



U.S. Department of Transportation
Federal Highway Administration

Weather Delay Costs to Trucking

Road Weather Management
Stakeholder Meeting
September 9, 2011



CAMBRIDGE
SYSTEMATICS
Transportation leadership you can trust.



A. Strauss-Wieder, Inc.
analyses for informed decision-making

Background

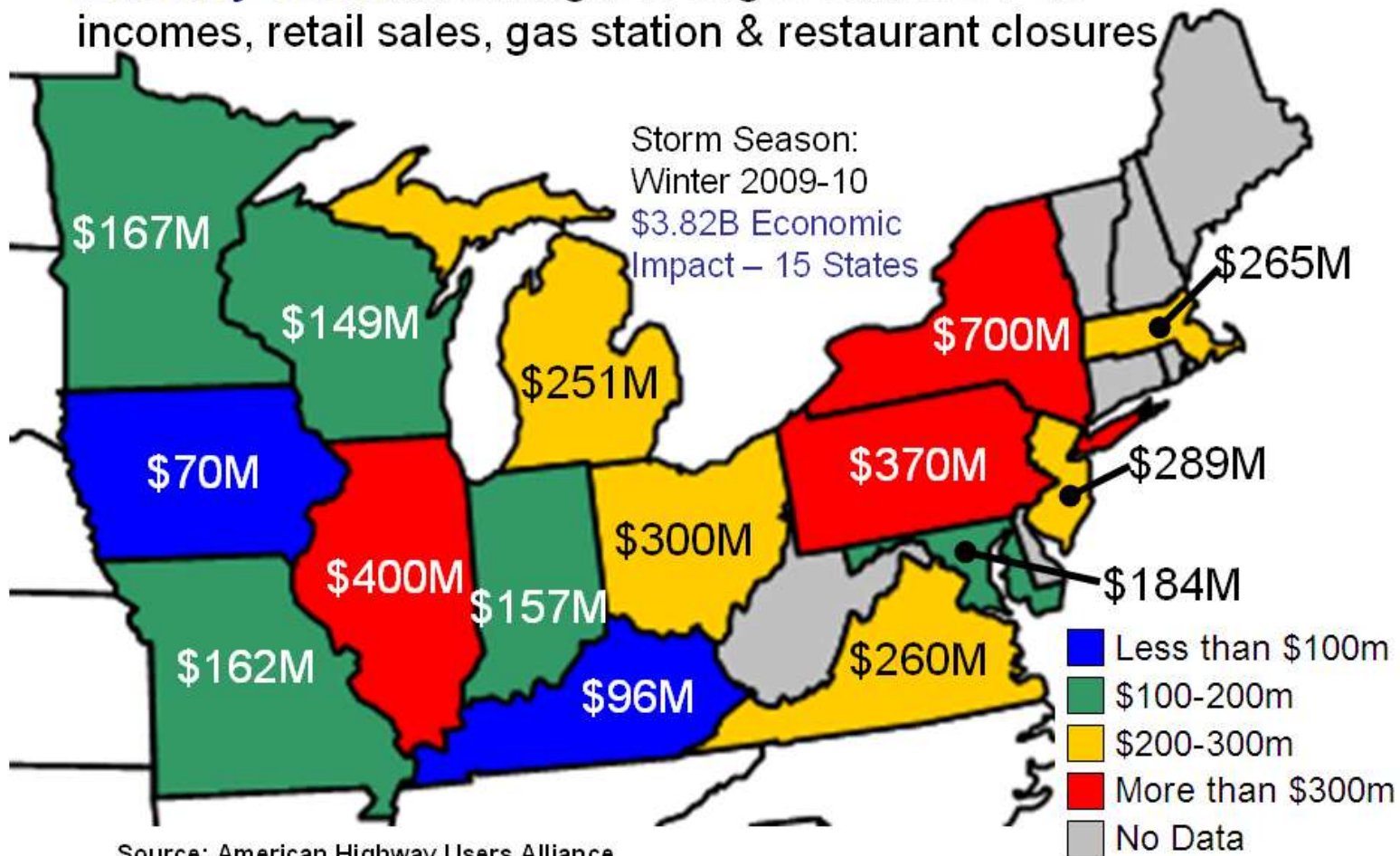
- **Commercial vehicles main mode of freight transportation**
 - » **\$500 billion freight sector**
 - » **70% of total value and 60% of weight moves by truck**
 - » **Estimates that adverse weather is responsible for 12% to 25% of all delay**
 - » **Trucking delays due to weather = \$3.1 billion/yr for the 50 largest cities**
 - » **Lost commerce due to snow closures = \$10 billion/day**
- **Other economic impacts of adverse weather**
 - » **More than \$2 billion/yr is spent on snow and ice control by State DOTs**
 - » **Weather accounts for 25% of non-recurring congestion**



