

EBOOK

# Special Report: Bike Safety Shift



STREETLIGHT



## Revisiting the Top 10 Riskiest States

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The recent nationwide resurgence in bike riding means that many localities are prioritizing bike safety. That prioritization should include an update on how transportation planners evaluate areas at high risk for bicycle accidents.

Our analysis shares a simple but powerful way to measure cycling safety and risk: fatalities per bike-mile ridden. We re-rank the top 10 riskiest states based on this new analysis, plus 10 states that are safer than they seem. The data also uncovers a surprising shift in bike exposure areas in New York City. Take a closer look to see who's doing better (and worse) than you thought.

# Why actual ride activity matters, and how to measure it

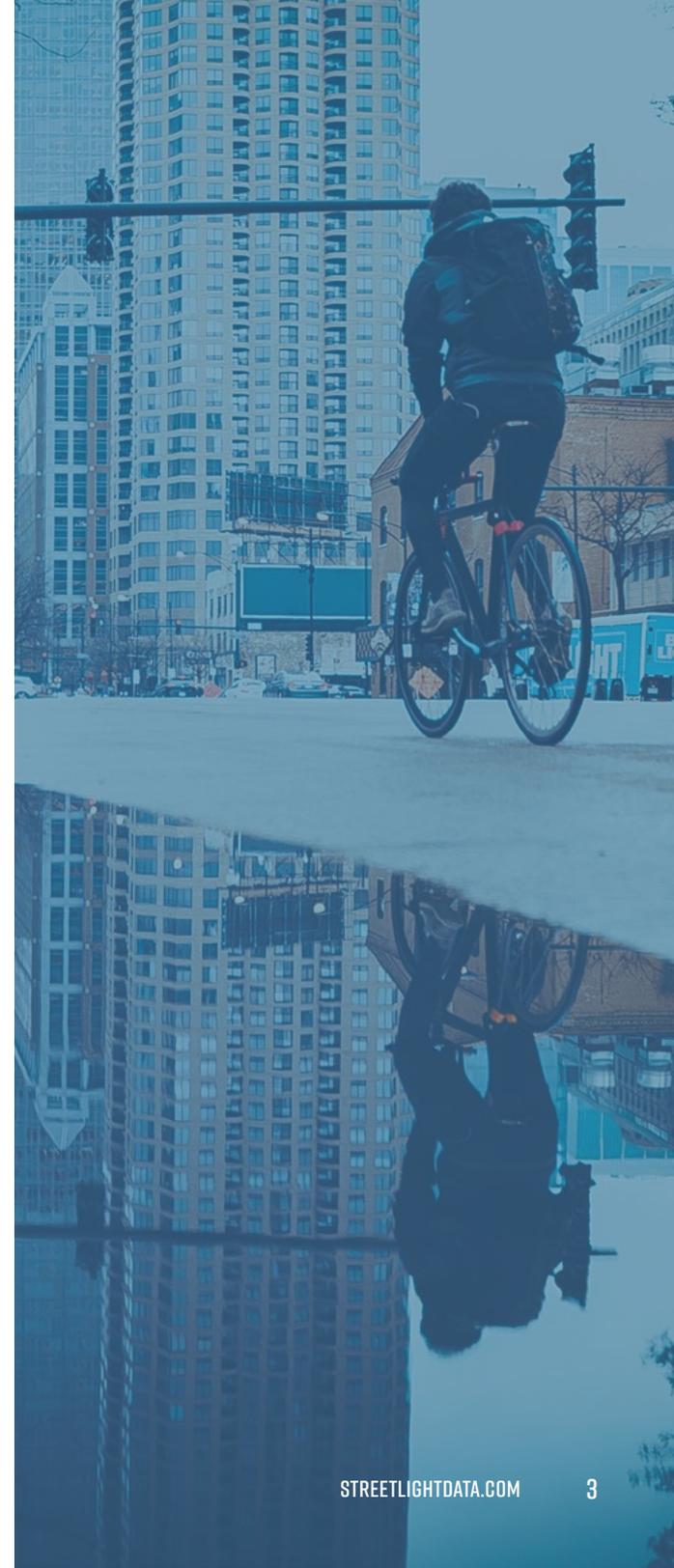
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The National Highway Traffic Safety Administration's Fatality Analysis Reporting System (FARS) tracks cycling fatalities and ranks states by fatal crashes per-capita. But why measure bike safety using per-capita data when the majority of a state's residents don't ride bikes?

