STREETLIGHT

Walk This Way: New Data for Pedestrian Safety

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Traffic fatalities rose even as driving decreased in 2020[1], and this sobering fact has transportation planners stepping up their safety initiatives — especially for pedestrians. We turned to our transportation database to uncover key insights that can help. This granular analysis revealed unexpected nationwide shifts in pedestrian travel, a fresh way to evaluate increased exposure, and an example of how this approach played out in a safety analysis for Orlando, Florida.

[1] *National Transportation Safety Council*

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Cities Where Pedestrians Traditionally Walk the Most

Pedestrian activity has generally been higher in dense city centers because distances are shorter between work, shopping, dining, transit hubs, and other regular activities. Although visitors to a city may drive in and park, once they're downtown, it's often easier to walk than drive from the office to a lunch location, for example.

But with 2020's large shift to work-from-home, we wondered if that pattern changed. To find out, we analyzed the top 10 cities for pedestrian activity in our *2020 U.S. Transportation Climate Impact Index* to see if habits shifted in those metro areas.

To pinpoint where pedestrian activity happens, we gridded each CBSA into equal-sized hexagons. This allowed us to analyze the numbers of walking trips by small 1-km zones instead of city-sized blobs.
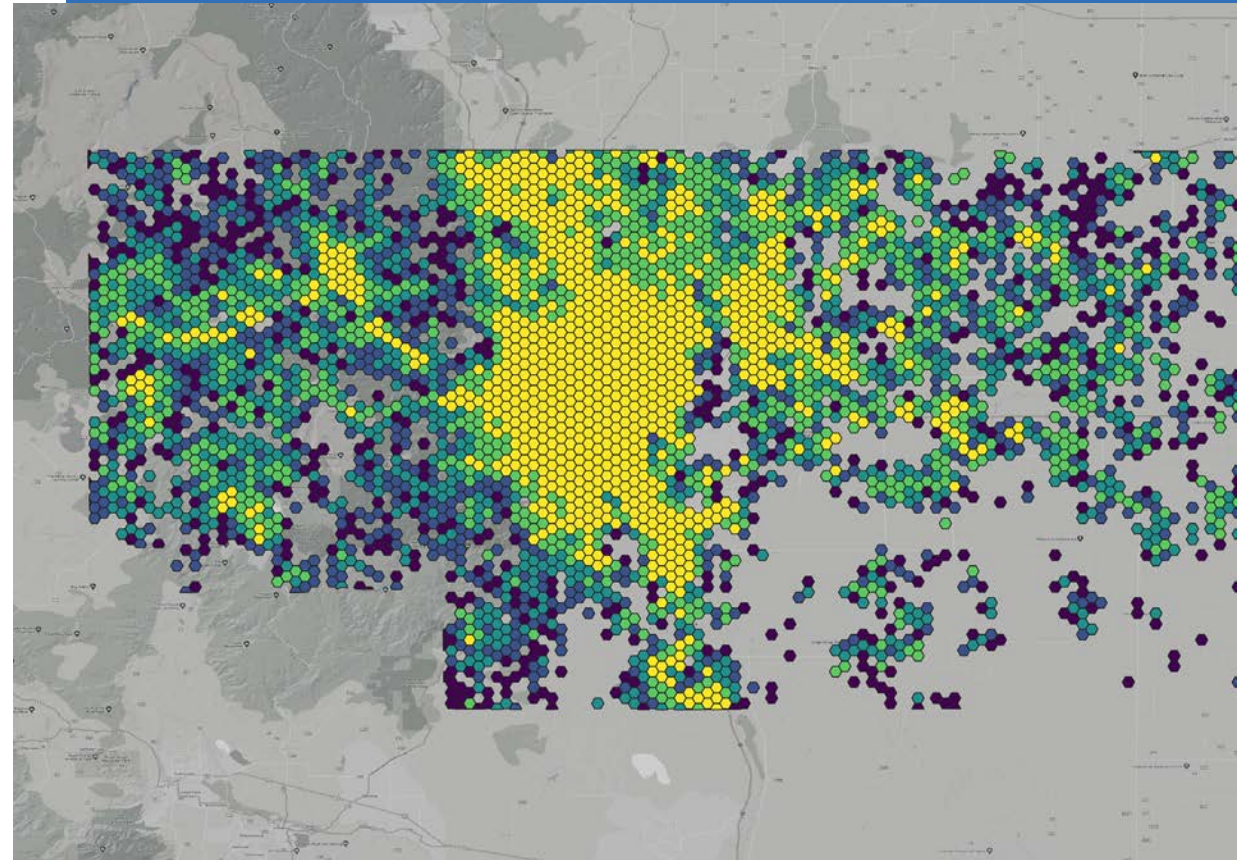
It turns out the pandemic didn't impact that high-level pedestrian trend: People still did more walking in the CBSA centers than in the outskirts of all 10 of the cities we analyzed for 2020.

