

Measuring Transit-Coverage Level-Of-Service in U.S. Border Cities

Luis David Galicia, Ph.D.
Texas A&M Transportation Institute





Overview of Presentation

- Background
- Problem Statement
- Literature Review
- Case Study
- Hypothesis
- Data Collection
- Methodology
- Results
- Conclusions

Background

- Level of Service (LOS) concept introduced by the Highway Capacity Manual (HWCM) in 1965
- The LOS is divided in 6 categories being "A" the highest and "F" the lowest
- A similar concept, Service Coverage-Level Of Service (SC-LOS), was adopted in the first edition of Transit Capacity and Level of Service Manual (TCQSM) in 2004

- Service Coverage is defined by the TCQSM as *"the availability a potential transit user has to access the transit system within a reasonable walking distance (typically $\frac{1}{4}$ of a mile) from the user's origin or the user's final destination"*



Problem Statement

- Is the SC-LOS suitable for border cities/regions in the U.S?





What the Literature Says..

- Transit Supportive Area (TSA) concept* is included in TCQSM-Part III-Chapter three “Fixed-Route Transit Service Measures” (Quality of Service)

LOS	% TSA Covered	Comments
A	90.0-100.0%	Virtually all major origins & destinations served
B	80.0-89.9%	Most major origins & destinations served
C	70.0-79.9%	About ¾ of higher-density areas served
D	60.0-69.9%	About two-thirds of higher-density areas served
E	50.0-59.9%	At least ½ of the higher-density areas served
F	<50.0%	Less than ½ of higher-density areas served

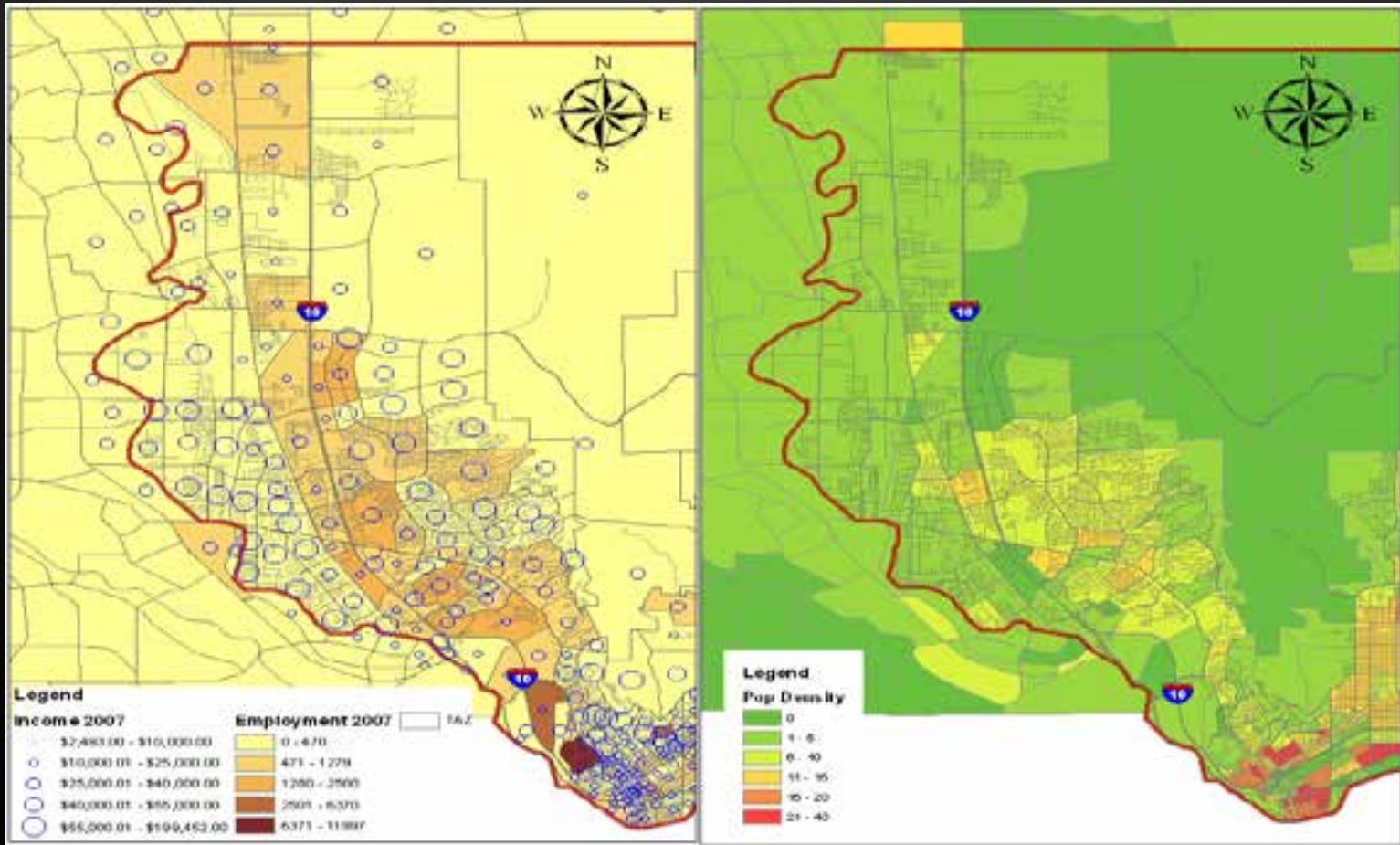
Transit-Supportive Area (TSA): The portion of the area being analyzed that has a household density of at least 3 units per gross acre (7.5 units per gross hectare) or an employment density of at least 4 jobs per gross acre (10 jobs per gross hectare).

