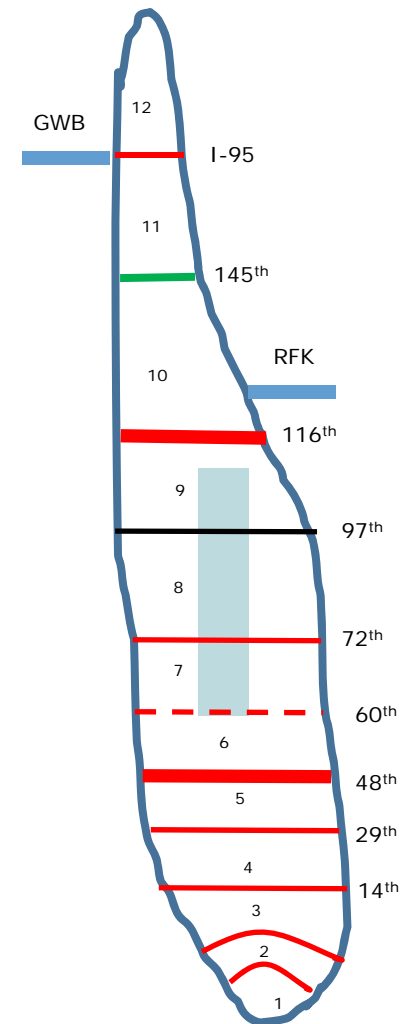
- Intra-Manhattan distribution problem



- Screenline counts show large gaps



- In general, difficult and costly to model outside of synthetic and ODME



Existing TFEM Update

- Additional Classified Counts Available
- O-D surveys to be considered:
 - 2009 PANYNJ Truck O-D Survey
 - 2009/10 MTA B & T O-D Survey
 - CATS II O-D Survey
- Update TG growth rates and external data based on new counts and O-D survey data
- Update model parameters (impedance, VoT, VOC)
- Update Special Generators (add TH-TDFM)
- Validate by screenlines (Crossings and Counties)