Cycling-centric analytics create more meaningful context, but we know that collecting bicycle data can be challenging. Self-reported information is incomplete, and it can skew heavily toward certain demographics, fitness cycling activity, and other biases. Sensors capture information only for the roads where they are placed, and they are prohibitively expensive to deploy across an entire region.

At StreetLight, we use de-identified and aggregated Location-Based Services (LBS) and GPS data from mobile devices, which our machine-learning algorithms sort into trip activity by various modes, including bicycles.

Our contextual analysis changes which states we perceive as the most dangerous, and the safest, for cyclists.



# New rankings reveal states with increased risk

First, kudos to the states with notably low numbers of bicycle fatalities! For statistical purposes, this report does not include states with fewer than five fatalities in 2018 and 2019 combined, but we list them here in recognition of their impressive safety records (also recognizing that some of these states have very low rates of cycling activity).

We include states with between five and 15 crashes, although we flag those for low sample size (see Methodology for full list). We did not want to eliminate these because some have higher levels of bike fatalities per capita, but their recast ranking is better and should be highlighted and celebrated.



## Lowest Cycling Fatalities

	WYOMING .....	0
	VERMONT .....	0
	RHODE ISLAND .....	1
	SOUTH DAKOTA .....	1
	NEBRASKA .....	1
	NEW HAMPSHIRE .....	2
	NORTH DAKOTA .....	4
	MAINE .....	4
	DISTRICT OF COLUMBIA .....	4
	CONNECTICUT .....	4



## Top 10 Riskiest Bicycling States

### New Ranking: Bike Miles Traveled

1. Delaware
2. South Carolina
3. Florida
4. Louisiana
5. New Mexico
6. Oklahoma
7. Mississippi
8. West Virginia
9. Arizona
10. California

### Old Ranking: Per Capita

1. Florida
2. Delaware
3. Louisiana
4. South Carolina
5. New Mexico
6. California
7. Arizona
8. Colorado
9. Oklahoma
10. Indiana

Here is an example: On traditional bike safety lists, we are all used to seeing Florida head up the “most dangerous” category. But when we compare Florida’s bike crashes to how many miles cyclists ride, it moves two slots down the list. There is still work to do in Florida, but Delaware and South Carolina are riskier.

When recasting national rankings by bike miles traveled (BMT), Colorado and Indiana drop out of the Top 10 most dangerous states for cyclists, replaced by newcomers Mississippi and West Virginia. The ranking reshuffles the other eight states – good news, not only for Florida but also for California, Arizona, and Louisiana.





Shifting to lower-risk states (excluding those with fewer than five bike fatalities), only Massachusetts, Pennsylvania, and New Mexico stay in the same position on both per-capita and BMT lists. Every other state shifts, many dramatically.

West Virginia, North Carolina, and Mississippi are in the mid-to-upper range of per-capita rankings, but recasting by BMT reveals much higher risk for cyclists there.



## Lower-Risk Bicycling States

### New Ranking: Bike Miles Traveled

1. Massachusetts
2. New York
3. Illinois
4. Pennsylvania
5. Utah
6. Tennessee
7. Minnesota
8. Missouri
9. Arkansas
10. Washington

### Old Ranking: Per Capita

1. Massachusetts
2. Tennessee
3. Arkansas
4. Pennsylvania
5. Missouri
6. Maryland
7. Illinois
8. Utah
9. Virginia
10. Alabama



### BMT Versus Per Capita: Biggest Drop in Bike Safety Rankings



### BMT Versus Per Capita: Biggest Rise in Bike Safety Rankings



Finally, we call out the states that drop or rise the most in our updated rankings. Cyclists in Oregon, New York, and Colorado are at less risk than per-capita rankings suggest. But in West Virginia, North Carolina, and Mississippi, transportation planners may be underestimating danger for cyclists.



**Keep reading to see a fresh take on the most dangerous bike areas in NYC.**

# Location-Based Services data (LBS) provides comprehensive bicycle and pedestrian travel information

StreetLight InSight® captures key analytics, including:

- Average bicycle trip distance
- Cycling trip origins and destinations
- Zones with the most cycling activity
- Before-and-after bike travel studies
- Education, income level, and other demographics



[streetlightdata.com/bike-ped](https://streetlightdata.com/bike-ped)



# New York's riskiest bicycling neighborhoods

New York state has the second-largest improvement in our re-ranked listing. The state's largest city has focused on improving bike safety over the past few years, and total bike fatalities there dropped from 29 in 2019 to 24 in 2020.

