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# ***GIS-based Modeling for Statewide and Corridor Freight Planning***

**GIS-T Conference  
Colorado Springs, CO**

***Presented by***

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***Cambridge Systematics, Inc.***

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# *Outline of Presentation*

- **Background**
- **Eastern Colorado Mobility Study Background**
- **GIS-based Modeling Approach**
- **Evaluation Process**
- **Project Results**
- **Application to Other Projects**
- **Conclusion**

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# ***Background***

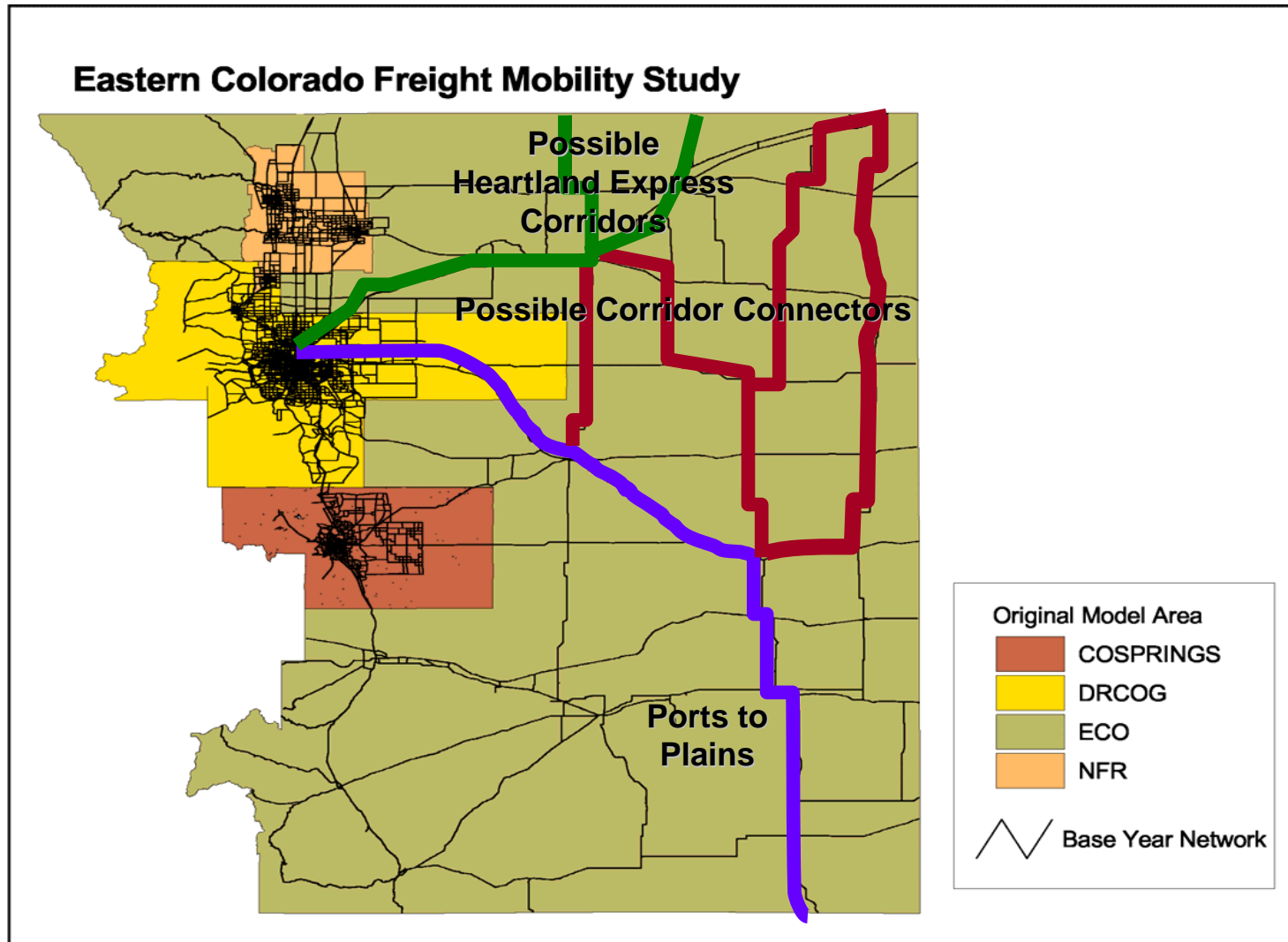
- **GIS used for assessing freight infrastructure needs**
  
- **GIS used as single platform for:**
  - **Data compilation**
  - **Travel modeling**
  - **Analysis**
    - Benefit/cost
    - Economic
    - Performance
  - **Display**

