

Western North Carolina Hurricane Helene Impact Assessment Brief for:



Agenda

1. High-level retrospect data view of the impact of Hurricane Helene
2. Ranking of impacted counties
3. Pre-Helene county positions by the stats
 - Income / Poverty
 - Demographic
 - Housing
 - Business penetration
4. Go-forward considerations

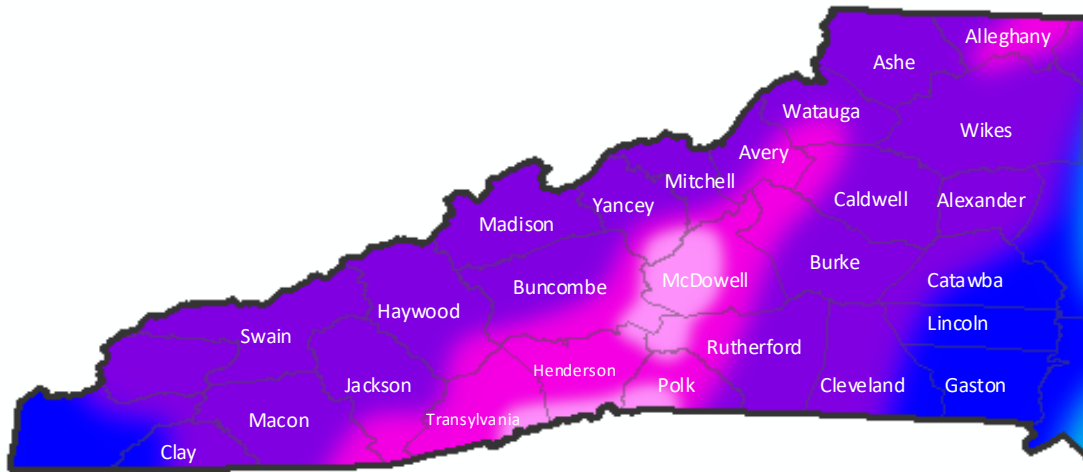
Context

We reviewed a number of things to provide context of the situation to help inform go-forward decisioning as it relates to Hurricane Helene response

- 1) We reviewed and validated the impacted areas leveraging a number of inputs from:
 - National Oceanic and Atmospheric Administration (NOAA)
 - National Weather Service (NWS)
 - NC State Climate Office
 - Duke Energy
 - North Carolina Forest Service
 - NC Department of Agriculture and Consumer Service
 - Qualitative Analysis on News
- 2) We performed a look back analysis on counties position pre-Helene leveraging a number of inputs from:
 - Census Bureau
 - NC Commerce Department

Impact

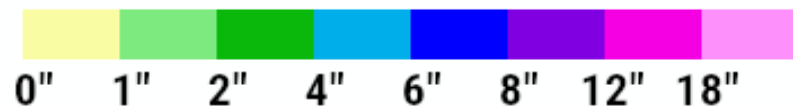
Helene Impact: Total Precipitation



Most impacted counties:

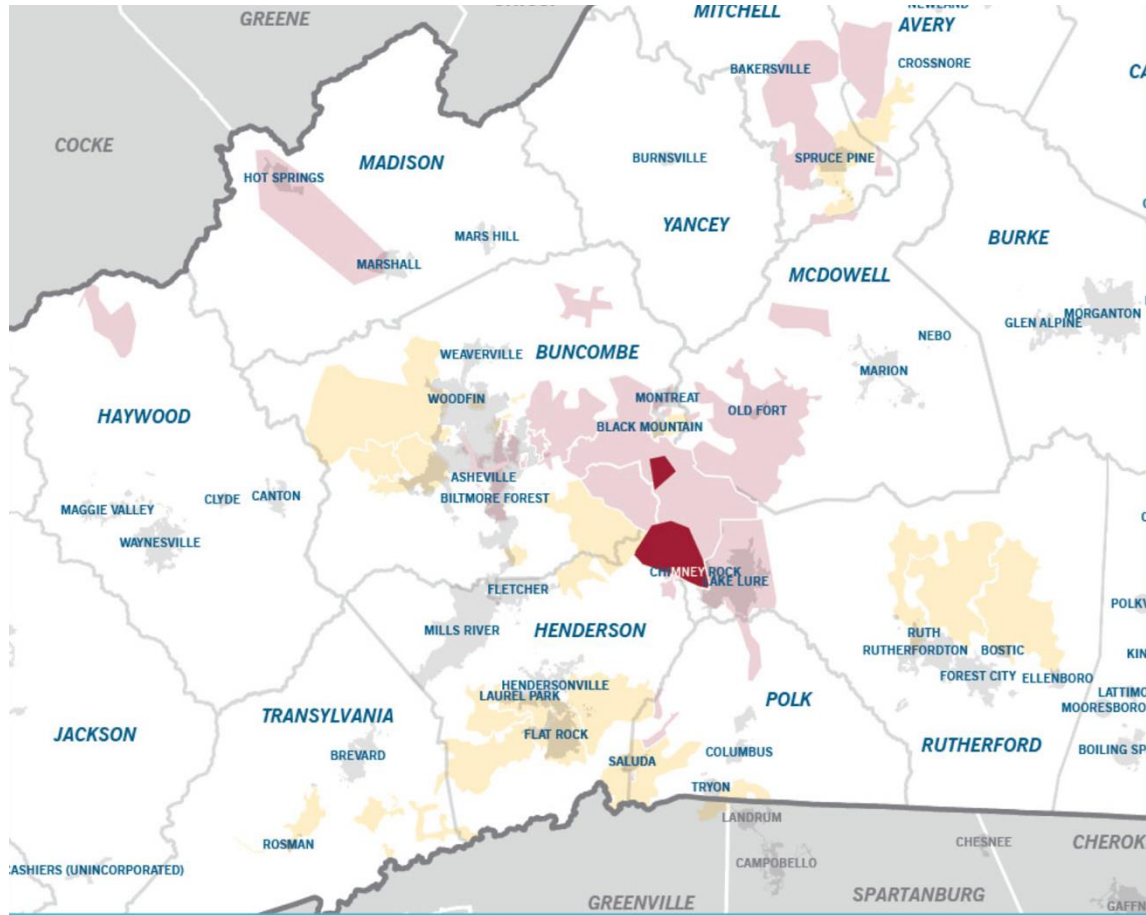
Buncombe, McDowell, Henderson,
Rutherford, Transylvania, Polk,
Yancey, Mitchell, Avery

Total Precipitation (inches)



Based on weather station observations, CoCoRaHS reports, and radar-estimated precipitation totals



Helene Impact: Power Damage



Counties that experienced power damage:
Buncombe, Henderson, McDowell, Rutherford, Polk,
Mitchell, Avery, Madison

*Image reflects dark red areas where significant damage remains.
The lighter toned red and yellow areas reflect where the harder hit
areas have been restored*

Map key

-  Complex repair zone
These areas experienced extensive damage, including broken poles, downed lines, damaged transmission lines or road access issues.
-  Disaster rebuild zone
These areas encountered significant damage and will require new poles, lines, electrical equipment, buildings and infrastructure. Temporary restoration solutions are under development.

<https://www.duke-energy.com/info/carolinas-restoration>

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Helene Impact: Forest Damage

Key Call Outs:

- 18 County Impact Area
 - Alleghany, Ashe, Avery, Buncombe, Burke, Caldwell, Haywood, Henderson, Lincoln, Madison, McDowell, Mitchell, Polk, Rutherford, Swain, Transylvania, Watauga, Yancey
- Heaviest Damage was a six-county area:
 - Avery
 - Buncombe
 - McDowell
 - Mitchell
 - Henderson
 - Yancey



NORTH CAROLINA FOREST DAMAGE APPRAISAL HURRICANE HELENE September 2024



Introduction – On September 23 the National Weather Service posted their first advisory on a newly formed tropical system identified as Potential Tropical Cyclone 9. This system was located 350 miles south/southeast of the western tip of Cuba. This system continued to develop into what would eventually become Hurricane Helene on September 25. Hurricane Helene continued to move through the Gulf of Mexico and strengthened to a category 4 hurricane prior to landfall. Landfall occurred on September 26 just south of Perry Florida with maximum sustained winds of 140 mph.

Helene then moved northward through Georgia and into the Carolinas. The National Hurricane Center's advisory for the morning of September 27 indicated damaging gusty winds and life-threatening flooding over portions of the Southern Appalachians Mountains. The 11:00 am advisory update predicted historic and catastrophic flooding in the same area. Sustained winds at this point were at 45 mph with gusts above 70 mph. In addition, 6 – 12 inches of rain were predicted with local areas receiving more than 20 inches of precipitation. This prediction proved accurate. Immediate reports from the affected area focused on the large-scale flooding events. As the system exited the area reports of blocked roads, power outages, and other damage caused by downed trees began to come in.

