BEND REDMOND MODEL

A Regional Computer Model for Transportation Forecasting

What is the BRM?

The Bend Redmond Model is an analysis tool used to forecast travel patterns (auto, walk, bike, transit) on the transportation system. The BRM forecasts how travel and transportation system conditions are likely to respond to changes in land use, population, employment, new transportation facilities, transit service, and public policy.

By showing the impacts and benefits associated with potential improvements, and capturing the economic and transportation connections between Bend and Redmond, this powerful tool helps transportation planners and policymakers make the most of limited funds and make better decisions.

The BRM can provide:

- *Trips by private vehicle, bus, bike, and walking*
- *Roadway volume and demand- to-capacity estimates*
- *Regional travel patterns*
- *Peak hour and daily travel forecasts*
- *Regional vehicle miles and vehicle hours travelled*
- *Average trip distances*
- *Transit park & ride lot usage*
- *Routing for specific vehicle trips*
- *Daily transit ridership by route*

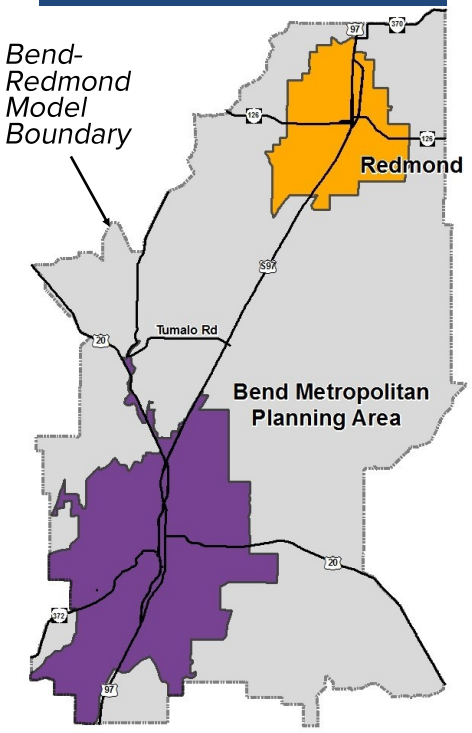
Other outputs are available.

How is the model used?

The BRM is used to analyze potential public policy changes, project investments, and other strategies. The model forecasts travel changes in response to future land use and transportation assumptions. It provides objective, quantitative information that enables communities to explore the implications of various transportation system investments.

Information from the BRM can be produced for an individual jurisdiction or the entire Bend-Redmond region. BRM information can also be used as input to other models, such as scenario planning tools.

