Texas Department of Transportation

Application of INRIX data on OD Development
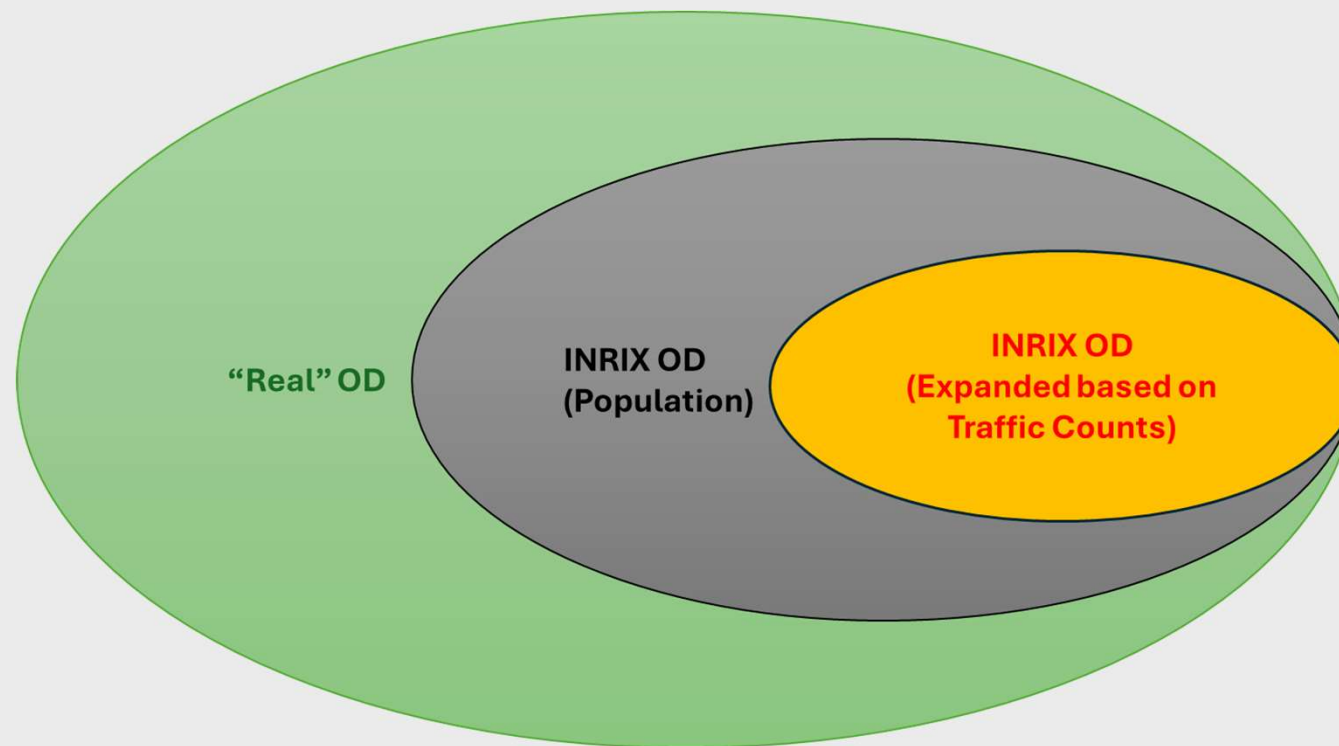
AADT Counts in Wichita Falls, TX

- Wichita Falls, TX:

    - Location: North Texas, near the Oklahoma border, northwest of Dallas-Fort Worths

   - Area: 71 square mile

    - Population: 105,000

    - Transportation: Served by U.S. Highways 287, 281, and 82

    - Field counts: 257 count locations, covering freeway, highway, frontage road, ramp, arterials