2020's Top 20 Cities for Pedestrian Activity

1. Orlando-Kissimmee-Sanford, FL
2. Cape Coral-Fort Myers, FL
3. Palm Bay-Melbourne-Titusville, FL
4. North Port-Sarasota-Bradenton, FL
5. Tampa-St. Petersburg-Clearwater, FL
6. Deltona-Daytona Beach-Ormond Beach, FL
7. Las Vegas-Henderson-Paradise, NV
8. Lakeland-Winter Haven, FL
9. Colorado Springs, CO
10. Austin-Round Rock, TX
11. Jacksonville, FL
12. Boise City, ID
13. Denver-Aurora-Lakewood, CO
14. Phoenix-Mesa-Scottsdale, AZ
15. Des Moines-West Des Moines, IA
16. Ogden-Clearfield, UT
17. San Antonio-New Braunfels, TX
18. Raleigh, NC
19. Charleston-North Charleston, SC
20. Toledo, OH

PEDESTRIAN TRIPS IN COLORADO SPRINGS, 2020

Colorado Springs shows the typical pattern we uncovered. The purple dots are zones that had zero, or very few, walking trips in 2020. Moving through the blue and green zones of our indexed results, we grouped the colors by quintiles. Yellow zones, concentrated in the city center, have the highest number of trip starts.
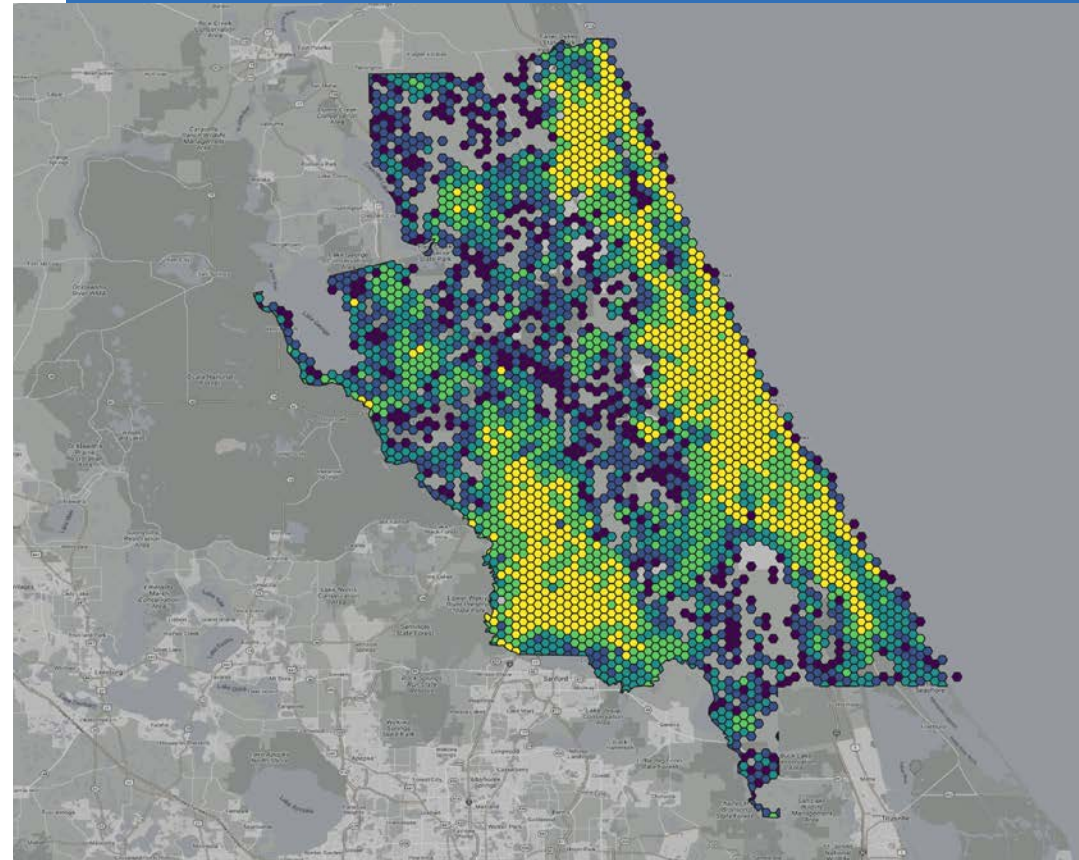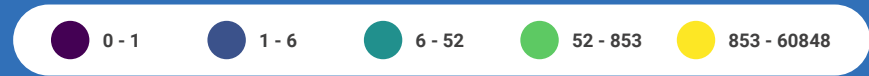
Pedestrian Trip Start Activity (Indexed)

