Broadband Measurement Summit:

Using crowdsource data to measure network performance

March 2024

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Contents:

- Introduction to Ookla and Speedtest

- New Guidance on Pre-Challenge Modifications

- Best Practices for Broadband Measurement from State Broadband Offices

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Ookla at a glance

Who we are   Founded in 2006, Ookla's global connectivity data and insights today help providers **build better networks** from the start — then **analyze, optimize**, and **publicize** network improvements.

Who we help   Our solutions help mobile network operators, ISPs, governments, regulatory bodies, hardware manufacturers, network infrastructure and tower providers, and other organizations seeking to improve connectivity for customers or constituents.

What we offer   Network testing tools; competitive intelligence and on network performance, coverage, availability, consumer sentiment, video experience, RF conditions, and lower-layer insights; as well as solutions for mapping and marketing your superior network.

How we collect data   Ookla's data is sourced from billions of first-party crowdsourced Speedtest results and mobile network coverage scans, scientifically controlled drive and walk testing, integrated network testing solutions, and the Ookla SDK.

Why we do it   Ookla's mission is to measure, understand, and help improve connected experiences.

Ookla: Trusted by consumers worldwide

18+ million
tests daily

billions
of mobile network
samples daily

50+ billion
tests to date

100%
of the world's
countries represented
in Ookla data

15,000+
testing servers in over
190 countries

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Recent Guidance (Q1-2024) from NTIA on using Speedtest data for Pre-Challenge Modifications

Following an Area Challenge approach, the NTIA has recently provided guidance to **allow broadband offices to use crowdsource data to identify areas that the National Broadband Map shows to have adequate service but that are actually areas of need that fall below the 25/3 Mbps (unserved) or 100/20 Mbps (underserved) thresholds.** Bringing orders of magnitude greater data than what has been collected through many federal, state, and local efforts, crowdsourced speed tests are backed by a rigorous and well-established methodology and therefore are particularly well suited to the Pre-Challenge Modification Process. Such tests provide an evidence-based, transparent, and fair way to evaluate performance compared to the National Broadband Map.

Contact our team at Ookla for a detailed description and pre-challenge qualification language
https://www.ookla.com/solutions/us-governments

Step-by-step guide to using crowdsource data to assess broadband network performance

1. Define criteria for unserved and underserved

2. Gather and filter speed test data

3. Use census blocks as initial evaluation areas, hexagons to compare to the FCC map

4. Evaluate based on best speed test results

5. Compare with federal maps and known funding decisions

6. Demarcate areas of eligibility

7. Publish public maps

8. Define BSLs by area

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Using crowdsourced data to identify unserved and underserved locations for broadband funding eligibility
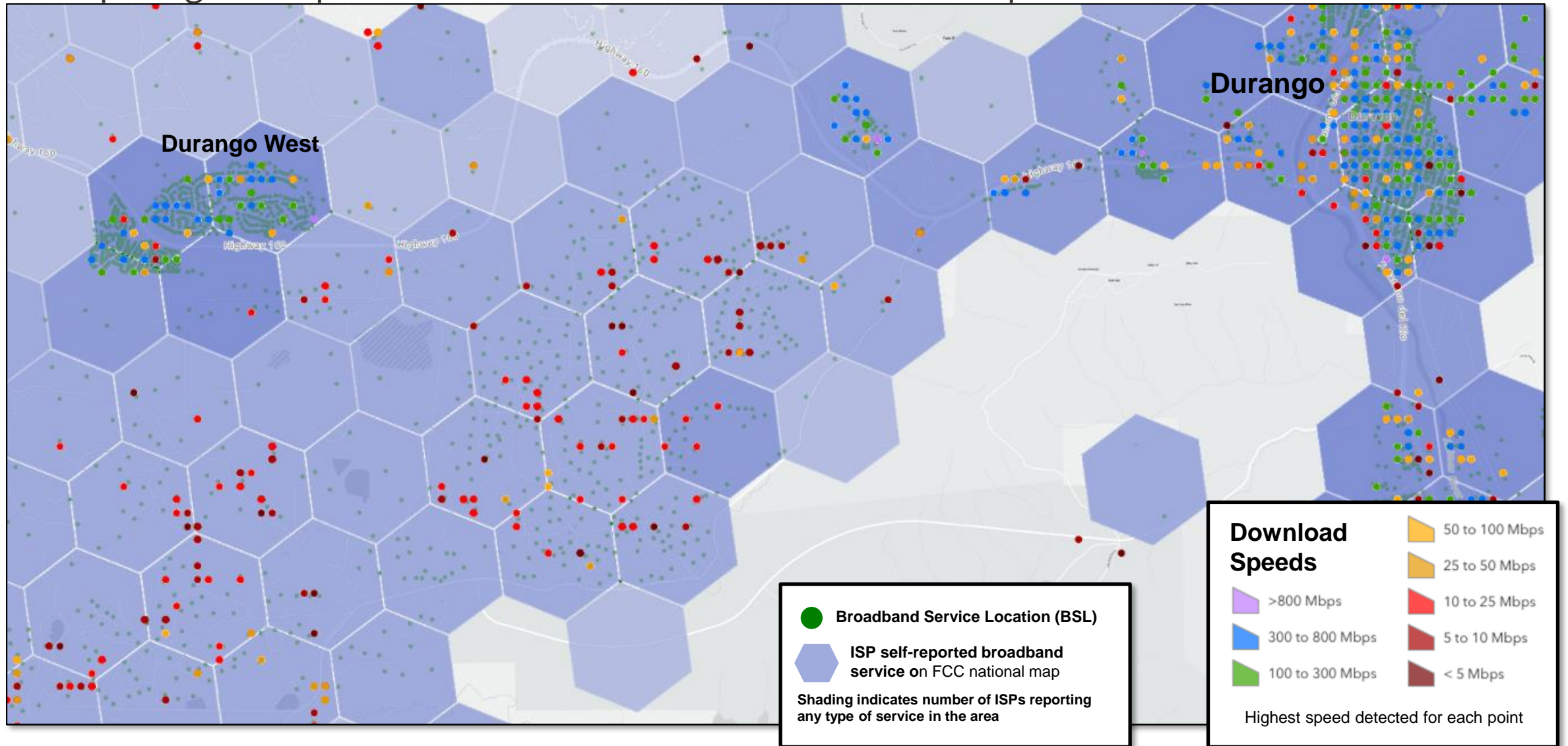
Version 1.0
Last updated: August 11, 2023