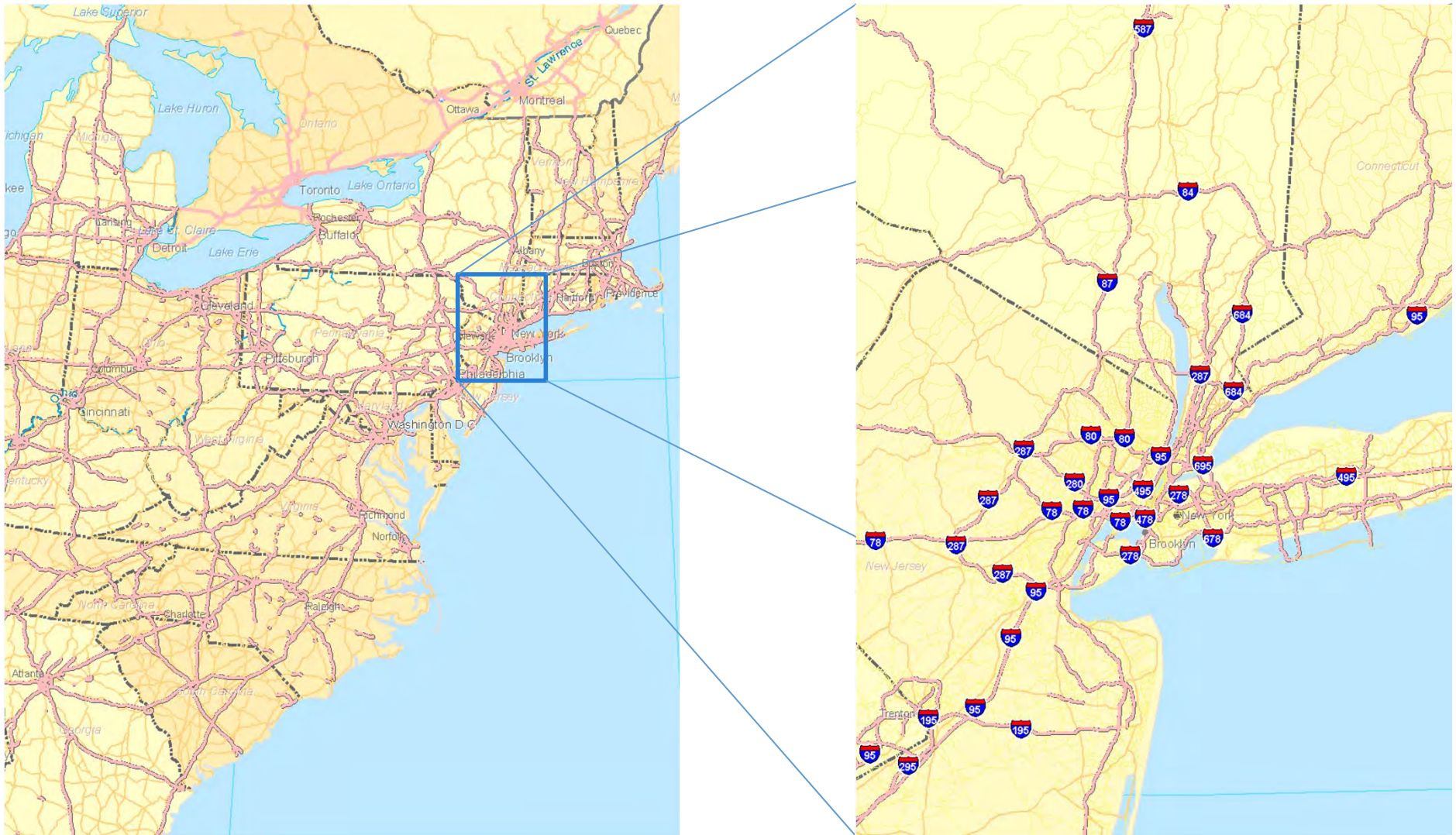
Existing TFEM Update – Trip Generation

- Current categories:
 - Households, Retail, Office and Other Employment
- Rates from 1992 Phoenix and 1999 NJ statewide model
- Special Generators:
 - Additional trip production estimates
 - LGA & JFK, UPS and Hunts Point, *Howland Hook*
- TH-TDFM Special Generators
 - Specific TG & TD replaced in each affected TAZ
 - Port Newark, Elizabeth & Jersey, Howland Hook
 - Bayonne Military Ocean Terminal
 - Newark Cargo Area, North & South
 - Newark Liberty International Airport

Problems of current approach

- Generally accepted limitations of ODME
 - Overly depends on quality of count data
 - Tends to artificially shorten trip length to match counts
 - Patterns derived from survey are lost in forecast
 - Resulting trip table is likely to be inconsistent with socio-economic data
- Model does not validate well
- Updating current approach with more recent data will lead to only marginal improvements