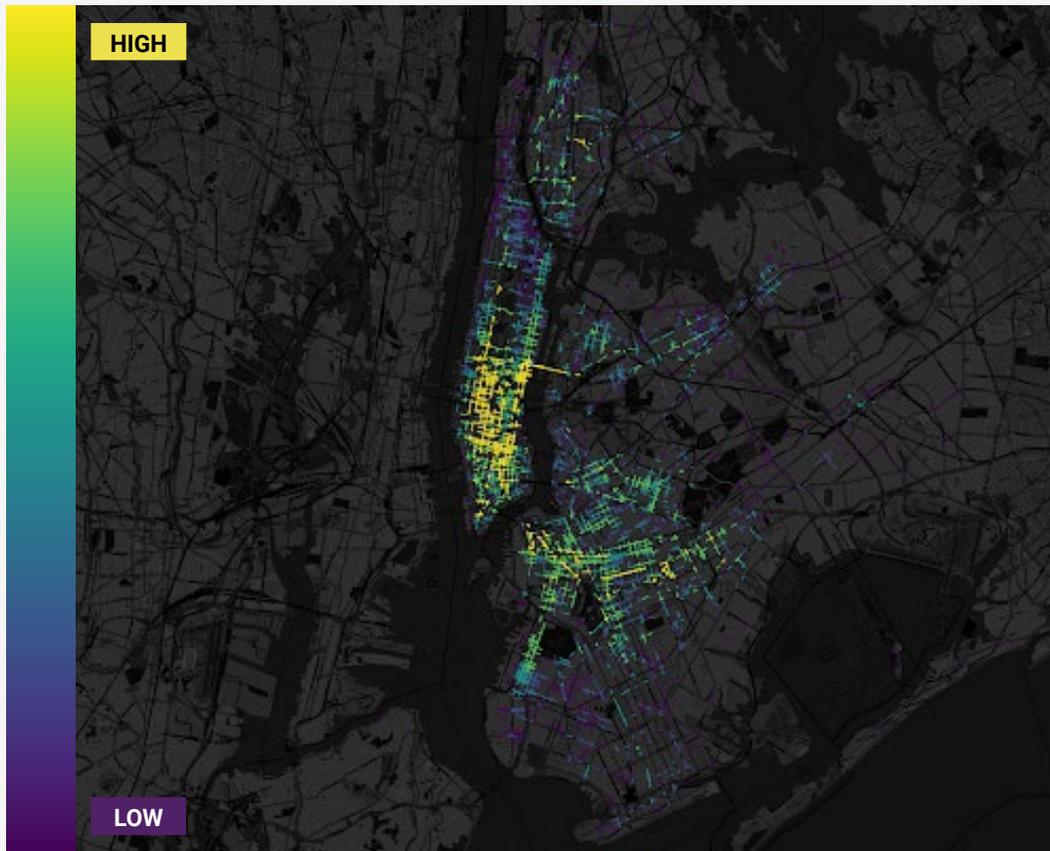
Rather than try to analyze the entire state, we took a closer look at bike risk in NYC.

Type of Vehicle	Bicycle Crashes
Sedan	1,604
Station Wagon/ Sport Utility Vehicle	1,437
Bike	1,151
Taxi	339
Pick-up Truck	80
E-Scooter	73
E-Bike	52
Box Truck	50
Bus	38
Van	22

*In 2019, 25 of New York City's 29 cycling fatalities involved large trucks, busses, SUVs, or vans. But sedans account for the vast majority of total crashes.*



## NYC Number of Bike Trips



Number of bike trips from lowest (purple) to highest (yellow)

For this analysis, we shift away from BMT and instead focus on bike trips. First, we identify all locations in metro NYC with bicycle incidents and plot all 4,127 on our map. Analyzing those locations using StreetLight's Metrics, we color-code the locations by how many bike trips passed by those crash points.

As one might guess, we see the most bike traffic in lower Manhattan and Brooklyn, confirming anecdotal evidence. But those aren't the riskiest areas.

