

CIPDSS National Transportation Model Overview

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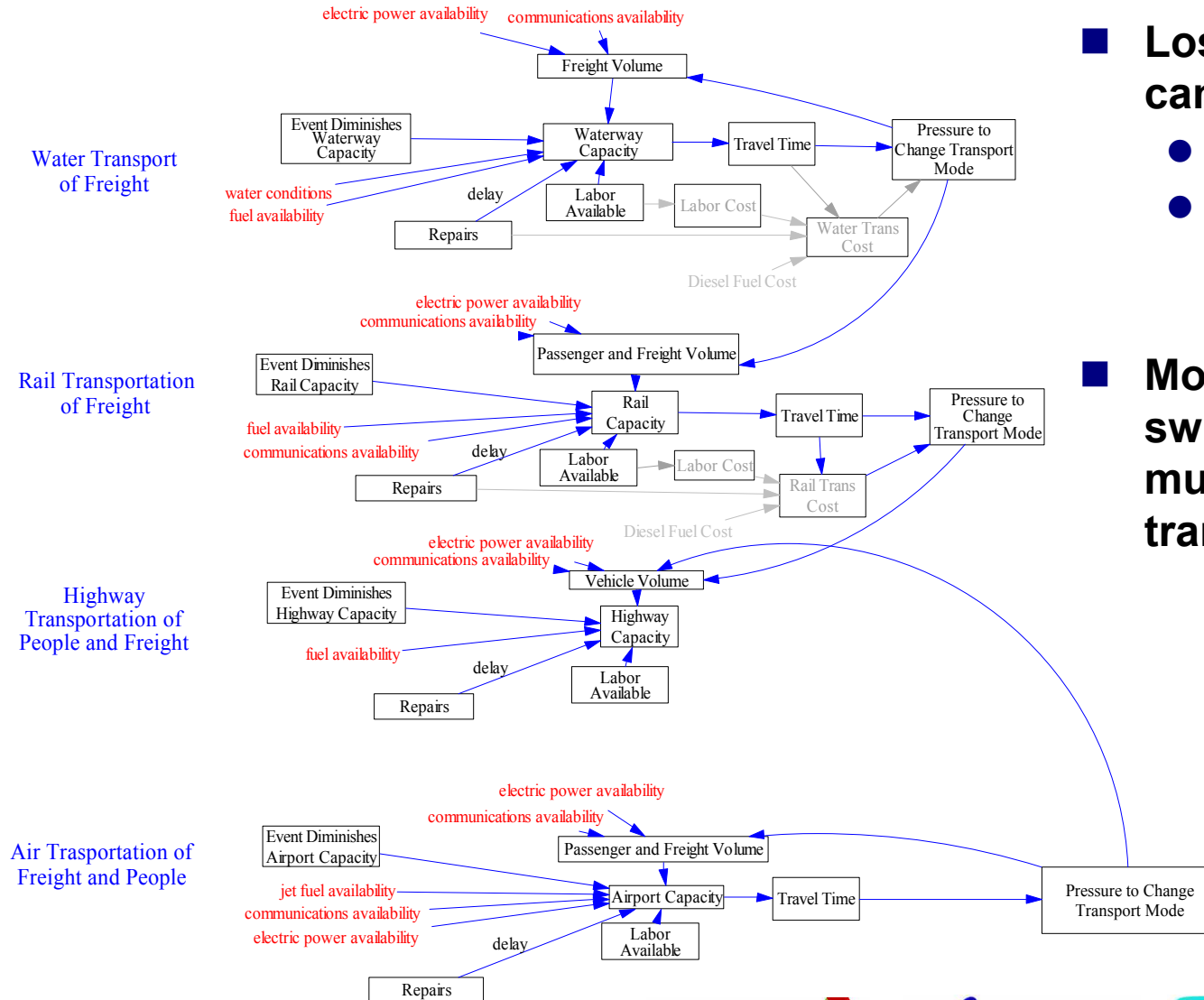


Transportation Model Scope

- **Waterways**
- **Rail**
- **Road**
- **Air**
- **(Pipeline transportation is included in the corresponding energy infrastructure model – i.e., petroleum and natural gas)**
- **Freight transportation can be arrayed to cover a variety of commodities**
 - Have used cattle, corn, dairy, grain, chemicals, coal, refined petroleum products, and air mail.