Covered Area: The area within 0.25 mile (400 m) of local bus service or 0.5 mile (800 m) of a busway or rail station, where pedestrian connections to transit are available from the surrounding area.

Source: TCQSM 2nd Edition

*Pushkarev, B., J. M. Zupan. *Public Transportation and Land Use Policy*. Bloomington, IN. Indiana University Press, 1977

Case Study (City of El Paso, Texas)



Hypothesis

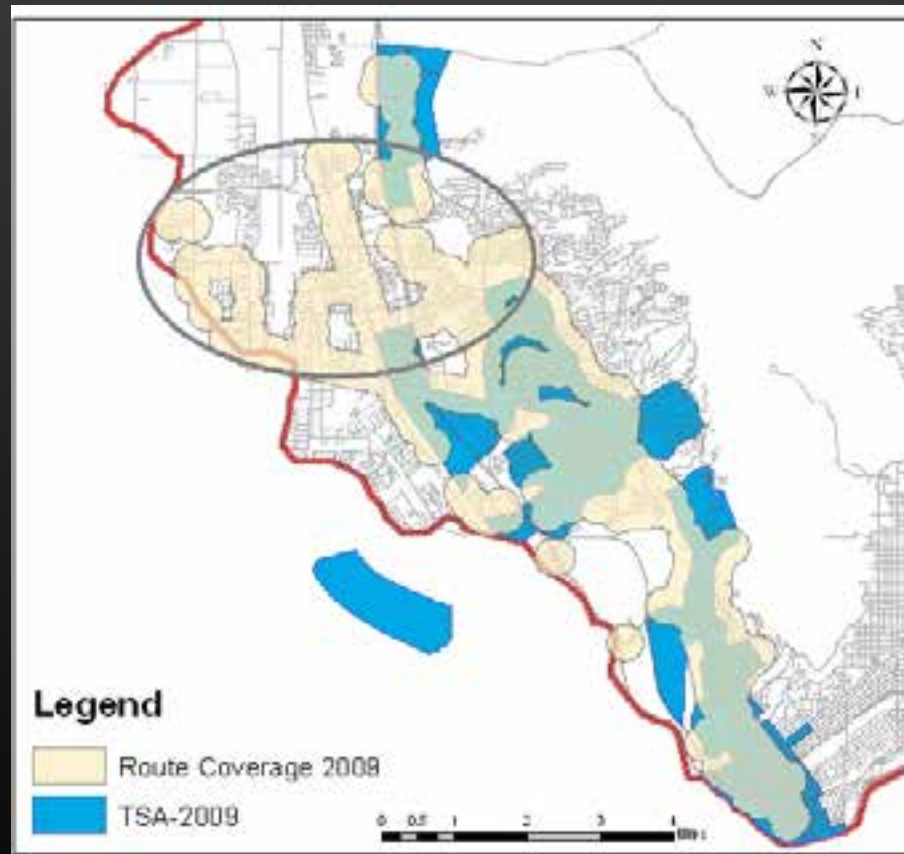
- Even though the TCQSM and TLOS help planners shape the areas that support transit route coverage, these methodologies might not lead to the most accurate results border cities/regions
- The TSA concept might “exclude” transit riders that have their work-base trips originated in other areas, thus reducing the employment/household density and the potential of a TAZ to be considered as a TSA