    - AADT value range: 52 – 31,884

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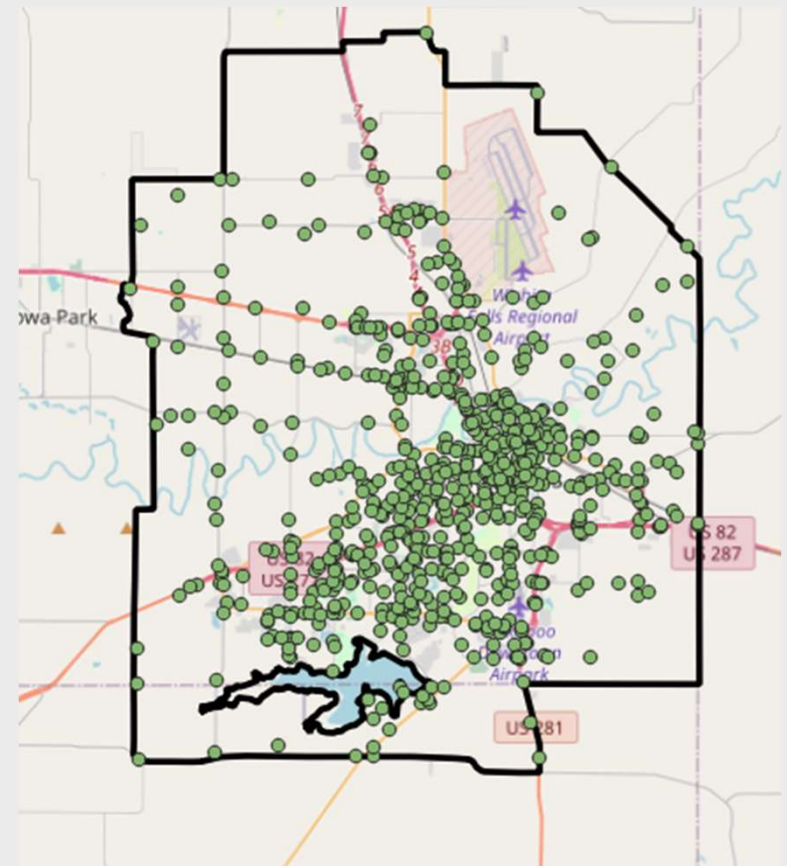
GPS Trips in Wichita Falls, Tx

- 14,179,737 INRIX trips have at least one field counts

- 19,067,368 INRIX trips within the study area

- 74.4% (**yellow**) of the INRIX trips could be expanded based on traffic counts

- 25.6% (**gray**) of INRIX trips need to be expanded using other approach for complete regional O-D pattern

"Real" OD

INRIX OD
(Population)

INRIX OD
(Expanded based on
Traffic Counts)
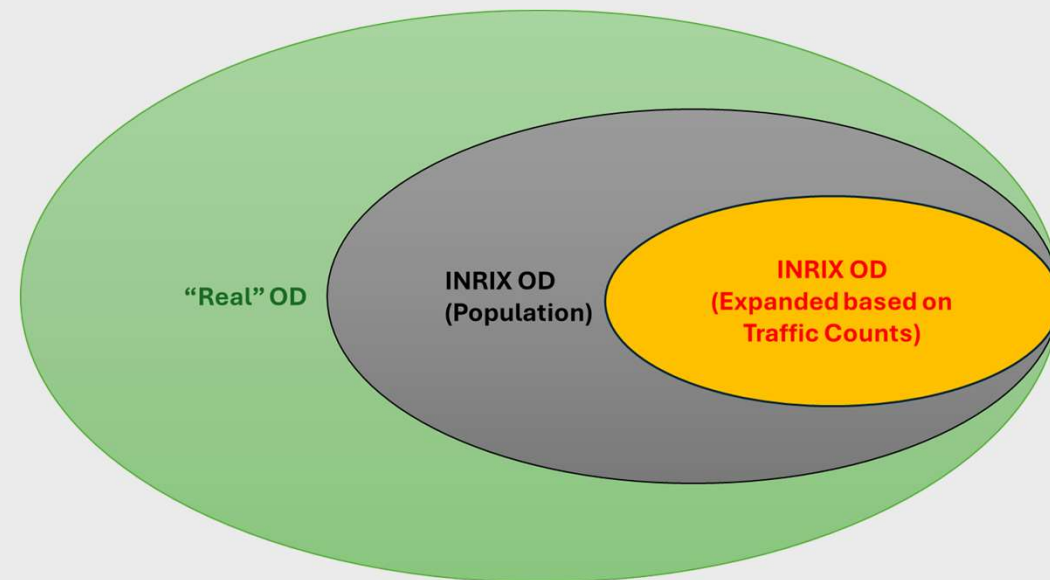
Methodology - Continued

