

Broadband 101

Broadband Technologies Overview
&
What's happening in South Central Minnesota

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Awakening
 Leaders attend a conference, hear complaints, see other communities acting, hear from consultants.

Gather facts
 Systematically gather facts on the community's infrastructure and services and on the user community.

Begin community discussion
 Leaders listen to experts, investigate, educate themselves, talk with providers, hold a community meeting.

Determine that your community's...

Infrastructure and services are adequate

- Market this asset for economic development.
- Increase community tech savvyness through market development activities.
- Collaborate with existing and prospective providers to ensure timely investments in network upgrades

Infrastructure and services are inadequate

Work with existing providers to upgrade the network. Attract competitive providers. Develop a public sector solution.

- Conduct a market study.
- Develop technology alternatives.
- Conduct a feasibility study.
- Conduct campaign to increase urgency of leadership and citizens.
- Implement market development activities to increase the attractiveness for investment.

Users are tech savvy

- Promote community technology culture as an economic development asset.
- Attract additional savvy users.
- Investigate collaborative opportunities for applications.
- Develop more community applications in government, health care and education.

Users lack sophistication

- Conduct an active effort of market development activities, including training, tech fairs, newspaper articles, incentives, etc.
- Implement programs to overcome socio-economic barriers to technology adoption.
- Attract tech vendors to provide increased support to the local community, especially to business.
- Develop more community applications in government, health care and education.

The Community Broadband Development Process

For more specific information on Community Networks and Market Development activities, please visit www.blandinfoundation.org/broadband.



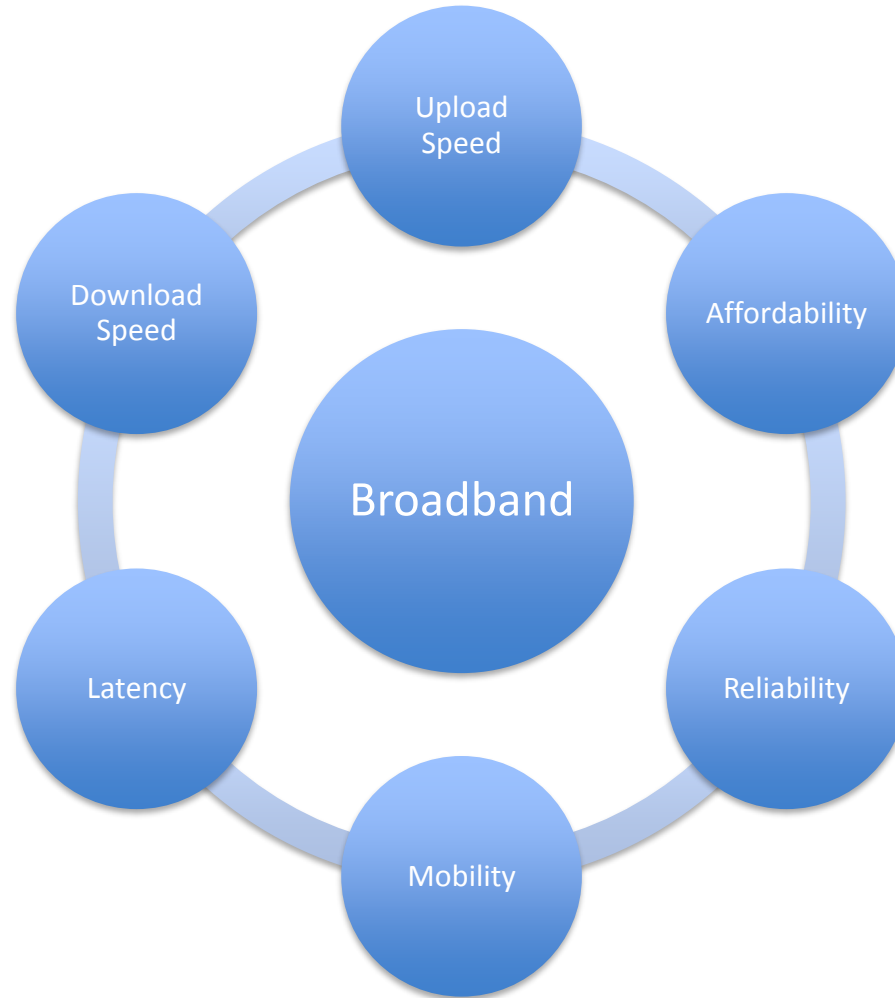
Blandin Foundation™
 STRENGTHENING RURAL MINNESOTA



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Broadband Trends

- Broadband at the FCC
 - Recently reaffirmed by the FCC:
 - Anything less than 25 Mb/3 Mb is not broadband
 - Mobile cellular is not a substitute for a fixed connection
 - The FCC standard increased 30-fold between 2008 and 2016
- Broadband in Minnesota
 - 25/3 by 2022
 - 100/20 by 2026
- Broadband in the marketplace
 - Some ISPs increased speeds 100-fold between 2008 and 2016
 - Comcast just raised all speed tiers by 50 Mb
 - Gigabit service is increasingly available
- Household use
 - Use more than 250 GB of data/month and rising
 - Have 13 connected devices; 50 devices by 2022
 - Computers, phones, fitness devices, home security, medical devices, thermostats, personal assistants, watches, home appliances, cars, farm animals, sensors, tractors



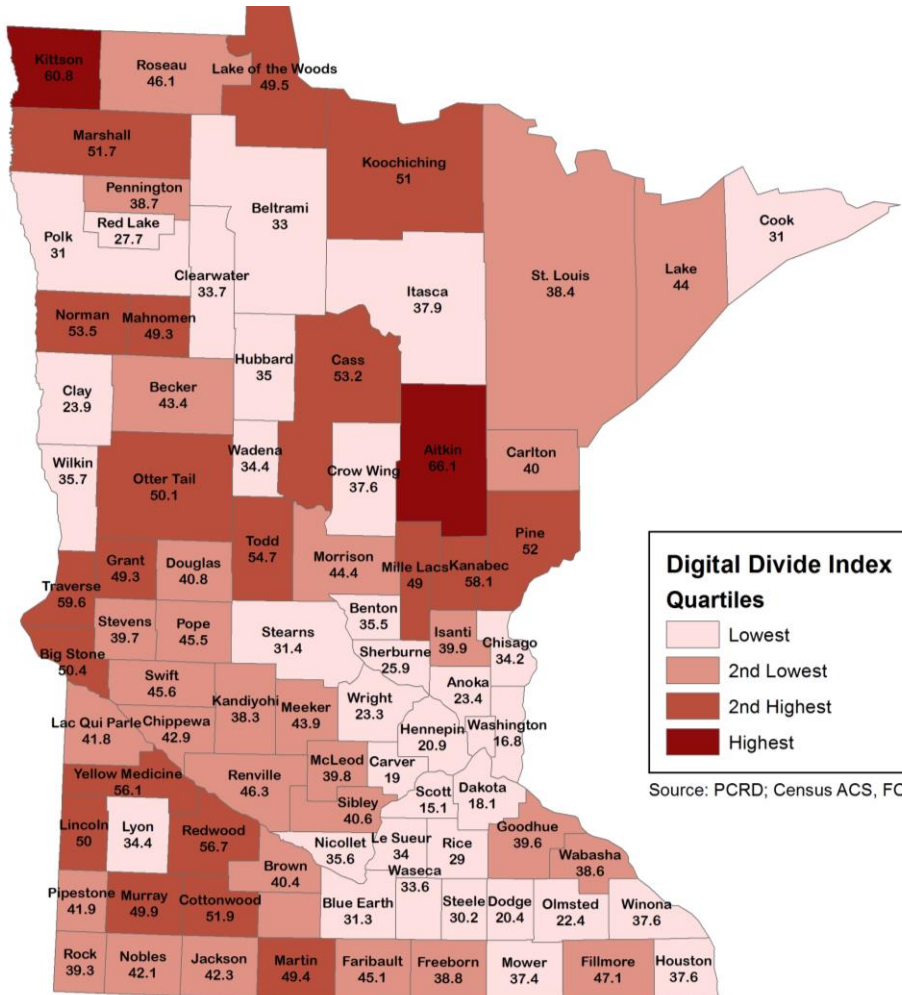
Assessing Broadband Technologies

"It's more than just download speed!"

