REGIONAL MODELING FOR LONG RANGE TRANSPORTATION PLANS

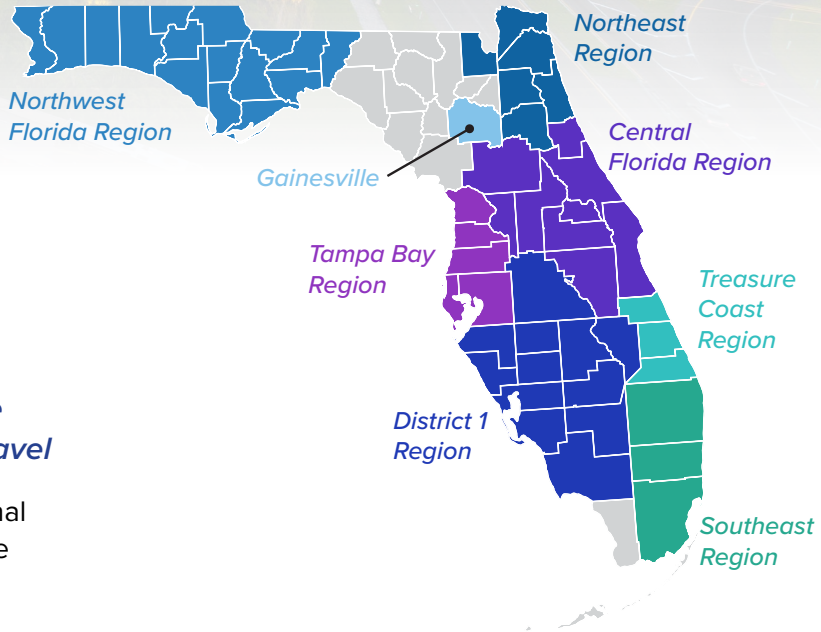
FLORIDA DEPARTMENT OF TRANSPORTATION

WHAT IS REGIONAL MODELING?

Regional modeling is a process used in transportation planning to assess and estimate future travel patterns within a specific geographic region. It involves the analysis of various factors that influence travel demand, such as:

- *Population*
- *Employment*
- *Land use*
- *Existing and future transportation infrastructure and the associated ease of travel*

Travel demand models (TDMs) are the computational tools running on specialized software used to make travel pattern forecasts.



WHY IS IT IMPORTANT?

The goal of regional modeling is understanding how people travel within a specific region, where people live and work, the modes of transportation they use, and the routes they take to their destinations. TDMs help Metropolitan Planning Organizations (MPOs) develop long range transportation plans (LRTPs) by analyzing travel patterns and land use alongside potential impacts of transportation policies and investments.

HOW DOES IT WORK?

The modeling process involves several interconnected work stages to capture travel patterns within a region, the first of which is collecting high-quality data that provides a picture of the current socioeconomic and infrastructural landscape of the region to serve as inputs into the model.

POPULATION DATA

Base Year:

U.S. Census Bureau

Census Transportation Planning Products (CTPP)

Future Year:

Bureau of Economic and Business Research (BEBR)

HIGHWAY NETWORK

Includes FDOT's Roadway Characteristic Inventory (RCI)

Future Year Network Includes:

Existing plus committed roadway infrastructure

Infrastructure that has been deemed cost feasible

EMPLOYMENT DATA

Public Sources:

U.S. Census Bureau

County Business Patterns (CBP)

Longitudinal Employer-Household Dynamics (LEHD)

Additional Sources:

A number of private sources are also used to develop employment data for regional models

Once the current trends in the region have been established, a baseline model run can be executed, which represents no changes in the region's infrastructure beyond those already planned and money allocated (programmed). The results of this run are utilized to identify potential future problems within the region's transportation system, such as overly congested roadways, access limitations, and more. Local planners are then able to assess any potential problems that are identified in the results and determine possible solutions.

The model serves as the key tool for testing these solutions. Any number of scenarios can be crafted containing modifications to the model inputs that reflect the solution(s) being tested. Modifications may involve new roadway alignments and infrastructure like bridges, tunnels etc., new transit service or service patterns, changed roadway characteristics such as widenings, different population, household and employment assumptions, among others. These scenarios are subsequently run to determine the magnitude of the impact of the suggested improvements on the future conditions of the region.

After studying the results from the completed scenarios, planners and decision-makers can determine which improvement projects to prioritize to address the needs of the region's anticipated future travel conditions. Scenarios are used during community engagement to help local stakeholders visualize future needs and consider tradeoffs and prioritization of projects and policies based on their specific regional needs or preferences.

LOADED NETWORK

How much traffic?
Shows volumes of vehicles along specific links

Type of Traffic?
Loaded vehicles may include trucks, autos etc.

Where are the issues?
Capacity constraints may be identified which are then used to prioritize alternatives

Indicates congested travel times by time period

Transit flow

TRIP TABLE

Indicates overall trip making activity

Shows where travelers originate and where they want to go

Gives a general idea of long-term patterns of trip making
Another data point for long term transportation investment prioritization

MODE SPLIT

Indicates how people move around region

How many travel together in same private vehicle?

How many travel by transit:
Bus | Train | Taxi
TNC | Micromobility, etc.

Gives information on the mix of transportation modal infrastructure and capacity
Allows prioritization for optimal mix to serve region

This ultimately results in the development of LRTPs that are built from the prioritization process and represent the list of projects that the community has agreed will best accommodate future growth, reduce congestion, enhance accessibility and generally address the needs, concerns and preferences of the region's stakeholders.

ADDITIONAL RESOURCES

FHWA Policy and Guidance for Travel Demand Modeling and Traffic Analysis Tools

Florida Standard Urban Transportation Model Structure

Florida Department of Transportation Metropolitan Planning Support

Florida Department of Transportation Forecasting & Trends Office

FDOT
FORECASTING & TRENDS OFFICE