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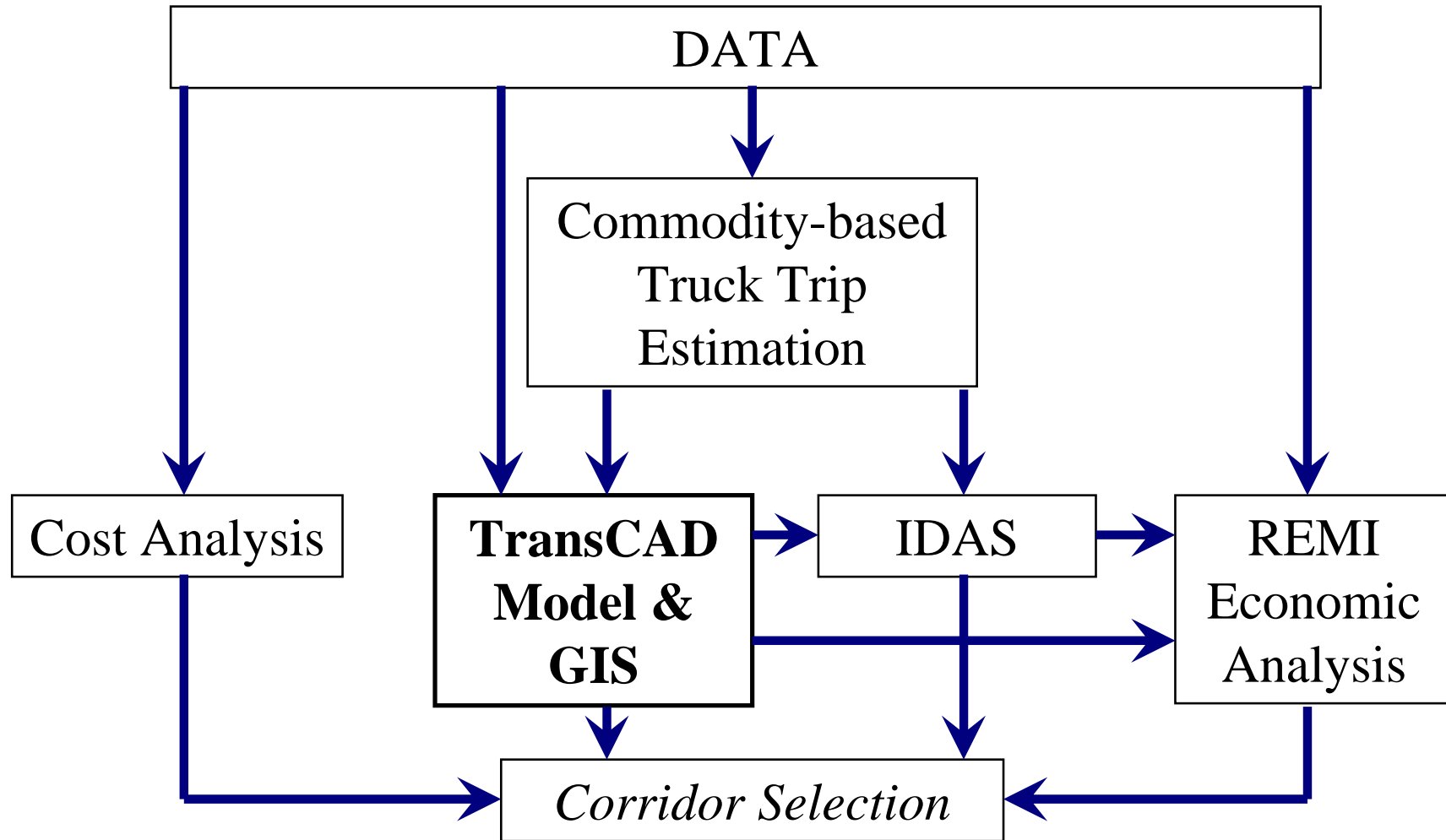
# ***Eastern Colorado Mobility Study Background***

- **GIS system used to assess freight mobility and infrastructure needs**
- **Improve north-south freight mobility/accessibility**
- **Integrate with Heartland Express and Ports to Plains corridor improvements**
- **Divert trucks from I-25 corridor in the Front Range**
- **Examine base and future needs (2000 and 2025)**