● 0.0 - 1.0   ● 1.0 - 4.0   ● 4.0 - 28.0   ● 28.0 - 321.2   ● 321.2 - 44500.0

We saw this same trend for the rest of our Top 10 pedestrian cities, confirming that even when work shifted to home locations for many, people still walked more downtown than outside it.

Still, anyone with a window could see that 2020 pedestrian activity definitely changed, so we compared it to 2019. That's where we found some interesting shifts.

PEDESTRIAN TRIPS IN DAYTONA BEACH, 2020

Pedestrian Trip Start Activity (Indexed)

- 0 - 1
- 1 - 6
- 6 - 52
- 52 - 853
- 853 - 60848

2 — Yellow Light

2020's Shifting Pedestrian Patterns

Our year-over-year analysis revealed an interesting change in pedestrian activity. We analyzed the Top 10 pedestrian CBSAs again, this time comparing total pedestrian trip starts in 2020 to 2019. Although people were still walking in downtowns, pedestrian travel in suburban areas shifted quite a lot.

In fact, while amounts of walking in city centers fluctuated only slightly across our 10 cities in 2020, walking outside the city rose or fell up to 100%.

## CHANGE IN PEDESTRIAN TRIPS FOR LAS VEGAS, 2019-2020

% Change in Trip Starts 2019-2020

● <-25   ● -25 – 0   ● 0   ● 0 – 75   ● 75+
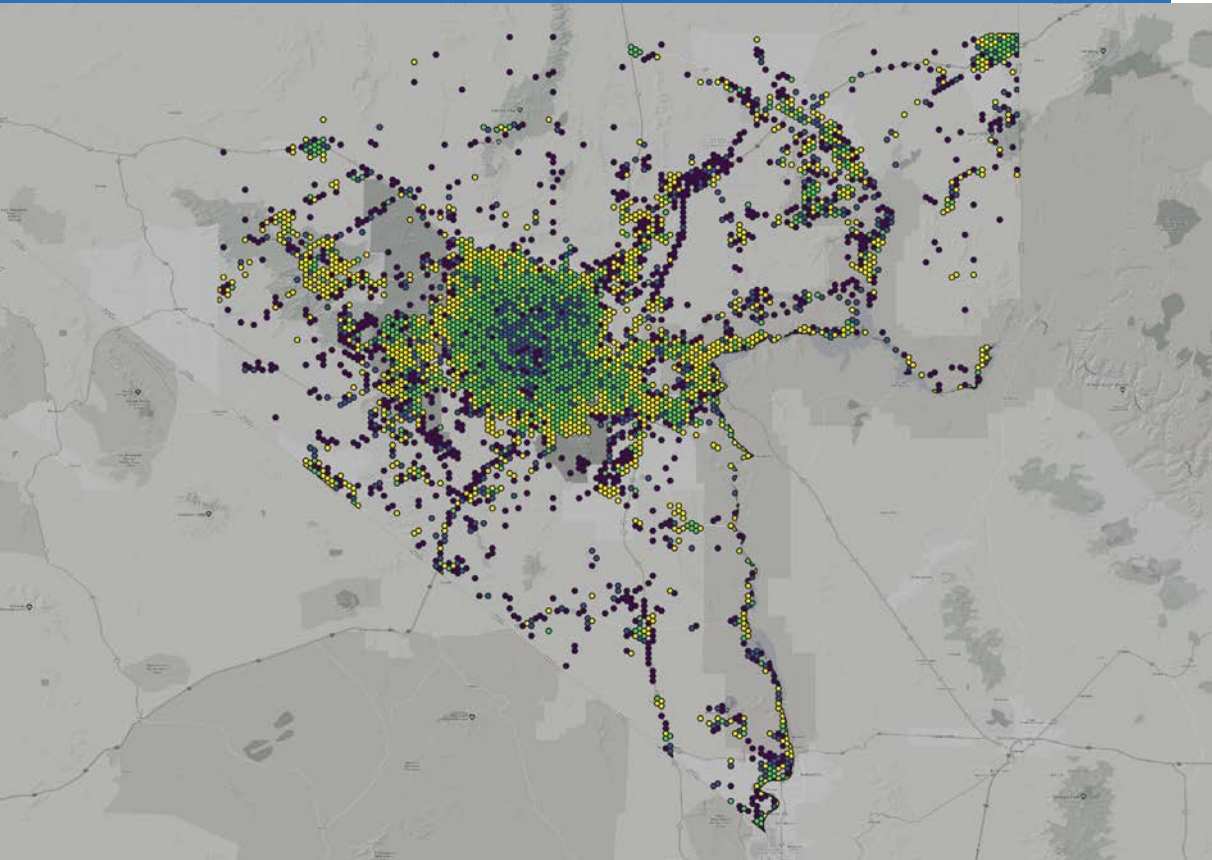
For example, the aqua areas in Las Vegas show where the number of pedestrian trips stayed the same in 2020 compared to 2019. But the wide scatter of dots in purple (more than 25% decrease) and yellow (more than 75% increase) show how volatile walking became in the suburbs (and dropped in the casinos).

This finding was similar for all the Top 10 cities we analyzed, including Daytona Beach, where beach and city center walking held, but away from those areas it dropped as much as 25% or even more.