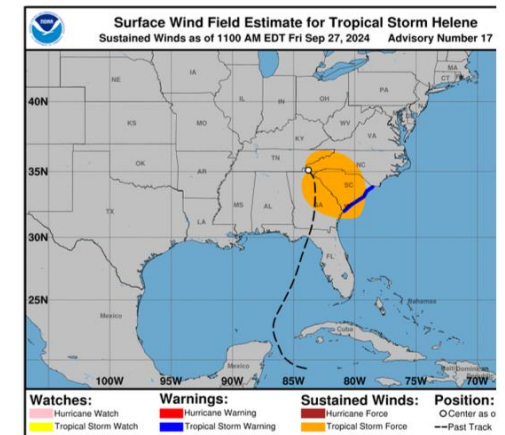


Figure 1. Hurricane Helene track and location on the morning of September 27, 2024. Tropical storm force wind (>39mph) extent is indicated. (Source: NOAA-NHC).

North Carolina Forest Service personnel began preparations for an aerial damage assessment focusing on the timber resource immediately following the passage of the system. However, the decision to conduct this assessment was delayed due to the large number of aircraft in the area conducting emergency response missions and the focus on dispatch of personnel to the area to assist with the emergency response activities.

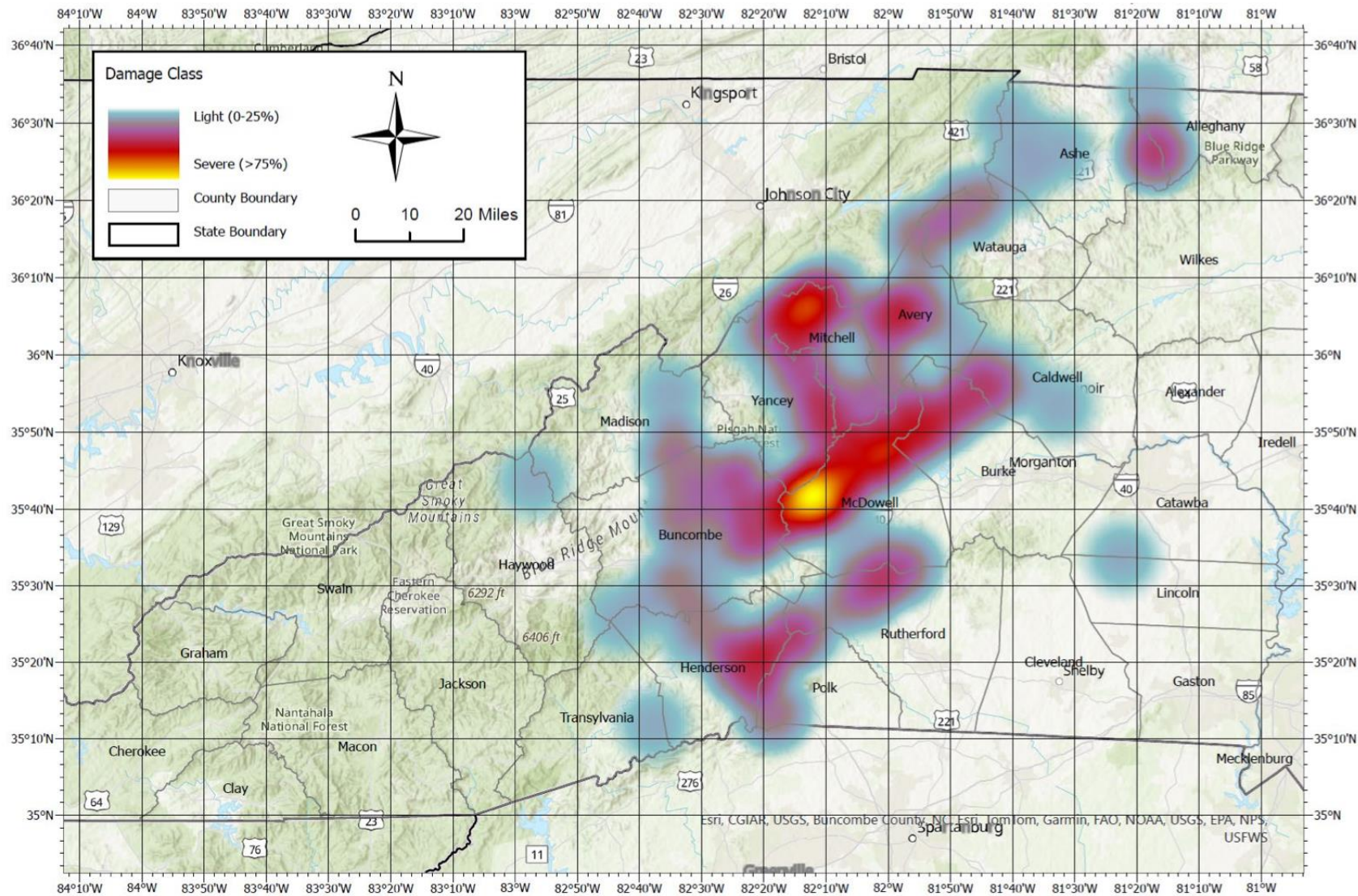


Figure 2. Hurricane Helene damage assessment map.



Most Impacted Counties

1. Buncombe County

Central to the most heavily impacted zone. Significant infrastructure damage and widespread forest damage across **89,440 acres**.

2. McDowell County

Experienced catastrophic flooding and the highest total area of forest damage at **130,805 acres**.

3. Mitchell County

Substantial forest and infrastructure damage.

4. Avery County

Severe flooding and infrastructure challenges.

5. Yancey County

Notable for landslides and forest damage

6. Henderson County

Impacted by heavy flooding.

Moderately Impacted Counties

7. Madison County

Sustained damage to 39,764 acres of forest, primarily in isolated areas.

8. Haywood County

Affected by flooding, with 16,737 acres of forest damage.

9. Transylvania County

Flooding led to damage across 21,376 acres, though the overall impact was moderate.

10. Watauga County

Flooding and isolated road damage.

11. Burke County

Moderate flooding

12. Caldwell County

Minor forest and structural damage

Least Impacted Counties

13. Swain County

Experienced scattered flooding and minor forest damage.

14. Clay County

Minimal flooding and negligible forest damage reported.

15. Cleveland County

Only light wind damage and power outages reported.

16. Polk County

Experienced low levels of flooding but minor overall damage

17. Rutherford County

Light flooding affected **42,587 acres**, with timber losses of **\$5.9M**.

18. Alleghany County

Minimal impact.

19. Ashe County

Similar to Alleghany, with minimal structural damage.

20. Lincoln County

Low impact, primarily limited to localized flooding and negligible timber losses.

21. Macon County

Experienced minimal flooding and no major structural damage reported.

22. Wilkes County

Minor damage from strong winds and scattered flooding.

23. Catawba County

Isolated cases of flooding but no major impact reported.

24. Alexander County

Minimal flooding; no significant damage reported.

25. Gaston County

Limited to minor flooding and power outages.

26. Mecklenburg County

Urban flooding reported, but overall impact was minimal compared to mountainous regions.

Lookback Analysis

Potential Ways to Define a Resiliency

- Business
 - high / small business ratio
- Population
 - Increasing / decreasing population
 - Lower / higher elder population
 - Increasing / decreasing young population
- Income
 - High / low-income growth
 - High / low poverty rate
- Housing
 - High / low homeowner to renter ratio
 - High / low home value growth
 - High / low home value to income growth disparity
 - Low / high rent burden