Conceptual Model

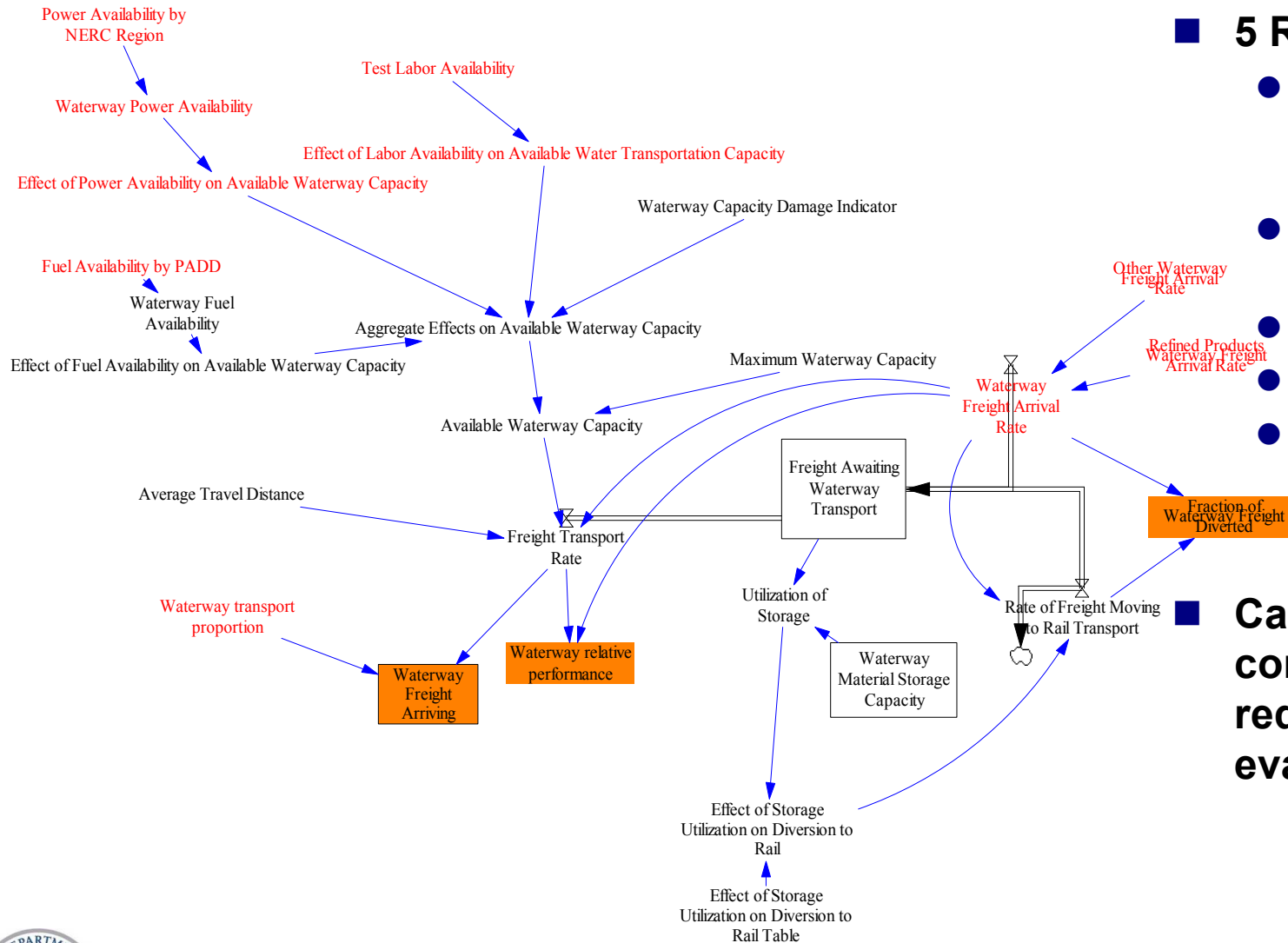


■ Loss of capacity can lead to delays

- Congestion
- Use of alternative transportation mode

■ Model allows for switching between multiple modes of transportation

