A Story of Synergy: Bike Counts and Strava Metro

For decades, transportation planners have used manual and automatic bicycle counters to collect hard data on where and when people ride. In that time, counters have become a crucial tool in the planner’s toolkit. The problem is this: bicycle counters can’t be everywhere all at once—they capture only a tiny fraction of the cycling activity actually taking place.

Planners need better cycling data, and now Strava Metro can provide it. Strava has millions of users uploading over nine million activities per week, and Metro anonymizes and aggregates their GPS tracks to create a detailed view of cycling behavior across entire road and trail networks. The data is akin to having a bicycle counter on every corner, 24 hours a day, seven days a week.

Bicycle counts and Metro data have their strengths and weaknesses. Metro data is a full portrait of where and when a limited population rides (there are plenty of cyclists who don’t use Strava, although more are joining every day). Bicycle count data captures all activities, but in a very limited place and time.

However, when combined, these data sets are more than the sum of their parts. That’s because Metro data has been shown, in numerous urban areas, to link closely with bike counts. What this means is cities can deploy Metro data to learn more about their network than they ever could before.

Let’s take a look at this kind of analysis. Seattle has full-time bike counters on its Freemont and Spokane bridges (among many others).
Proving Correlation

A routine study of counter and Metro data from February to December of 2014 on the bridges revealed a close tracking of the two data sets.

As the counter data showed a steady increase in riders, so too did the Metro data, even though Strava users represented just 2.7% of the riders crossing the Freemont Bridge, and 5.1% of riders on the Spokane Bridge.

A statistical analysis of the correlation found that the Metro data could predict the behavior of the overall bike population with an accuracy of 91% and 94% on the Freemont and Spokane bridges, respectively. This is about as robust a relationship as one can expect in the real world, which means that Metro data is a highly reliable representation of what is happening on the ground in cities.
Extrapolation and Multiplication

Practically speaking, the accuracy of Metro data means planners can take what they know from their bike counters and extrapolate that data to every street and intersection in their city or region by using a multiplier. In Seattle’s case, the multiplier was 27 (for every Strava user, there are 27 other riders). So if the Metro data shows 1,000 activities on a given street in one year, there are actually 27,000 activities on that street.

Strava counts ran through the multiplier in GIS software to extrapolate total counts

Calculating Yearly Trips and Bike Miles Traveled

The multiplier applies to every metric the Metro data contains, such as riders, activities, and bicycle miles traveled. Once proven with statistical significance, you can apply the multiplier across the entire network.

16,297 Strava Bike Trips in 2014 x 27 Multiplier:
• 440,019 year bike trips
  • 199,476 trips from 6-9 AM
• 63,253,198 bike miles traveled
From these metrics, other statistics can spring. For instance, once you know how many miles people biked instead of drove, you can calculate the number of tons of carbon dioxide saved by your bicycle-friendly infrastructure.

That’s 48,000 TONS of carbon!*  

What else can we use that energy for? 
7,088 homes’ worth of electricity for 1 year. 

What would it take to remove those emissions from the atmosphere? 
1,243,975 tree seedlings grown for 10 years.**

*The Nature Conservancy carbon footprint calculator  
**EPA.gov

Completing the Picture

Seattle has been doing this bike counter/Metro data analysis since 2015, with great success. “What we’ve really focused on is combining our count data with Strava to give us a broader picture of what’s happening with cycling across the city,” said Craig Moore, who manages the traffic data and records group for the Seattle Department of Transportation. “The combination has really proved valuable because it’s allowing us to say things about parts of the network we didn’t have any data on.”

Bicycle counters will remain a crucial part of any transportation planner’s approach to data gathering. Now Metro is an equally important part. Together, they provide the best data and insights currently available on cyclist behavior.
About Strava

Strava unlocks potential through the power of sport. Strava’s mobile apps and website connect millions of runners and cyclists every day.

About Strava Metro

Strava Metro makes riding, running and walking in cities better. Millions of people upload their rides and runs to Strava every week via their smartphone or GPS device. Metro anonymizes and aggregates this data and then partners with departments of transportation and city planning groups to improve infrastructure for bicyclists and pedestrians.

Contact us to learn how you can make an impact by using Strava Metro.