Multi-Layer Concept



Short/Long-distance Freight flows

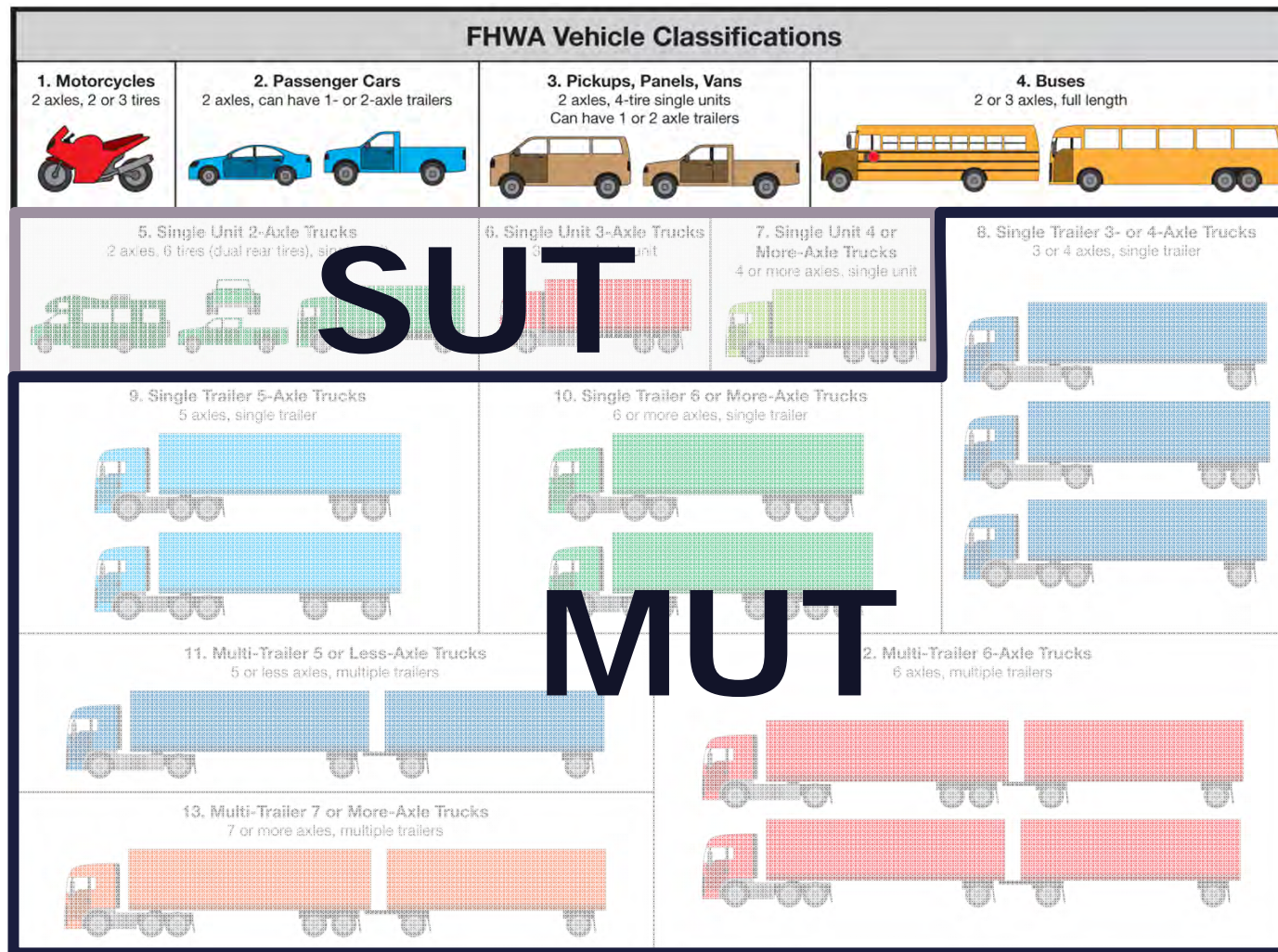
Short-Distance

- Trips shorter than 50 miles
- Quick Response Freight Manual (QRFM) is most common concept
- 3 tour-based models implemented in Northern America

Long-Distance

- Trips longer than 50 miles
- Based on commodity flow survey data (FAF or Transearch)
- Covers all trips nationwide

FHWA Vehicle Classes

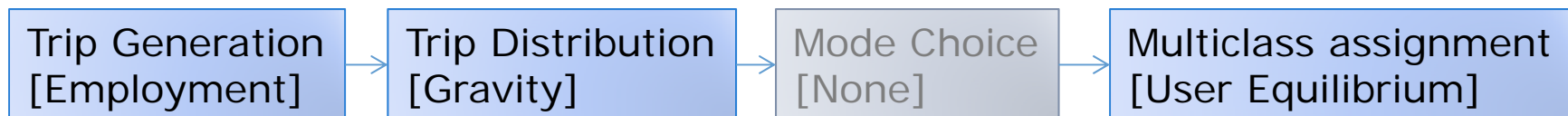


SHORT-DISTANCE TRUCKS

NYMTC Truck Model Revisions

Short-distance Truck Trips

- Trip generation based on employment data
- Gravity model for trip distribution
- No mode choice necessary
- Truck types include
 - Four-Tire Trucks (Vans, Pick-up trucks)
 - Single-Unit Trucks (6+ Tires)
 - Multi-Unit Trucks



Recommended QRFM Adjustments

a) Revise trip generation

- Run synthetic matrix estimation
- Calculate productions and attractions
- Calculate zonal density (or use area type)
- Multiple regression