Age Distribution

18-29 age Distribution

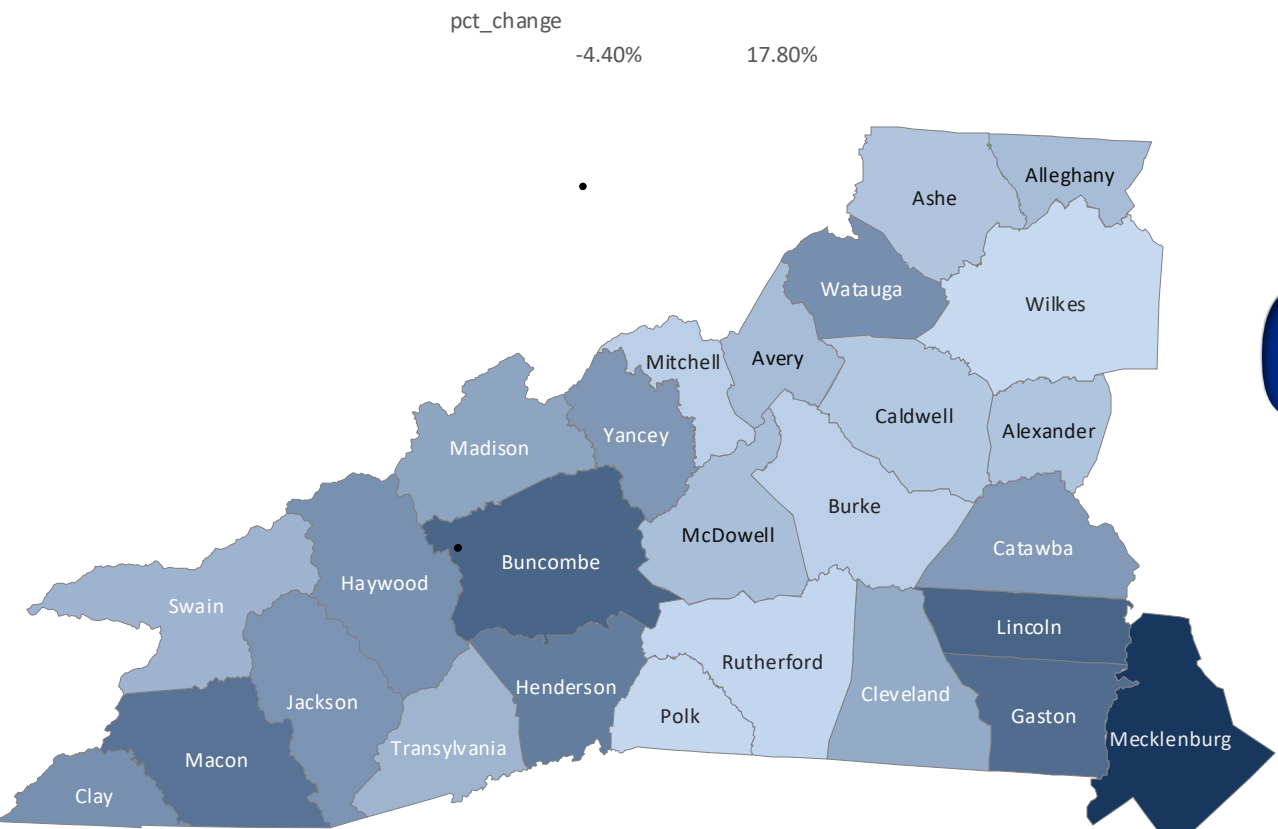
	2013	2022	pct_change
Mecklenburg	3317	3022	-8.89%
Wilkes	2160	1988	-7.96%
Rutherford	1295	1220	-5.79%
Polk	10374	9928	-4.30%
Mitchell	13148	12605	-4.13%
McDowell	4161	4004	-3.77%
Caldwell	2850	2788	-2.18%
Burke	2014	1972	-2.09%
Avery	8555	8564	0.11%
Ashe	10928	10998	0.64%
Alleghany	19303	19841	2.79%
Alexander	4966	5107	2.84%
Yancey	1991	2069	3.92%
Transylvania	1068	1113	4.21%
Swain	5935	6215	4.72%
Madison	36833	38865	5.52%
Cleveland	8551	9042	5.74%
Catawba	14244	15155	6.40%
Watauga	7144	7682	7.53%
Jackson	12382	13439	8.54%
Henderson	3059	3347	9.41%
Haywood	21489	23726	10.41%
Clay	9930	11141	12.20%
Lincoln	2012	2268	12.72%
Gaston	30019	34031	13.36%
Buncombe	169725	199620	17.61%

Age Over 66 Distribution

	2013	2022	pct_change
Buncombe	73261	109795	49.87%
Gaston	9387	13889	47.96%
Lincoln	5415	7817	44.36%
Mecklenburg	2235	3194	42.91%
Clay	34109	48541	42.31%
Haywood	1969	2743	39.31%
Henderson	3241	4459	37.58%
Jackson	5626	7672	36.37%
Watauga	3288	4447	35.25%
Catawba	23998	32287	34.54%
Cleveland	19221	25412	32.21%
Madison	11304	14577	28.95%
Swain	2855	3665	28.37%
Transylvania	10260	13121	27.88%
Yancey	4958	6198	25.01%
Alexander	5124	6390	24.71%
Alleghany	13063	16264	24.50%
Ashe	21619	26826	24.09%
Avery	11172	13728	22.88%
Burke	6675	8167	22.35%
Caldwell	13177	15942	20.98%
McDowell	10271	12294	19.70%
Mitchell	4615	5397	16.94%
Polk	7686	8781	14.25%
Rutherford	1962	2236	13.97%
Wilkes	2948	3196	8.41%

Population

Population Change (2013-2022)



Powered by Bing
© GeoNames, TomTom

4

High Growth
>10%

Mecklenburg	17.77%
Lincoln	11.65%
Buncombe	11.43%
Gaston	10.47%

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Moderate Growth
(5%,10%)

Macon	9.54%
Henderson	8.26%
Watauga	5.79%
Clay	5.54%
Haywood	5.43%
Jackson	5.02%

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Low Growth
(0%,5%)

Yancey	4.59%
Catawba	4.26%
Madison	2.74%
Cleveland	1.90%
Swain	0.81%
Transylvania	0.72%

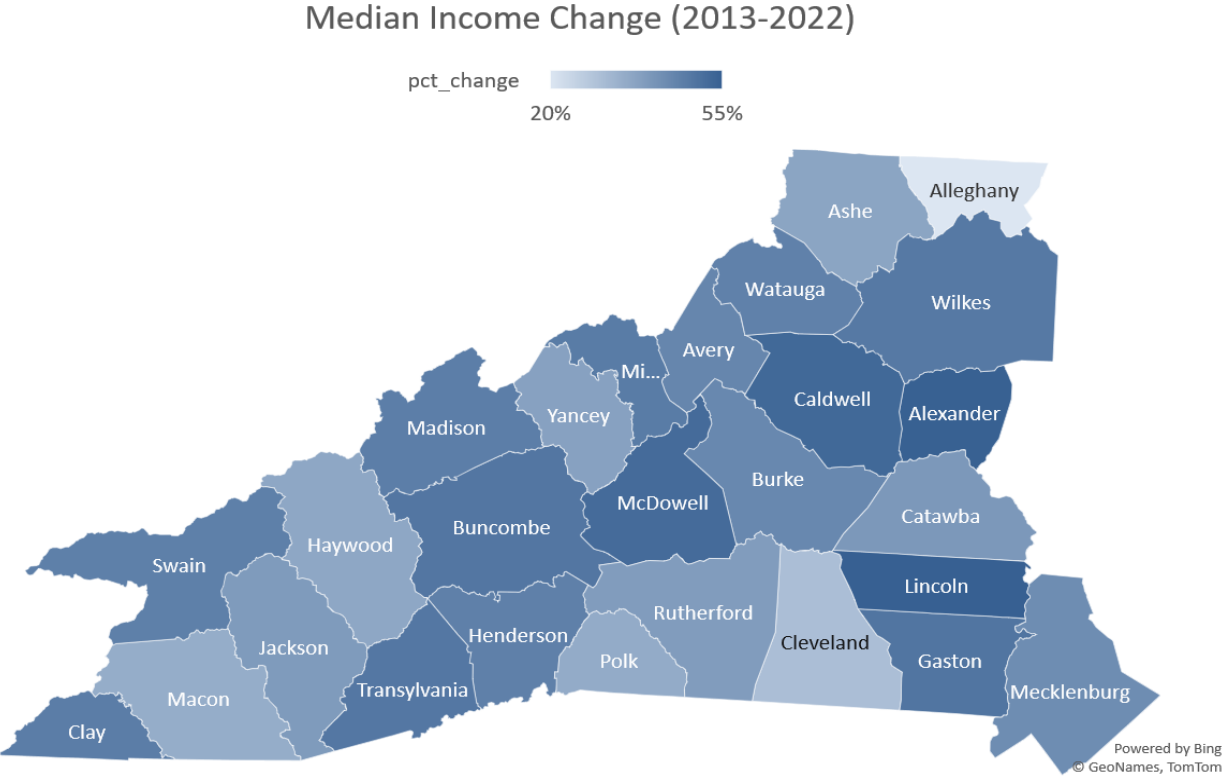
11

Population Decline
<0%

Avery	-0.43%
Alleghany	-0.52%
McDowell	-0.74%
Alexander	-1.53%
Ashe	-1.55%
Caldwell	-2.05%
Mitchell	-3.00%
Burke	-3.08%
Rutherford	-4.04%
Polk	-4.14%
Wilkes	-4.42%

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Income



4

High Growth
>50%

Lincoln	54.62%
Alexander	54.45%
Caldwell	52.41%
McDowell	51.66%

13

Moderate Growth
(40%,50%)

Gaston	49.05%
Buncombe	48.80%
Transylvania	48.53%
Wilkes	48.13%
Mitchell	47.38%
Clay	46.97%
Madison	46.81%
Swain	46.33%
Henderson	46.17%
Watauga	45.90%
Avery	44.75%
Burke	44.20%
Mecklenburg	42.96%

9

Low Growth
(30%,40%)