Waterway Transportation Model



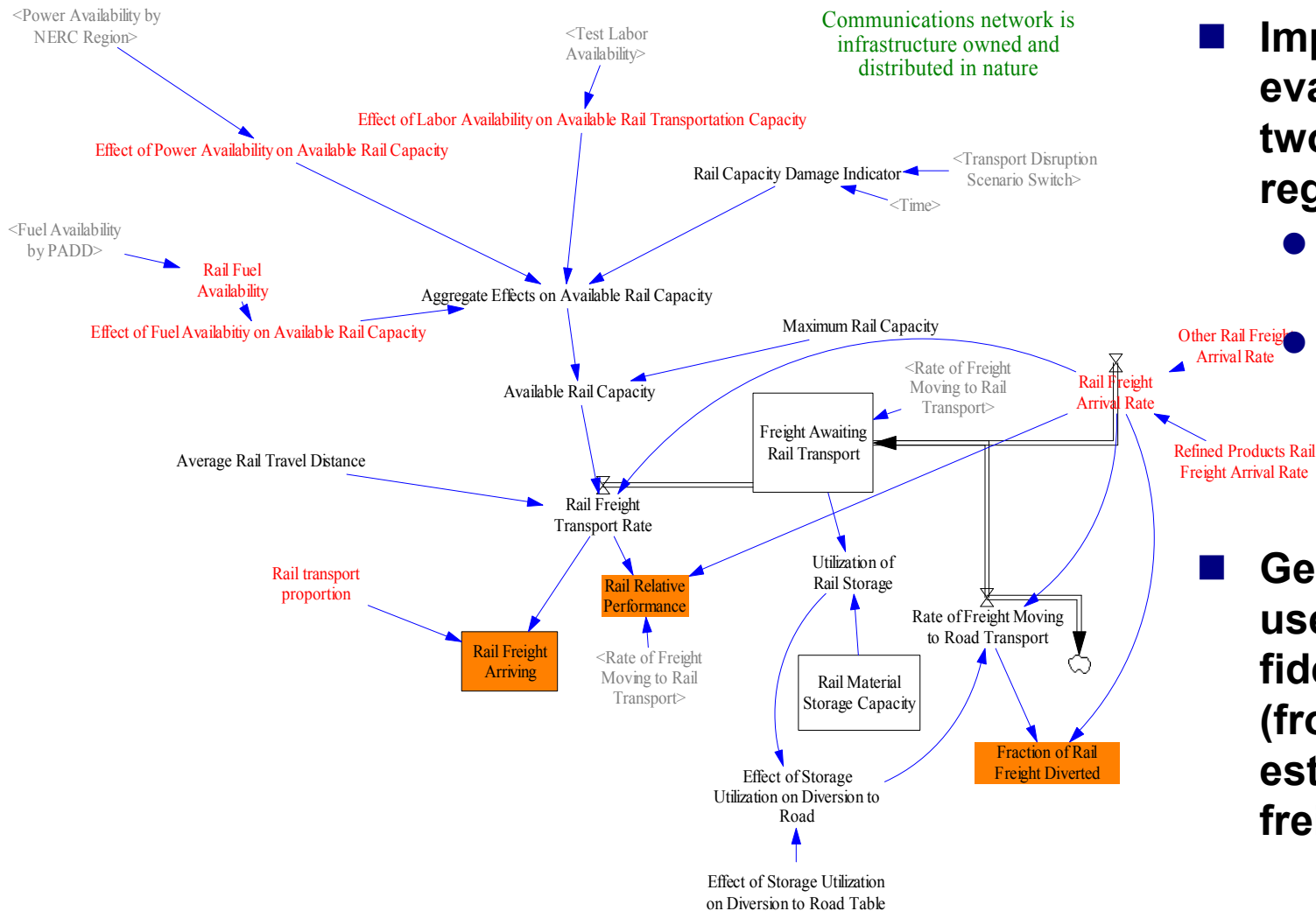
■ **5 Regions:**

- Columbia River and West Coast
- Mississippi River
- Gulf Coast
- Great Lakes
- East Coast