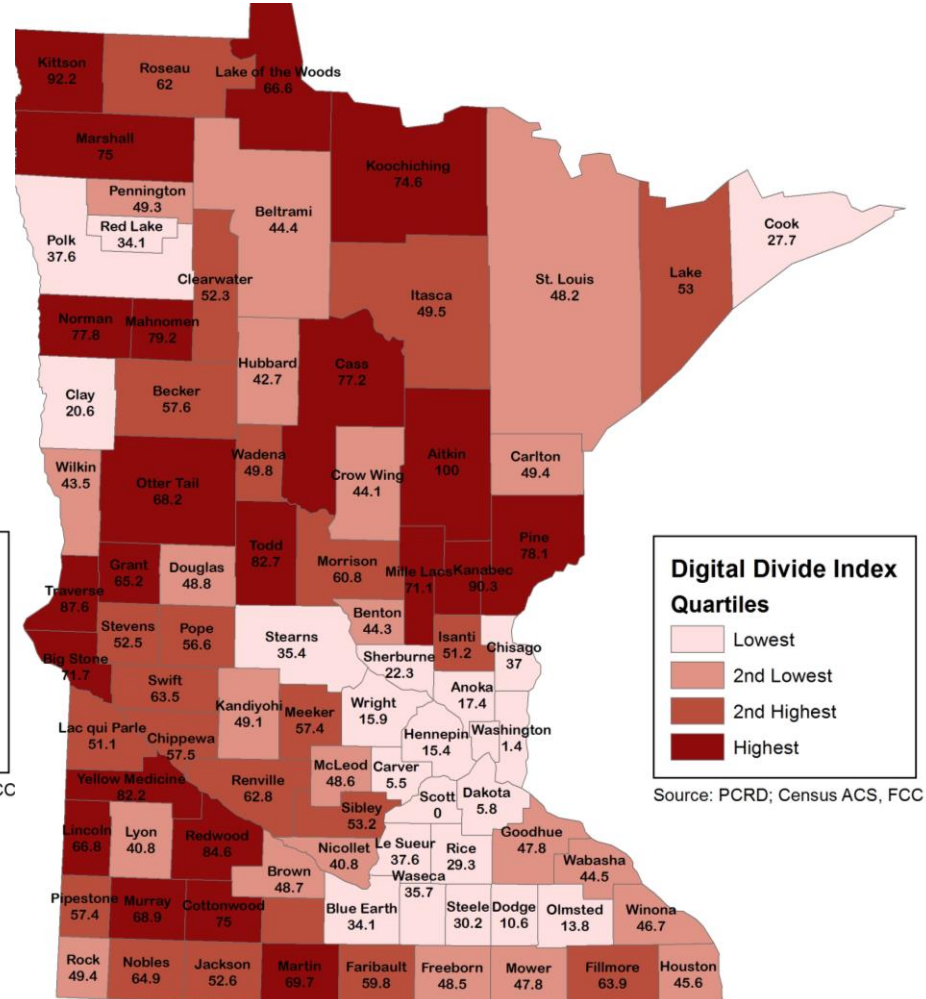
Digital Divide Index

Combines demographic and connectivity data
“Is your future dark or bright?”