- Essentially an ODME Approach - Optimization (Gradient Descent)

  - Objective Function:

    - Minimizing the difference between expanded trip counts and AADT

    - Prevent the occurrence of excessively large expansion factors

$$\text{Objective} = \sum_{\text{link}} (\text{Estimated Volume} - \text{AADT})^2 + \lambda \sum_{\text{trip}} (\text{Expansion Factor})^2$$

- Expansion Factor updates:

$$f_{\text{trip}} = \max(f_{\text{trip}} - \eta \cdot \textbf{gradient}, 0.1)$$

Trip Expansion Results - 3

- Regional Results:

  - Average expansion factor (overall) method is efficient and adequate for expanding INRIX trips within the study area

  - Total trips in TexPack model: 430,880 (referred to as "Real" OD)

  - The expanded INRIX trips are approximately 95% of those in TexPack model.

Methods	Groups	Number of Expanded Trips
Average expansion factor (overall)	1	410,601
Average expansion factors (trip length groups)	5	406,644
Average expansion factors (vehicle class groups)	3	410,027
Average expansion factors (cluster analysis)	8	411,744

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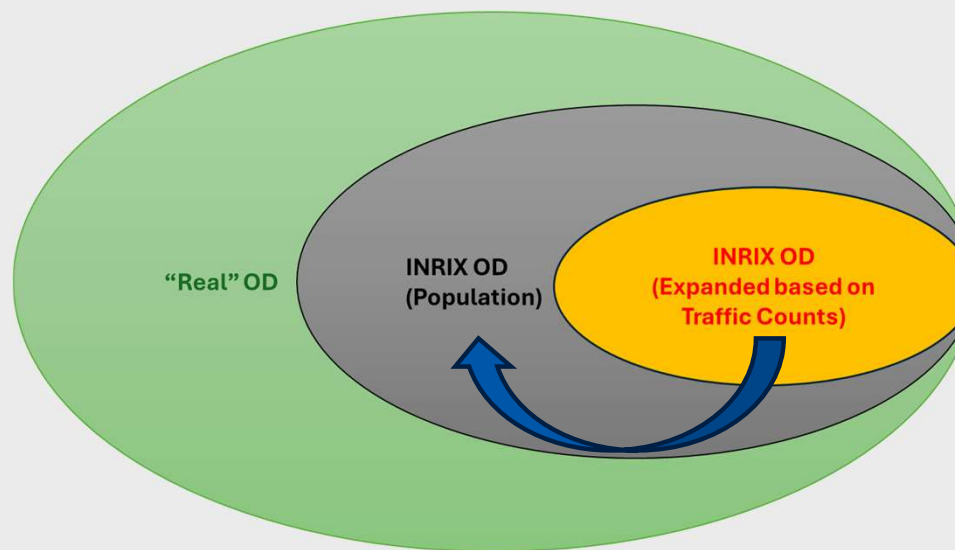
Ongoing Work

- Critical Assumptions for ODME - Mutual Exclusiveness

  - A: All target roadway traffic used for matching originates exclusively from the trips designated for adjustment.

  - B: Every trip included in the adjustment process contributes exclusively to the target roadway traffic considered in the matching

- Weighting Strategies in Objective Function

  - To address potential violation of assumption A

  - Preprocessing prevents the violation of assumption B

100% To

Trips to be Expanded

Target Roadway Traffic Counts for Matching

100% From

"Real" OD

INRIX OD (Population)

INRIX OD (Expanded based on Traffic Counts)

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