# Eastern Colorado Mobility Study Background



# Eastern Colorado Mobility Study Background

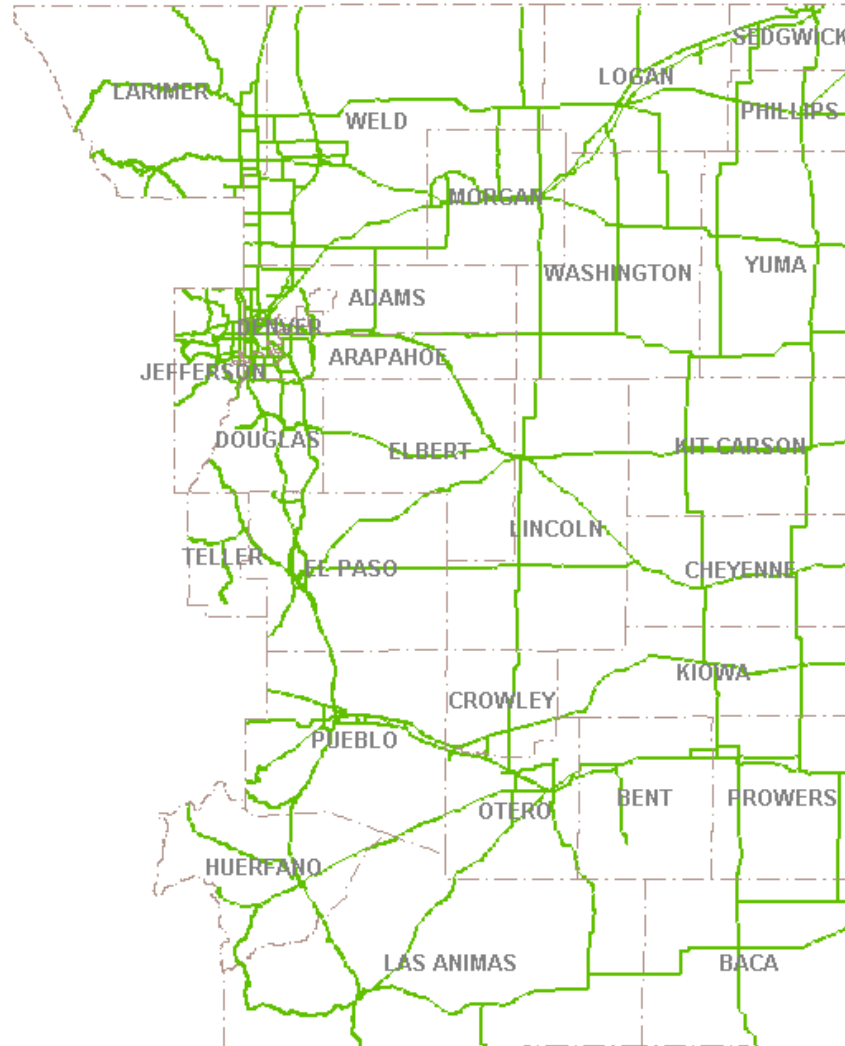


# ***GIS-based Modeling Approach - Data Inputs***

- **Truck demand (trips)**
  - **Estimated using:**
    - Reebie & Associates Commodity Flow Data
    - Woods & Poole Employment Data
    - Truck counts and payload factors
  
- **Socioeconomic data from:**
  - **NFR TAFS model**
  - **PPACG model**
  - **Woods & Poole**
  - **Census**

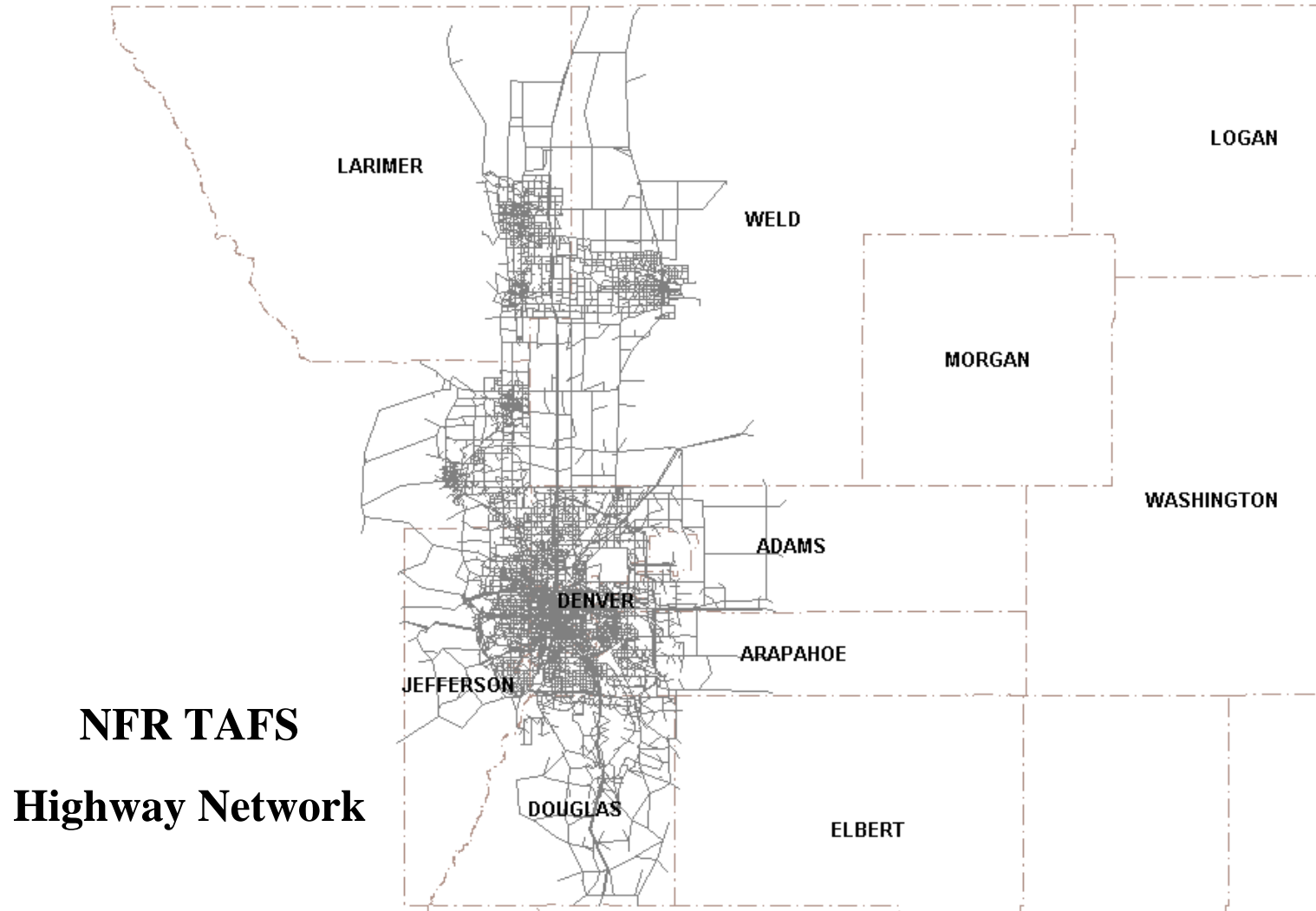
# GIS-based Modeling Approach - Data Inputs