Note: This is a living document and is expected to evolve as the BEAD Challenge Process advances. It should be considered a reference tool and not as a final determination of methodology, as each state authority will define their own approach.
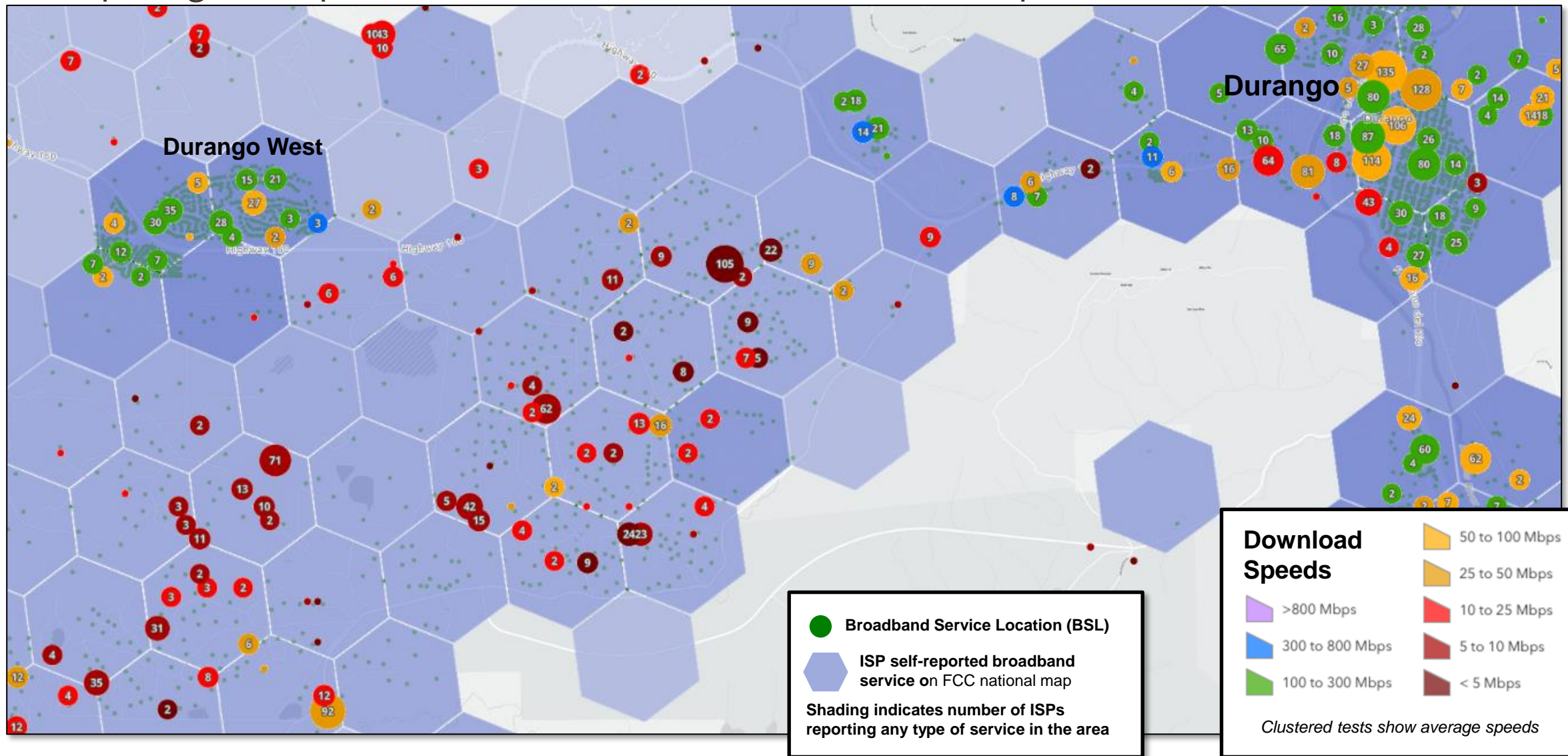
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Measuring Broadband:
Comparing FCC reported broadband service areas vs. User Experience

Durango

Durango West

Download Speeds

- ● Broadband Service Location (BSL)
- ⬡ ISP self-reported broadband service on FCC national map

Shading indicates number of ISPs reporting any type of service in the area

- 50 to 100 Mbps
- 25 to 50 Mbps
- >800 Mbps
- 10 to 25 Mbps
- 300 to 800 Mbps
- 5 to 10 Mbps
- 100 to 300 Mbps
- < 5 Mbps

Highest speed detected for each point

Measuring Broadband:
Comparing FCC reported broadband service areas vs. User Experience

Durango

Durango West

Download Speeds

Legend	
🟩 Broadband Service Location (BSL)	
🔷 ISP self-reported broadband service on FCC national map	

Shading indicates number of ISPs reporting any type of service in the area

Download Speeds	
🟪 >800 Mbps	🟧 50 to 100 Mbps
🟦 300 to 800 Mbps	🟧 25 to 50 Mbps
🟩 100 to 300 Mbps	🟥 10 to 25 Mbps
	🟥 5 to 10 Mbps
	🟥 < 5 Mbps

