



# Emergency Services

## EMS Study Update

*Presented by*

Greg Grayson, North Carolina Fire Chief Consulting (NCFCC)



**BUNCOMBE COUNTY**



# BUNCOMBE COUNTY EMERGENCY MEDICAL SERVICES 2022 SYSTEM BASELINE ANALYSIS

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# NCFCC Commitment to North Carolina Local Governments



NC Fire Chief Consulting work is based on the principle of continuous improvement.



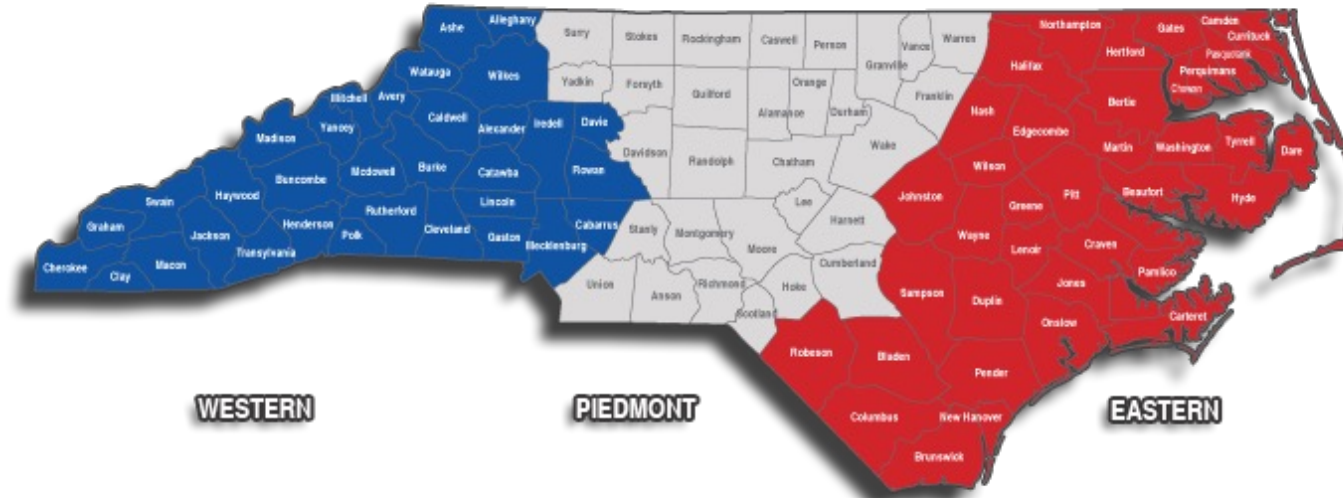


# NC Fire Chief Consulting is a Full-Service Fire Consulting Provider

- Strategic Planning
- Service Delivery Needs Analysis
- Standards of Coverage Analysis
- Contract Development and Facilitation
- Fire District Transition
- Transition of Private, Non-Profit Fire Department to Municipal Fire Department
- Fire Station Placement
- Fire Chief Selection and Promotional Processes
- Human Resource Assistance
- Professional Development, Mentoring and Coaching
- Human Resource Based Causation Analysis
- Interim Chief Fire Officer Leadership
- Fire Apparatus Evaluation and Fire Station Facility Analysis
- Capital Improvement Plan Review and Analysis
- Emergency Operations Post Incident Analysis



# Fire Management Core Team Capability



**Wayne Hamilton**



**David Bullins**



**Wes Greene**



**Todd Tuttle**



**Wes Hutchins**



**Mike Varnell**



**Frank Blackley**



**Donna Black**



What dynamics are prompting many North Carolina counties to consider changes to public safety service delivery systems in 2023?



# Why?

Growth in our State

Changes in the Workforce

Cost of Operations and Capital

Funding Sustainability

Equity and Parity Across Jurisdictions

Changes in Dynamics/the Environment

Others





# Buncombe County's Key Goals With This Initiative:

- **Fire Marshal Office Analysis**
- **CAD/Data/Statistical Analysis**
  - Calculate the 90<sup>th</sup> percentile evaluation of total response time.
- **GIS Analysis** Relative to Potential EMS Station Deployment Options.
  - Current Conditions Analysis.
  - EMS Station Planning – Immediate Needs.
    - Identify gaps and overlaps in coverage from travel time analysis.
    - Analyze current locations.
    - Identify potential hub locations.
  - Desire for improved sustainability with retention and recruitment of County EMS staff with improved work/life balance.