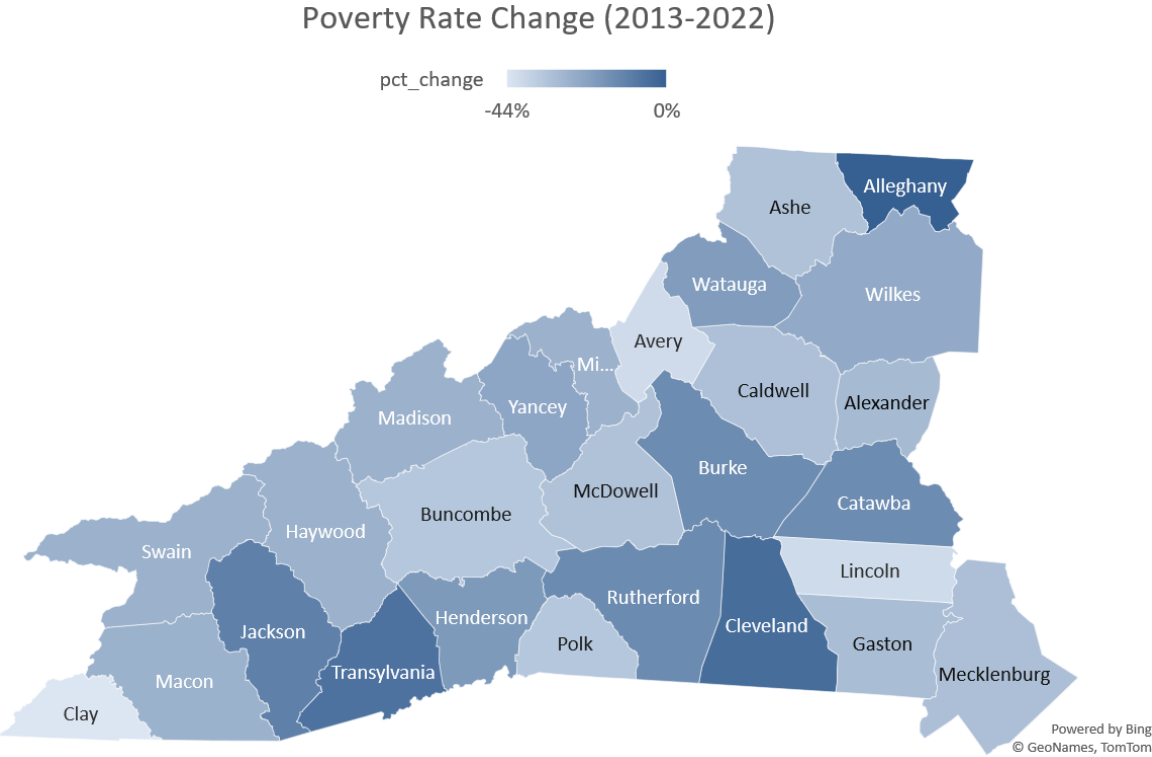
Catawba	40.01%
Jackson	39.33%
Rutherford	39.02%
Yancey	37.65%
Ashe	36.79%
Haywood	36.19%
Polk	35.13%
Macon	34.70%
Cleveland	30.10%

1

Minimal Growth
<30%

Alleghany	19.75%
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Poverty



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High Decline
<-30%

Clay	-44.37%
Avery	-40.83%
Lincoln	-40.74%
Polk	-34.07%
Buncombe	-34.06%
McDowell	-32.66%
Ashe	-32.62%
Caldwell	-31.92%
Mecklenburg	-31.52%
Gaston	-30.75%

9

Moderate Decline
(-30%,-20%)

Alexander	-29.87%
Macon	-27.13%
Madison	-27.10%
Haywood	-27.04%
Mitchell	-26.98%
Swain	-26.96%
Wilkes	-24.74%
Yancey	-23.50%
Watauga	-20.09%

5

Low Decline
(-20%,-10%)

Henderson	-19.28%
Burke	-14.74%
Catawba	-14.65%
Rutherford	-14.39%
Jackson	-10.95%

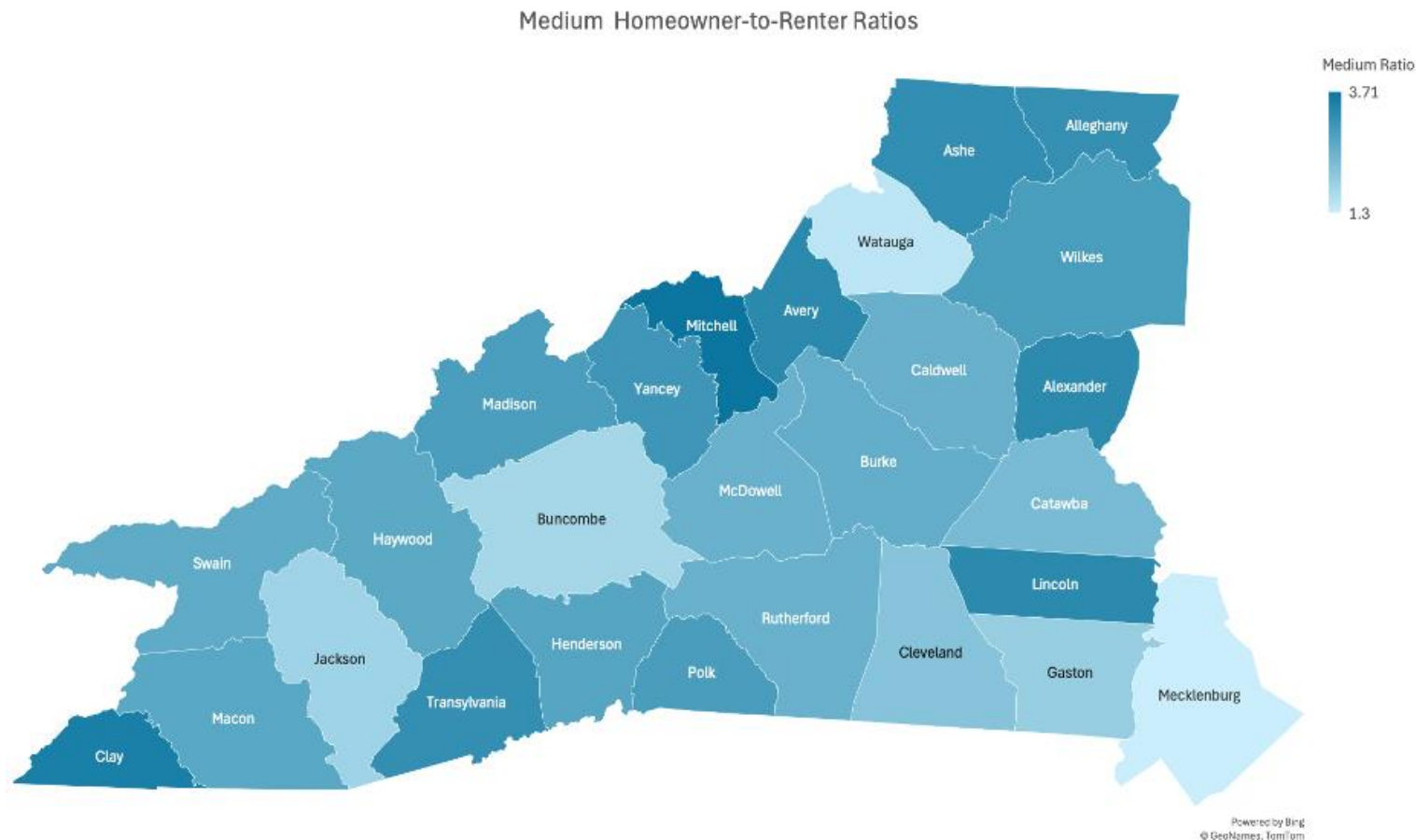
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Minimal Decline
>-10%