Clustered tests show average speeds

Best Practices for Measuring Broadband amidst the State Challenge process

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Colorado Broadband Office: Raise Awareness through Public Facing Maps
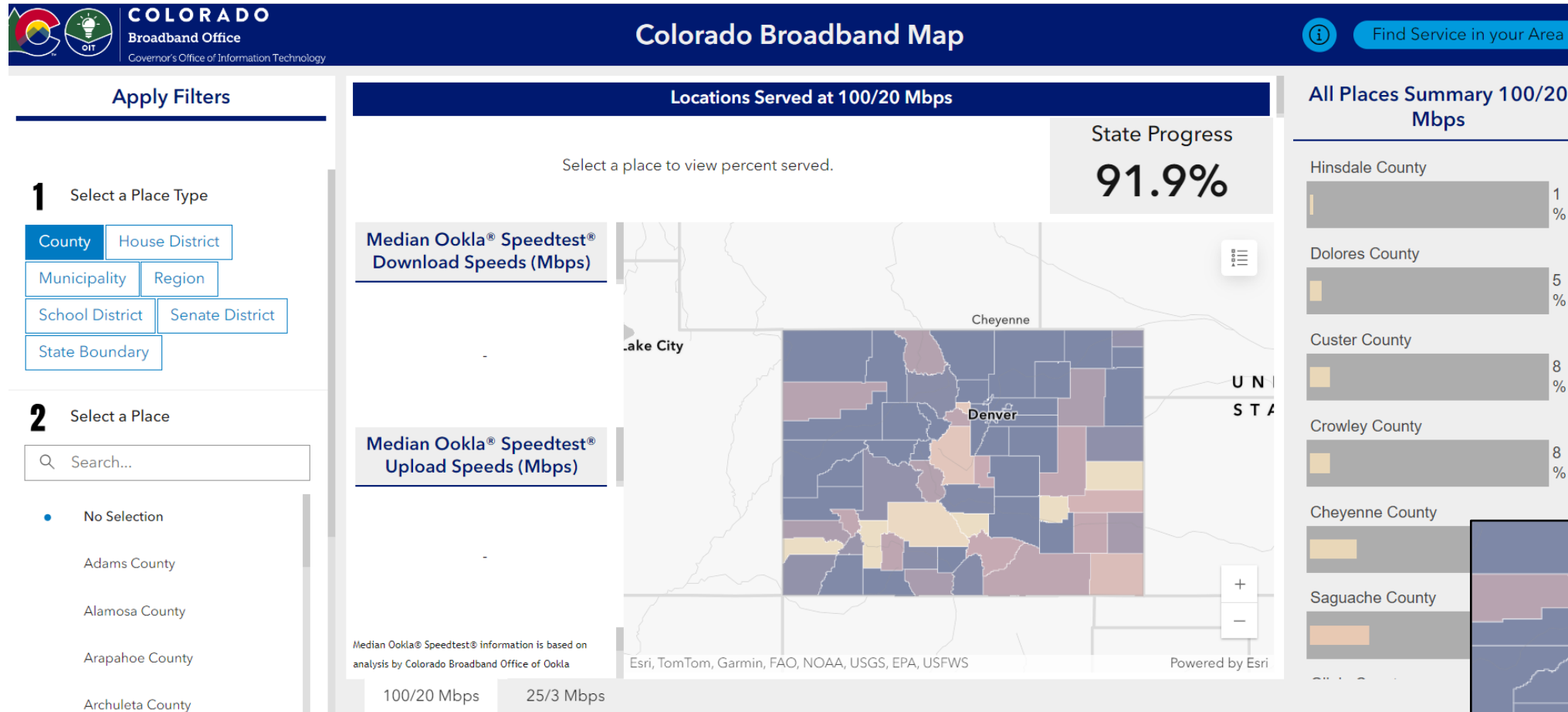
Combining FCC Broadband Map and Speedtest data
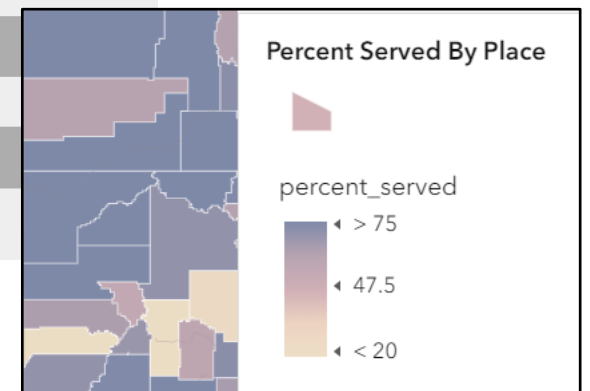