# NCFCC's Purpose:

- This independent, third party, analysis is to guide county staff and emergency services leaders towards building the strongest, most sustainable EMS service delivery system possible that is in the best interest of protecting and serving the people of Buncombe County, North Carolina.





# Key Issues:

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- Evaluate demonstrated performance to determine if EMS stations are in the right place.
- Make recommendations for needed service delivery improvement relative to the ongoing growth in Buncombe County.

# Buncombe County Fire Marshal's Office Review:

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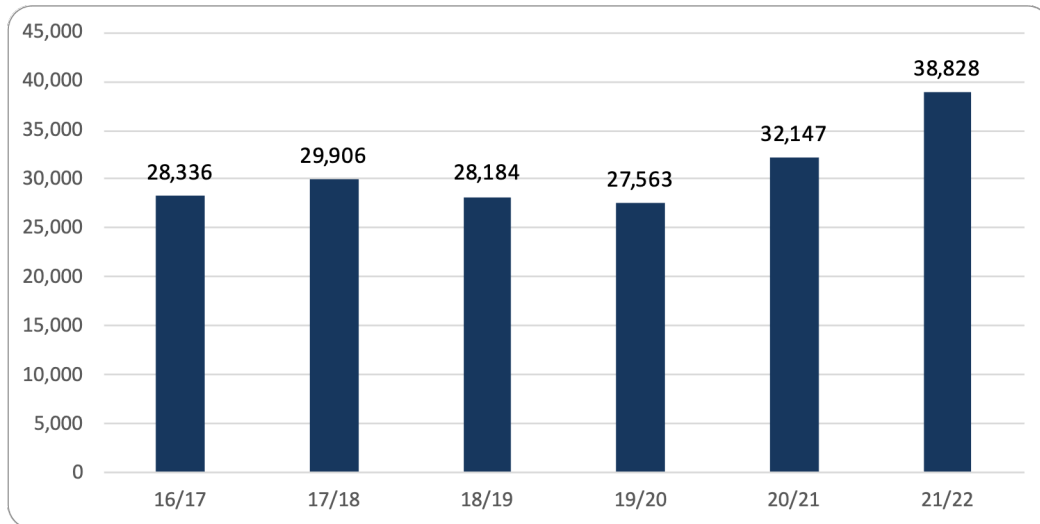
- Comprehensive analysis was conducted for all functions of the office.
- Opportunities for improvement were identified.
- Many of the recommendations made have already been implemented or are in process.
- A revision of the county's fire prevention ordinance is still needed by County Commissioners.



# Buncombe County EMS Call Volume:

**Note** – 31.11% of total calls did not have an EMD priority code applied and are excluded from the numbers below, reducing the total records from 184,964 to 127,426 for the six-year period.