USA data

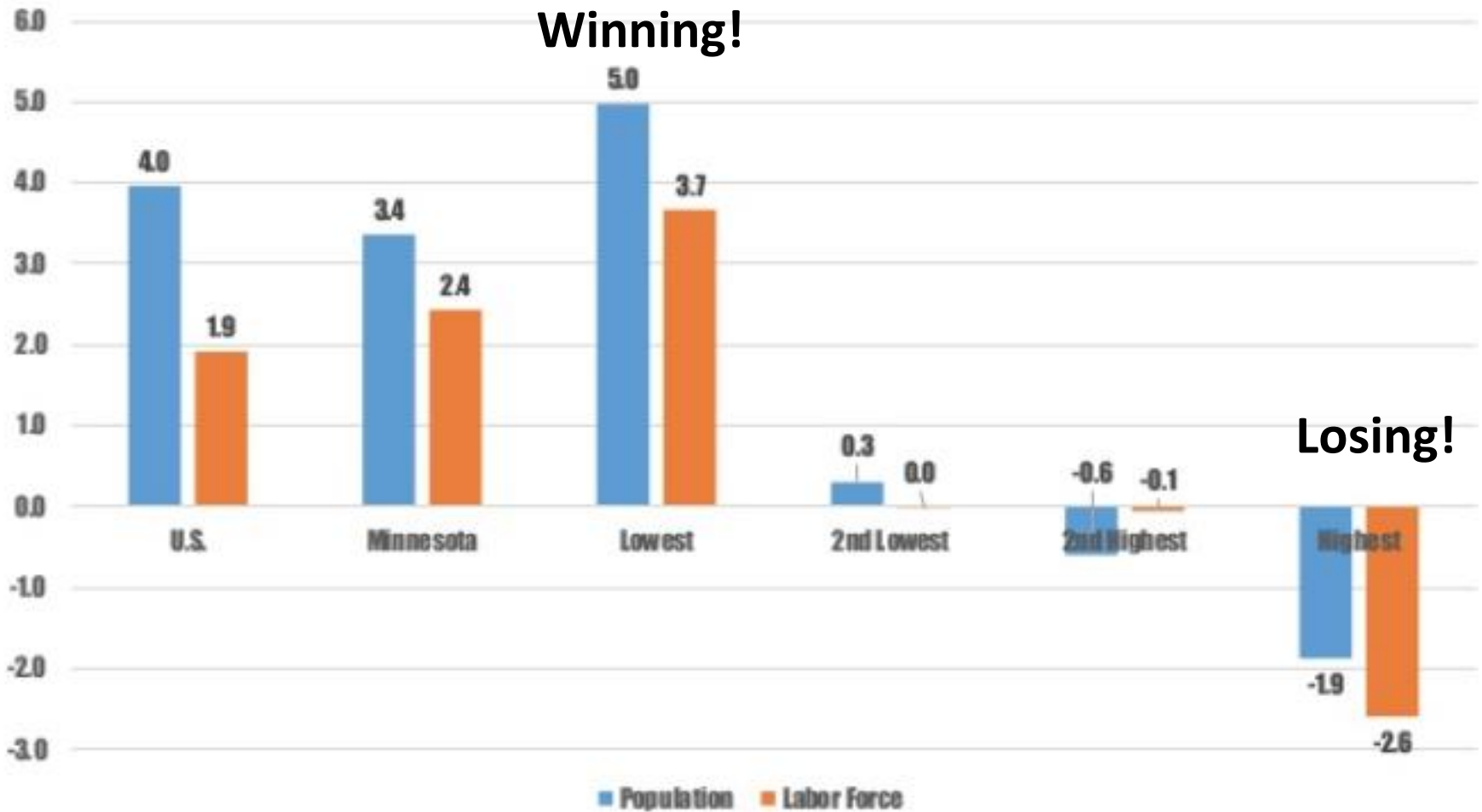


Minnesota-only data



Source: Purdue University, Robert Gallardo

2010-2015 Percent Change: U.S., Minnesota, & DDI Quartiles



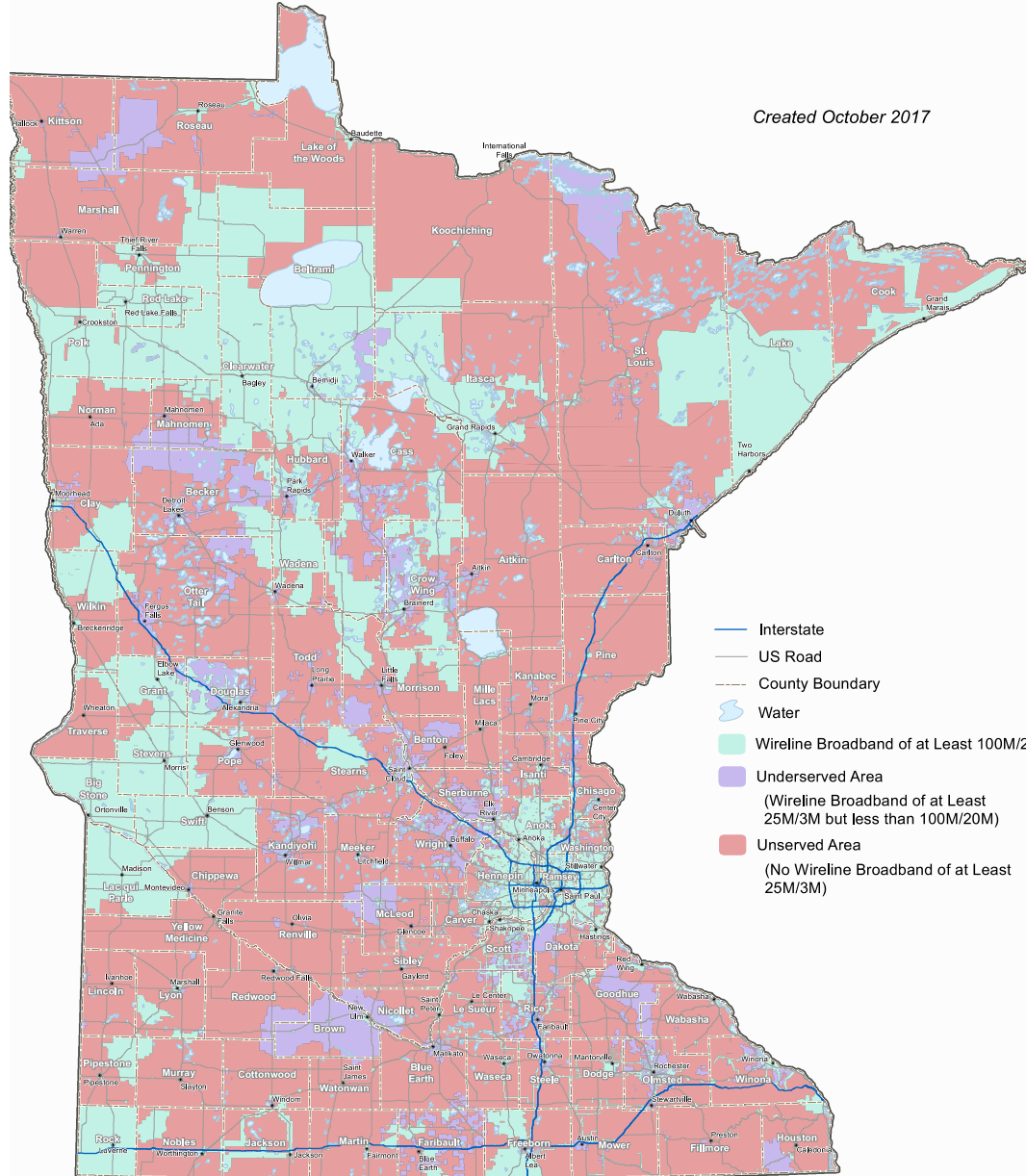
As broadband becomes even more important, these trends will accelerate!