Dependent variable: Number of trucks

Independent variables: Households

Employment by type

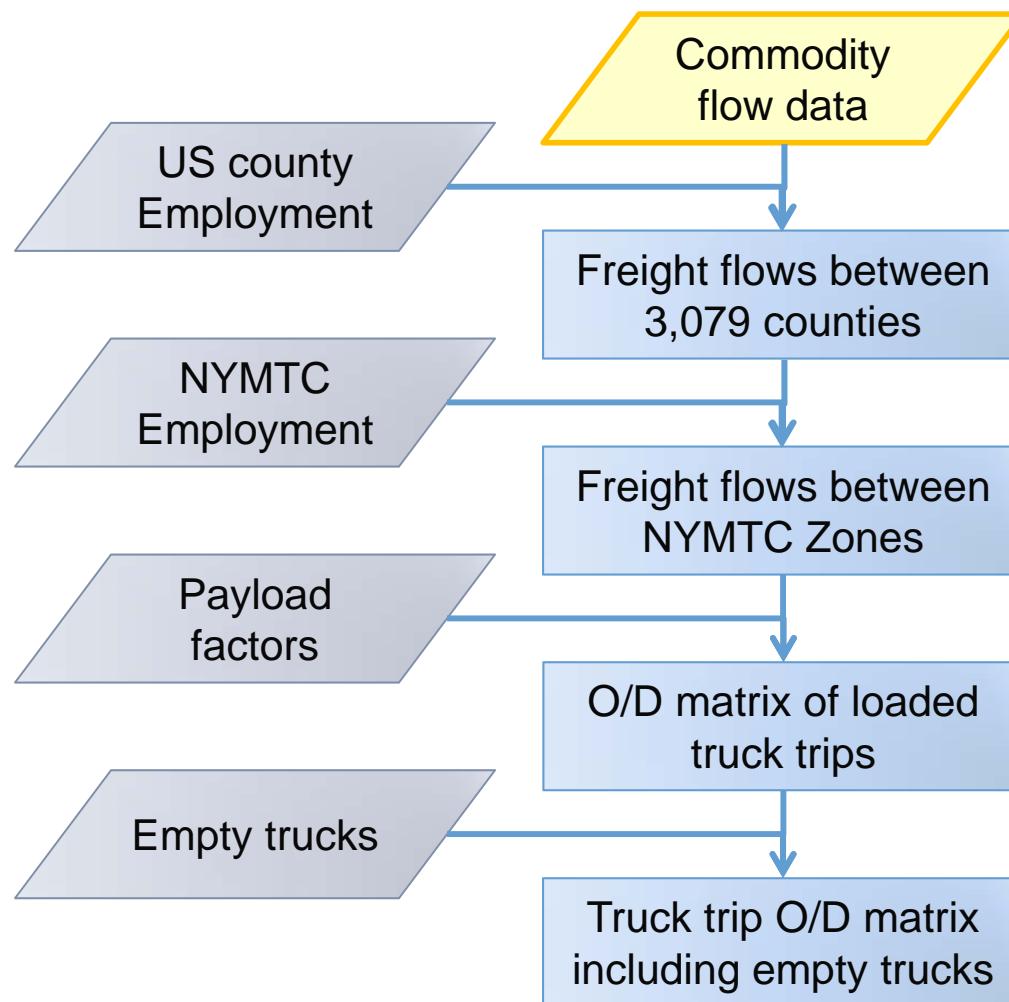
Density

b) Calibrate trip length frequency distribution based on survey data

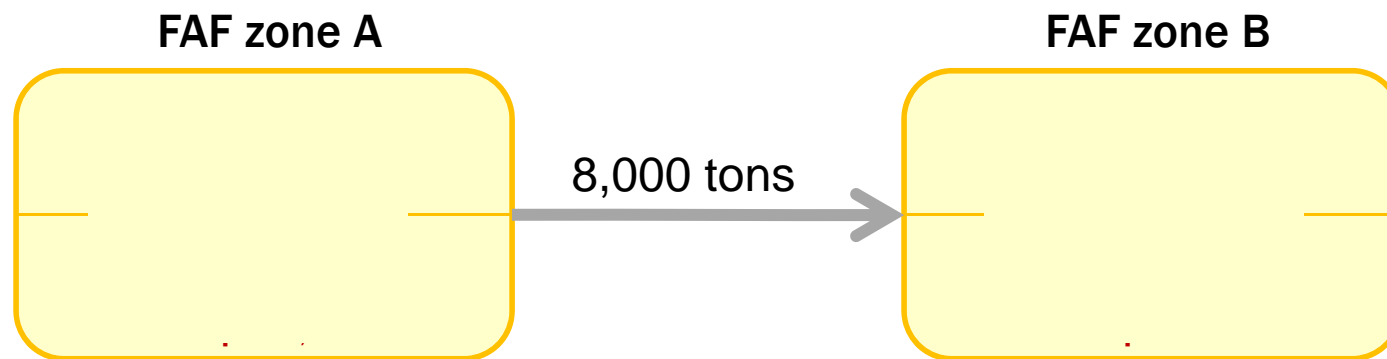
LONG-DISTANCE TRUCKS

NYMTC Truck Model Revisions