Weather & Roads – The Economy

Fiscal Impacts of Storm-closed Roads

One-day costs, including lost wages and taxes on incomes, retail sales, gas station & restaurant closures



Source: American Highway Users Alliance



Project Objective

- **Quantify the Impact of Adverse Weather on U.S. Roadway Freight Operations**
 - » **Key Questions**
 - **What is the overall level of delay in the system?**
 - **What portion of delay is incurred by CVs?**
 - **What portion of delay is caused by adverse weather?**
 - **What is the value of commercial shipments?**
 - » **Various data sources available**
 - » **Important to select the realistic level of detail**



Weather Delay Costs to Trucking

WORK PLAN



Literature Search

- **Review previous related work**
- **Analytical techniques are focus**
 - » **Congestion delays on a national, or broad geographic basis**
 - » **Impacts of weather on roadway delay**
 - » **Impact of delay on freight movements and costs**
- **Build on previous lit reviews**
 - » **Weather Data Mining and Gap Analysis**
 - » **Strategic Highway Research Program 2 L08 Reliability**
- **New sources – DHS, others**



Data Sources

- **Congestion**

- » **Urban Mobility/Congestion Report**
- » **Highway Performance Monitoring System (HPMS) and Highway Economic Requirements System (HERS)**
- » **Statewide Traffic Management Centers**
- » **State DOT “dashboard” summaries**
- » **Private sources (Inrix, NavTeq)**



Data Sources

- **Weather**
 - » **NCDC**
 - » **MADIS**
 - » *Clarus*
 - » **Private**
 - » **Summaries such as Places Rated Almanac**



Data Sources

- Weather

- » Event Classification

- Tradeoff between level of detail and ability to process
 - Classification scheme

Table 3. Sample Consolidated Classification System

| Roadway Type | Weather Events | Freight Cost Impacts |
|--|--|--|
| Urban Limited Access | Catastrophic - Major hurricane, regional floods | Long-distance time delay Local time delay Incident-related delay Indirect operating costs, insurance, maintenance, etc. |
| | Severe - Annual events with major impact, blizzards, localized flooding | |
| | Localized - Snowstorm, severe thunderstorms | |
| | Background - Moderate events (rain at peak hour) which only impacts certain roadway (heavy recurring congestion, steep grades, etc.) | |
| Rural Limited Access | | |
| Urban Major Arterial | | |
| Rural Major Arterial | | |
| Minor Arterials, Collectors and Local Road | | |