Border-to-Border Broadband Development Grant Program

Unserviced, Underserved and Served Broadband Areas

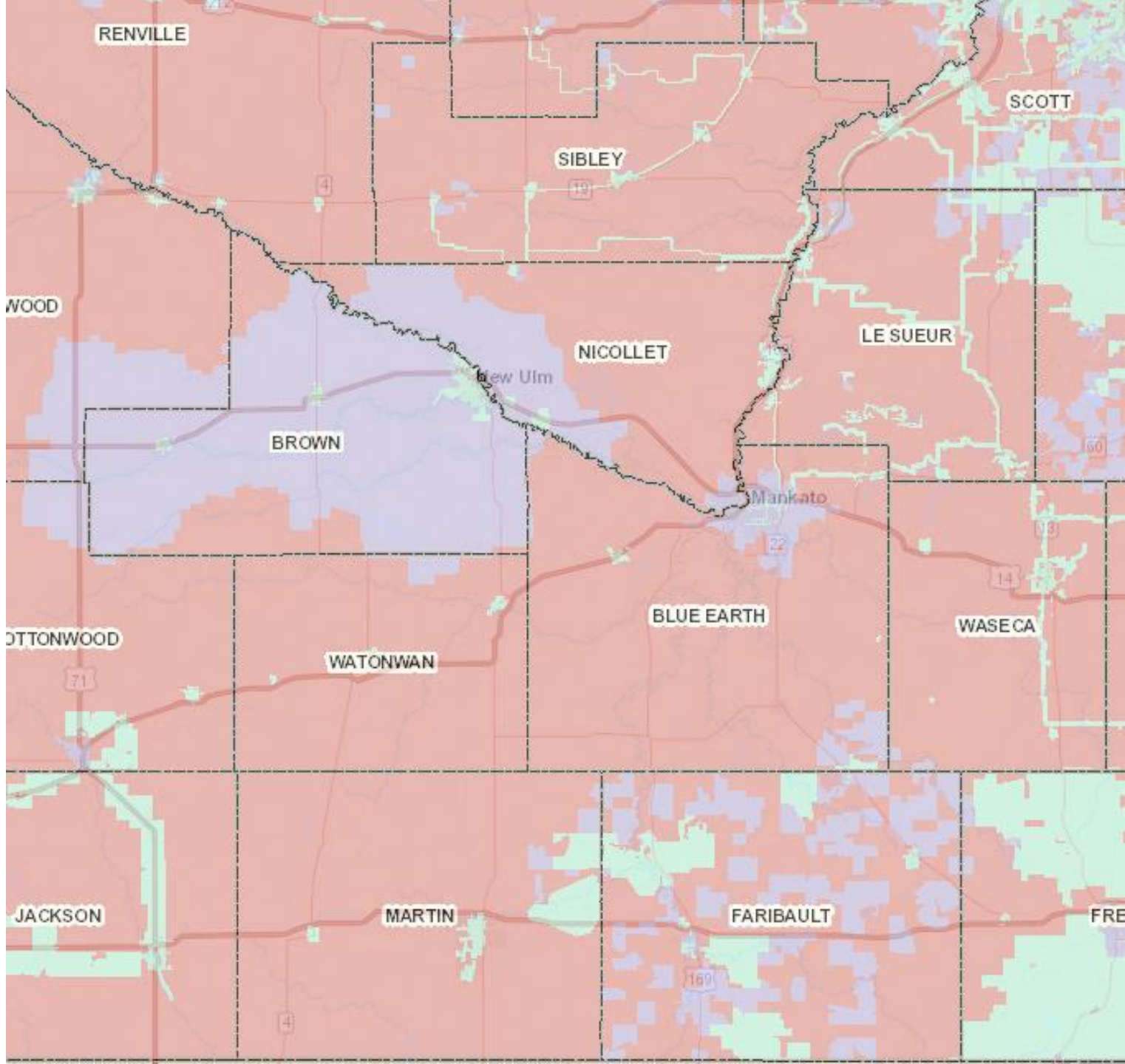
Created October 2017

Note:
New broadband
maps will be out
in mid-April!