Long-distance truck model design



Flow disaggregation

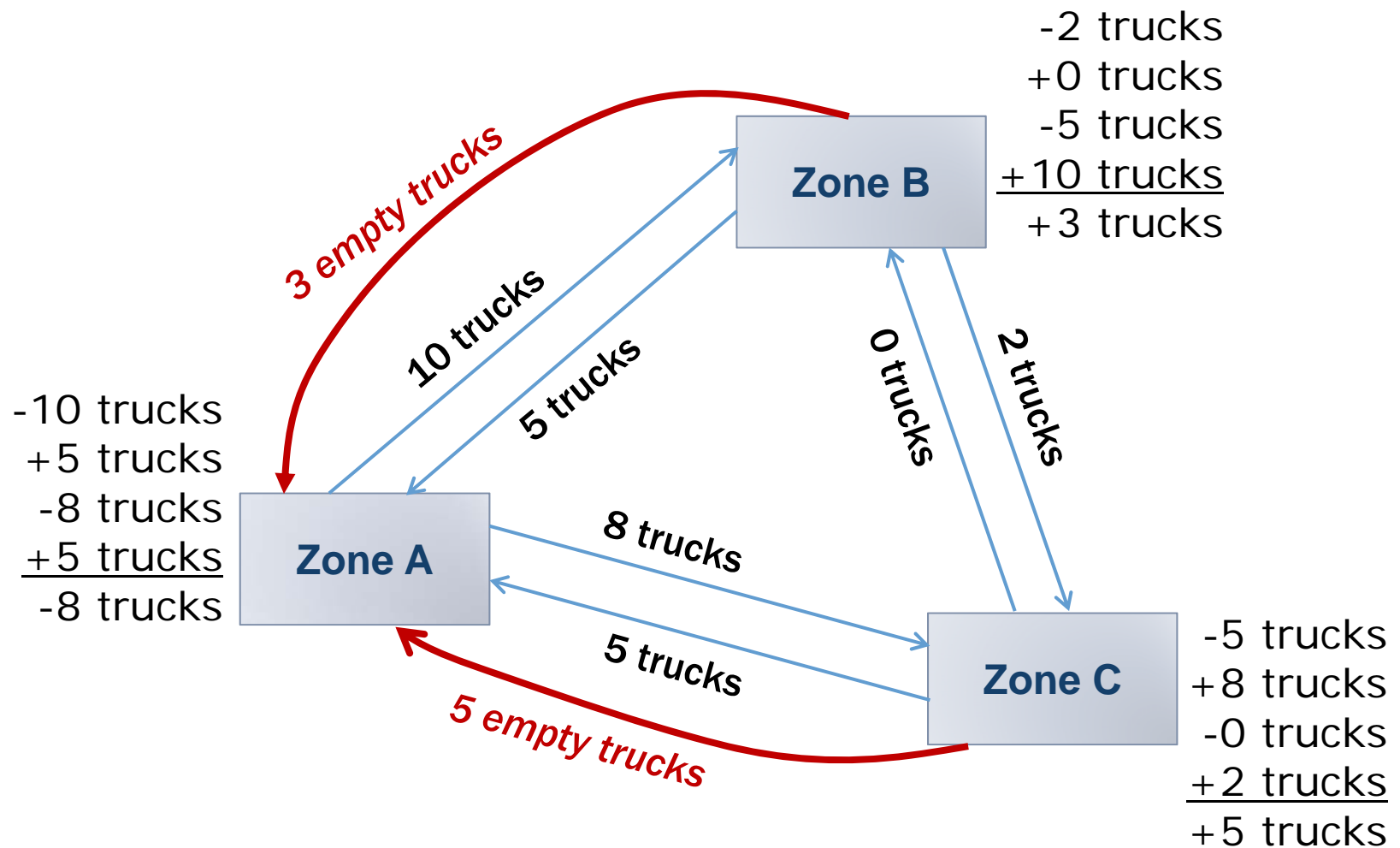


Flow	Calculation	Weight	Share	Tons
i → k	1,000 * 5,000	5,000,000	30 %	2,424
j → k	2,000 * 5,000	10,000,000	61 %	2,848
i → l	1,000 * 500	500,000	3 %	242
j → l	2,000 * 500	1,000,000	6 %	485
Total		16,500,000	100 %	8,000