**CDOT  
Highway Network**

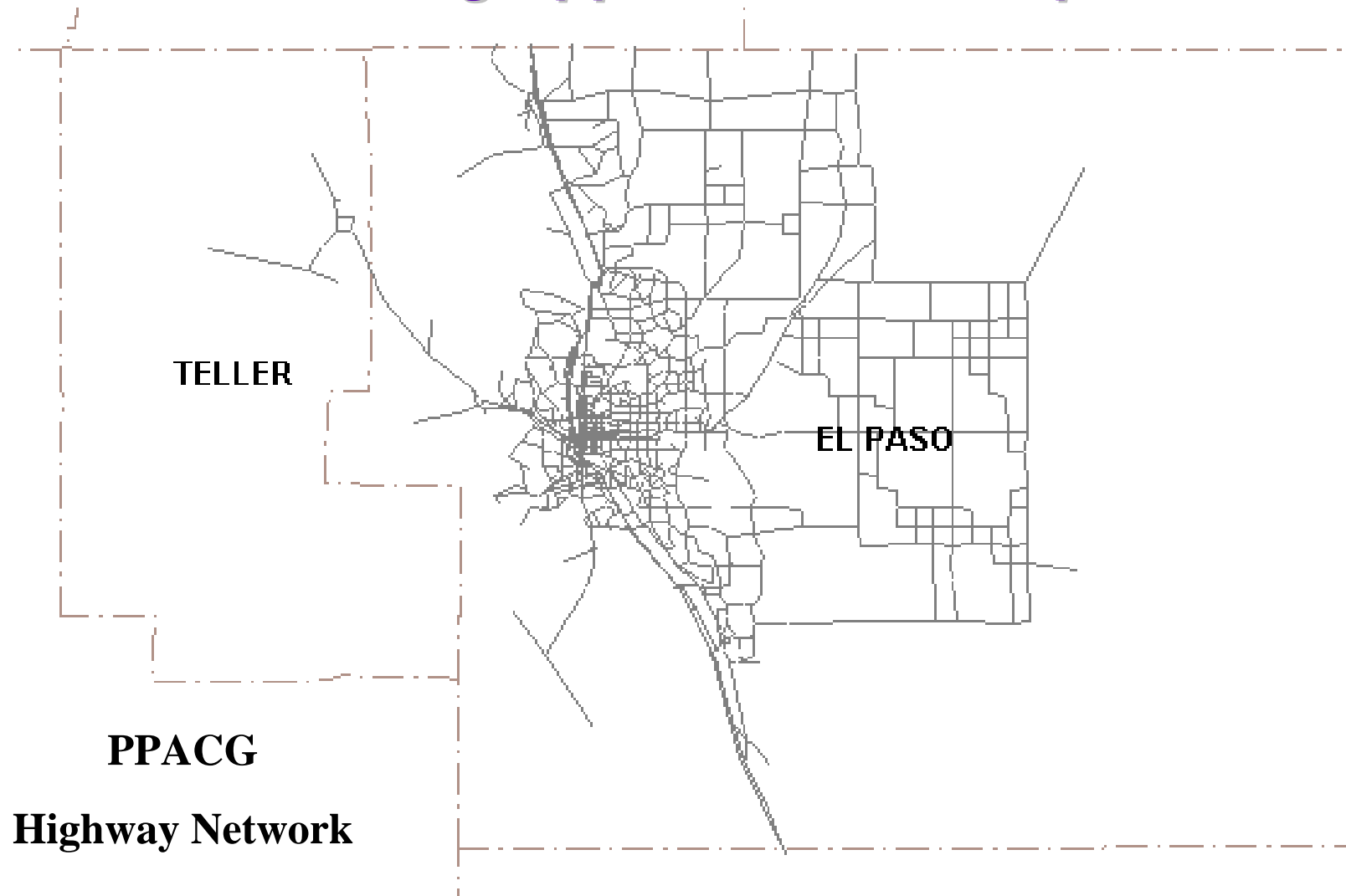




# GIS-based Modeling Approach - Data Inputs



# *GIS-based Modeling