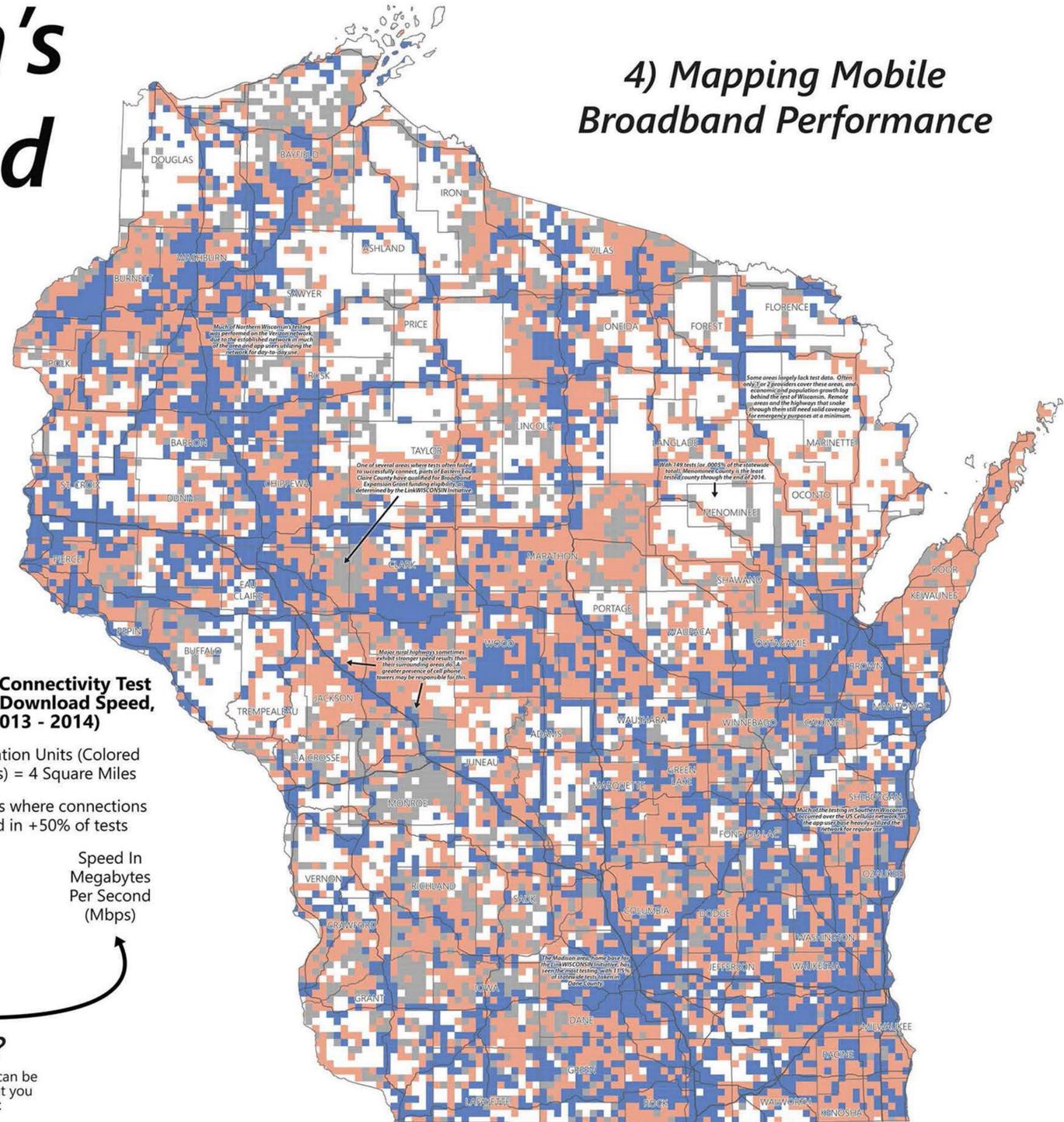


Testing Wisconsin's Mobile Broadband Connectivity

4) Mapping Mobile Broadband Performance



1) Mapping Broadband Coverage

The LinkWISCONSIN Initiative has been collecting coverage data from cell phone companies since 2009. With the advance of 3G and 4G LTE networks, coverage is better than ever. The map to the right displays the extent of advertised coverage and speeds across Wisconsin.