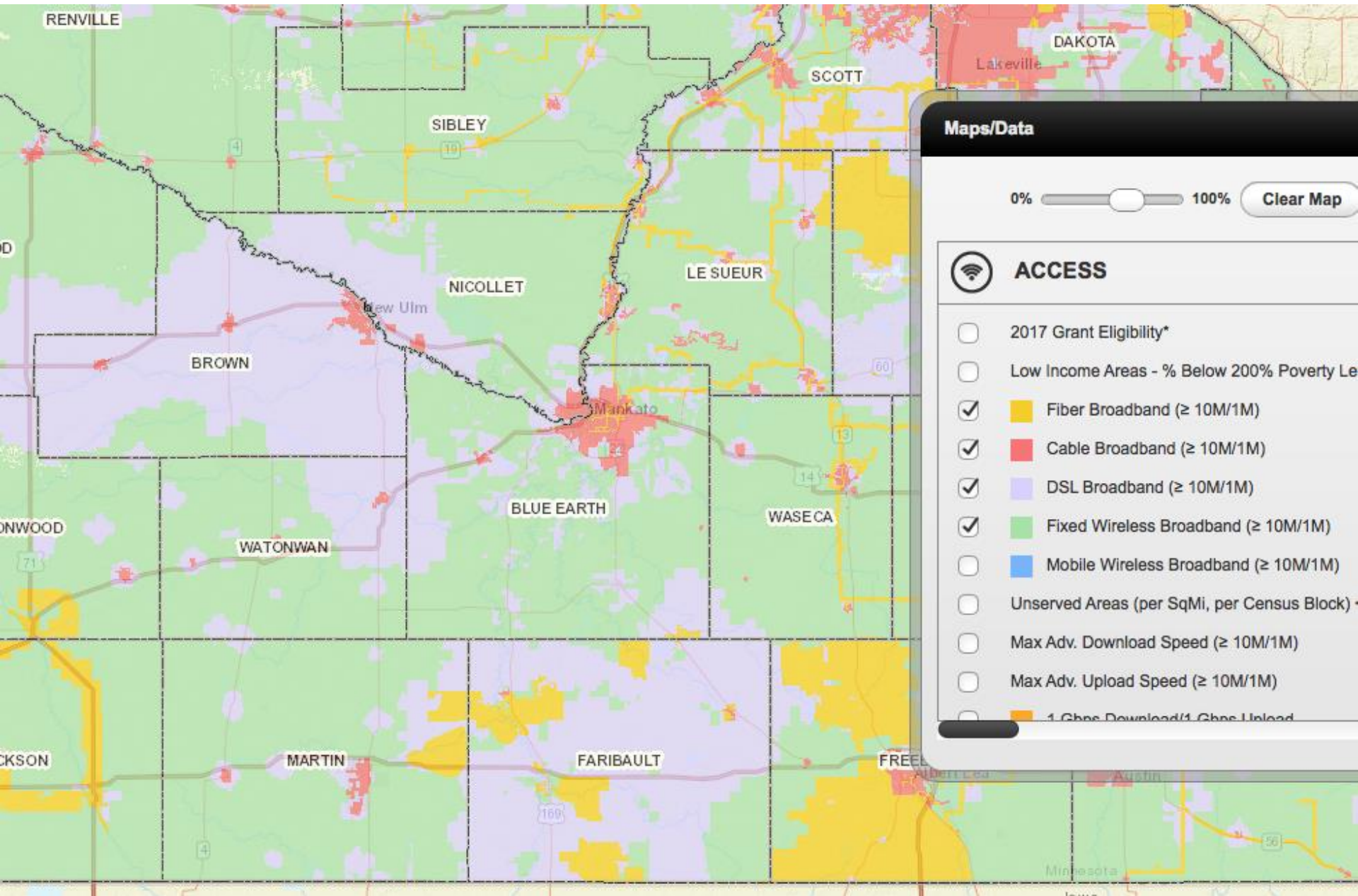


**Region
Nine
DEED
OBD
Border to
Border
Broad-
band
Grant
Eligibility**

*All red
areas are
a priority*

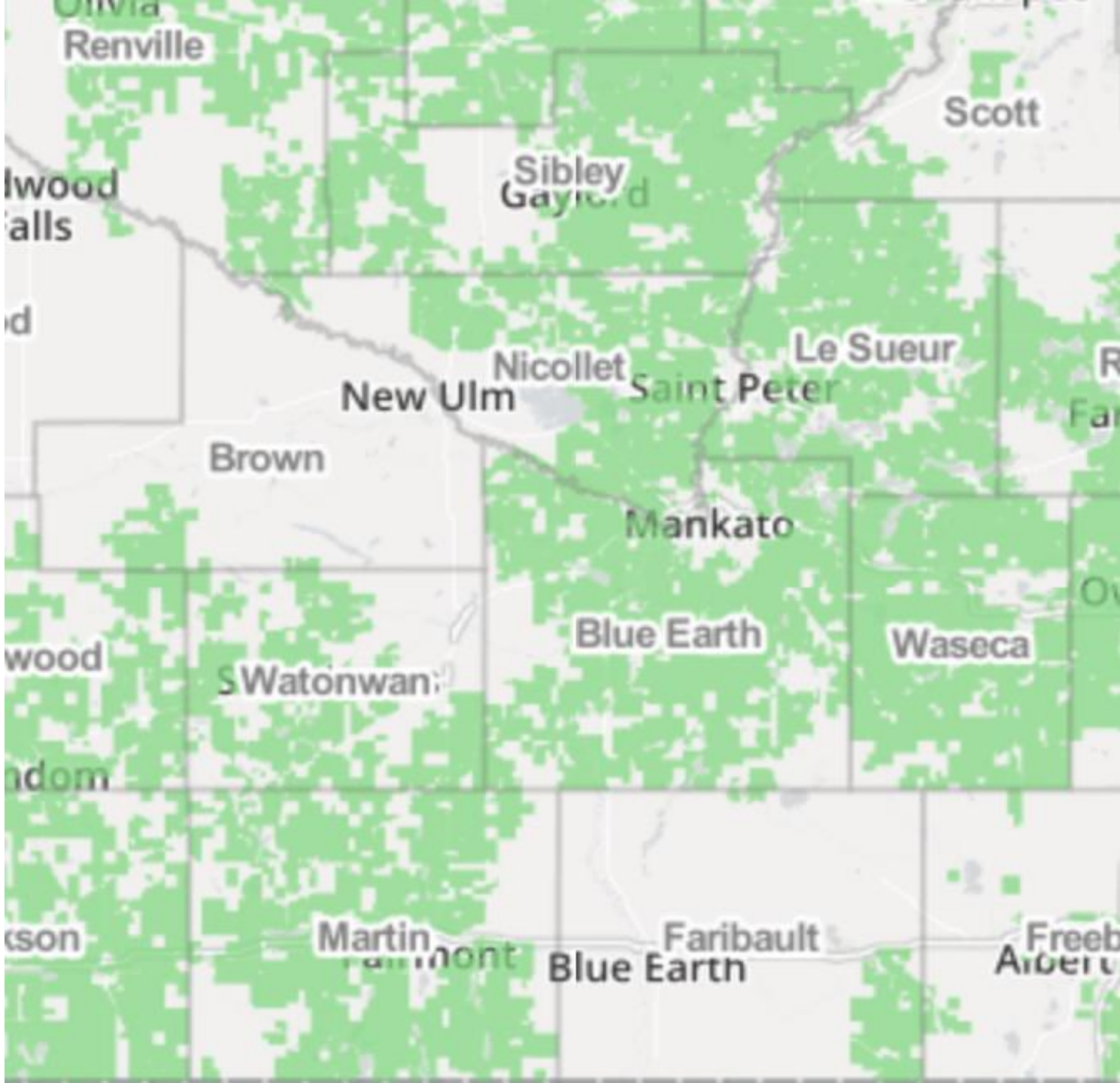


Region Nine Broadband Infrastructure



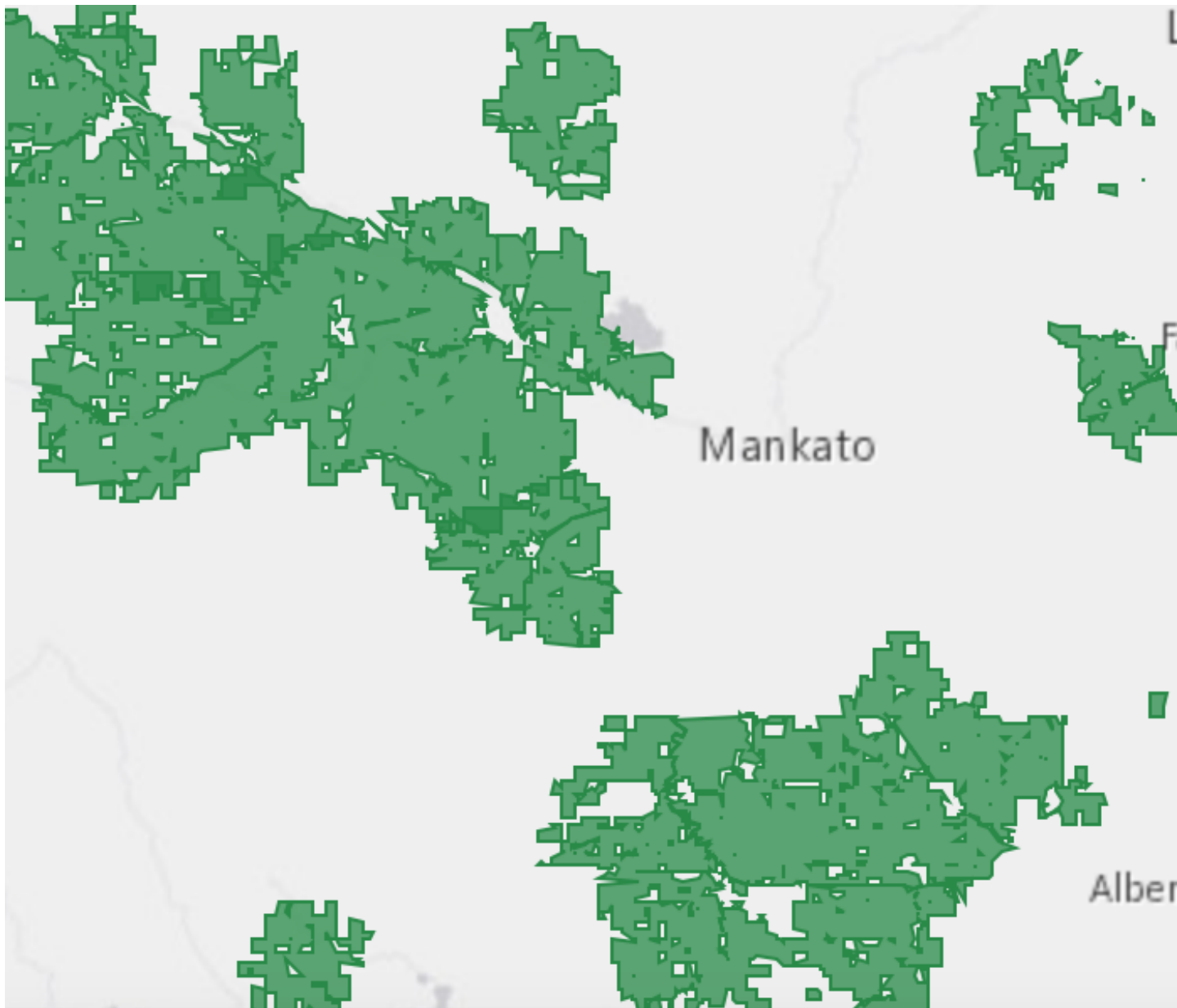
**Federal
Broadband
Subsidies for
Larger Carriers
(CAF II) affecting
the region**

www.fcc.gov/reports-research/maps/caf-2-accepted-map/



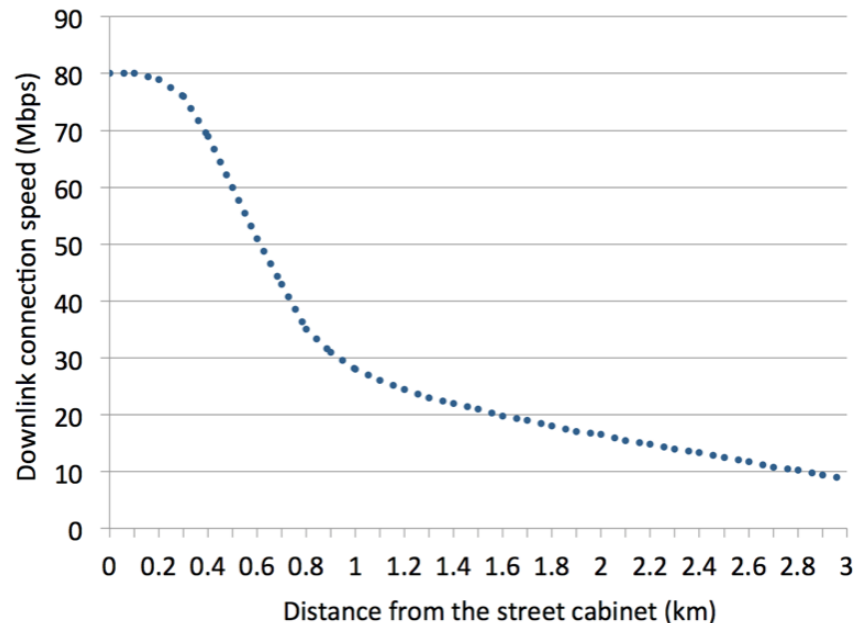
**(ACAM), a federal
subsidy for Mid-size
Carriers affecting the
region**