Approach - Data Inputs*

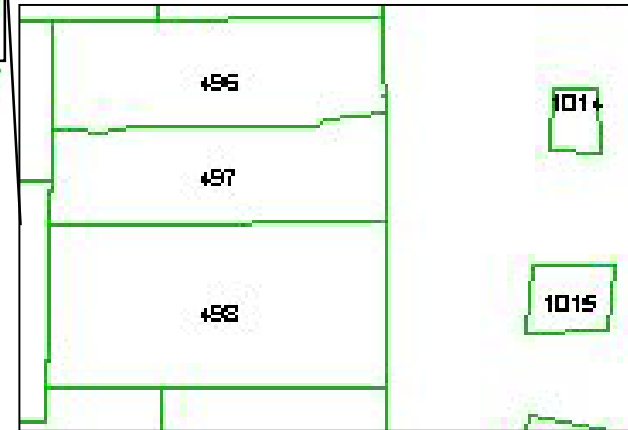
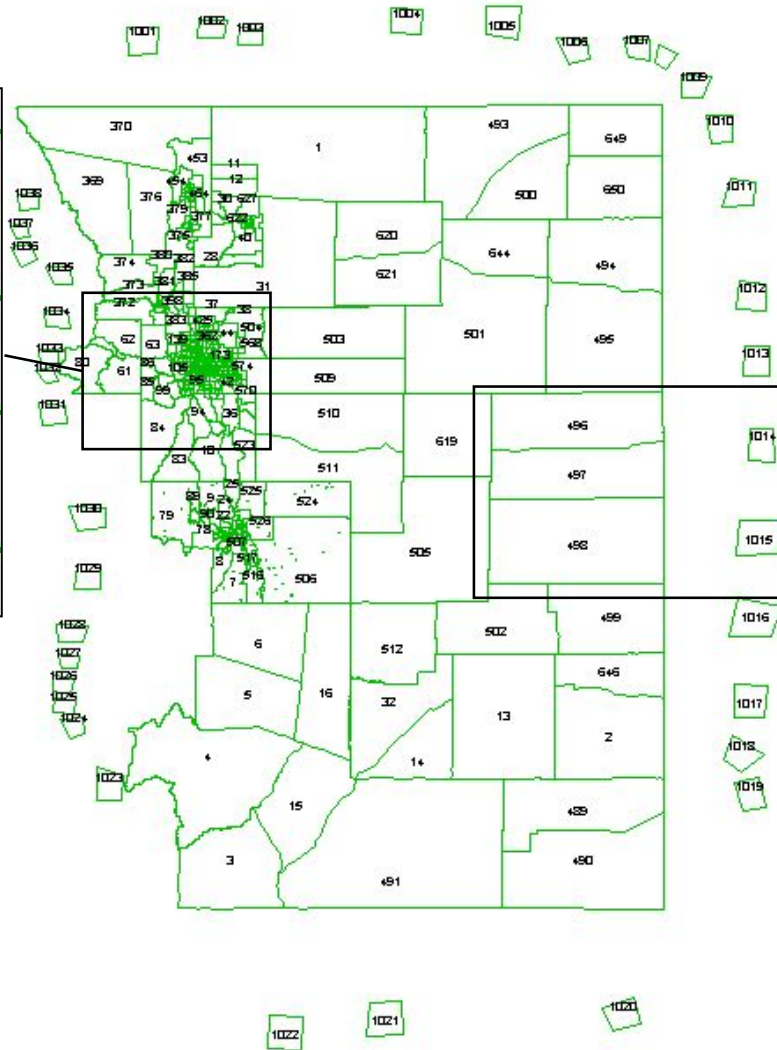
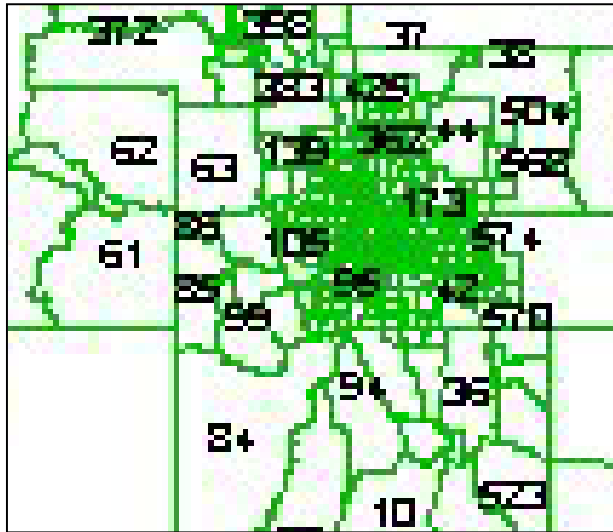