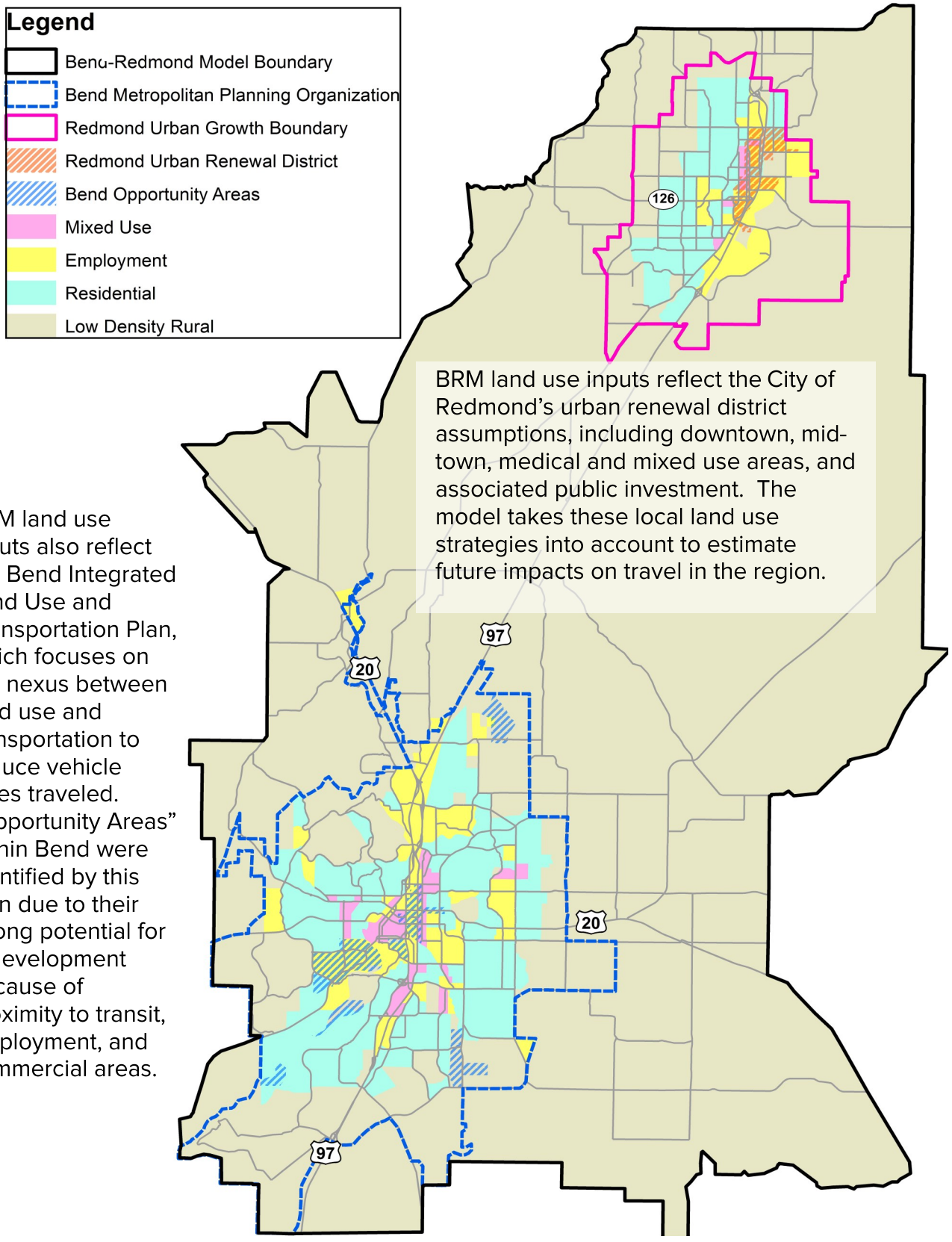
Like all transportation models, the BRM is an informational tool to assist with decision making. While information on the impacts of different investment options is valuable for planning purposes, the model does not provide the "right answer." It simply provides information to enable better decision-making.



BEND-REDMOND MODEL AREA

- *City of Bend*
- *City of Redmond*
- *Surrounding portions of Deschutes County*

Activity Patterns Impact Travel



BRM land use inputs reflect the City of Redmond's urban renewal district assumptions, including downtown, mid-town, medical and mixed use areas, and associated public investment. The model takes these local land use strategies into account to estimate future impacts on travel in the region.

BRM land use inputs also reflect the Bend Integrated Land Use and Transportation Plan, which focuses on the nexus between land use and transportation to reduce vehicle miles traveled. "Opportunity Areas" within Bend were identified by this plan due to their strong potential for redevelopment because of proximity to transit, employment, and commercial areas.

The location, mix, and density of population, employment and land uses define the region's transportation needs.

LEVELS OF TRANSIT MODELING

Metro Area Size

SMALL

1 *Model predicts regional transit trips and mode share only. This level is suitable for regional planning in most small metropolitan areas.*

Bend-Redmond Model

2 *Model may be used for corridor-level transit analysis and to predict mode shares by trip purpose.*

3 *Model may be used for corridor multi- modal planning, projecting route-level ridership, and estimating boarding and transfers.*

4 *Model is needed to perform complex multi-function transit route and stop analysis for large metropolitan systems.*