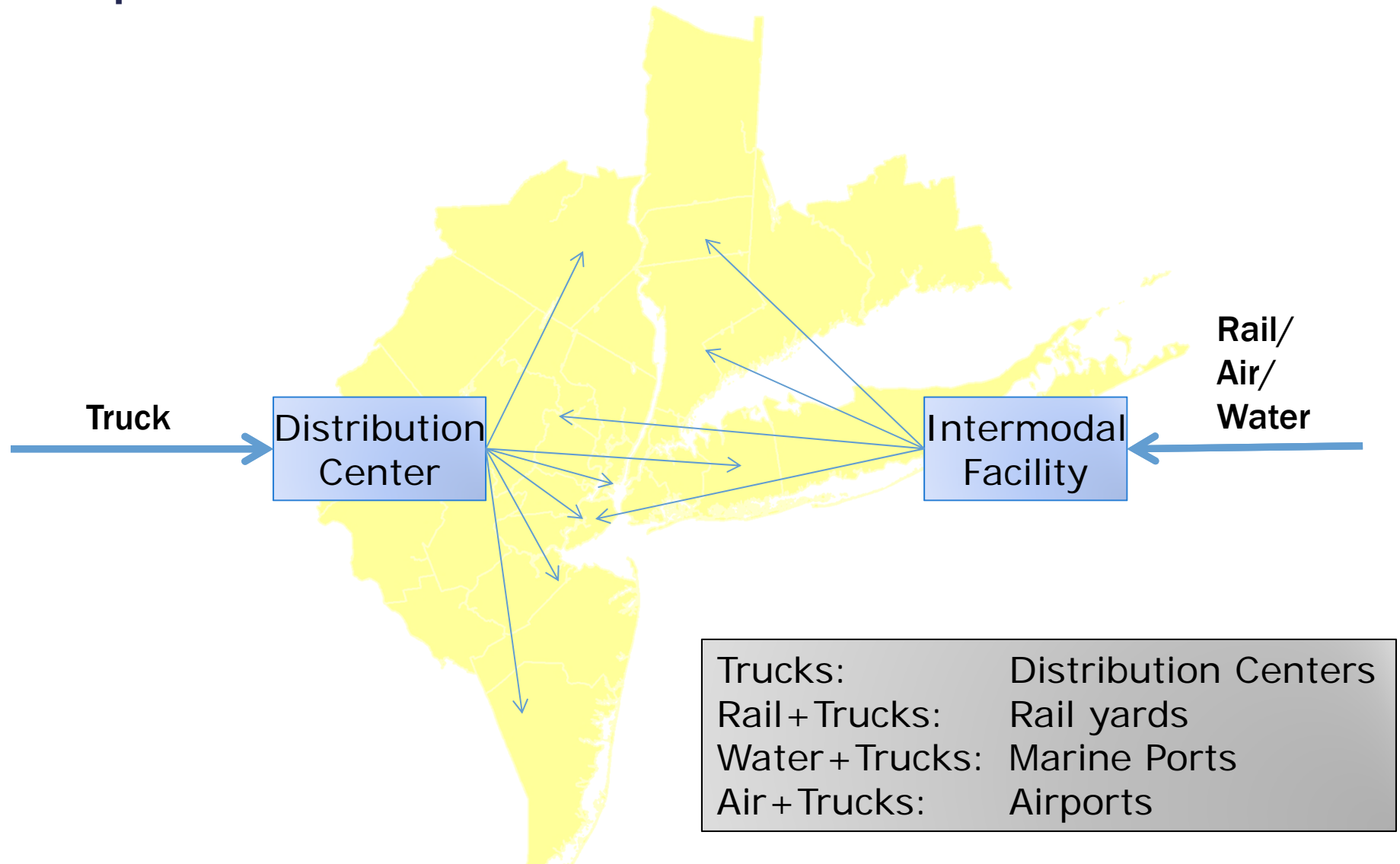
Ton to truck conversion

- Truck type depends on trip distance
- Payload factors by truck type convert tons to trucks
- Weekday factor converts yearly trucks into average weekday trucks