CHANGE IN PEDESTRIAN TRIPS FOR DAYTONA BEACH, 2019-2020
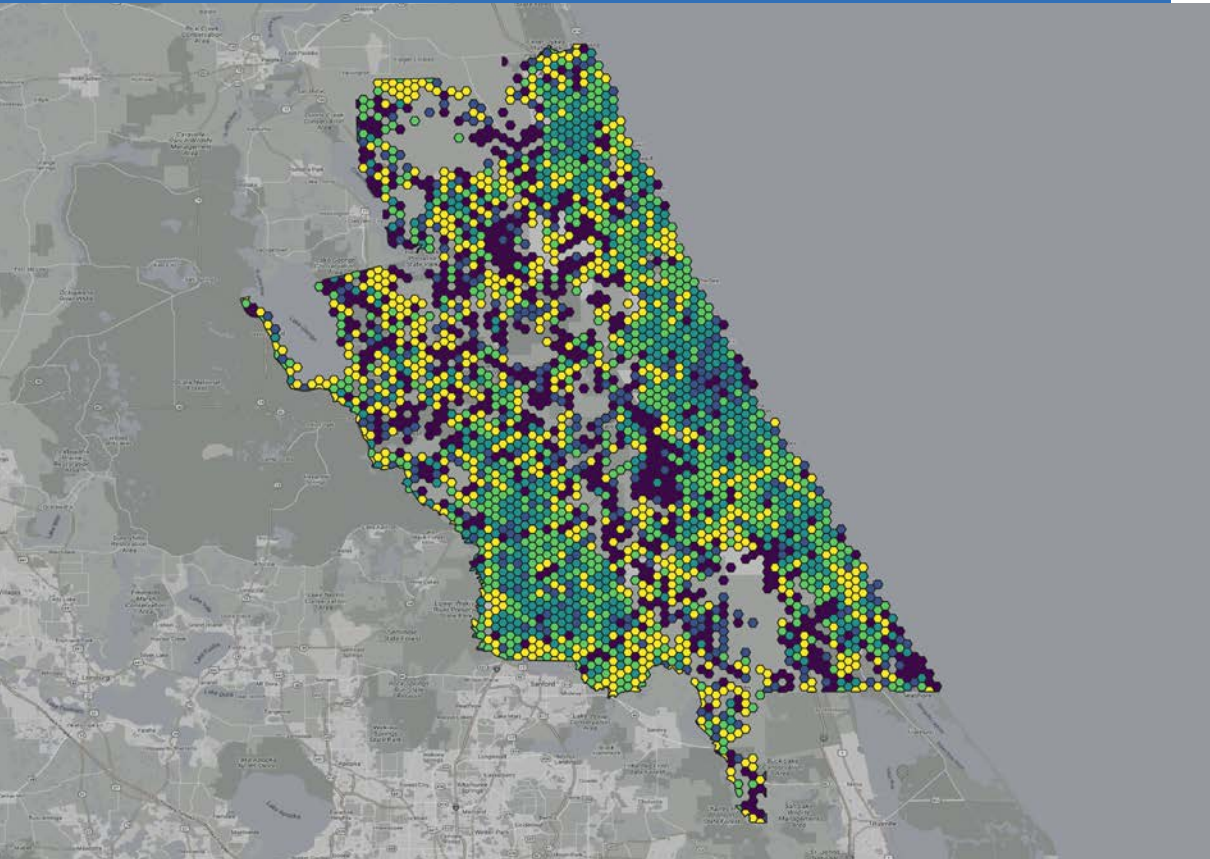
% Change in Trip Starts 2019-2020

● <-10   ● -10 – 0   ● 0 – 40   ● 40 – 100   ● 100+

Why does this matter? As transportation planners focus on pedestrian safety, our analysis suggests three key takeaways:

- We cannot rely on old data, because pedestrian activity has changed significantly.

- Pedestrian activity varies widely from city center to outlying areas.

- Be especially wary of modeling suburban pedestrian activity based on urban data, and vice versa.

To see how these takeaways play out in real life, we took a closer look at pedestrian safety in one city. Our results illustrate how reliance on incomplete data can lead to erroneous conclusions and poorly deployed resources.

3 Crash Report

One City's Unexpected Discovery

Most DOTs don't have extensive data for pedestrian and bicycle travel, and therefore can't effectively prioritize countermeasures. Localities that *do* track pedestrian metrics may not have the resources or nuanced crash data to apply a Federal Highway Administration "KABCO" ranking to individual zones. Armed with only rudimentary data, it can seem appropriate to equally prioritize zones with, for example, similar crash volumes.

Our analysis suggests a different direction.

The top city for pedestrian activity on our Climate Index list is Orlando. Probably not coincidentally, Orlando is also ranked as the most dangerous pedestrian city in the country by the nonprofit, Smart Growth America, which creates its annual Dangerous by Design pedestrian danger index.[2]

To uncover its high-exposure areas, we combined Orlando's pedestrian crash data from 2016 to 2018 (the most recent year FDOT provides) with our pedestrian trip volume data. We plotted the results using a GIS mapping system to create a visualization of crashes compared to pedestrian trips versus just total number of crashes.

We focused on two zones with almost the same number of pedestrian crashes: Orlando's central business district (six crashes) and the Holden Heights area (seven crashes), about a mile to the southwest.

In 2019, the zone near the Holden Heights area actually had much lower pedestrian activity overall. In contrast, the central business district zone had significantly more pedestrian activity – 15x the trips of Holden Heights, in fact.

[2] *Dangerous by Design 2021*, Smart Growth America.

Comparing the amounts of pedestrian activity with the number of pedestrian crashes for the two zones shows Holden Heights with a much higher pedestrian-to-crash exposure ratio. The central business district may have had a similar number of crashes, but because it had 15x more pedestrian activity, it has a lower pedestrian-to-crash exposure ratio than Holden Heights.