Transylvania	-6.21%
Cleveland	-4.59%
Alleghany	-0.32%

Housing

Ratio of homeowners to renter: Owner-Occupied Units / Renter-Occupied Units



5 Low Ratio

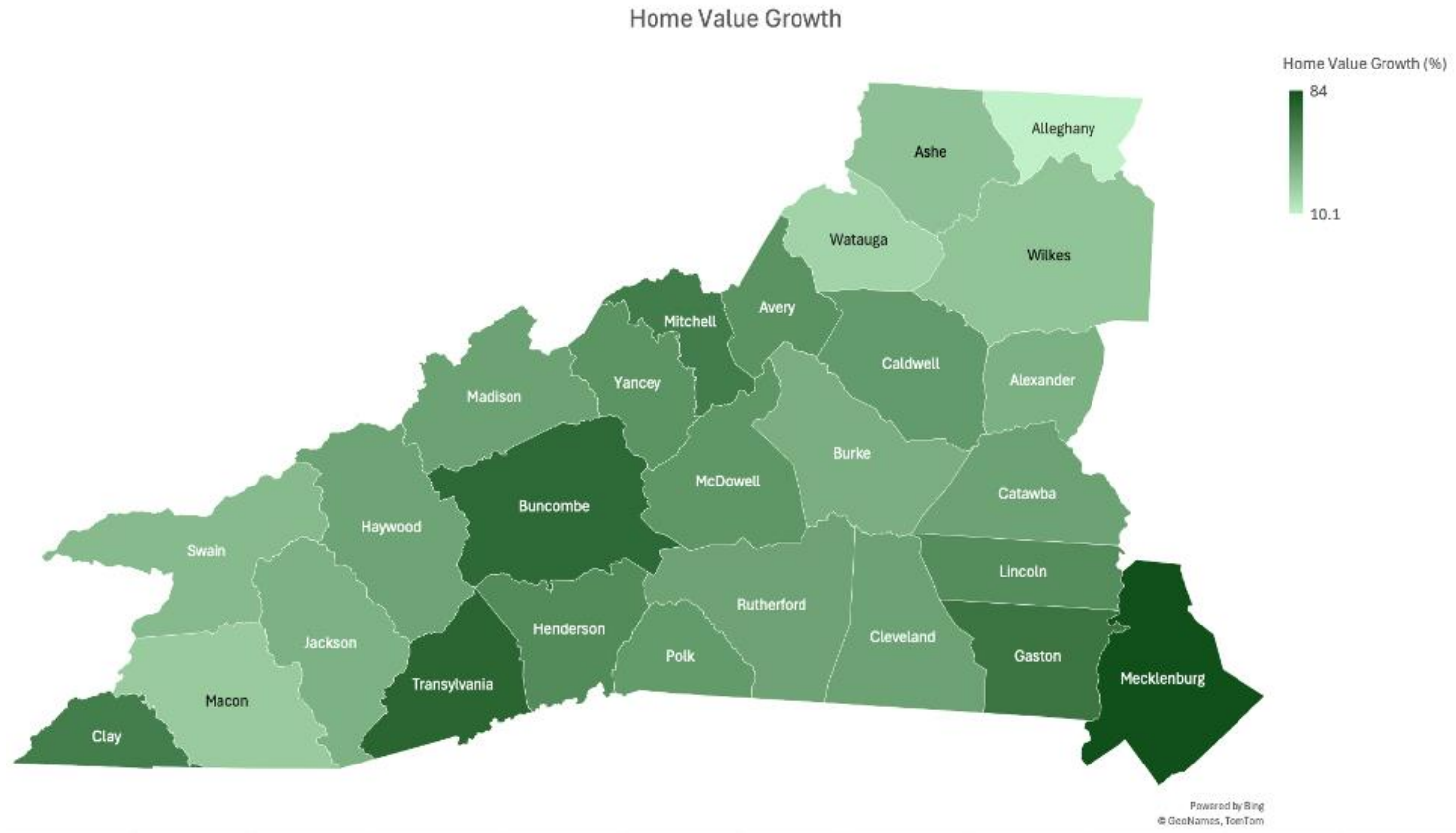
<2

Mecklenburg	1.33
Watauga	1.46
Buncombe	1.77
Jackson	1.86
Gaston	1.96

Low Ratio Implication:

- High renter concentration
- Lack of affordable housing for ownership

Home Value Growth



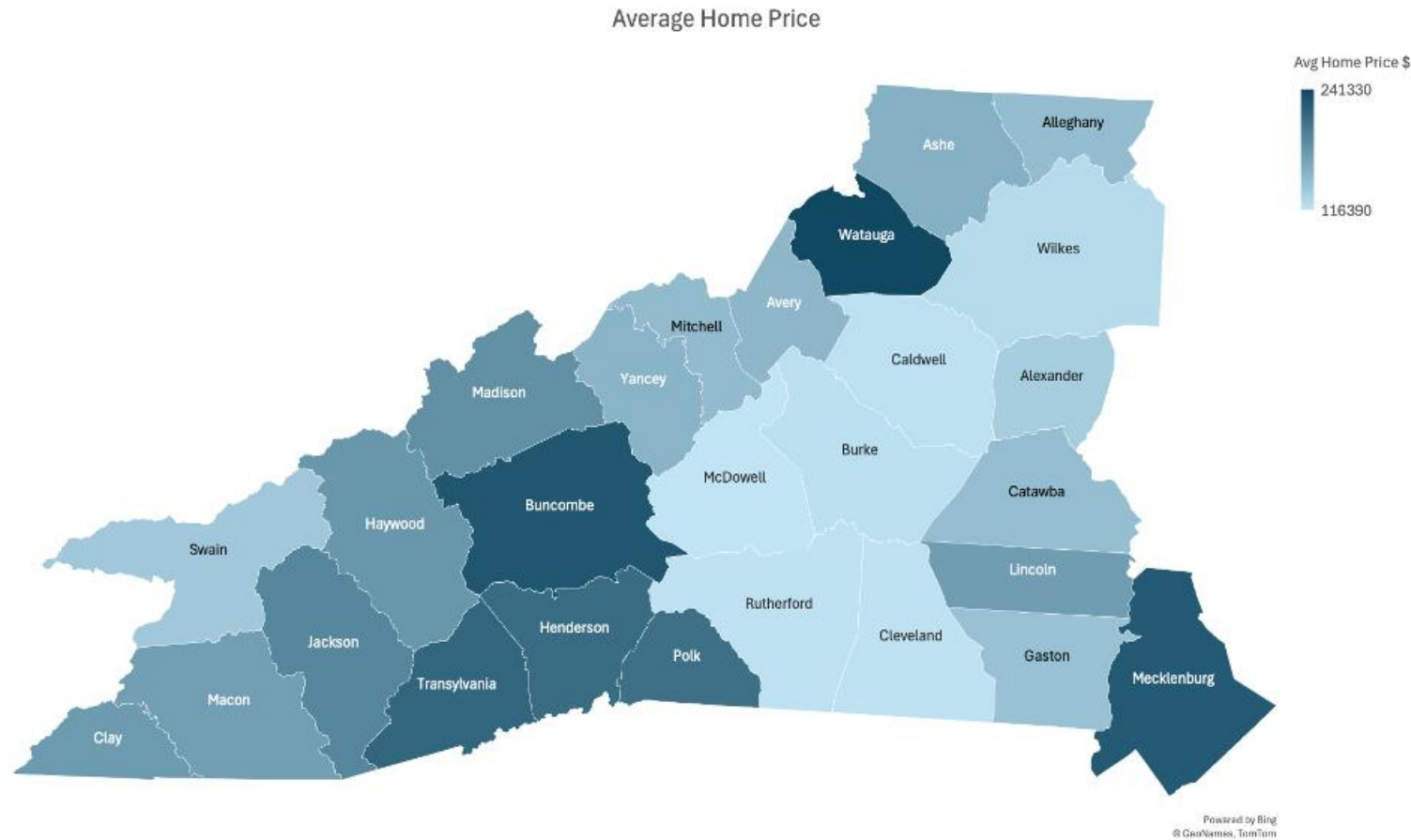
3 Slow home value growth <30%

Alleghany	10.1%
Watauga	23.7%
Macon	27.5%

Slow Growth Implication:

- Lack of economic diversity or poor infrastructure.
- Less attractive to investors or businesses

Home Price



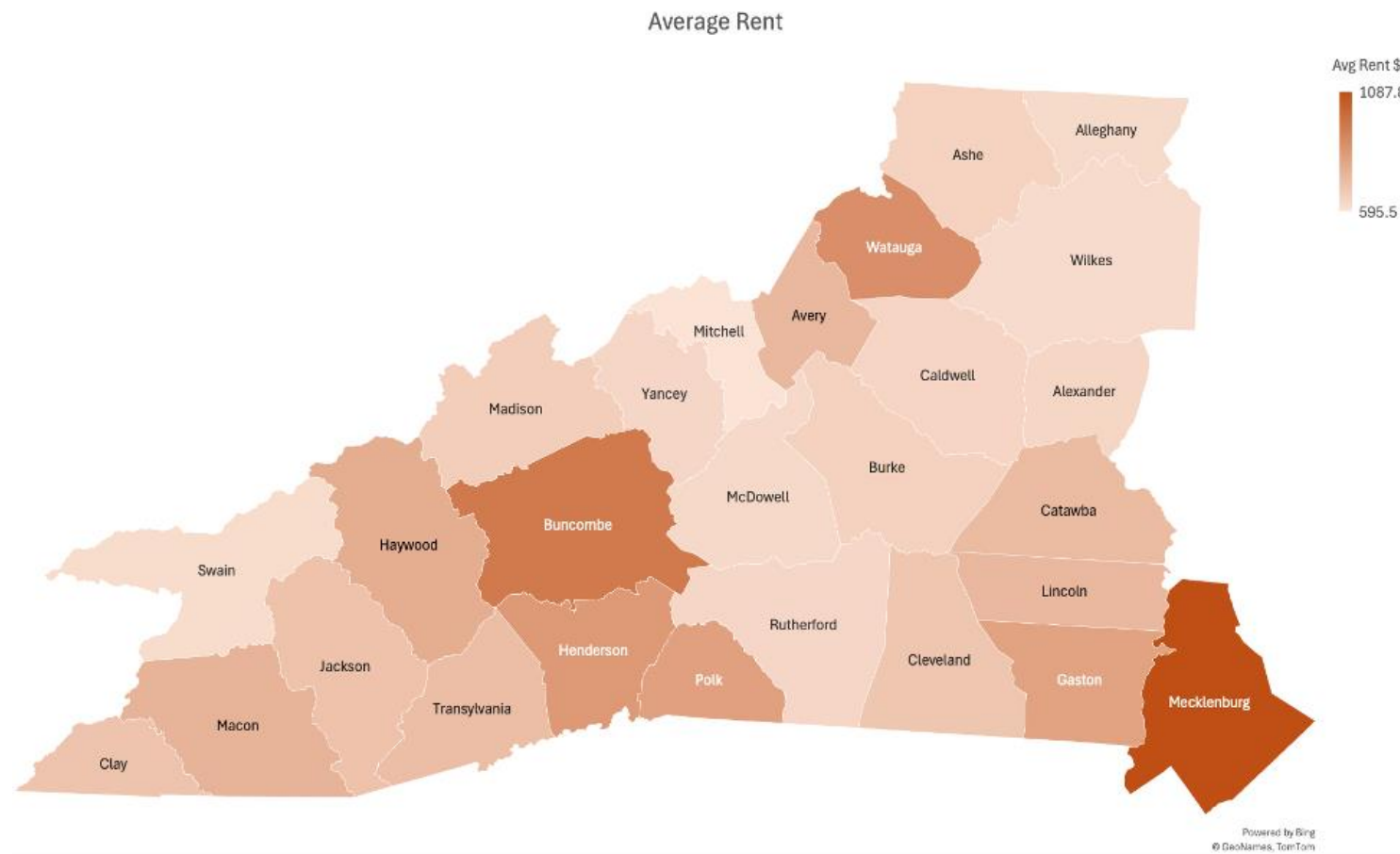
3 Disparity between home price to income >20%