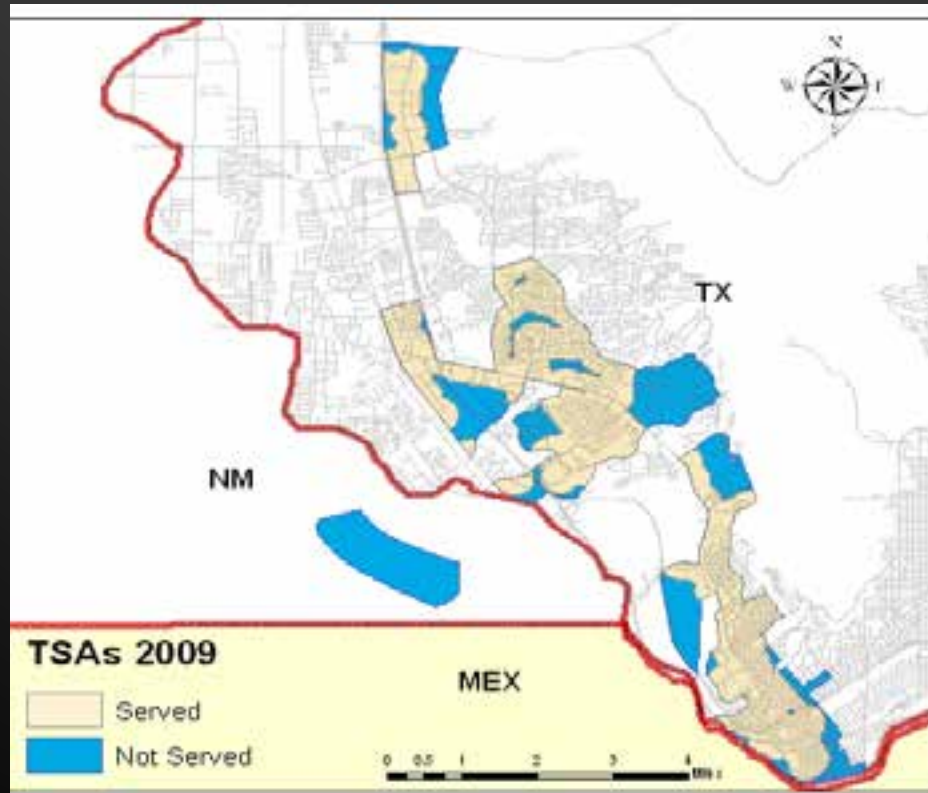
Data Collection

- Shapefiles provided by local MPO, and other web sources (e.g. Paso del Norte Maps web site)
- City of El Paso
- Sun Metro's Route shapefiles
- ArcGIS Business Analyst for 2009 estimations
- ArcGIS Spatial Analysis
- TTI's O-D Survey