🚶 — **19x** — 🚗

In other words, a pedestrian walking in Holden Heights is 19 times more likely to be hit by a vehicle than if they walked downtown.

PEDESTRIAN ACTIVITY IN ORLANDO'S CENTRAL BUSINESS DISTRICT (YELLOW) COMPARED TO HOLDEN HEIGHTS (GREY)
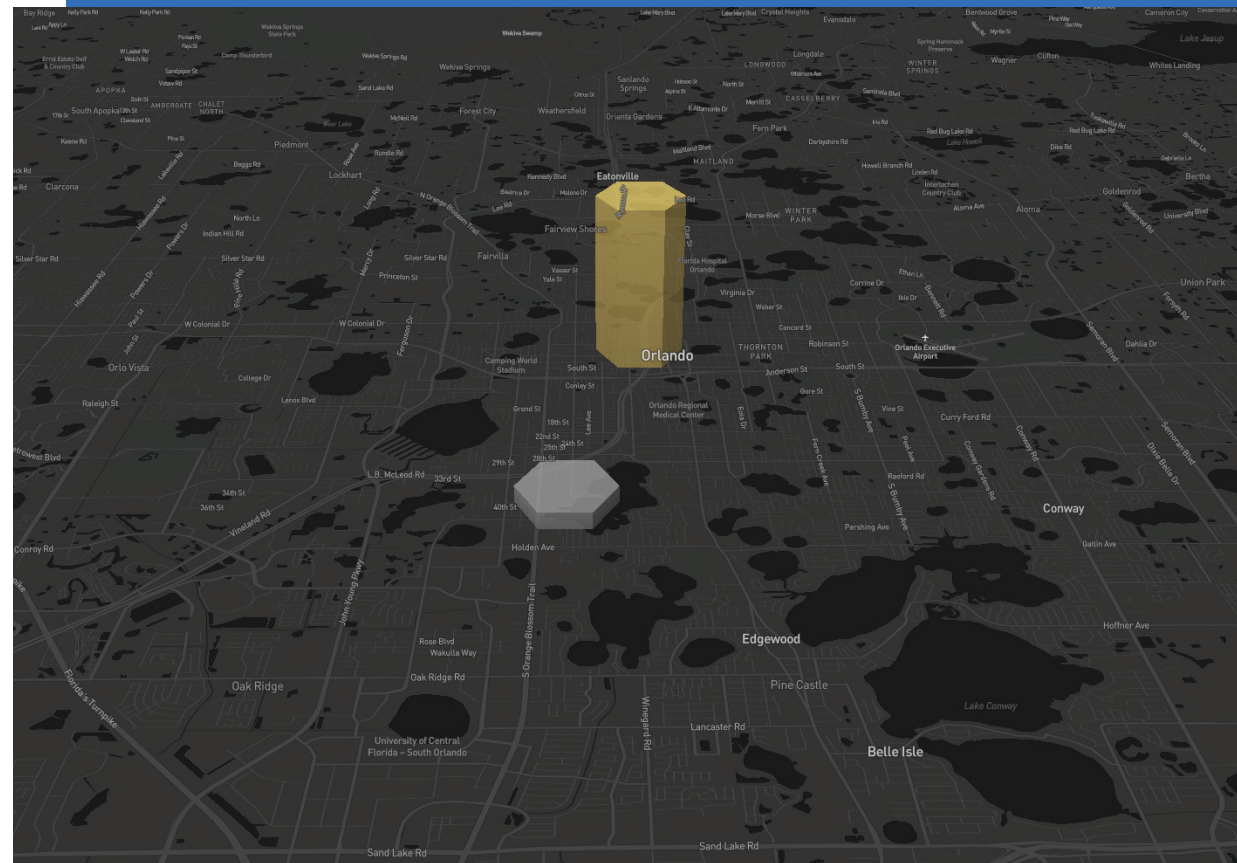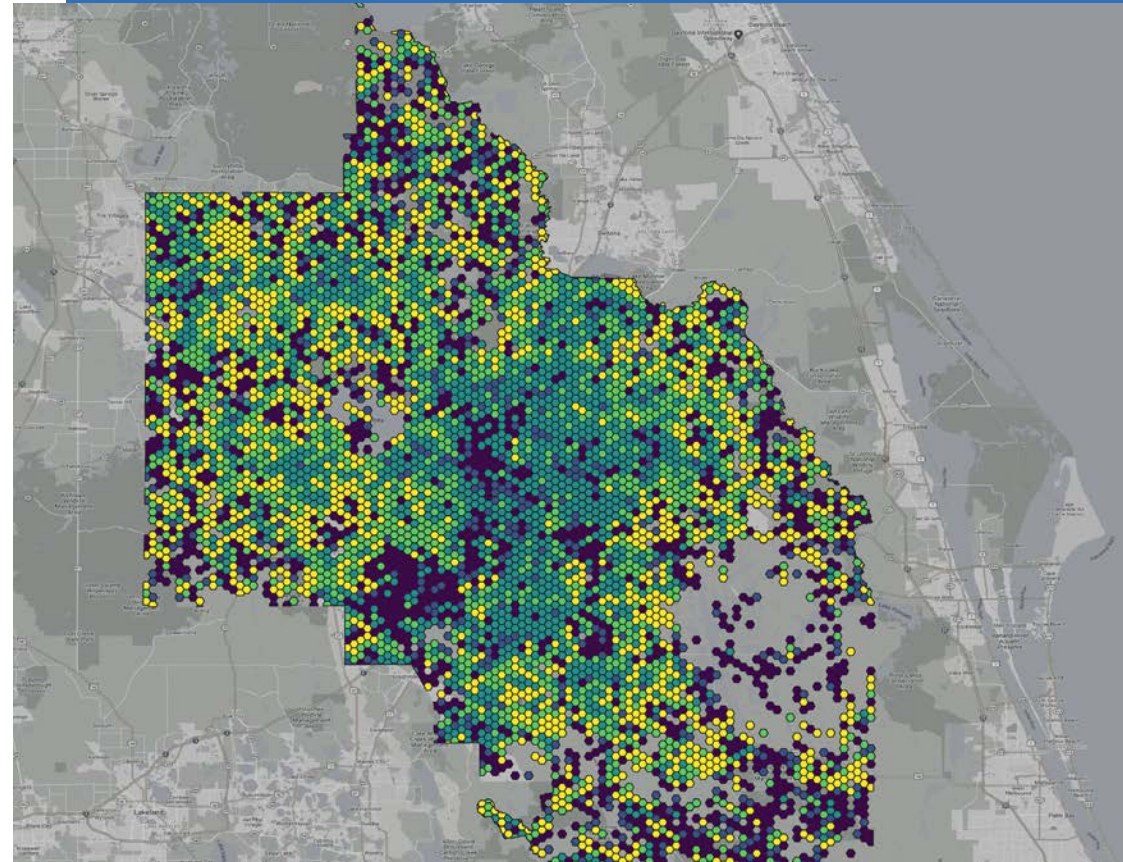
PEDESTRIAN ACCIDENT LOCATIONS MAPPED IN ORLANDO