## DEMAND BY FISCAL YEAR



## BUNCOMBE COUNTY PRIORITY SYSTEM LEVEL RESPONSES

Alpha = 27.92%      non-life threatening  
Nationally = 25.83%

Bravo = 13.07%      basic life support  
Nationally = 16.63%

Charlie = 25.47%      advanced life support (ALS)  
Nationally = 24.03%

Delta = 31.61%      life-threatening (ALS)  
Nationally = 29.86%

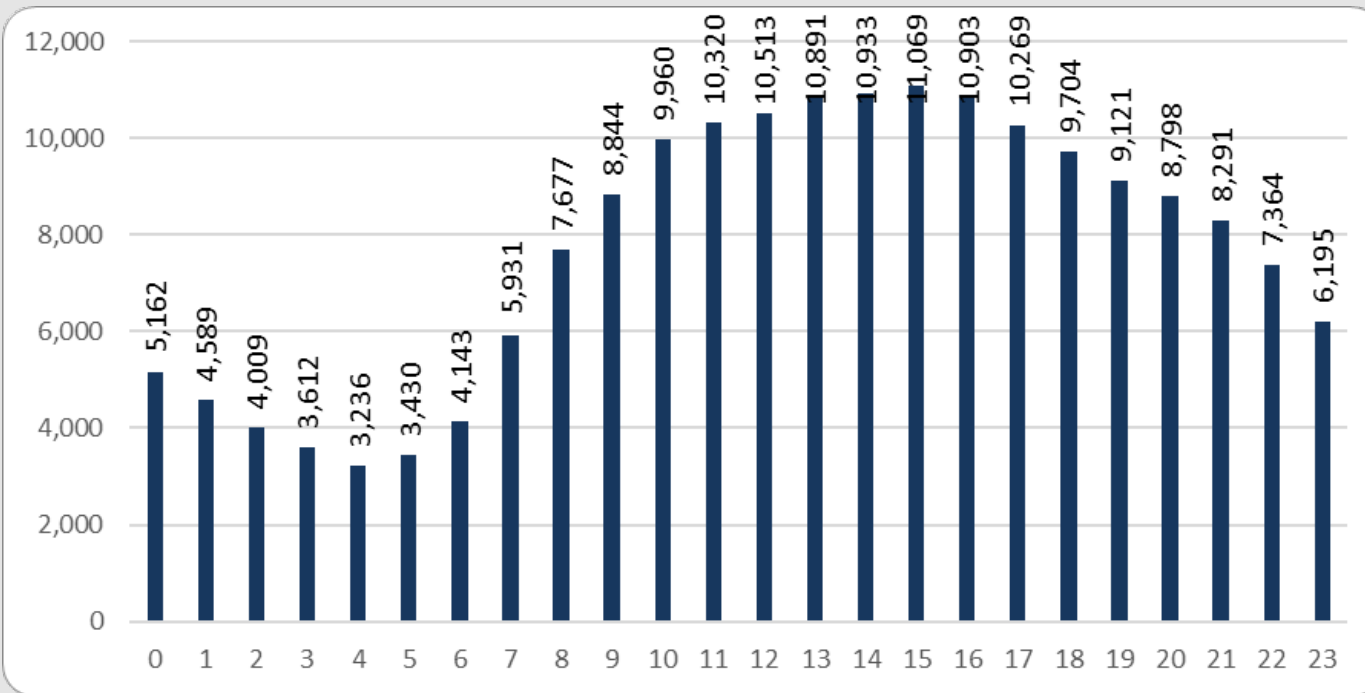
Echo = 1.93%      most critical (ALS)  
Nationally = 2.19%