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# ***GIS-based Modeling Approach - Platform Selection***

- **TransCAD**
  - **GIS**
  - **Travel demand model**
  - **Can be used for presentation of data/output**
  - **Already used by many CO agencies**
    - NFR MPO
    - DRCOG
    - CDOT (for several corridor studies and Eastern Colorado)

# GIS-based Modeling Approach

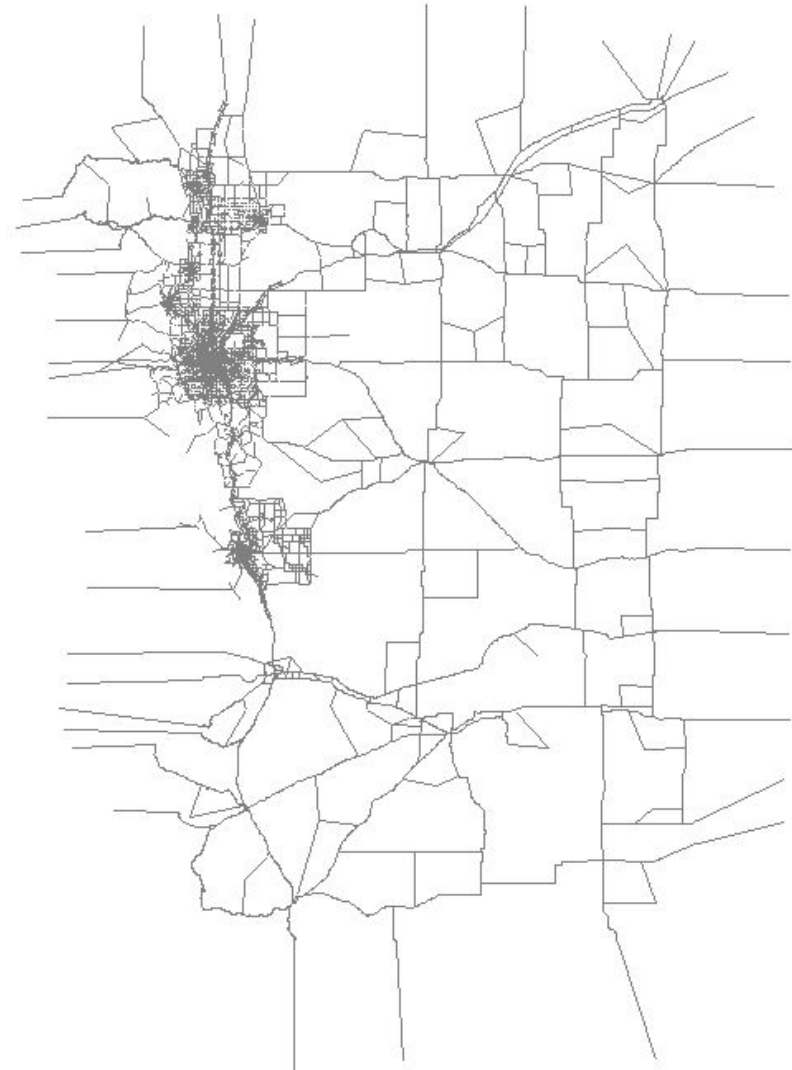


**Eastern Colorado  
Mobility Study  
2000 TAZ System**

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# ***GIS-based Modeling Approach***

**Eastern Colorado Mobility Study  
2000 Highway Network**



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## ***GIS-based Modeling Approach***

- **Auto demand (trips) created in TransCAD using O-D matrix estimation**
  - **Traffic counts**
  - **Employment data**
  - **NCHRP 365 trip rates, occupancies**
- **Truck demand imported into GIS and modeling system**
- **Auto and truck demand assigned using multi-class assignment**
  - **Capacity constraint applied to account for congestion**
  - **Identified diversions of autos and trucks**

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## ***GIS-based Modeling Approach - 2025***