Data Sources

- **Freight**

- » **FTR Model Database**

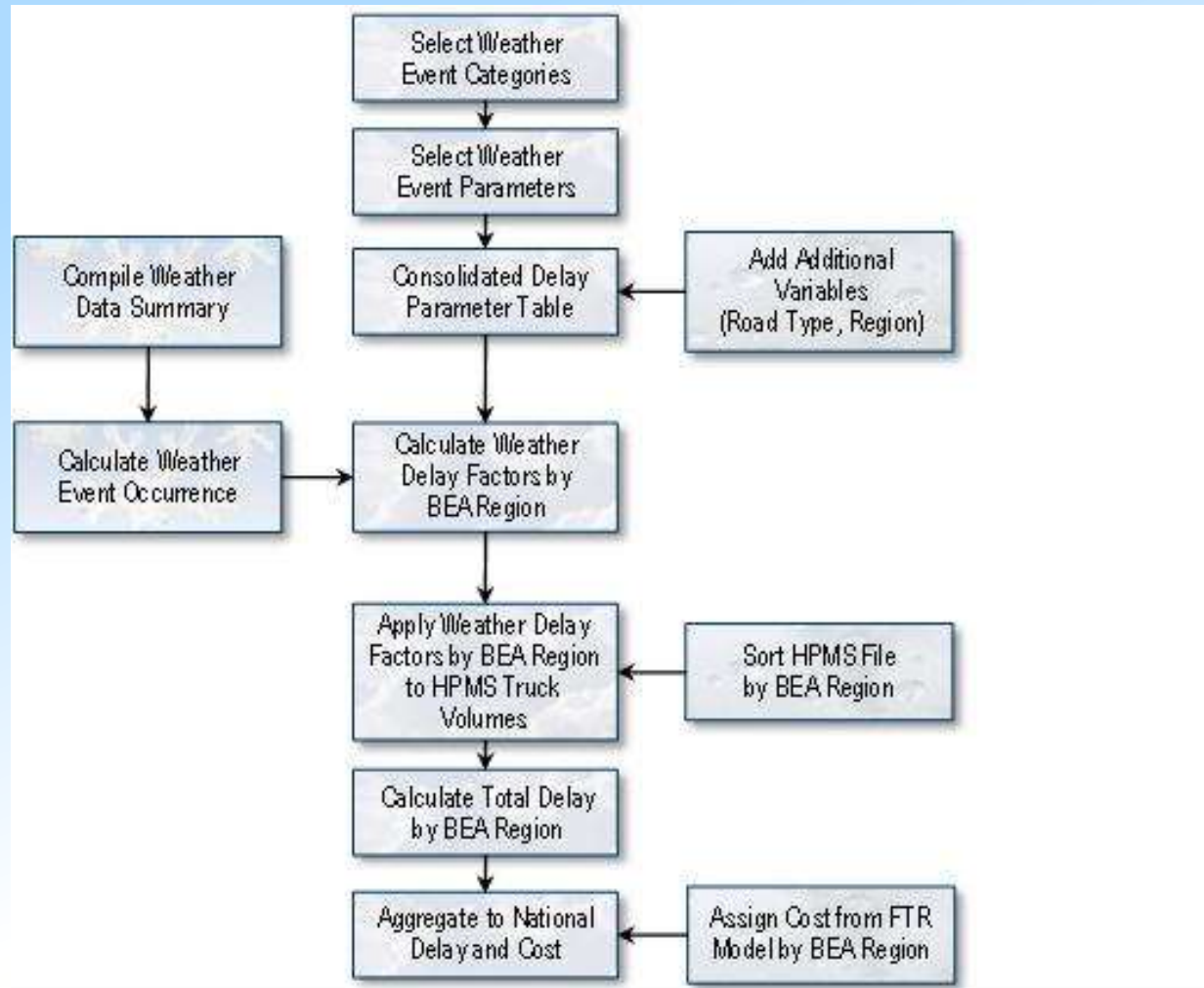
- **Total truck tons, loads and ton-miles by 3-digit STCC code and length of haul segment**
- **Productivity model translates freight volumes into truck work estimates**
- **Models of truck cost data**
- **Models of national logistics costs for supply chain implications**