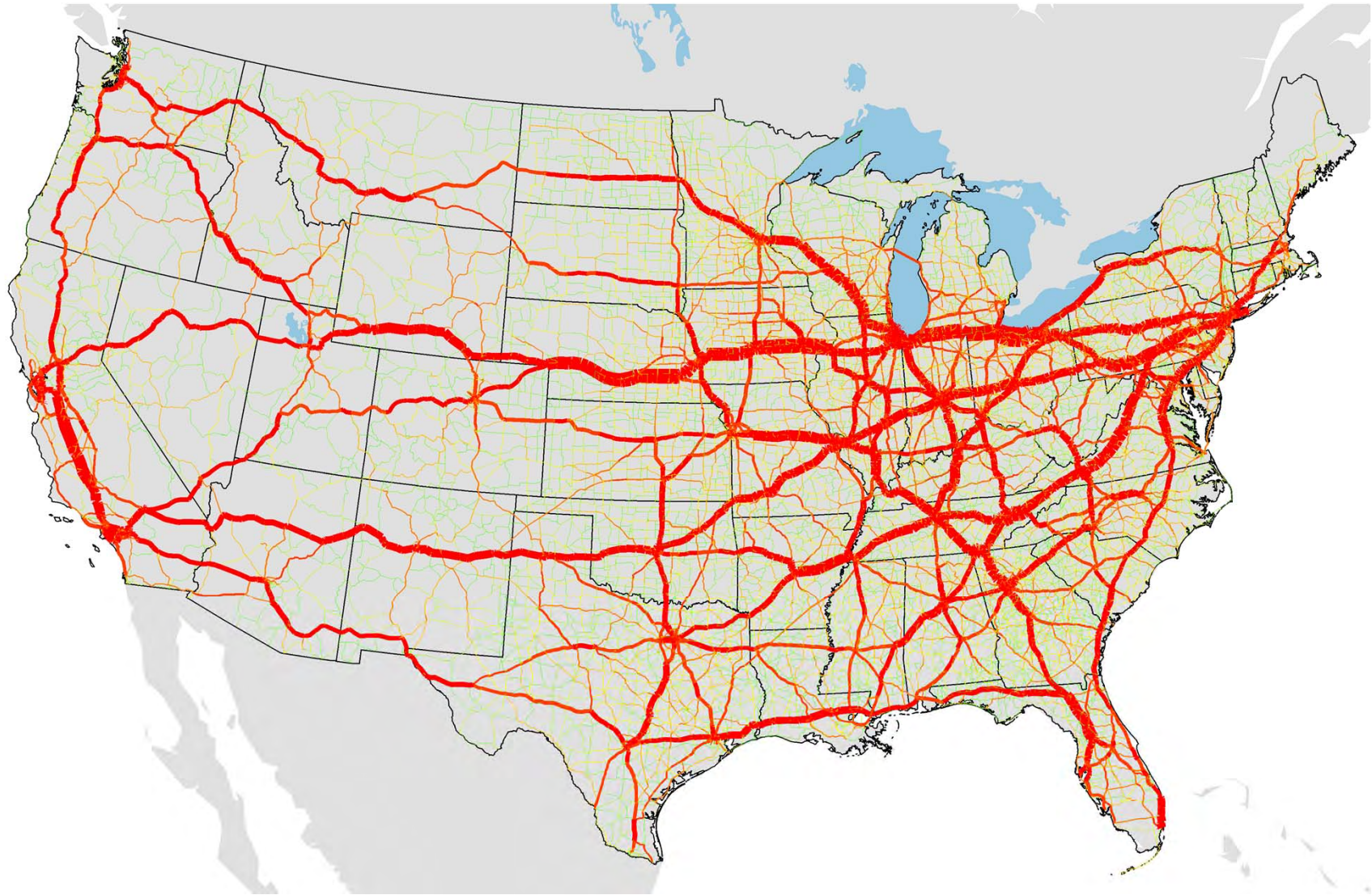
Empty Truck Trips



Optional: Distribution Centers



Assignment of National Truck Flows



Questions

- Employment data availability
- Data available for intermodal facilities/distribution centers?
- Anticipated scenarios that may affect truck travel