The central business district is clearly able to handle large amounts of pedestrian activity in a safe manner, while the built environment or other local factors in the Holden Heights area cannot.

CHANGE IN PEDESTRIAN TRIPS FOR ORLANDO, 2019-2020
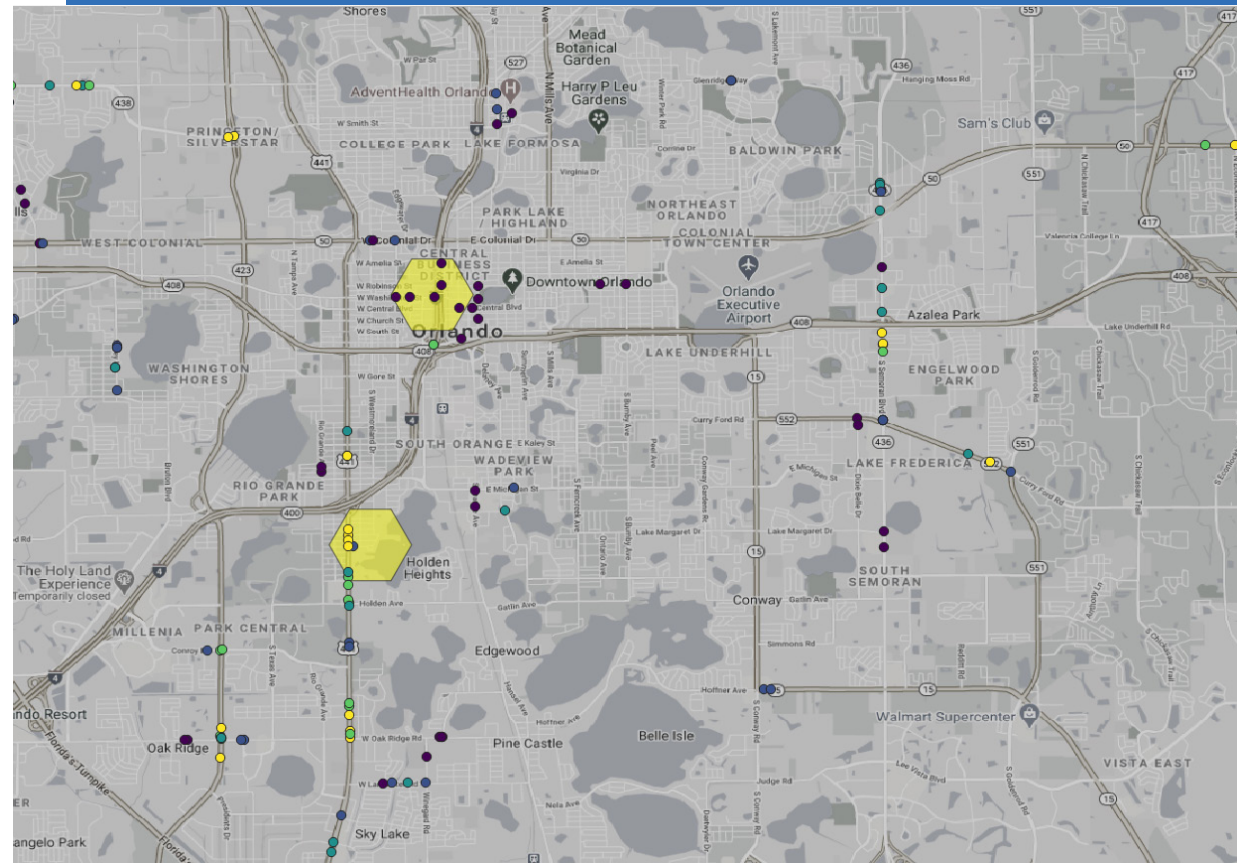
Orlando's change in pedestrian activity over the past year shifted anywhere from a 10% drop to a >100% increase depending on the block. Safety-minded transportation planners will need to re-analyze pedestrian activity in order to prioritize zones where investments and improvements would have the biggest impact in the years to come. They will also need to reevaluate their models now that data older than 2020 is not applicable to current conditions.

% Change in Trip Starts 2019-2020

<-10   -10 – 0   0 – 40   40 – 100   100+

4 Getting Directions

Metrics for Diagnosing Pedestrian Safety In Your City

Pedestrian Metrics and more are available for your city as a software subscription or custom project at streetlightdata.com/bike-ped

For each of the CBSAs measured, we created 696m x 696m grids and ran a Zone Activity analysis in StreetLight InSight® for the same 12-month period as measured in the 2020 U.S. Transportation Climate Impact Index (Sept. 2019-Aug. 2020). For each CBSA, we created a heat map of the zones with the most pedestrian trip starts in 2020, as well as the zones with the % difference in trip starts from 2019 to 2020.

We used 2016, 2017, and 2018 Florida NonMotorist Fatal and Serious Injuries open data sets to determine the number of accidents for a given area. We then visualized both the StreetLight Metrics and accident data in QGIS.

About StreetLight Data

StreetLight Data pioneered the use of data analytics to help transportation professionals solve their biggest problems. We apply proprietary algorithms to billions of anonymized location records every month to measure multimodal travel across North America.

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