The TCQSM method...Step 1

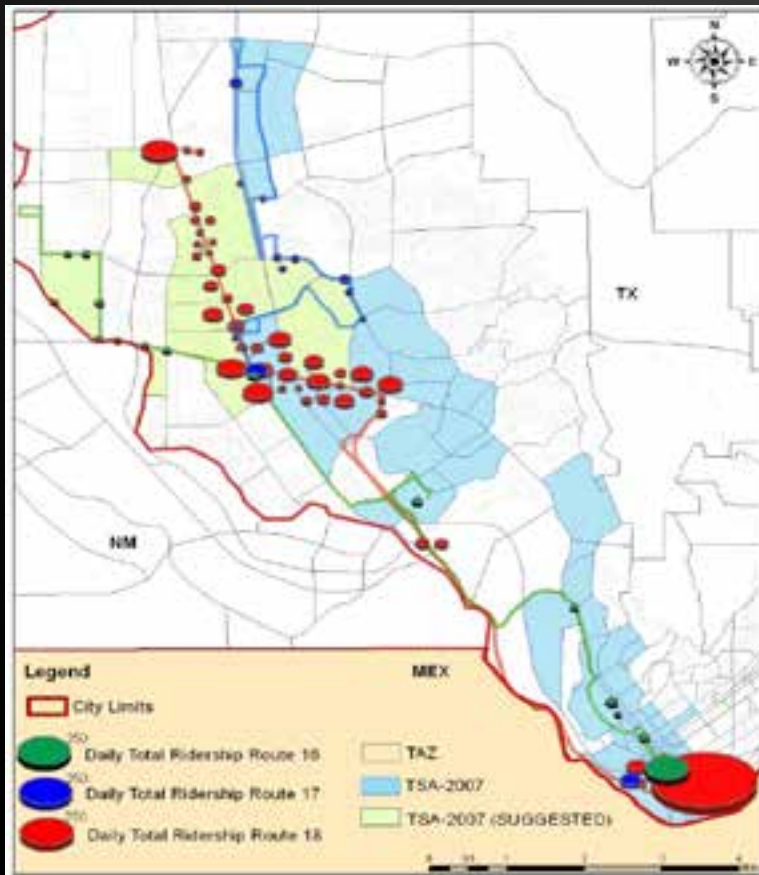


The TCQSM method...Step 2

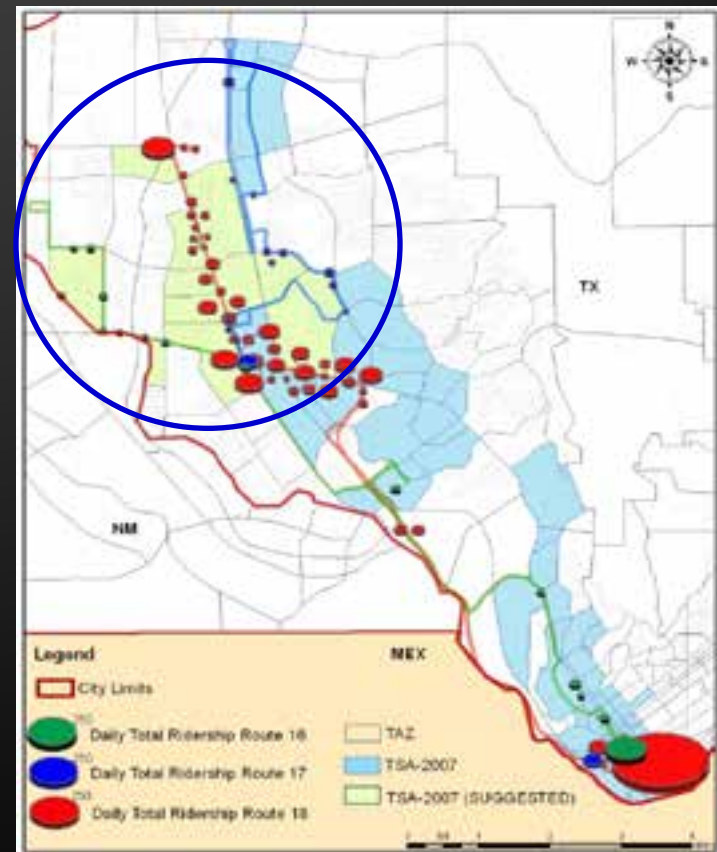
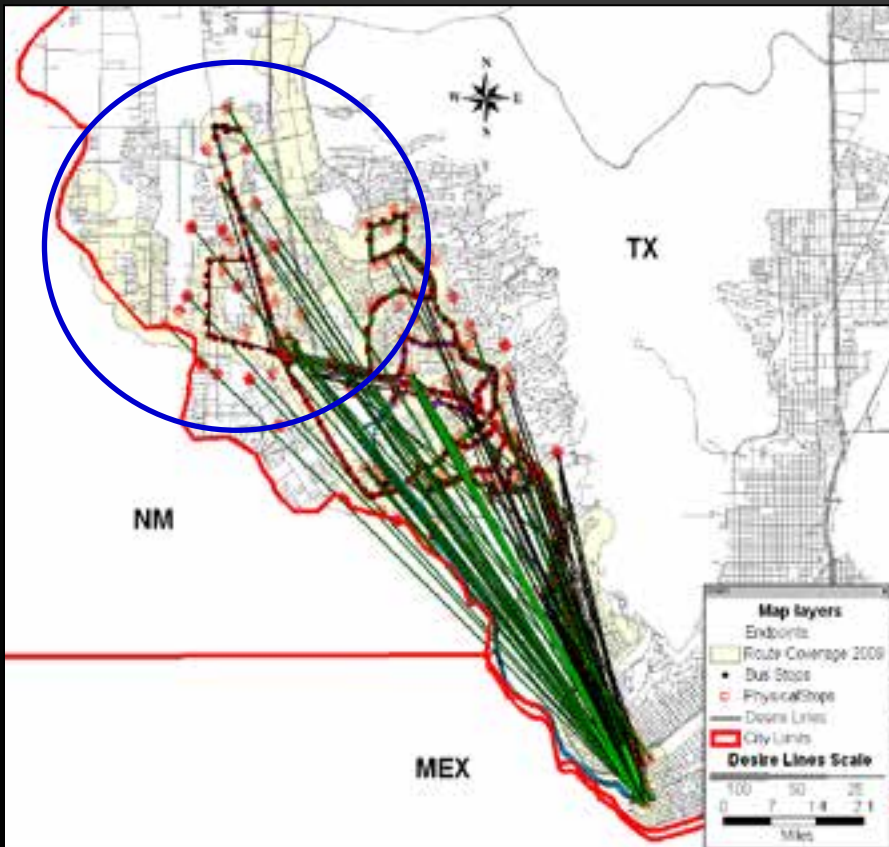


Year	Coverage area (acre)	TSA (acre)	TSA served (acre)	Area served (%)	SC-LOS
(1)	(2)	(3)	(4)	(5)=(4)/(3)	
2009	13,694	7,539	5,753	76.30%	C