However, most folks still deal with lost broadband signals and poor coverage areas! There are a few reasons that this may be the case:

- Modeling is used to estimate coverage areas, which can fail to detect unique geographies that may limit broadband signal strength (example: Driftless Area ridges and valleys).
- Areas with high demand for mobile broadband may have surges in use that weigh down on performance for broadband users as a whole (example: Thousands of fans posting to Facebook on game days at Lambeau Field).
- Lightly populated areas still lack robust mobile broadband infrastructure, which may prevent folks from using smartphones.



Advertised Mobile Broadband Speed, Sourced From Cell Phone Providers (Coverage as of June 30, 2014)

> 3 Speed In Megabytes Per Second
< 3

Mobile Connectivity Test Median Download Speed, (2013 - 2014)

Enumeration Units (Colored Squares) = 4 Square Miles

Grey Areas where connections failed in +50% of tests
Blue > 3 Speed In Megabytes Per Second (Mbps)
Orange < 3

2) What Do We Do To Validate Coverage?

Beginning in April 2013, the LinkWISCONSIN Mobile Broadband Testing Project has been collecting ground-truth data of mobile broadband performance. In ideal conditions, the entire state would be tested using each cell phone provider network that claims to cover part of Wisconsin.

Wait! What Do These Speed Figures Mean To Me?

In the world of broadband service, advertised speed figures can be a little overwhelming. To get a better understanding of what you can do with certain broadband speeds, here is a guide:

With this Speed.....You Can Do The Following

- | | |
|-----------------|----------------------------------|
| 10 Mbps or more | Multi-player gaming |
| 6 - 10 Mbps | Streaming for video conferencing |
| 3 - 6 Mbps | Robust web-surfing experience |
| 1.5 - 3 Mbps | General web-surfing |

3) How Does Testing Work?

A smartphone app developed by Mobile Pulse was configured and branded to test the normal use of smartphones. The app runs a connectivity performance test on a regular basis, collecting speed metrics and analytical attributes.

Mobile Connectivity Test Frequency (2013 - 2014)

> 10 Test Count Per Square Mile
1.25 - 10
.25 - 1 Enumeration Units (Colored Squares) = 4 Square Miles
0

Critical to the success of the project are the efforts of hundreds of volunteers who installed the app and collected test data. The map on the left shows the extent of Wisconsin that has been tested so far.

5) What Can We Learn From This?

As analysis of the test results evolves, below are some observations from the test data and anticipated themes for further research:

Observations From Analysis So Far

- Download speeds appear to be faster along major highways than in surrounding areas, especially in rural Wisconsin.
- Some parts of the state are largely untested, possibly due to limited coverage options, delayed smartphone adoption, or other reasons.

Questions for Further Research

- How has connection strength changed across the state during the 18+ month project?
- Which providers are delivering the best mobile broadband service to Wisconsin's communities and remote areas?

6) How Can You Help Test Mobile Broadband?

Download the "LinkWISCONSIN Mobile Test" app onto your smartphone from Android's Play Store or Apple's App Store. Advise fellow stakeholders, local governments, and businesses to consider their broadband needs and install the app. Contact the LinkWISCONSIN Initiative at PSCStateBroadbandOffice@wisconsin.gov to learn about our advanced testing app.

Produced by the Public Service Commission of Wisconsin as part of the LinkWISCONSIN Initiative.

Visit LinkWISCONSIN on the Web: <http://www.link.wisconsin.gov>
Email: PSCStateBroadbandOffice@wisconsin.gov Date: 2/17/2015

Disclaimer: All broadband performance data on this poster are the results of the LinkWISCONSIN testing apps and are not necessarily an authoritative claim for broadband speed and access. Other information sources included the Federal Communications Commission website (www.fcc.gov). While testing is ongoing, this map depicts tests collected in 2013 and 2014.



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