Key Steps to Delay Estimate

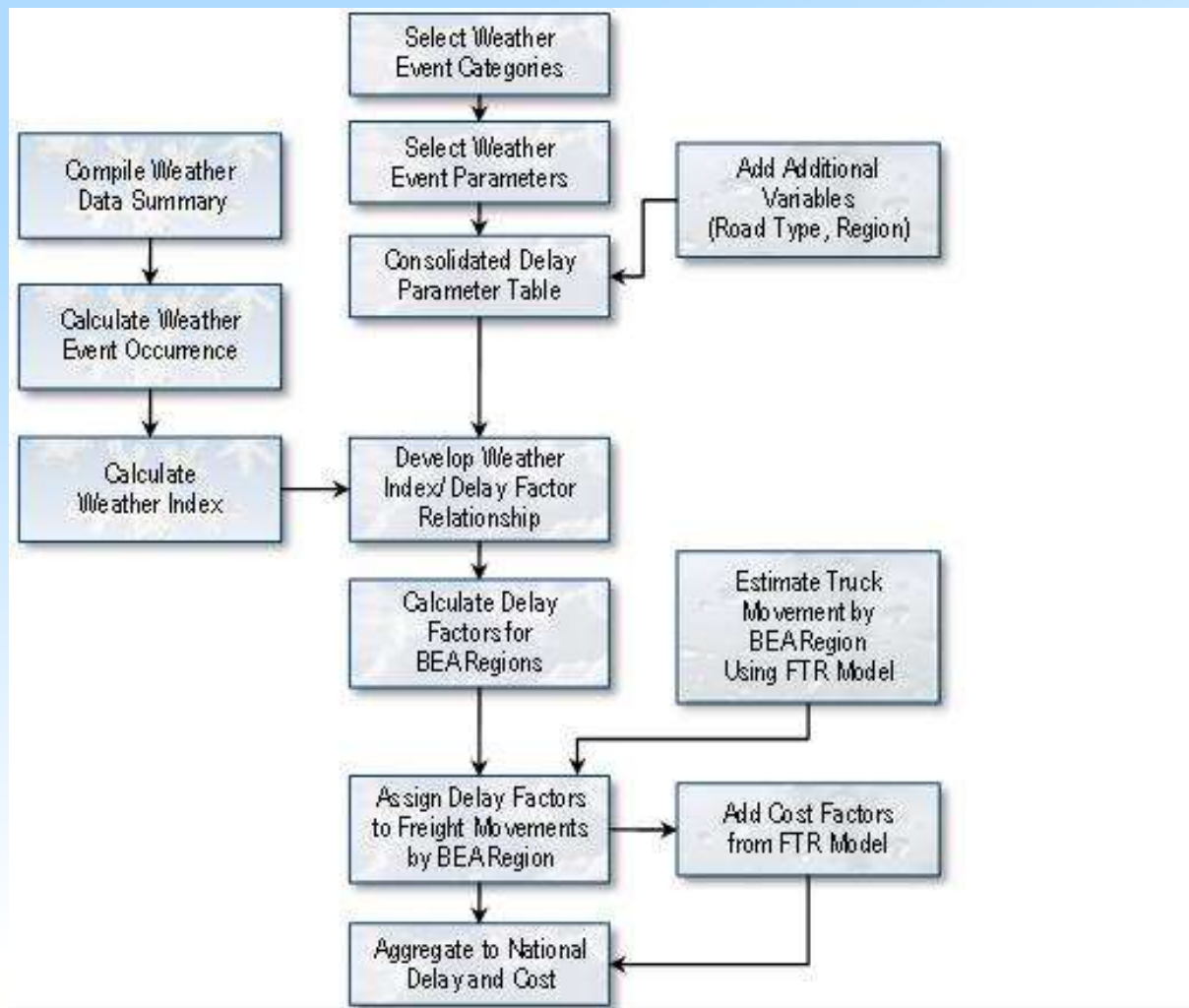
1. **Develop weather and congestion parameters**
2. **Identify key supply chain locations with weather impact**
3. **Estimate delays for base year using classification scheme**
 - Weather event, facility type and freight cost impact
4. **Convert weather related delay to delay/truckload**
5. **Use FTR model to estimate \$\$/truckload**
6. **Estimate truckloads impacted by weather events**
7. **Calculate and annualize costs**
8. **Develop risk profile**
9. **Develop future year forecasts**



Work Plan Option #1



Work Plan Option #2



Questions or Comments