Buncombe	23.2%
Transylvania	25.5%
Mecklenburg	41.0%

Large Disparity Implication:

- Social Inequality
- Vulnerable to Market Shock

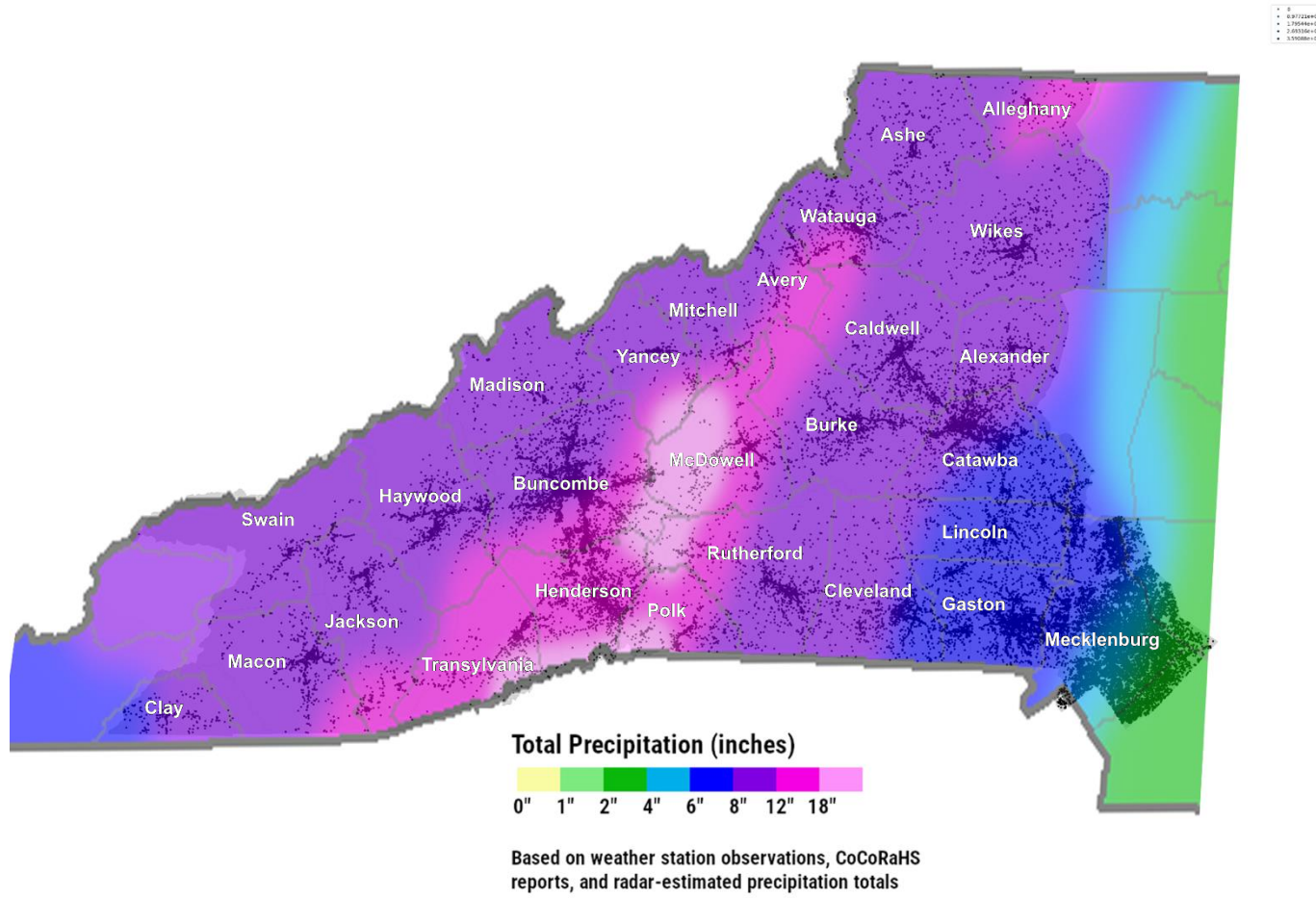
Rent



6 High Rent Burden >20%

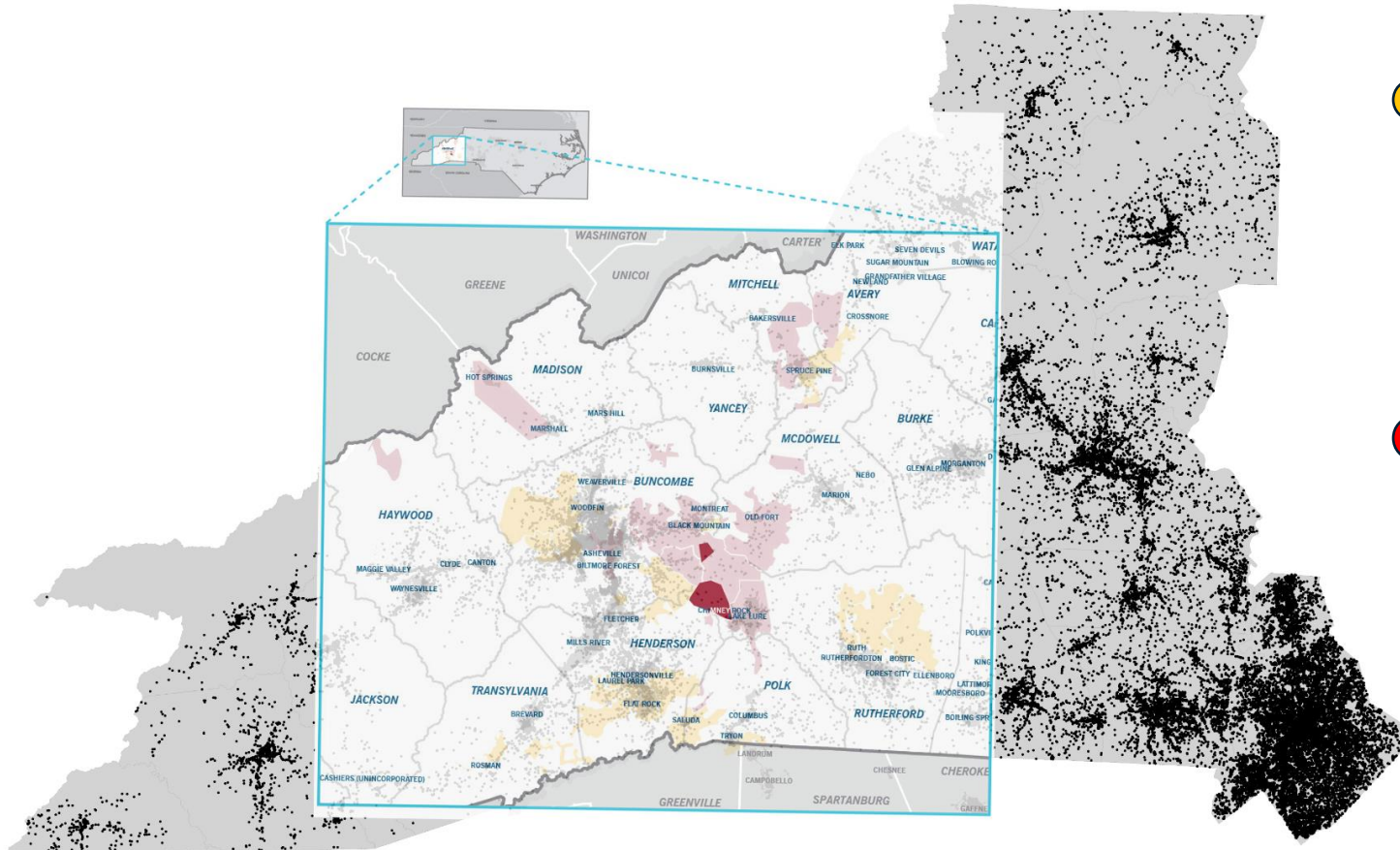
Mecklenburg	20.2%
Clay	20.5%
Macon	21.1%
Avery	21.9%
Buncombe	22.0%
Watauga	24.7%

How are businesses impacted by Hurricane Helene?