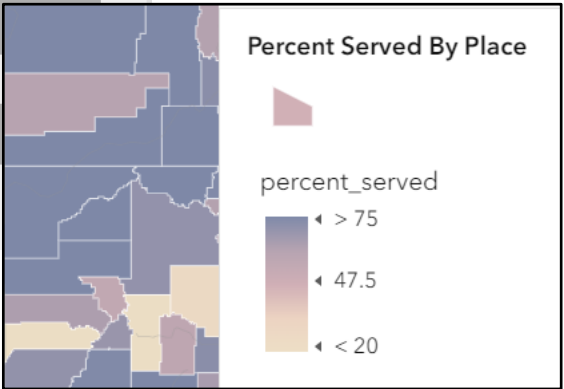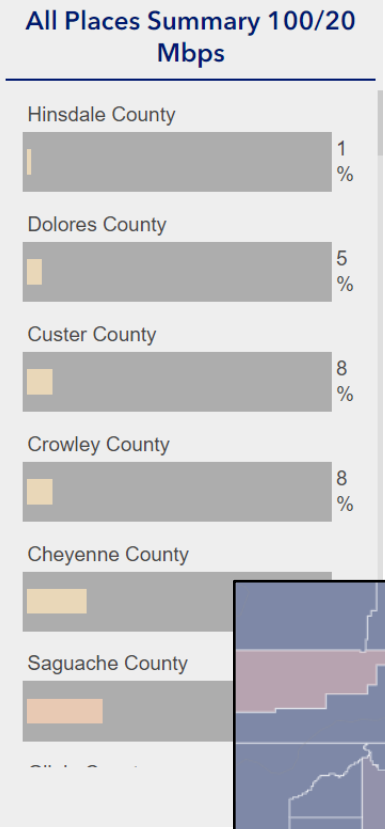# Colorado Broadband Office: Identify areas that need broadband improvement
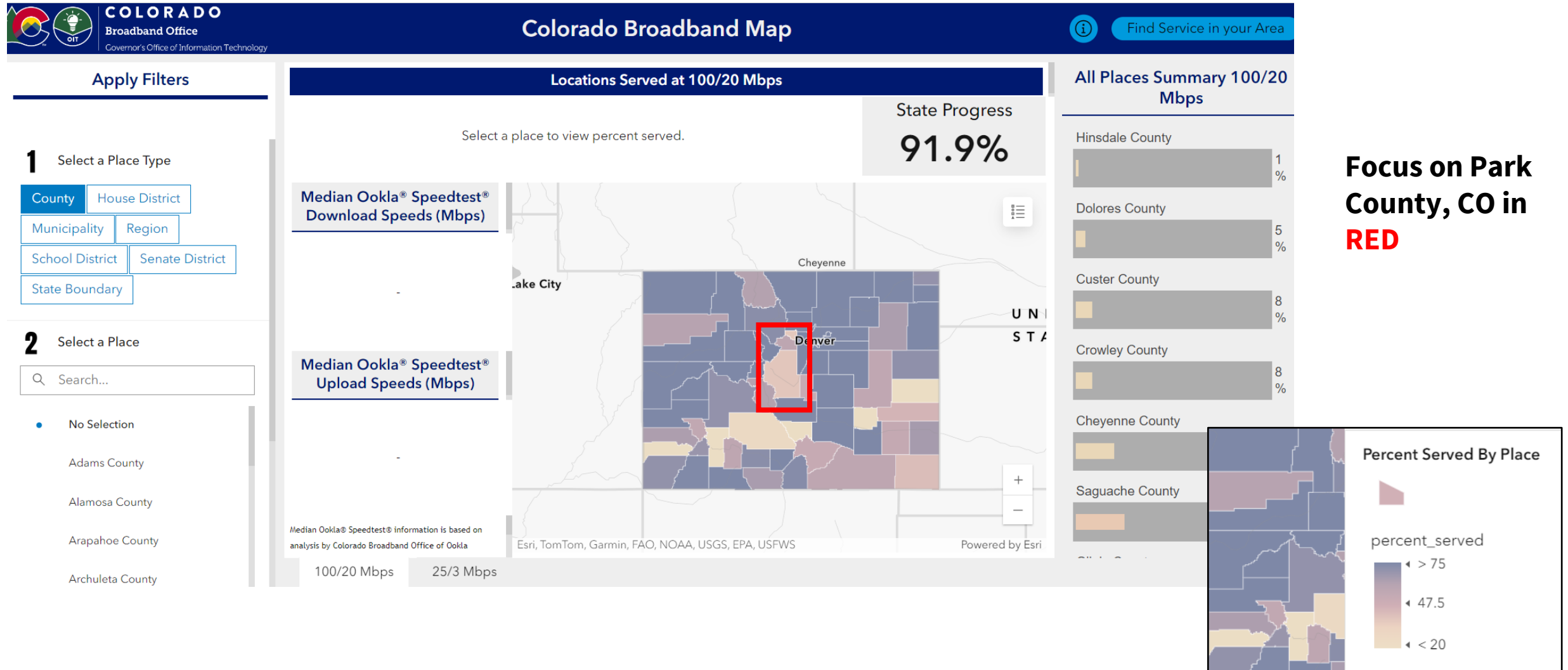
Colorado Broadband Office: Address important questions from state residents
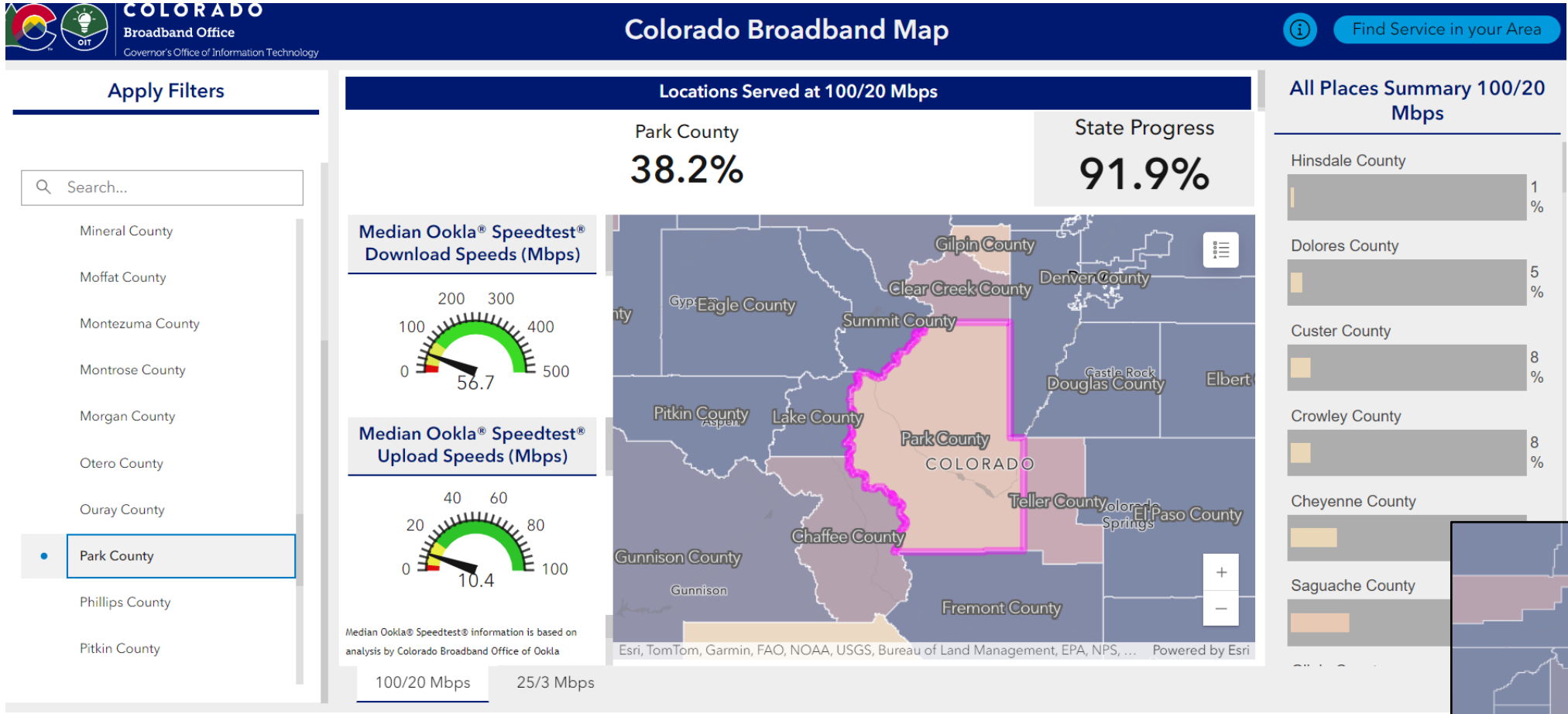
Colorado's Map answers
• Do I have service?
• How does my community compare to the rest of the state?
• Is there any grant funding in my community?