- **Network updated based on CDOT programmed projects**
- **Auto demand increased with growth factors (applied using GIS) from population forecasts**
- **Truck demand increased with growth factors (applied using GIS) from:**
  - **Employment**
  - **Productivity**
  - **Consumption**

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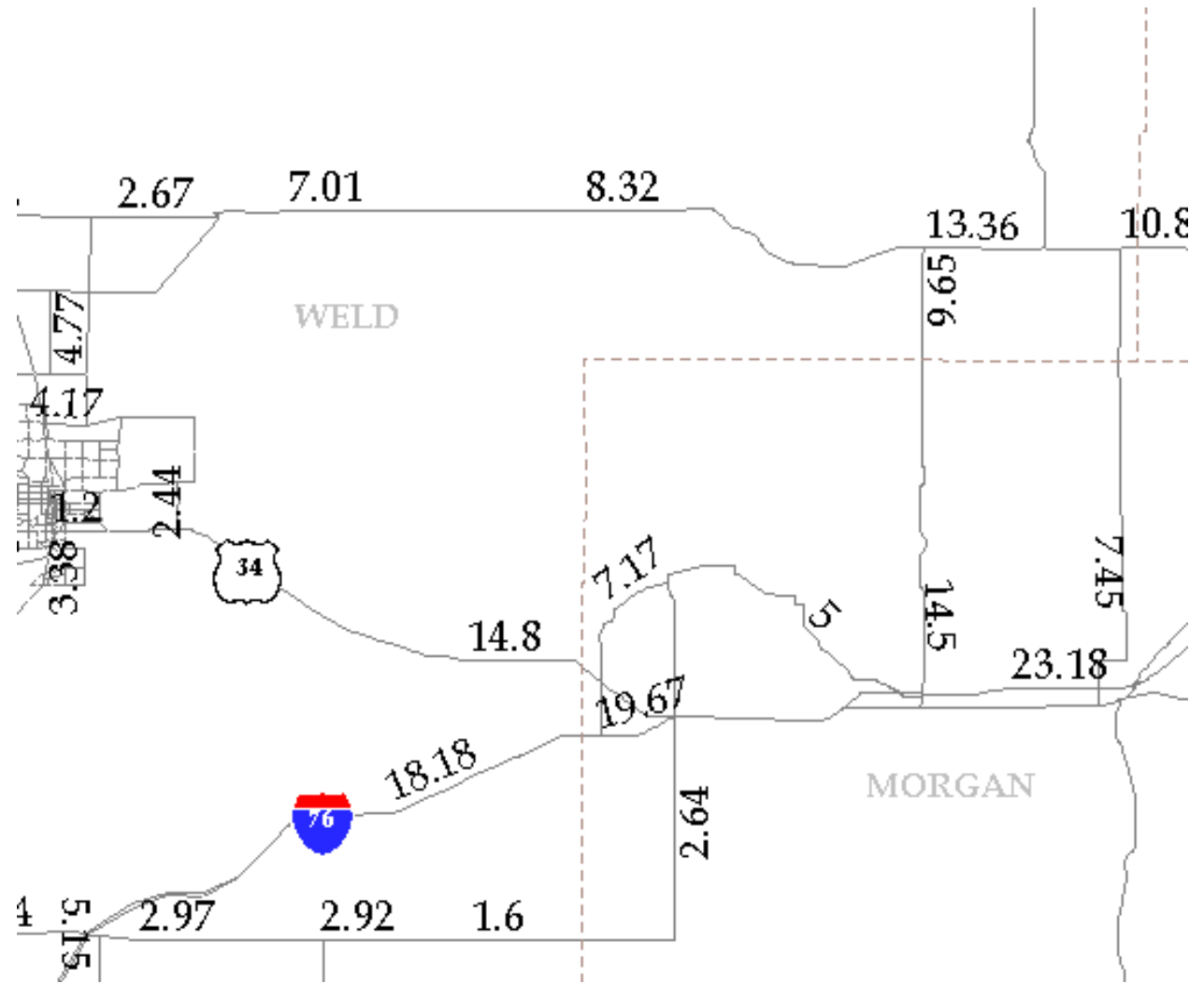
## ***Evaluation Process***

- **Data, trips, networks, and TransCAD model results stored using GIS**
- **IDAS integrated with GIS travel demand-based data to assess impacts of:**
  - **Emissions**
  - **Reliability**
  - **Accidents**
  - **Fuel consumption**
  - **Other measures**
- **Project costs based on CDOT estimates**
- **Economic impact analysis using REMI and integrated with GIS system**