- **Capacity constraints require further evaluation**



Rail Transportation Model

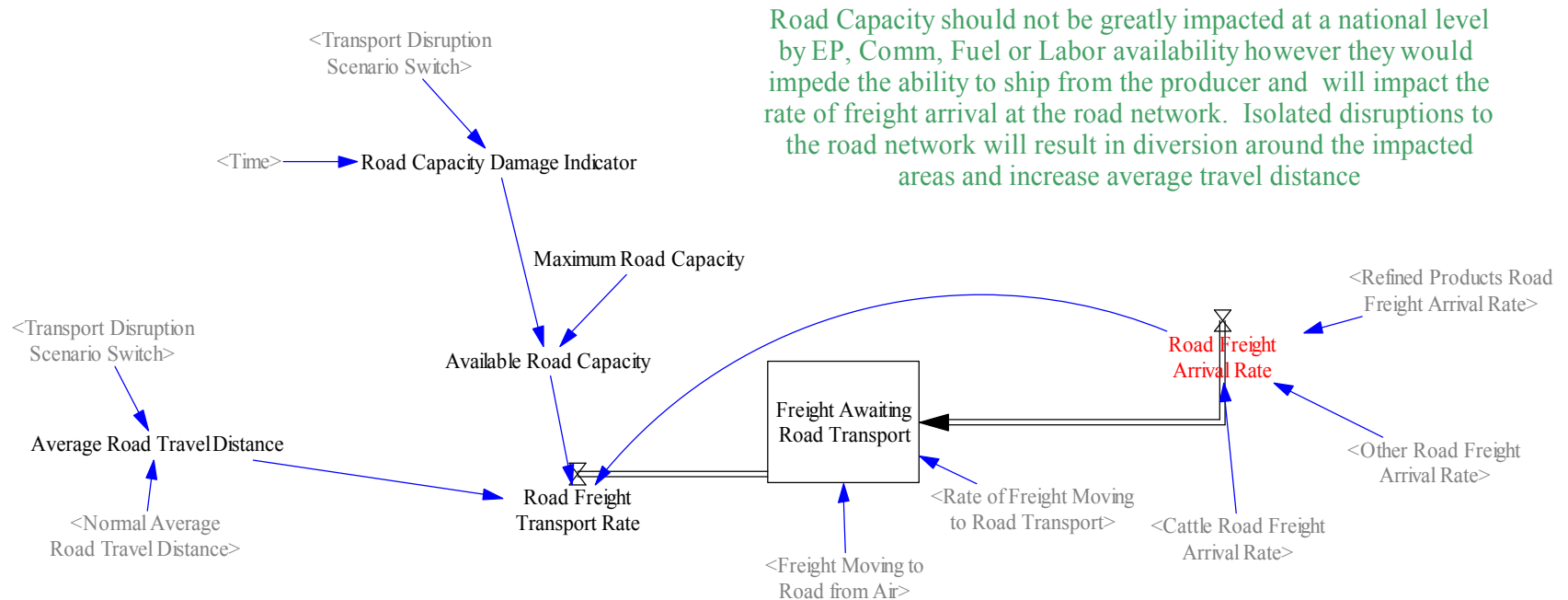


Impacts evaluated using two or more regions

- At least on impacted region
- Un-impacted region

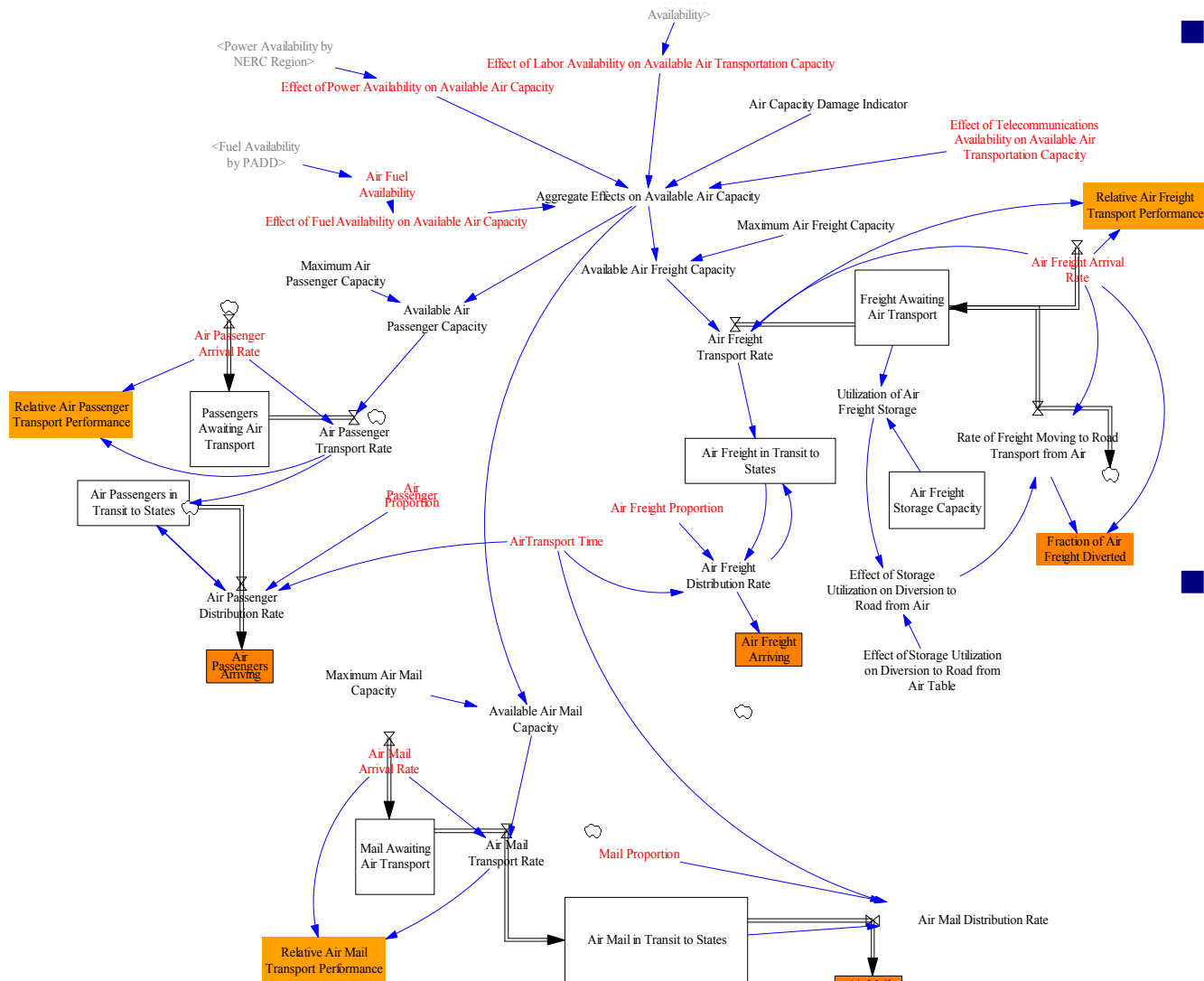
Generally have used a higher fidelity model (from NISAC) to estimate rail freight impacts

Road Transportation Model



Road Capacity should not be greatly impacted at a national level by EP, Comm, Fuel or Labor availability however they would impede the ability to ship from the producer and will impact the rate of freight arrival at the road network. Isolated disruptions to the road network will result in diversion around the impacted areas and increase average travel distance

Air Transportation Model



Structure replicated for 8 hubs:

- ATL
- BWI
- CLT
- DFW
- JFK
- LAX
- ORD
- Memphis

Data for freight and passenger movements are based on Bureau of Transportation Statistics data