South Carolina: Measuring Broadband Build-Out

Oconee County
South Carolina

Construction Dashboard

December 31, 2023

Verified Speed Tiers (download / upload)

- >= 100 Mbps / 100 Mbps (symmetric)
- >= 100 Mbps / 20 Mbps

with 50+ Ookla Speedtest Results and 15+ Users in Project Area

Construction Status

- Network Live in Last 30 Days
- 1+ Ookla Speedtest Results in Project Area

Managed Investment

- State
- Federal
- County
- Private

Data Sources: Based on SC Broadband Office (SCBBO) analysis of near real-time Ookla Speedtest Intelligence® data at H3 Resolution 7 within funded projects that are currently under construction in South Carolina.

The SCBBO is neither responsible nor liable for damages or injuries caused by failure of performance, error, omission, inaccuracy, inaccessibility, incompleteness or any other errors in information or formatting on this map.

Speedtest Intelligence® data from Jan. 1, 2019 through Dec. 31, 2023 utilized for analysis by SCBBO in the region. Ookla® trademarks and logos used under license and reprinted with permission.

Additional broadband information may be found at www.scdigitaldrive.org. Submit comments or questions to maps@ors.sc.gov

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South Carolina: Measuring Broadband Build-Out

BROADBAND OFFICE

South Carolina: Measuring Broadband Build-Out
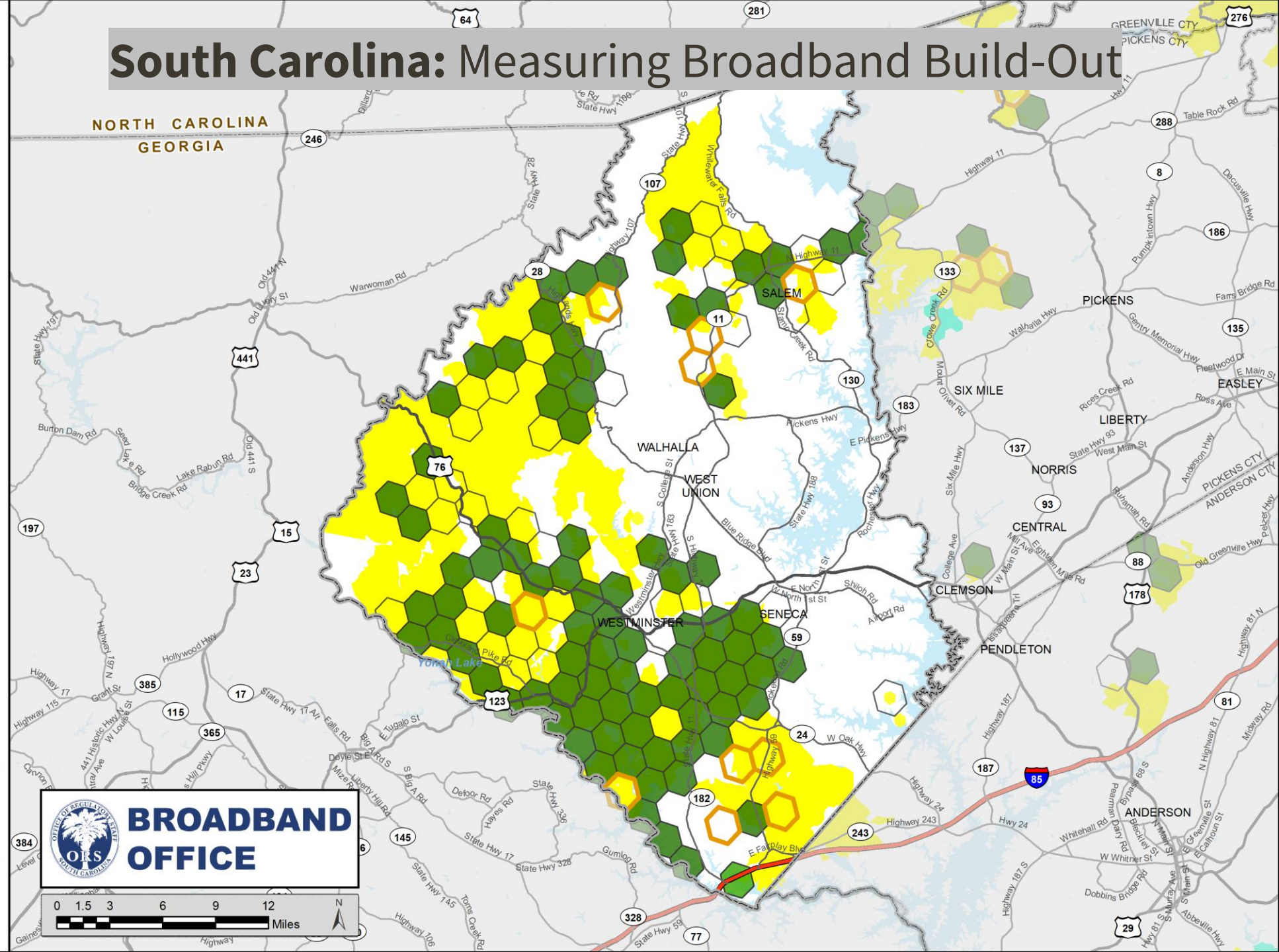
Oconee County
South Carolina