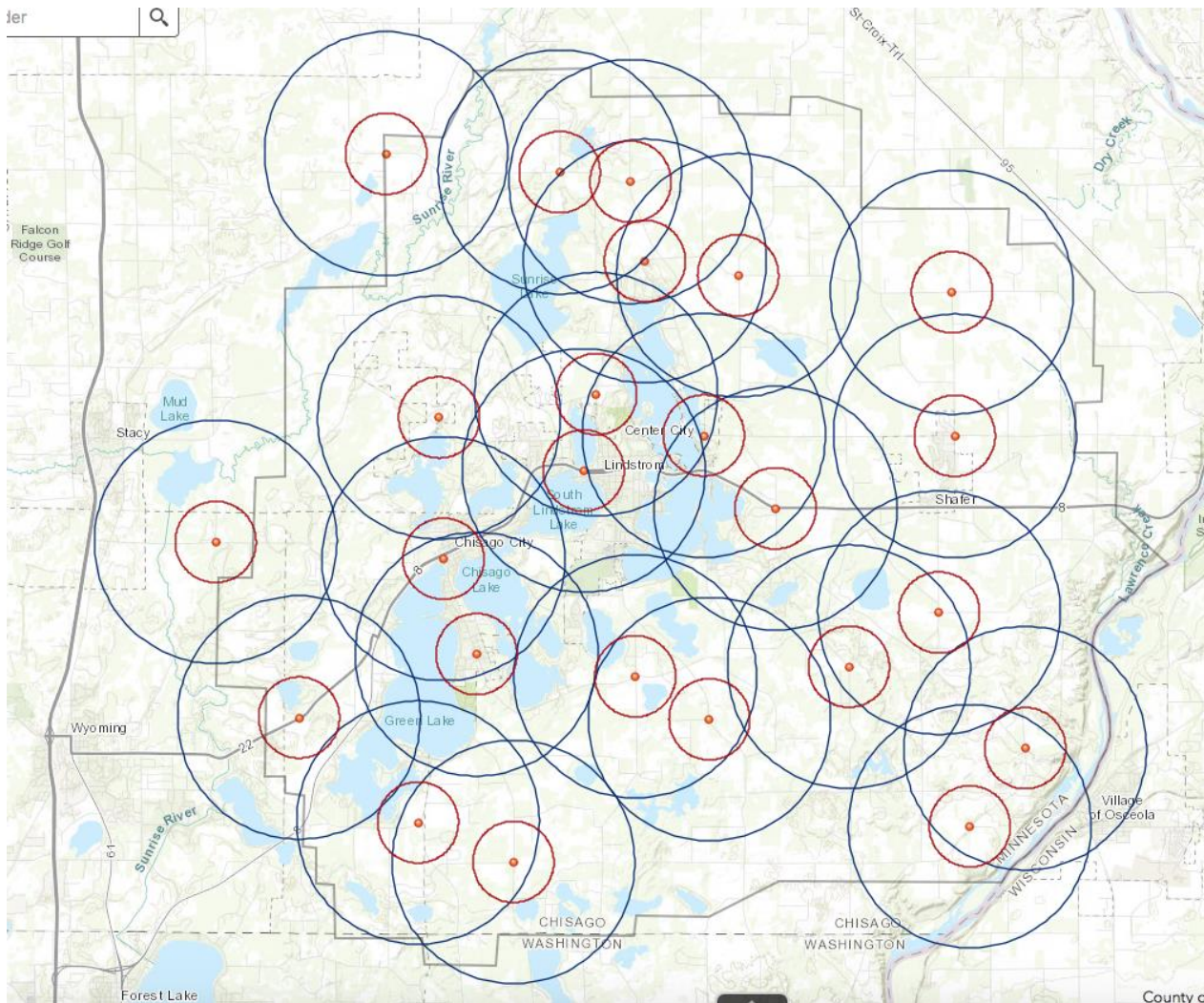
www.fcc.gov/reports-research/maps/a-cam-offer-map/



FCC CAF II and ACAM Improvements

- CAF II
 - Capital subsidies to CenturyLink, Frontier, Consolidated & Windstream
 - 10 /1 minimum
- ACAM
 - Operating subsidies to NU-Telecom, BEVCOMM, Arvig and others
 - Requires minimum of 25/3, 10 /1 or 4/1 depending on costs
- No requirement to serve everyone
- Within 3,000 feet > 25 Mb or greater possible
- At 10,000 feet = ~ 10 Mb
- Copper condition affects carrying capacity over distance