**184,964 records over six years**



# Observations of Buncombe EMS Performance

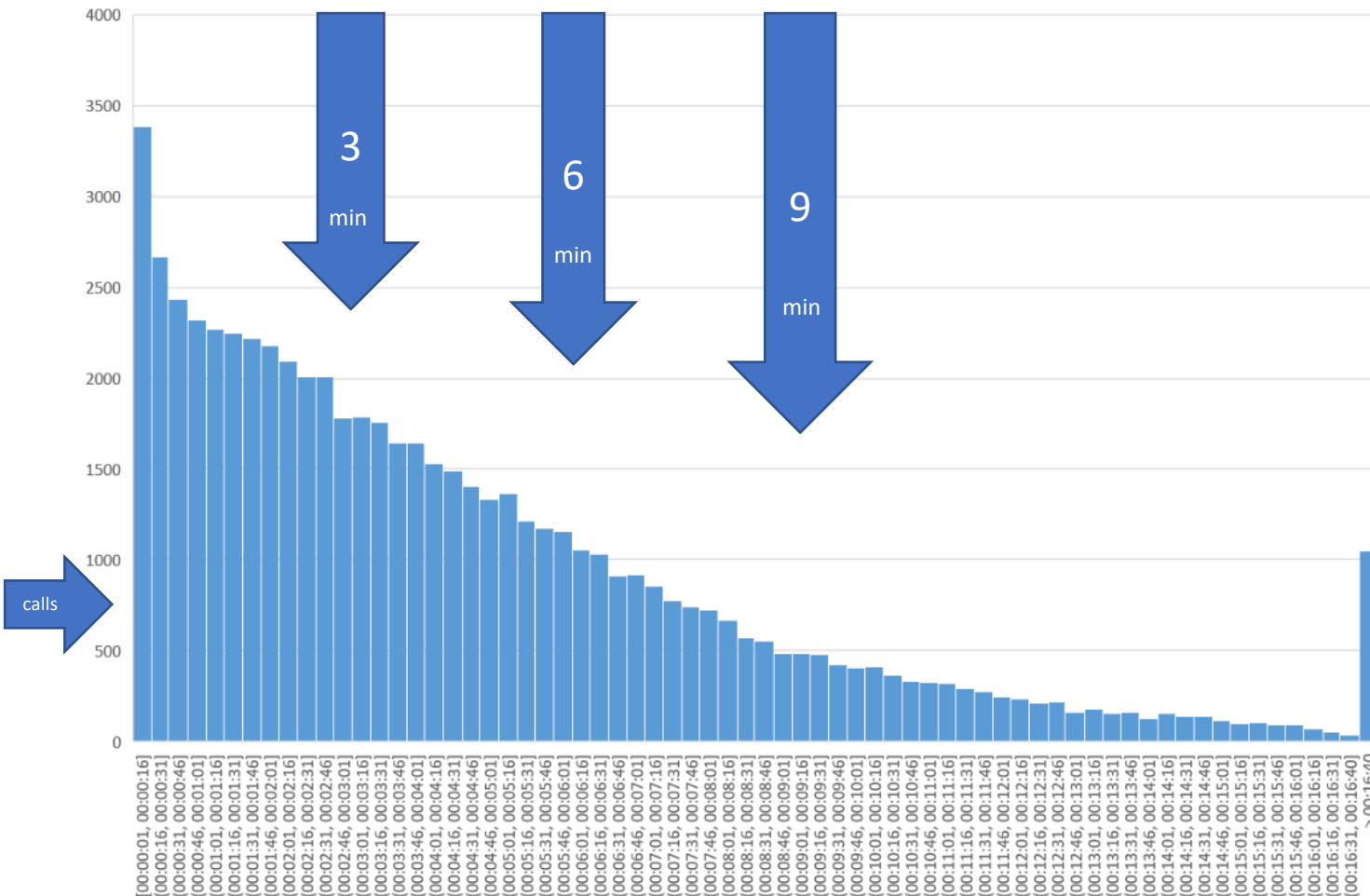


- Higher number of Delta calls than some EMS systems.
- High volume of calls requiring advanced life support (ALS).
- ALS calls keep ambulances tied up longer.
- Peak call volume is 11am – 5pm but maintains a high call volume until 10pm+.
- Fire Department medical first responders (non-transport) are critically important to Buncombe County's EMS service delivery system –filling a critical gap by arriving before Buncombe EMS paramedic unit almost 69% of the time on emergency responses.





# Fire Department First Responders Are Vital Components of the EMS Service Delivery System



When removing Alpha Level Responses and incidents with no information....

76.66% of medical emergencies received a Fire Department response.

On 68.74% of those responses, the Fire Department arrived BEFORE EMS and began patient care.

The chart on the left is in 15 second blocks of time showing firefighters arriving ahead of Buncombe EMS.

# Cascade of Emergency Medical Care in Buncombe County

Medical Emergency Occurs

EMS System is Activated by 9-1-1

9-1-1 Call is Processed and Dispatch Occurs

EMS Paramedic and Fire Department First Responders Turn Out (where provided)

Travel Time occurs

Fire Department First Responders Arrive and Start Providing Patient Care (where provided)