Construction Dashboard

January 7, 2024

Verified Speed Tiers (download / upload)
- >= 100 Mbps / 100 Mbps (symmetric)
- >= 100 Mbps / 20 Mbps

with 50+ Ookla Speedtest Results and 15+ Users in Project Area

Construction Status
- Network Live in Last 30 Days
- 1+ Ookla Speedtest Results in Project Area
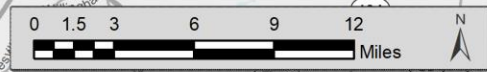
Managed Investment
- State
- Federal
- County
- Private

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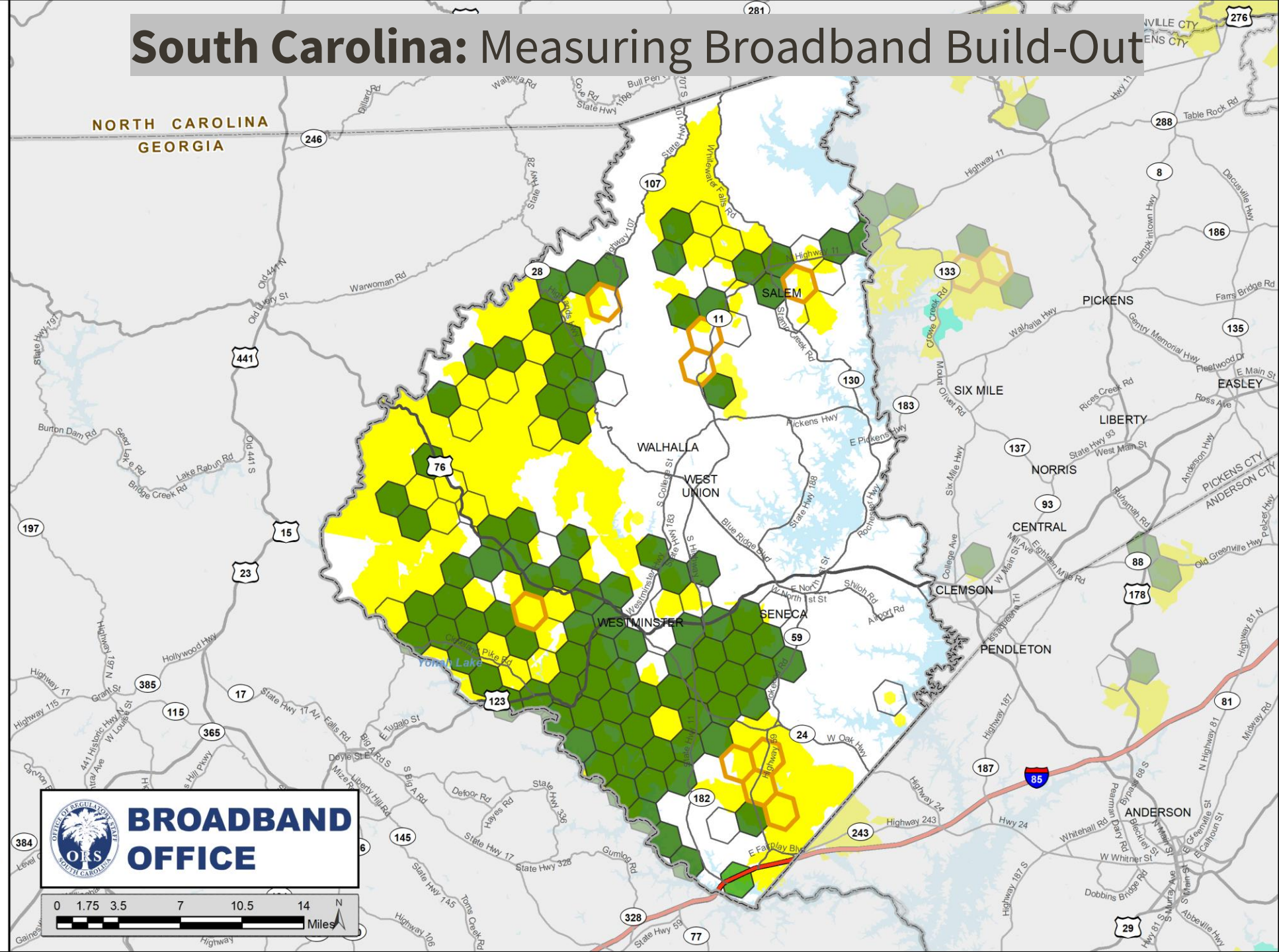
Oconee County

South Carolina

Construction Dashboard

March 3, 2024

Verified Speed Tiers (download / upload)

- >= 100 Mbps / 100 Mbps (symmetric)
- >= 100 Mbps / 20 Mbps

with 5+ Ookla Speedtest Results and 3+ Users in Project Area

Construction Status

- Network Live in Last 30 Days
- 1+ Ookla Speedtest Results in Project Area
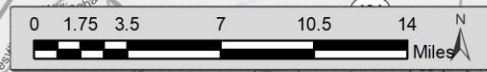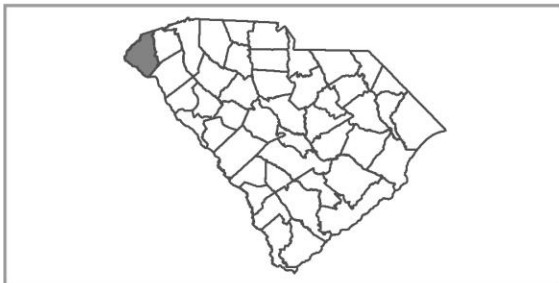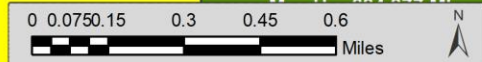
Managed Investment