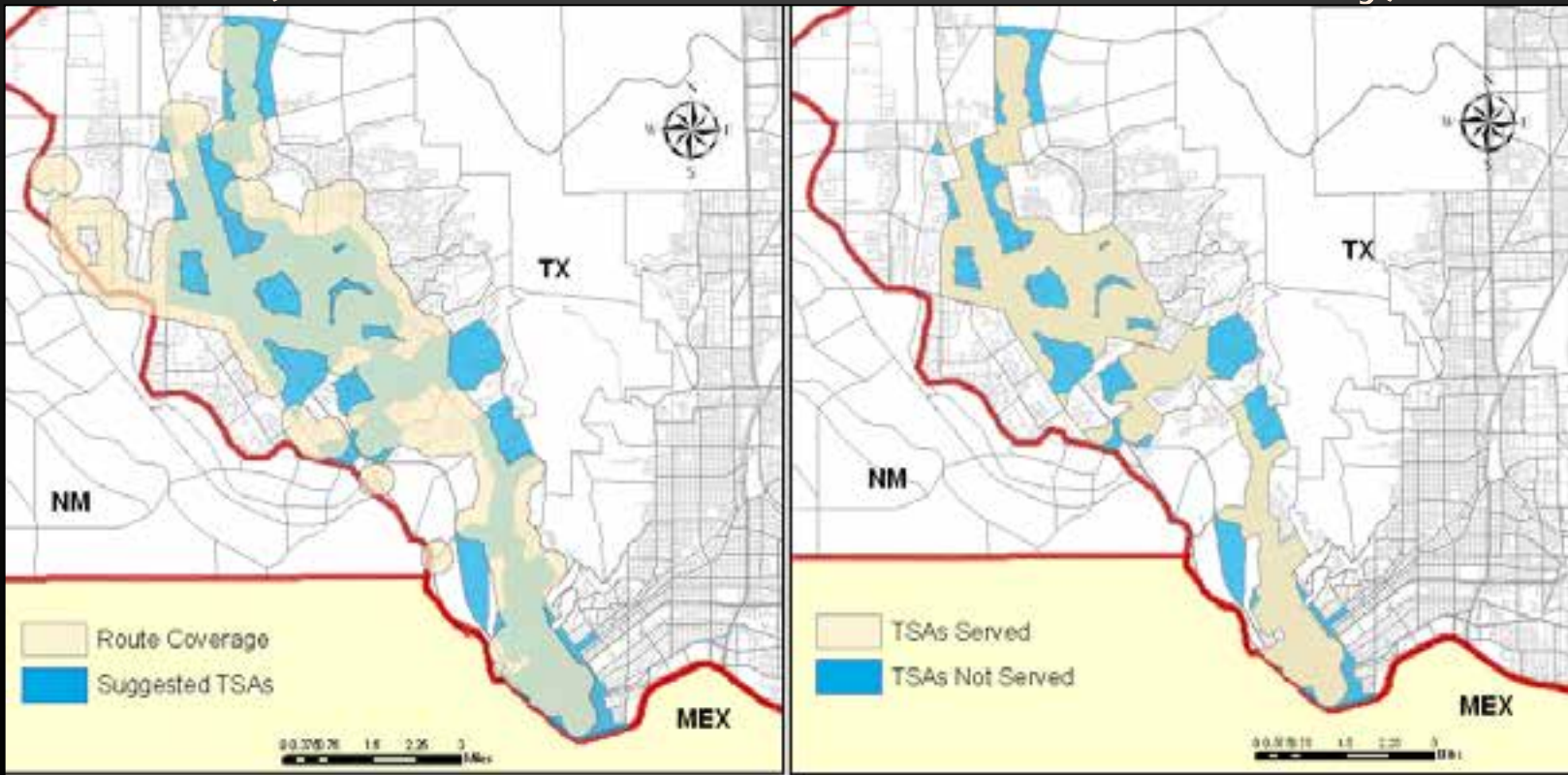
Author's suggested method...Step 1



Author's suggested method...Step 3



Author's suggested method...Step 4 (Recalculation of SC-LOS based on OD Survey)



New Analysis Area	Coverage Area (Acre)	TSA (Acre)	TSA Served (Acre)	Area Served (%)	SC-LOS
Westside El Paso 2009	13,694.95	9,220.87	7,648.39	82.95%	B



TCQSM vs Author's Suggested Method

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Conclusions

- The hypothesis was verified via the suggested methodology
- The occurrence of work-based trip attraction at TAZs with almost no employment suggests that the work trips are for household services
- The portion of TSAs covered by the transit service increased by approximately 5% just by adding some TSAs with relatively high passenger volumes (although these TSAs have low household density or employment)
- TCQSM's TSA and SC-LOS determination methodology may not cover border regions with special trip generators or attractors, such as the one presented in this research