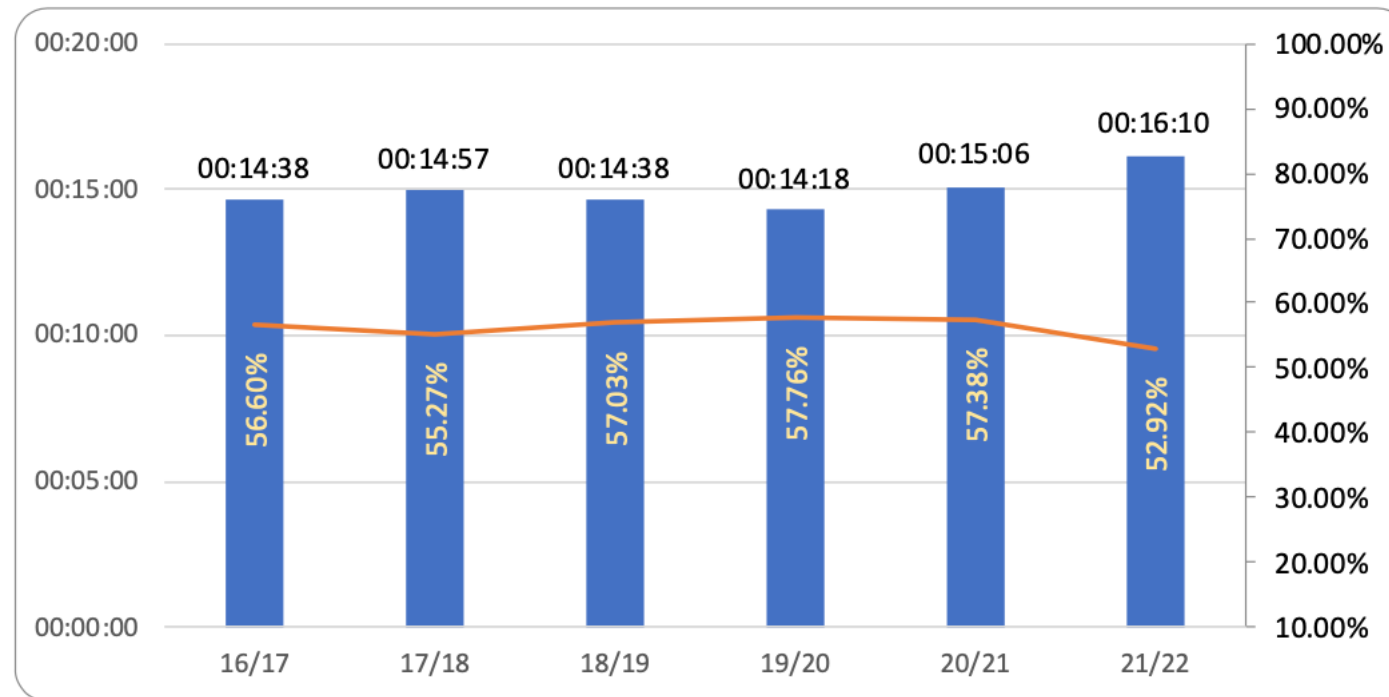
EMS Paramedics Arrive and Provide Paramedic Care

Patient Transport Occurs – when needed

# Buncombe County EMS Emergency Service Delivery Levels:

- EMS RESPONSE TIME = includes the time from when EMS receives the 9-1-1 dispatch until Buncombe County EMS arrives on the scene.

EMS RESPONSE TIME BY FISCAL YEAR



Model EMS Response  
Times for Buncombe  
County, NC

Response Time  
= EMS to arrive  
in 8 minutes 59  
seconds or less  
90% of the  
time.

*This is an EMS industry standard.*



# Response Time Analysis for Buncombe County EMS

## Baseline Performance

7/01/2016 through 6/30/2022 – 6 full years

Total Emergency Events: 105,935

Benchmark EMS Response Time: 8 minutes, 59 seconds (8:59)  
at the 90<sup>th</sup> percentile

Actual EMS Response Time: 15 minutes, 2 seconds (15:02)  
at the 90<sup>th</sup> percentile

GAP of Benchmark to Baseline = 6 minutes, 3 seconds (06:03)

- The GAP in total response time between the EMS baseline level of service and Buncombe County's actual level of service is 6 minutes, 3 seconds.
- This is with 6 years of data from 2016 to 2022. Buncombe County continues to grow, and demand continues to grow as well, creating a sense of urgency and need for enhancement.