- State
- Federal
- County
- Private

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BROADBAND OFFICE

0   0.075 0.15   0.3   0.45   0.6   Miles

NW Live: 8/20/2023 4:2:57
Max Down: 251.546 Mbps
Max Up: 389.988 Mbps
Min Latency: 6 ms

Speedtests: 1
NW Live: 10/6/2023 14:53:32
Max Down: 459.502 Mbps
Max Up: 457.338 Mbps
Min Latency: 8 ms

Speedtests: 43
NW Live: 3/31/2023 16:24:1
Max Down: 922.445 Mbps
Max Up: 959.685 Mbps
Min Latency: 6 ms

Users: 1
Speedtests: 2
NW Live: 11/9/2023 21:28:6
Max Down: 153.502 Mbps
Max Up: 129.128 Mbps
Min Latency: 6 ms

WCTEL
Users: 6
Speedtests: 39
NW Live: 10/6/2023 0:22:8
Max Down: 723.729 Mbps
Max Up: 665.099 Mbps
Min Latency: 5 ms

WCTEL
Users: 5
Speedtests: 64
NW Live: 4/18/2023 13:36:16
Max Down: 668.126 Mbps
Max Up: 706.764 Mbps
Min Latency: 5 ms

WCTEL
Users: 1
Speedtests: 1
NW Live: 11/29/2023 14:25:47
Max Down: 282.367 Mbps
Max Up: 272.642 Mbps
Min Latency: 6 ms

WCTEL
Users: 2
Speedtests: 4
NW Live: 11/9/2022 16:56:3
Max Down: 564.53 Mbps
Max Up: 461.246 Mbps
Min Latency: 6 ms

WCTEL
Users: 4
Speedtests: 24
NW Live: 8/19/2023 20:27:55
Max Down: 563.025 Mbps
Max Up: 532.54 Mbps
Min Latency: 6 ms

WCTEL
Users: 7
Speedtests: 44
NW Live: 4/18/2023 17:22:4
Max Down: 782.496 Mbps
Max Up: 822.977 Mbps
Min Latency: 5 ms

WCTEL
Users: 6
Speedtests: 14
NW Live: 11/11/2022 17:4:45
Max Down: 615.476 Mbps
Max Up: 534.084 Mbps
Min Latency: 7 ms

SENECA
WCTEL
Users: 23
Speedtests: 165
NW Live: 11/16/2022 17:9:40
Max Down: 744.255 Mbps
Max Up: 729.937 Mbps
Min Latency: 6 ms

WCTEL
Users: 2
Speedtests: 2
NW Live: 10/3/2023 18:2:13
Max Down: 329.474 Mbps
Max Up: 329.992 Mbps
Min Latency: 6 ms

WCTEL
Users: 3
Speedtests: 5
NW Live: 10/9/2023 21:52:38
Max Down: 553.937 Mbps
Max Up: 394.272 Mbps
Min Latency: 6 ms

WCTEL
Users: 13
Speedtests: 31
NW Live: 11/15/2022 17:22:42
Max Down: 541.776 Mbps
Max Up: 440.956 Mbps
Min Latency: 6 ms

WCTEL
Users: 8
Speedtests: 25
NW Live: 9/6/2023 14:15:57
Max Down: 761.95 Mbps
Max Up: 717.786 Mbps
Min Latency: 6 ms

CASE STUDY

Mapping Broadband Availability and Digital Equity in Loudoun County, VA
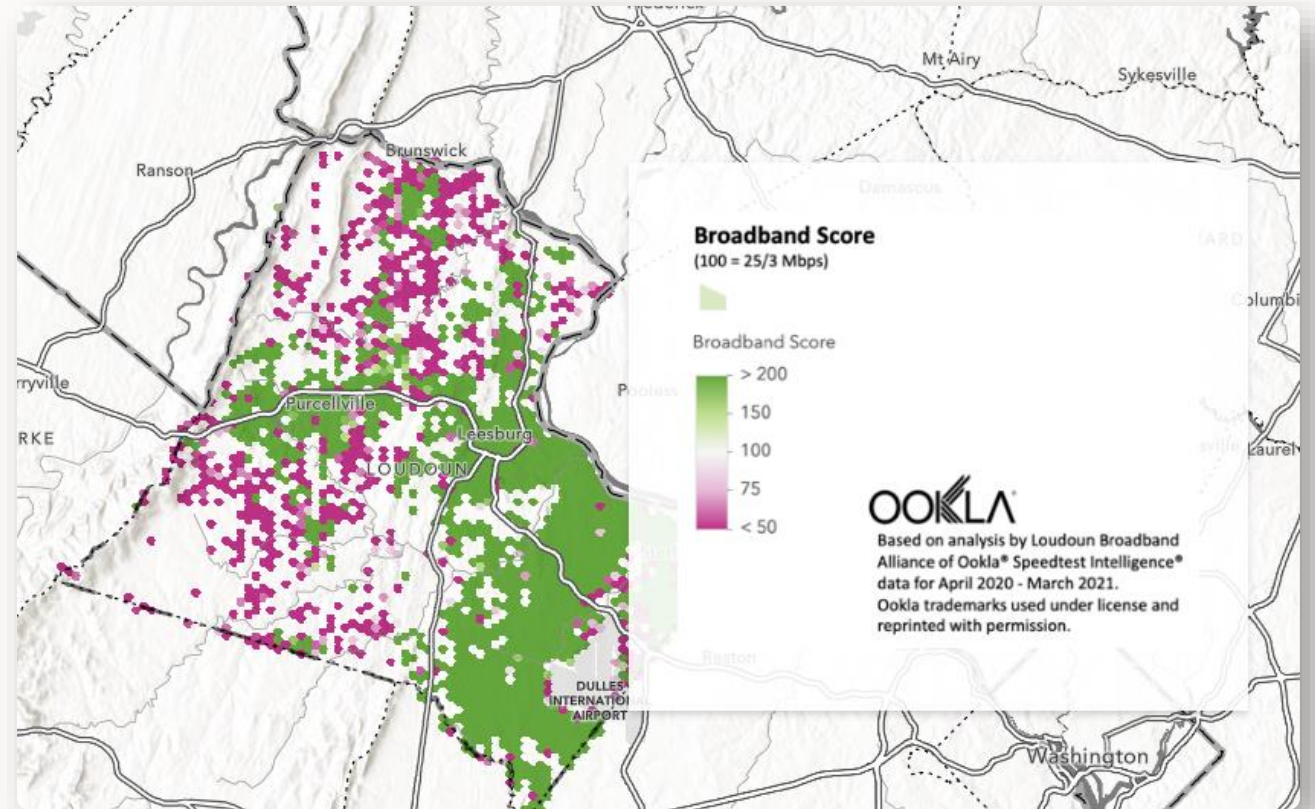
CHALLENGE

In an effort to close the digital divide in communities across the nation, the US federal government has allocated billions of dollars in broadband funding with the American Rescue Plan (ARP) Act.