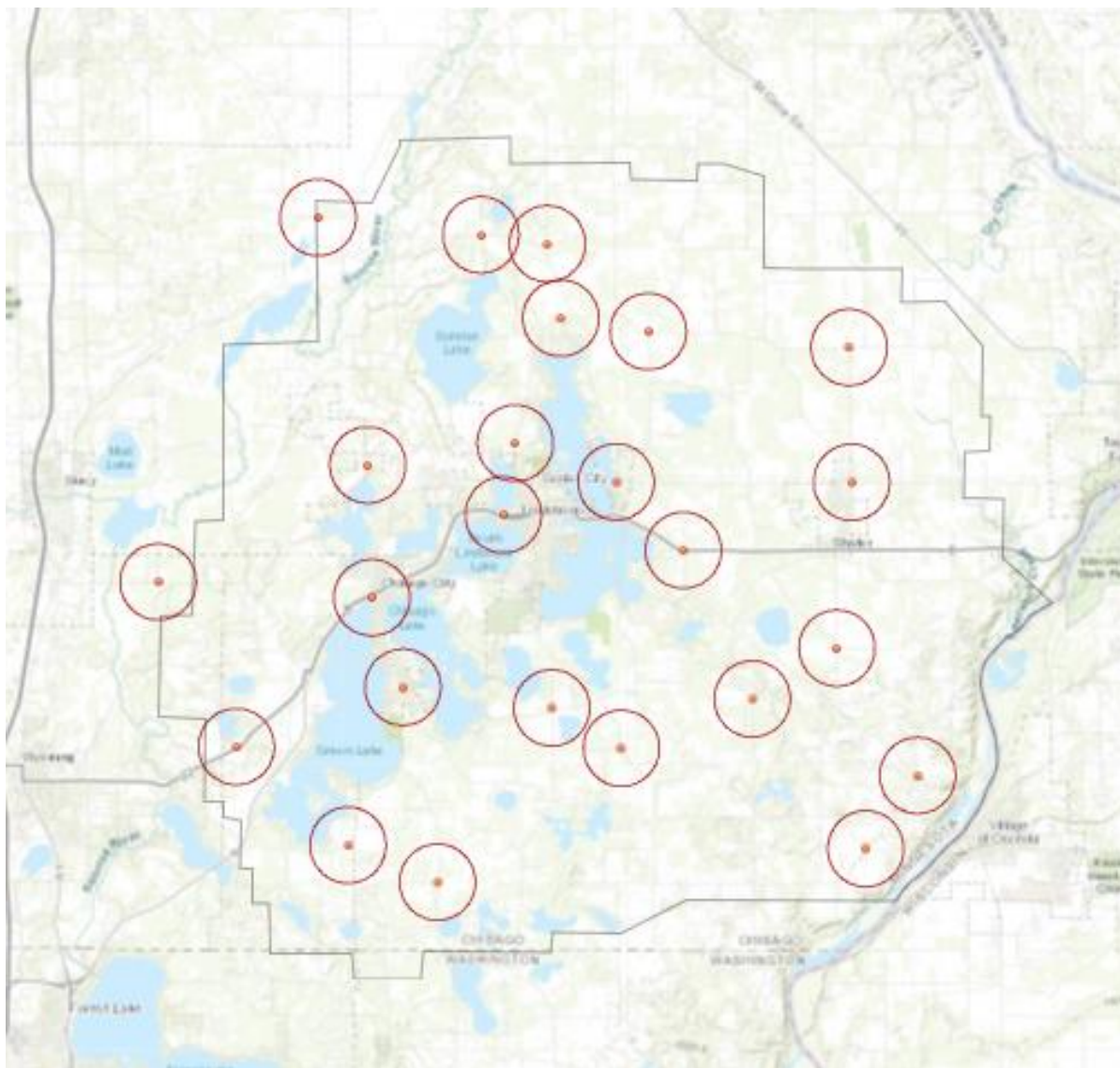




Red circles = 3,000 foot radius = 25 Mb/3 Mb and higher

Blue circles = 9,000 foot radius = between 25 Mb/3 Mb to 10 Mb/1 Mb

FRONTIER'S LINDSTROM EXCHANGE



Those within the circles, about 10% of land area, would likely meet the 2022 state goal of 25 Mb/3Mb; no one would meet the 100 Mb/20 Mb 2026 state goal.

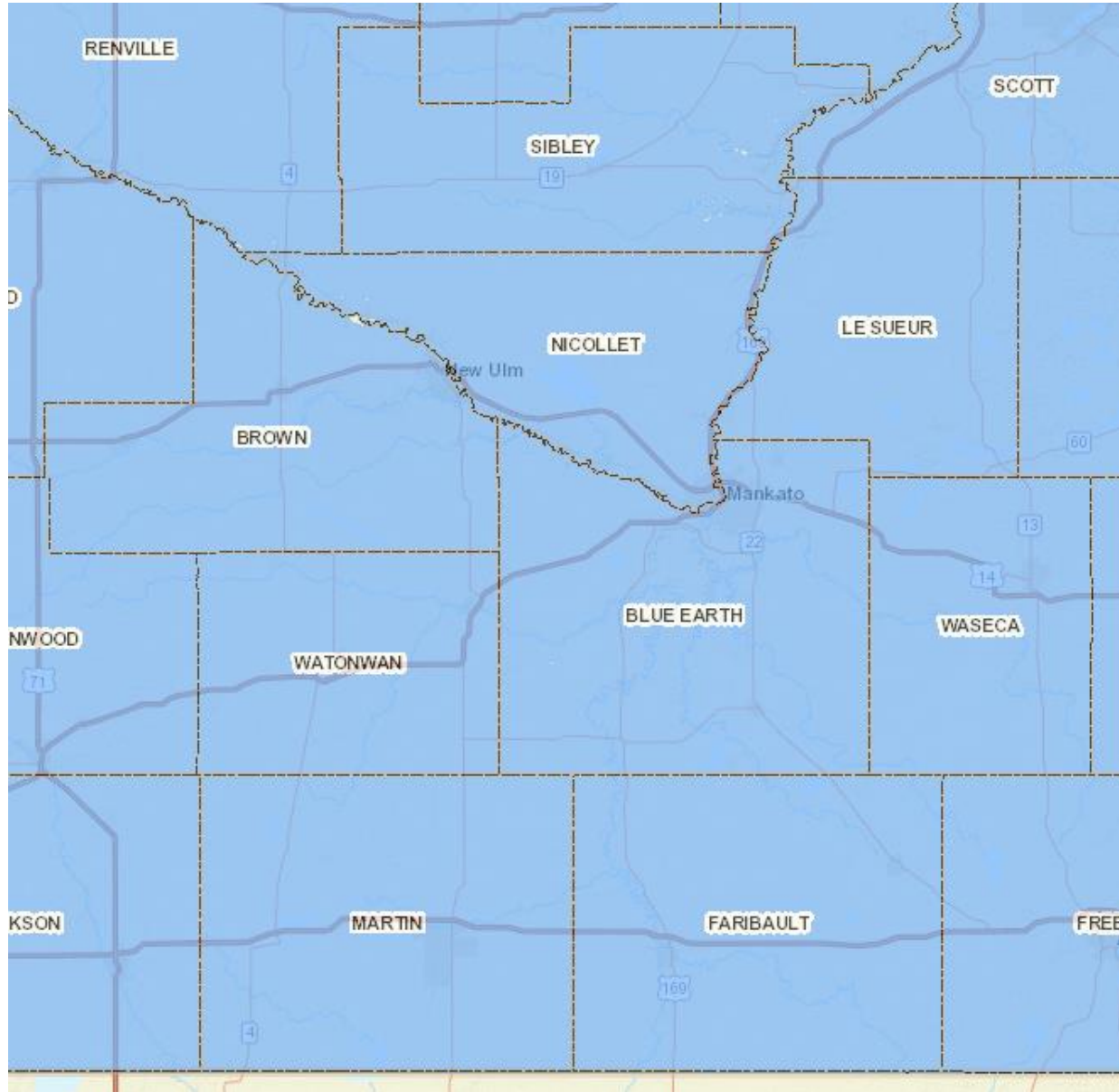
FRONTIER'S LINDSTROM EXCHANGE

WIRELESS

Fixed Wireless

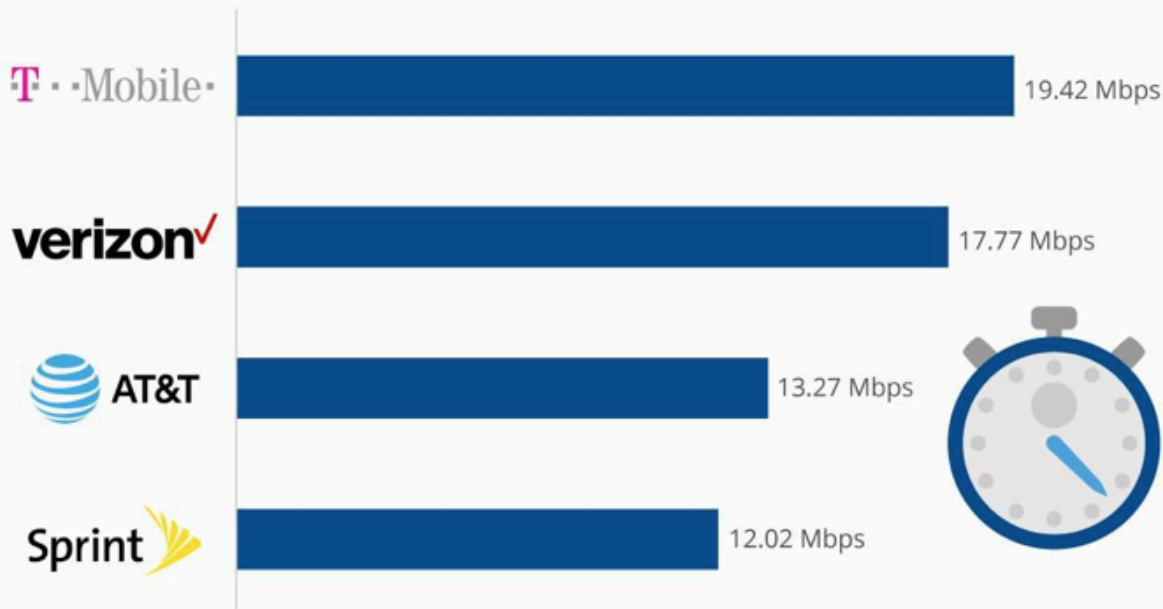
- Improvements
 - Increasingly robust with fiber-fed towers, especially on the prairie
 - Many combinations of technologies and spectrum
 - Balancing of power and bandwidth
 - Licensed, lightly licensed and unlicensed
- Challenges
 - Trees can eat wireless
 - Hills can hide wireless
 - Availability and cost of Internet backhaul

Test Question: What does this map show?



