Reliable Transportation Index Calculation

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Overview:

- We replaced the old z-score paradigm with a new 0-100 scoring system that accounted for national averages and trends.

- We analyzed some of the observed changes and differences when applying our new index scoring paradigm.

Here is the list of Variables that we will be working with and their definitions.

- `ACT` This is the percentage of workers who walk or bike to work
- `CAR` This is the percentage of workers who drive alone to work
- `PUB` This is the percentage of workers using public transit
- `NVC` This is the percentage of households without a vehicle
- `TRV` This is the mean travel time to work.
- `EKW` This is the walkability index, where higher values indicate higher walkability.

Scoring Approach

Each variable is converted to a Condition Score between 0 and 100 using five breakpoints: 0 (terrible), 25 (bad), 50 (average), 75 (good), 100 (ideal).

The breakpoints are based on:

- National data (e.g., American Community Survey benchmarks)

- Local dataset distributions

- Our judgment about what values indicate more reliable, safe, and accessible transportation

Table 1: Breakpoints for Reliable Transportation Index Variables

Variable	Terrible (0)	Bad (25)	Average (50)	Good (75)	Ideal (100)	Direction
ACT (Walk/Bike) %	0%	1.2%	3.5%	7%	17%	Higher is better
CAR (Drive Alone) %	90%	82%	76%	65%	50%	Lower is better
PUB (Public Transit) %	0%	0.5%	2%	5%	10%	Higher is better
NVC (No Vehicle) %	25%	15%	8.5%	4%	0%	Lower is better
TRV (Commute Time, min)	35	30	26.4	20	15	Lower is better
EKW (Walkability)	3	6	9	13	16	Higher is better

This table is a simplified view, the actual calculation process also involves `interpolation` between breakpoints, clamping out of range values, and mapping all six variables to national benchmarks before averaging them for the overall index I didn't include all of those technical steps here to avoid a long winded explanation, but I'm happy to walk through the full process if that would be useful.

Looking ahead, I think there's a lot of potential to align the index more closely with the broader range of trip purposes and transportation modes in the pyramid Sarah Shared, while still grounding it in data that we can track consistently over time.

Here is a visualization of how each variable is scored
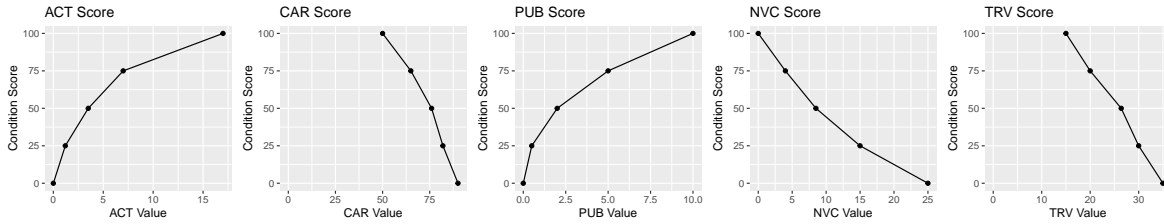
Overall Index Calculation

We score each variable using its breakpoints. Example for `ACT`:

A tract with 5% walking/biking would score between 50 (average) and 75 (good), closer to 75.

We would then take the average of the six variable scores for that tract.

The final index is has a scale of 0–100, where higher scores indicate more favorable transportation conditions.

Since we are using equal weights for each variable as of now, here would be the formula for each census tract (let me know if you think some variables should be weighted more heavily in the calculation)

Formula

```
Overall Index = mean(ACT_score, CAR_score, PUB_score, NVC_score, TRV_score,
EKW_score)
```

Map

I set 0-100 limits on the scale. Although the values in our dataset do not necessarily reach both ends of the spectrum, this is helpful so that we can compare the tri county to national benchmarks (where 0 would be the worst, and 100 the best in the nation) and understand where we stand relative to other areas in the United States.
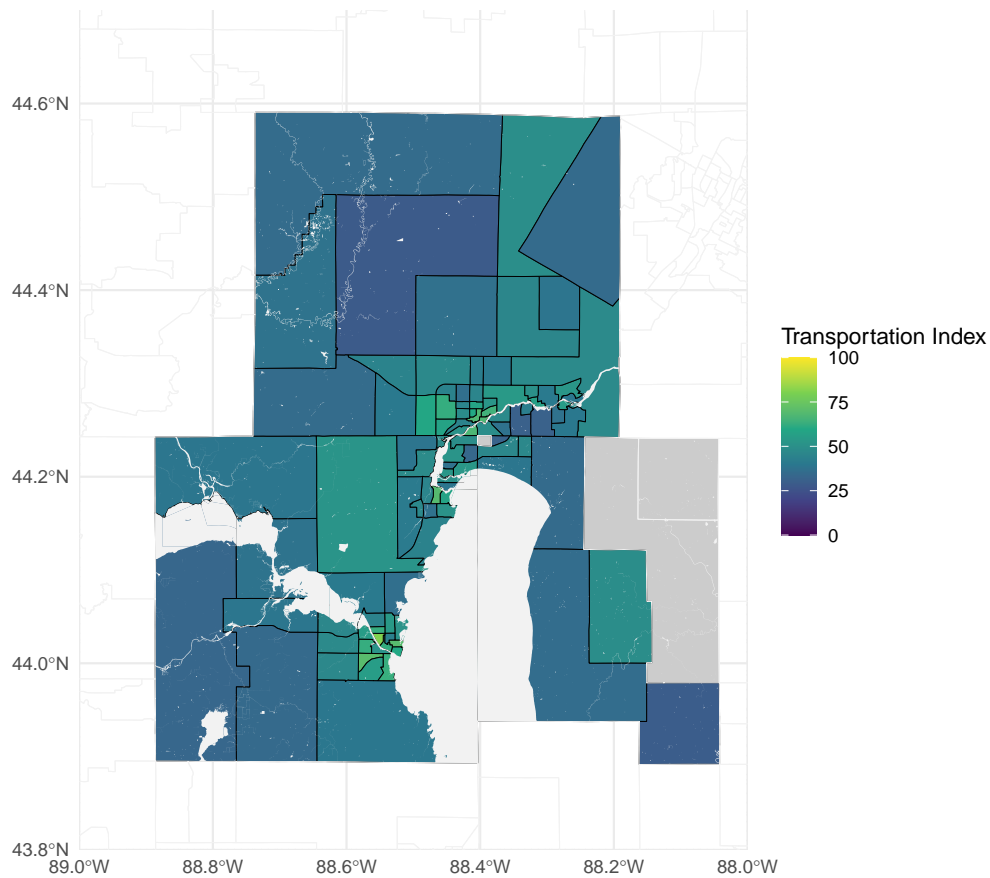

Figure 1: Map of Reliable Transportation index by census tract

The results show a clear urban–rural divide. Urban tracts, especially near downtown Appleton and Oshkosh, score higher due to better walkability, transit access, and lower car dependency.

Rural tracts score lower, which is expected, but this may reflect the index over-penalizing areas where walking or transit aren't practical. Equal weighting of variables and subjective breakpoints may also influence results, so these are areas to review as we refine the index.