- Distribution of business: The dot plot
- How we get there: The point data – location, sales, employees, industries
- Overlap to have further insight of impact on business
- Areas impacted with many/few business

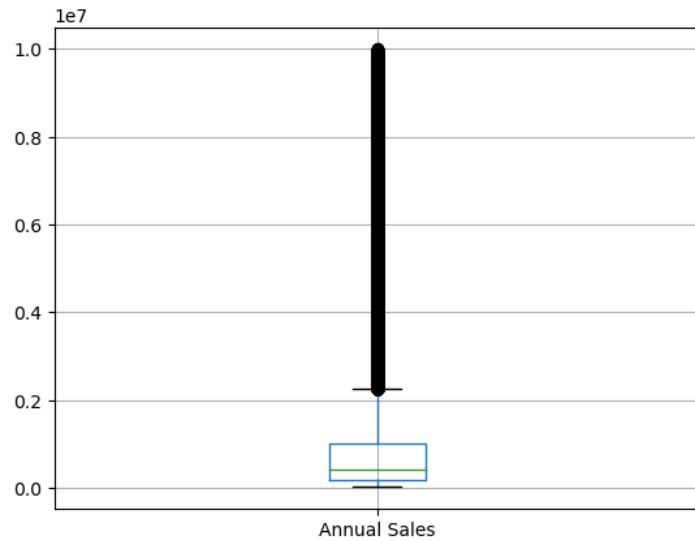
How are businesses impacted by power outage?



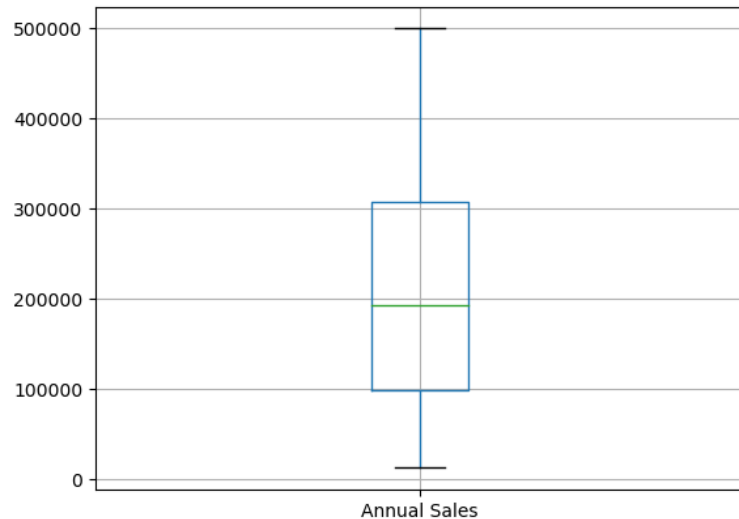
Map key

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These areas experienced extensive damage, including broken poles, downed lines, damaged transmission lines or road access issues.
- Disaster rebuild zone
These areas encountered significant damage and will require new poles, lines, electrical equipment, buildings and infrastructure. Temporary restoration solutions are under development.

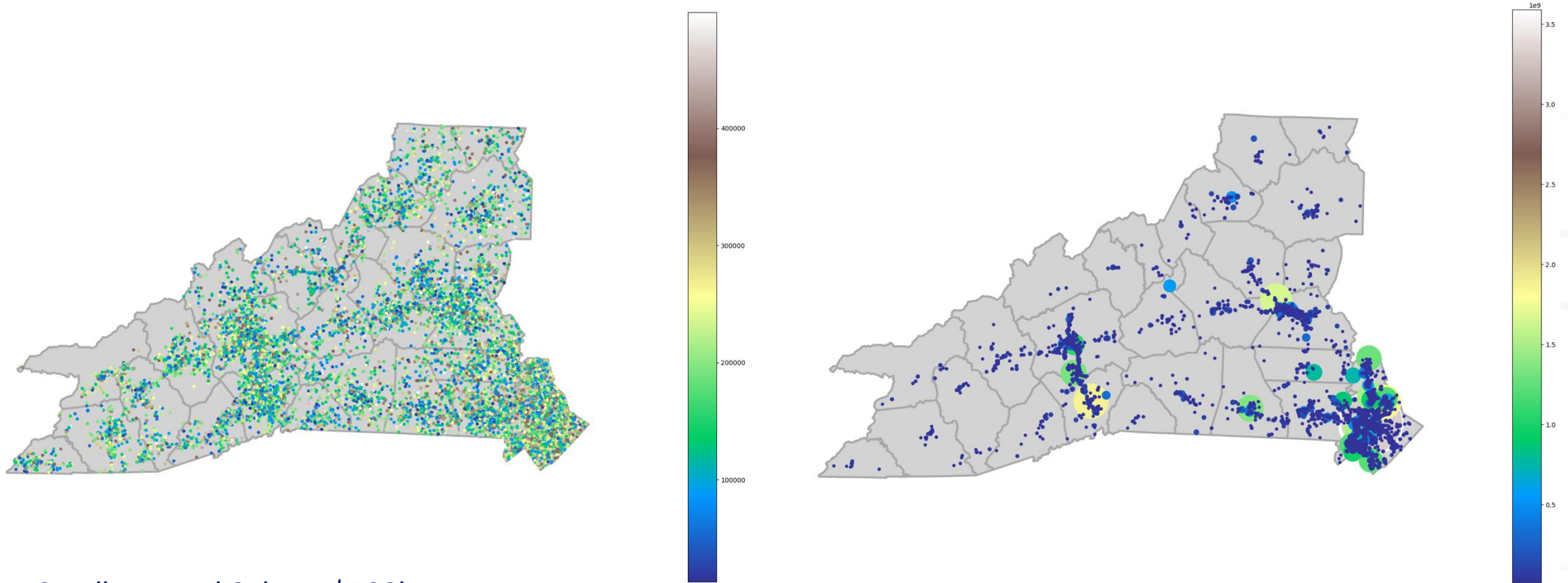
Small Business Distribution



- Employees and Revenue positively correlated (0.67) – Focus on Annual Sales
- In All: \$10m as 3rd quantile (3/4)
- Within \$10m: \$500k as median
- Define small: Annual Sales < \$500k
- Define large: Annual Sales > \$10m
- The amount of small: About half of total