America's Fastest Mobile Networks

Average 4G download speed by carrier in the U.S. (Q4 2017)



StatistaCharts

OpenSignal analyzed 5.9 billion measurements collected from 237,213 mobile devices between Oct. 1 and Dec. 30 of 2017.

Source: OpenSignal

Forbes statista

Average 4G download speed by carrier in the U.S.

Cellular Issues

- 4G/3G coverage can be spotty in rural away from highways
- Bandwidth decreases with distance from tower
- Beware of ** on “unlimited” data plans
- 5G will require fiber to within 1,000 feet of customer

Satellite

- Improvements
 - Increased speeds
 - Increased affordability
- Challenges
 - Latency/delay affects advanced use
 - Virtual private networks
 - Teleworking
 - Skype/Facetime video apps
 - Weather affects reliability
 - Same unlimited** considerations as cellular

Fiber Infrastructure Investment – Is it a good choice?

- Fiber to the Home costs between \$4,000 and \$12,000 per home
- Seventy percent of homebuyers will not buy a home without a good broadband connection
- A fiber-connected home increases in value by \$3,000 to \$7,000
- Well-connected residents and businesses save money in many ways, conservatively estimated at \$1,500 per year
- Customers switching from satellite/cellular packages to triple play FTTH report savings of \$300 - \$400 per month!
- Wireless is on fiber for most of its path

What else costs about \$10,000?



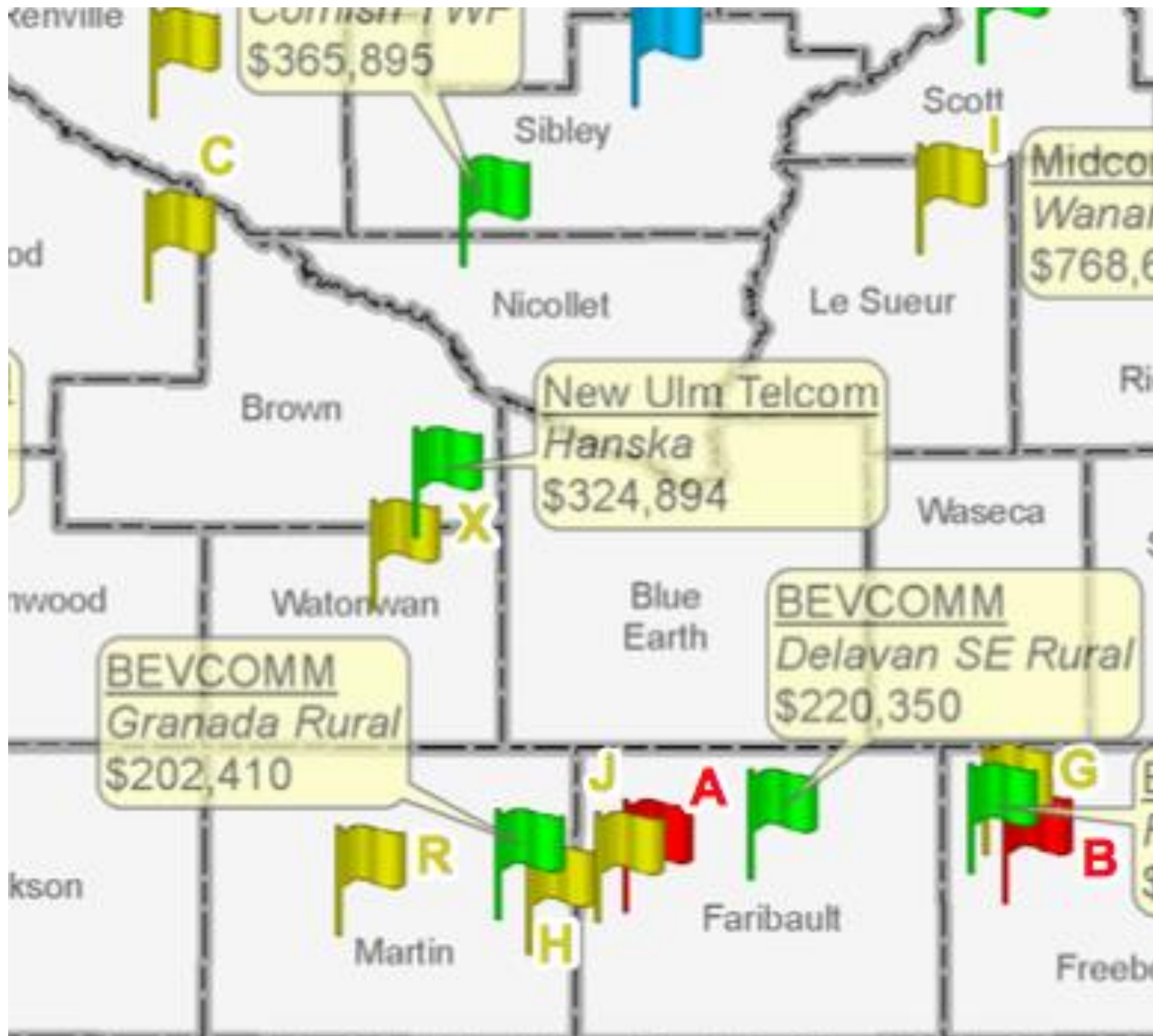
Anyone can decide to buy some 10 year-old stuff on Craigslist!

But one person cannot buy their own broadband network...we have to do that together!

Tools and Resources

- DEED Office of Broadband
 - Grant program
 - Maps and data
 - Liaison with broadband providers
- Federal Government
 - USDA Rural Development
 - US Commerce – NTIA
- Region Nine Development Commission
- Blandin Foundation
 - Community Broadband Resources Program
 - Robust Network Feasibility Study
 - Broadband Communities Program
 - Blandin on Broadband Blog & BF web site
- Others
 - Fiber Broadband Association
 - Benton Foundation

DEED OBD Broadband Grants



Conclusions

- RNDC
 - Wide variations in connectivity
 - Relatively few FTTH deployments
 - Strong reliance on fixed wireless in rural
 - Larger farms with fewer people, but more connected devices, sensors and livestock
- Broadband Improvement Strategies
 - Subsidies are required for private sector investment
- Response
 - April 12 Broadband Day on the Hill
 - www.mnbroadbandcoalition.com
- Leadership determines “what’s good enough?”