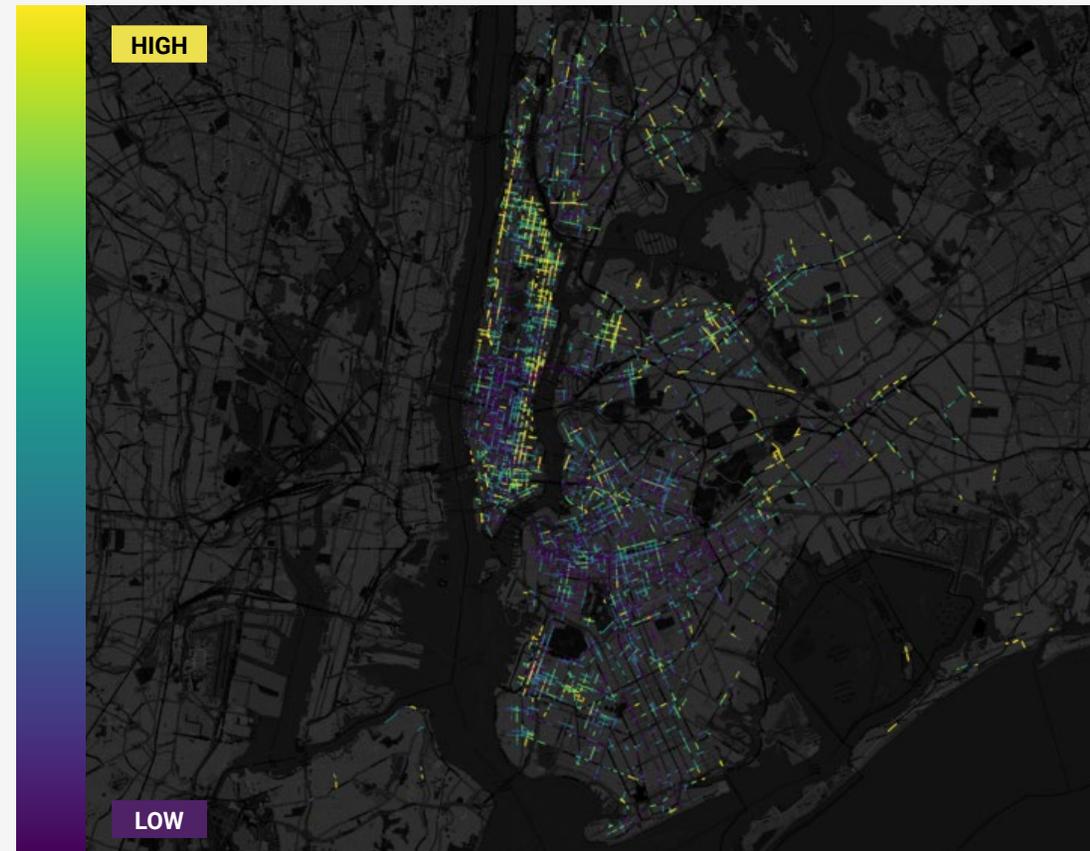


After mapping crash sites, we then count how many bike trips passed through that crash location during the period measured. Finally, we count the number of “nearby” crashes (within 500m on the same road) and add those for context. Exposure is the ratio of crashes to bike trips.

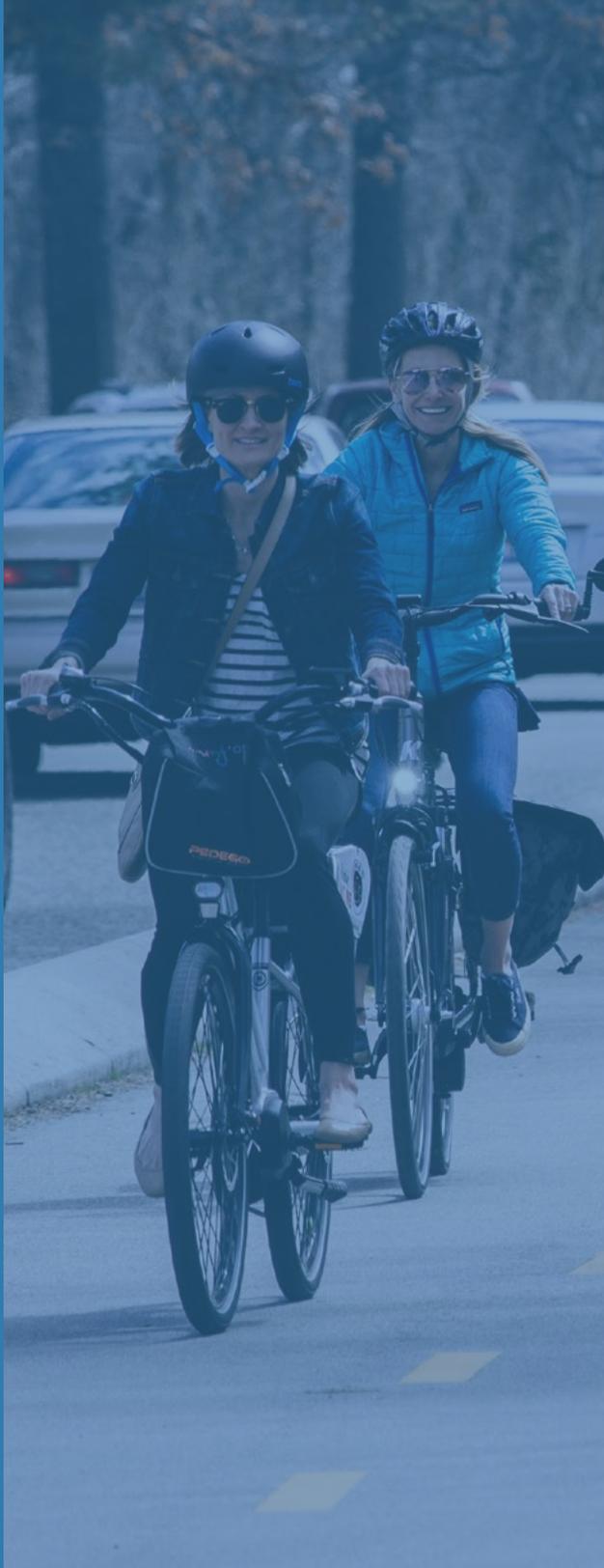
In the visualization, Brooklyn and Manhattan stand out for its low crash-to-trip ratio (purple). This suggests that investments in dedicated bike infrastructure (and resulting driver behavior) manage to keep cyclists relatively safe, compared to other NYC neighborhoods.