LARGE

BRM Transit Modeling

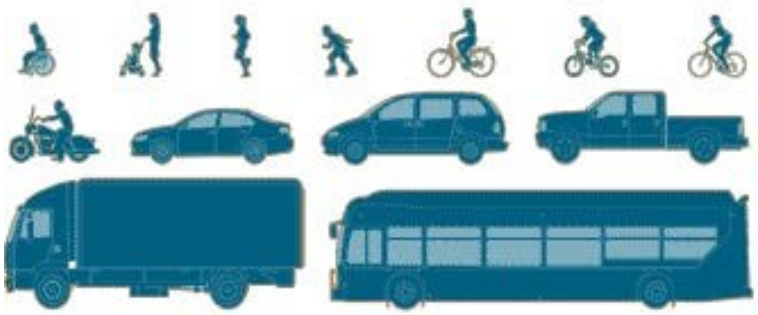
The detail and complexity of a large metropolitan transit model is not necessary for regional transit planning in small metropolitan areas such as Bend or Redmond. However, the BRM supports a higher level of analysis than is typical for similarly sized metropolitan areas across the country.

The BRM transit module enables communities to examine how major transit investments, such as new routes or significant changes in service frequencies, may affect future ridership, while accounting for interaction and competition with other modes.

Different Travel Needs

A diverse mix of people and goods share the region's multimodal transportation system. In addition to peak hour commuting and off-peak shopping, long-haul freight and local delivery trucks keep the economy moving.

A local delivery truck, for instance, might make many stops across the region throughout the day, in contrast to the peak hour home-to-work or work-to-home trips of a commuter. As new data becomes available, travel models are refined to better account for these different travel patterns.



Frequently Asked Questions

How is Oregon's modeling program managed?

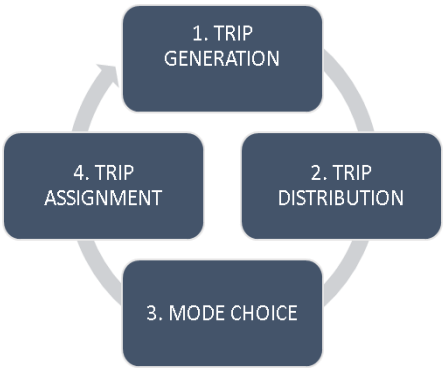
Statewide transportation models, as well as models for small to mid-size metropolitan areas and small cities, are managed by the Oregon Department of Transportation (ODOT). This centralized approach, which is unique to Oregon, supports regions with limited technical staff and provides significant advantages for model consistency, quality and cost.

For example, in order to handle the increasing demand for travel models in small to mid-size metropolitan areas, ODOT used Portland Metro's regional model to develop a template. The template is an empty shell that is then filled with local data and calibrated to match travel conditions in each unique location. This cost-effective approach expedites the development of new models, and provides Oregon's metropolitan planning organizations and other small and mid-sized communities with sophisticated planning tools that out-perform those used in comparable areas of the country.

The BRM is a "4-step model." What does that mean?

The BRM's calculations are performed in four steps representing major household travel behaviors:

1. **Why** we travel (*trip generation*). The BRM estimates the number of trips made from each origin by trip purpose, based on household size, income and number of workers.
2. **Where** we travel (*trip distribution*). The BRM estimates a destination choice for each trip.
3. **How** we travel (*mode choice*). The BRM estimates whether each trip will occur by car or truck, bicycle, walking or transit.
4. **Which way** we travel (*trip assignment*). The BRM estimates the shortest route taken to accomplish each trip, considering congestion.



How do we know the BRM's forecasts are reasonable?

Before future travel estimates are made, the model is run to provide a picture of existing travel patterns. The results are given a reality check where modelers confirm the numbers make sense and cross-check how well the model represents current "observed" patterns. This checking process is called validation.

Can we expand the BRM's capabilities?

When it comes to model development, there is a point at which the additional information to be gained simply cannot justify the level of effort required for model enhancements. It is important to make a clear distinction between information that is essential for planning purposes and information that may be helpful or interesting, but would take resources and model runtime that is not commensurate with the value that would be added.

While ODOT's modeling resources are limited, we welcome partnerships and resource-sharing opportunities with customers who may desire custom outputs or enhanced model functions.

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