SOLUTION

Loudoun Broadband Alliance (LBA) chose Ookla to research residents' actual connectivity and network performance. LBA identified a large number of unserved households in contrast to FCC data which showed them as served. Loudoun County was awarded over $17 million of funding to help eliminate the broadband gap.

RESULT

Using ArcGIS with Ookla data, LBA has shown that existing data combined with local knowledge can produce accurate and actionable maps. Localities have the best and most detailed knowledge of community need and LBA has shown that by empowering and encouraging them they can help overcome the limitations of the digital divide.

Broadband Score
(100 = 25/3 Mbps)

Broadband Score
> 200
150
100
75
< 50

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Based on analysis by Loudoun Broadband Alliance of Ookla® Speedtest Intelligence® data for April 2020 - March 2021. Ookla trademarks used under license and reprinted with permission.

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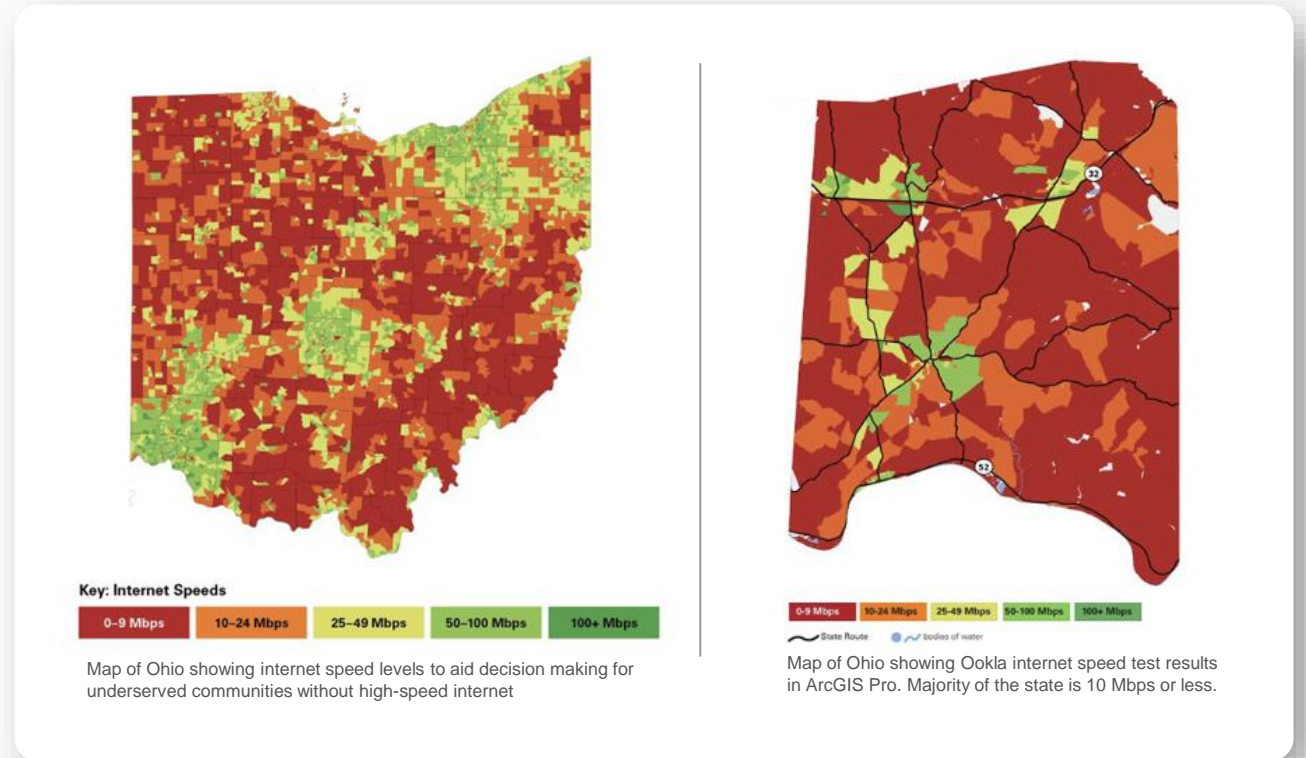# Bridging the Digital Divide in the State of Ohio with GIS

CHALLENGE

Incomplete FCC reports made it challenging for Ohio government leaders to assess which residents lacked broadband access across the state.

SOLUTION

Using ArcGIS, the Ohio team layered data—such as demographics, internet speed from Ookla, and occupied housing—in one authoritative online map for a clear picture of the digital divide.

RESULT

Using geographic information system (GIS) technology, Ohio developed a comprehensive broadband strategy with maps that show precisely where residents need reliable and affordable high-speed internet.

Key: Internet Speeds

| 0–9 Mbps | 10–24 Mbps | 25–49 Mbps | 50–100 Mbps | 100+ Mbps |

Map of Ohio showing internet speed levels to aid decision making for underserved communities without high-speed internet

| 0–9 Mbps | 10–24 Mbps | 25–49 Mbps | 50–100 Mbps | 100+ Mbps |
State Route ⬤ ∿ bodies of water

Map of Ohio showing Ookla internet speed test results in ArcGIS Pro. Majority of the state is 10 Mbps or less.

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THANK YOU

Do you have any questions?

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