In contrast, Harlem and the Lower East Side light up as higher-risk zones (yellow).

## NYC Crash Locations and Bike Risk Areas



*Ratio of crashes to bike trips from lowest risk (purple) to highest risk (yellow)*



## Local insights inform causality and prioritization

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Local transportation planners familiar with their own travel sheds have insights into possible causality, which can be supported or expanded with this type of data analysis. For example, are the crash areas that the analysis identifies hazardous because vehicle speeds are higher, or because the areas lack infrastructure and clear markings?

Planners can also combine StreetLight's Bicycle Origin-Destination (O-D) or Zone Activity Metrics with safety data to identify heavily traveled cycling areas that lack existing infrastructure, like this [analysis of the D.C. area](#). The data can also help pinpoint optimal areas for safety measures, similar to [this San Francisco-based study](#).

Locals will have opinions about which corridors can be widened, which have neighborhood support for cycling, and where high-speed or high-volume vehicle traffic could be shifted. Those hypotheses can be explored with detailed cycling data.

Combining StreetLight's cycling analytics with your local insights can help create a richer perspective on bike safety – and prioritizes where to invest first.

# Methodology

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For the state rankings, StreetLight analyzed the 48 contiguous United States. For per-capita data, we used pedalcyclist fatality data from FARS for 2018 and 2019 combined (the most recent available). StreetLight's BMT data is an indexed value calculated from StreetLight InSight® Metrics, multiplying the relative number of bike trips in each state by the average trip length. Fatalities are then measured per 100k BMT.

We excluded from our analysis nine states and the District of Columbia for having fewer than five fatalities during the period studied: CT, ME, ND, NE, NH, RI, SD, VT, WY.

We included the following eight states that have between five and 15 crashes, which we flag as a low sample size: AL, AR, DE, ID, KS, KY, MA, MS, TN, UT, WV.

For the NYC analysis, we first plotted 2019 bicycle-involved crashes, as reported in [NYC OpenData](#). We analyzed 2019 data because it represents a more "average" transportation year than 2020. Then we used StreetLight Metrics to count how many bike trips passed through the crash location. Finally, we counted the number of "nearby" crashes (within 500m on the same road) to each original crash point, and added those up for a total crash number. Risk = ratio of total crash number to bike trip counts.

We color-coded the segments according to bike trip counts or risk – with yellow being the most and purple being the least. Trip counts are represented by StreetLight's bike-trip sample size (a subset of real-world values).





# STREETLIGHT

Big Data for Mobility

StreetLight Data Inc. pioneered the use of Big Data analytics to help transportation professionals solve their biggest problems. Applying proprietary machine-learning algorithms to over 100 billion location data points every month, StreetLight measures multimodal travel patterns and makes them available on-demand via the world's first SaaS platform for mobility, StreetLight InSight®. From identifying sources of congestion to optimizing new infrastructure to planning for autonomous vehicles, StreetLight powers more than 6,000 projects every month.

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