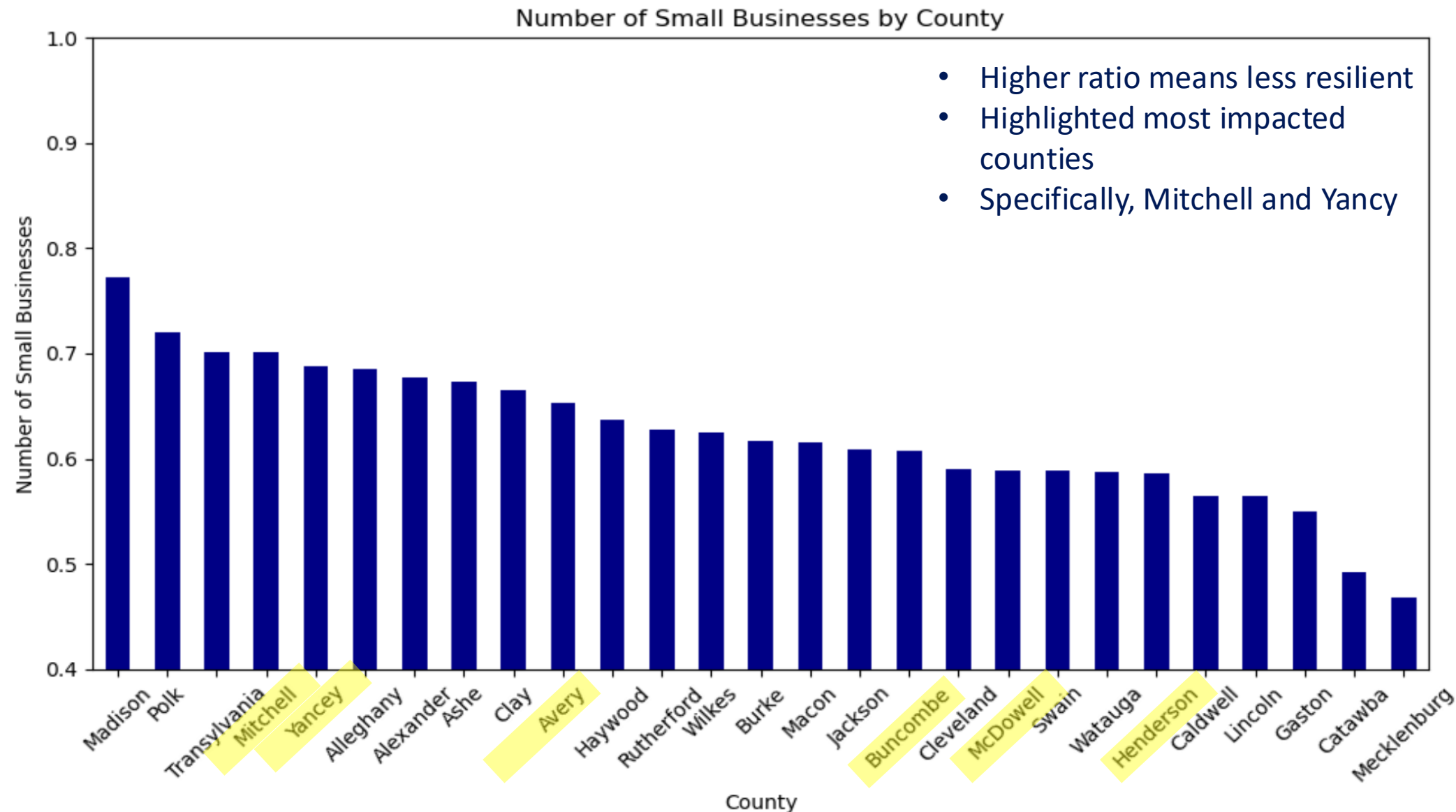


Small/Large Business Distribution



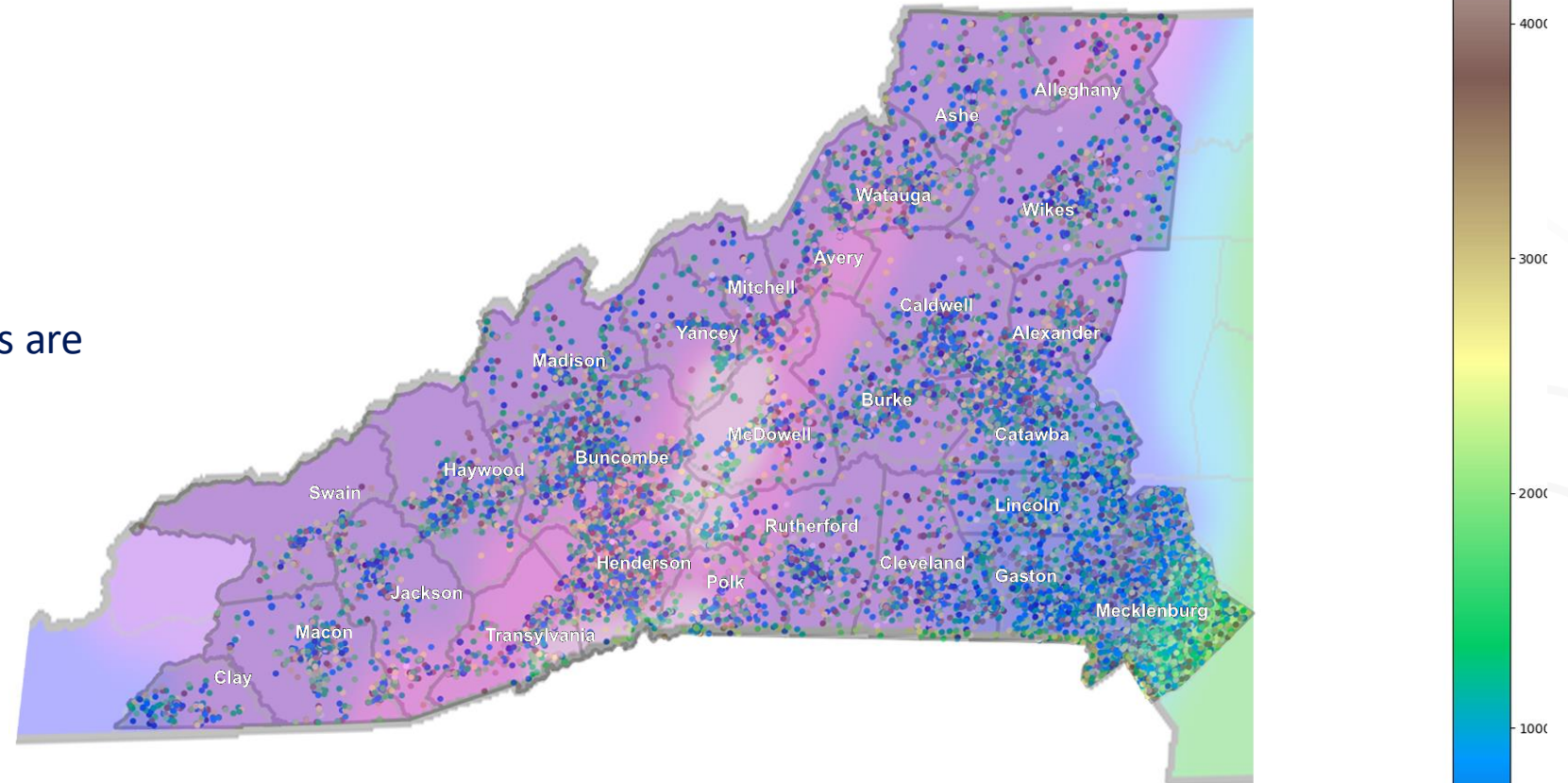
- Small: Annual Sales < \$500k
- Large: Annual Sales > \$10m
- Counties with few large business - introducing the ratio of small in all

Ratio: Small to All



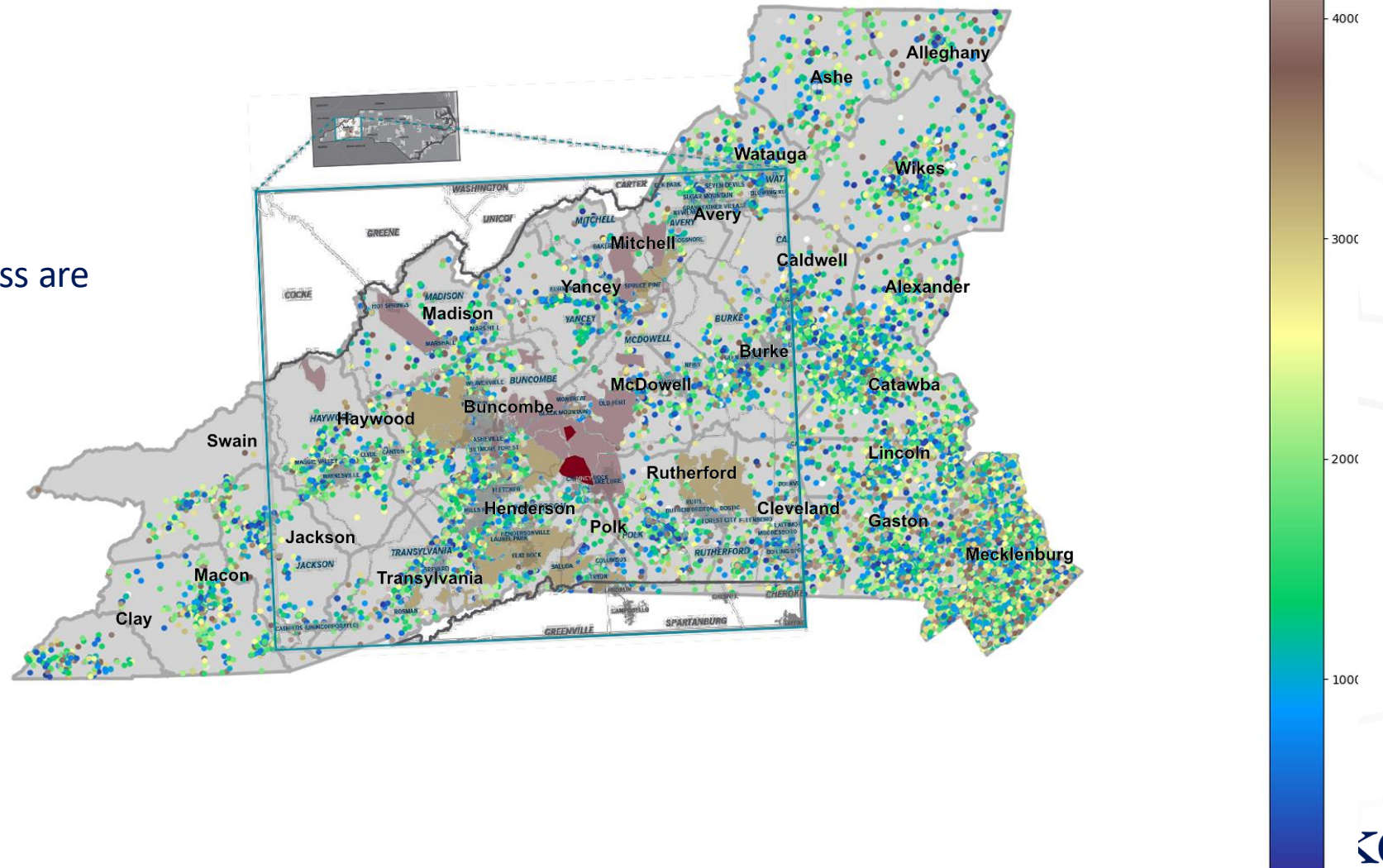
Small Business Impacted

- A closer look: How small business are impacted



Small Business Impacted

- A closer look: How small business are impacted



Go-Forward Considerations

Go-Forward Considerations

A number of things should be considered when driving policy and funding initiatives for Western North Carolina including:

1) Build out Data (e.g. Infrastructure / Demographic Inputs):

- Resiliency: How resilient is the infrastructure, business community, general population
- Growth: What did growth rates look like before the Hurricane
- Poverty: What did poverty look like before the Hurricane
- Vacancy: What does home / business vacancy look like
- Bankruptcies: What do bankruptcies filings look like pre / post event
- Population: What % of the population is moving on because of the storm

2) Identify federal, state, county programs / grants / assistance available and under development to understand what are the constraints and vehicles that can be leveraged for action

3) Determine critical solves, examples include:

- How to help our most vulnerable population
- How to jump start business activity
- How to insulate and more full proof our system from future catastrophes
- How to prevent fraud

Thank You

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