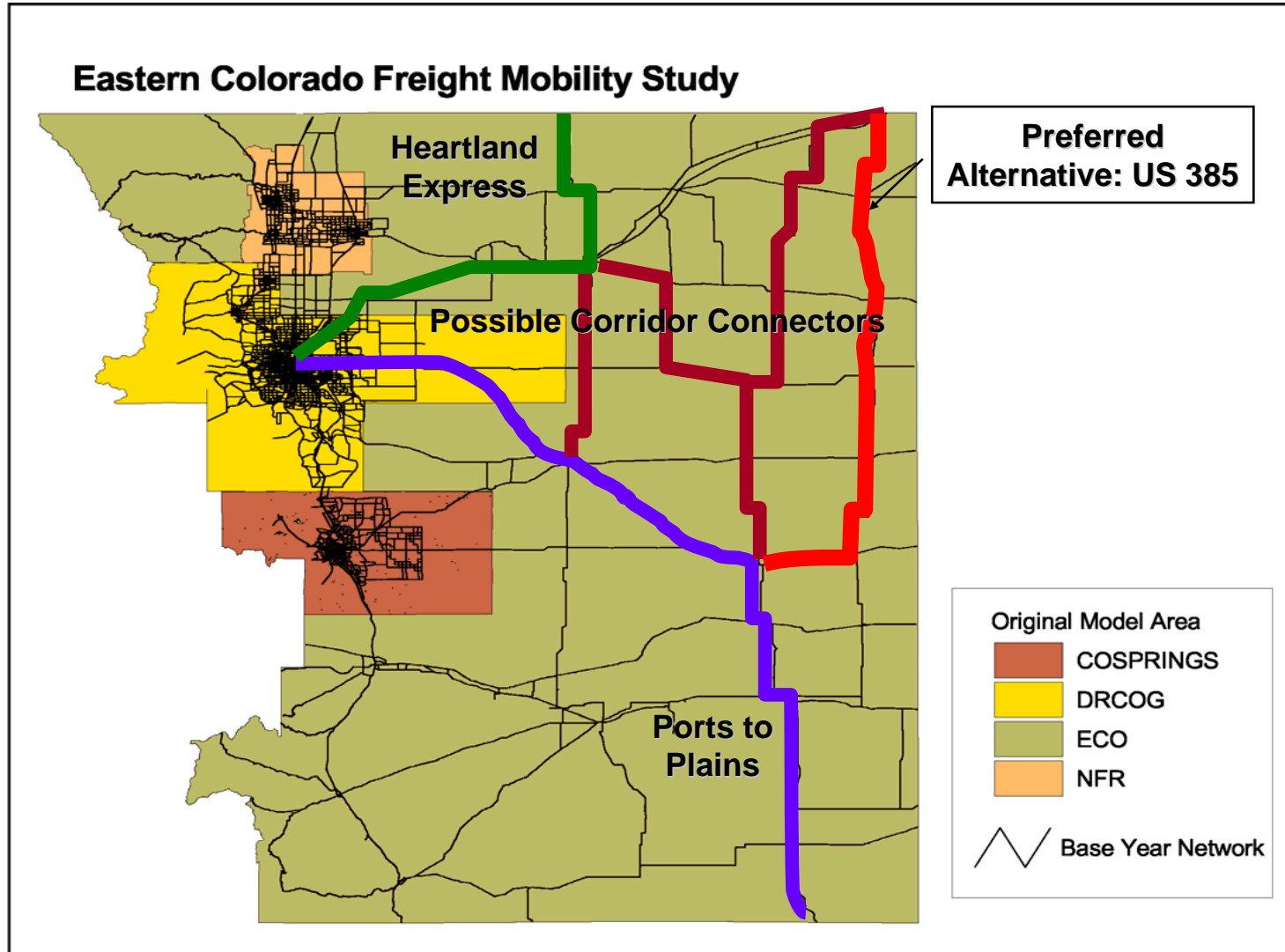


# Project Results

**Sample Output:  
2025 Truck Percentages**



# Project Results



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## ***Application to Other Projects***

- **Reebie data purchased by Colorado to represent:**
  - **Colorado county-to-county flows (all counties)**
  - **State-to-state flows (entire U.S.)**
  - **Commodity flows by mode (rail, air, truck)**
- **TransCAD GIS system represents:**
  - **Detailed eastern Colorado highway network, TAZ system, travel demand, and socioeconomic data**
  - **Procedures in-place to expand system for entire state**

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# *Application to Other Projects*

- **These data used for Colorado:**
  - **Freight analysis**
  - **Passenger analysis**
  - **Long-distance corridor analysis**
  - **Statewide planning and transportation planning region analysis**
  
- **Can be expanded to build:**
  - **Statewide GIS system**
  - **Statewide travel modeling system**
  - **Statewide intermodal/freight plan**

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# ***Conclusion***

- **GIS can provide a single platform for:**
  - **Data compilation**
  - **Travel modeling**
  - **Analysis**
  - **Display**
- **GIS can accept, store, join data from many different platforms and sources**
- **GIS was instrumental in successful completion of Eastern CO Mobility Study**