# Why is time so crucial in medical emergencies?

**EARLY HEART ATTACK CARE**

Learn to recognize the early signs and symptoms of a heart attack — **early recognition can save a life!**

About 730,000 people in the U.S. have heart attacks each year. Of those, about 115,000 die. If you think someone is having a heart attack, **call 9-1-1**. Emergency services can get to you faster and start time-sensitive treatment.

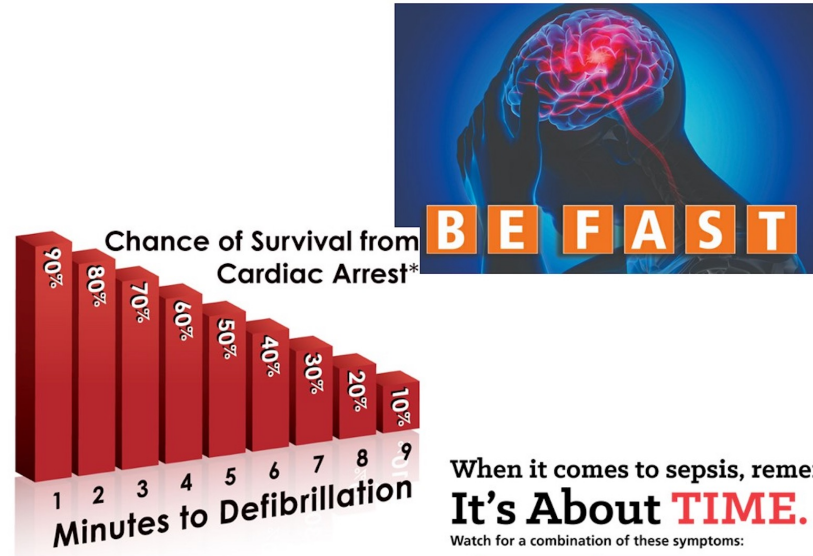
If an adult suddenly collapses in front of you, **call 9-1-1** and start **Hands-Only CPR**. Push hard and fast in the center of the chest 100-120 times a minute. Learn more at [redcross.org/CPR](http://redcross.org/CPR).

**Signs of a heart attack can include...**

- Chest discomfort
- Cold sweat
- Difficulty breathing
- Pain or discomfort in the chest, jaw, neck or arm
- Sudden onset of weakness or profound fatigue
- Sudden onset of dizziness or lightheadedness
- Sudden onset of nausea or vomiting
- Sudden onset of shortness of breath
- Sudden onset of sweating
- Sudden onset of pain or discomfort in the chest, jaw, neck or arm
- Sudden onset of weakness or profound fatigue
- Sudden onset of dizziness or lightheadedness
- Sudden onset of nausea or vomiting
- Sudden onset of shortness of breath

**...Women may also experience...**

- Sudden onset of weakness or profound fatigue
- Sudden onset of dizziness or lightheadedness
- Sudden onset of nausea or vomiting
- Sudden onset of shortness of breath



## The Golden Hour



The time following a traumatic injury when prompt medical treatment has the highest likelihood to prevent death

When it comes to sepsis, remember **It's About TIME.**

Watch for a combination of these symptoms:

<b>T</b>	<b>Temperature</b> higher or lower than normal
<b>I</b>	<b>Infection</b> may have signs and symptoms of an infection
<b>M</b>	<b>Mental Decline</b> confused, sleepy, difficult to rouse
<b>E</b>	<b>Extremely ill</b> "I feel like I might die", severe pain or discomfort

If you suspect sepsis, see a doctor immediately, call 911 or go to the ER.

The six years of data reviewed would allow Buncombe County Commissioners to accurately state to residents that from the time you dial 9-1-1 until BCEMS arrives will be 17 minutes, 17 seconds 90% of the time.

# Review of 9-1-1 Center, Data Systems, Mobile Data, CAD Operation and Integration:

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The assessment team identified opportunities to reduce response times by improving technology use in several ways, consistent with best practices in North Carolina, including:

- **Use of Automatic Vehicle Location (AVL),**
- **Real Time Unit Monitoring/Forecasting,**
- **Priority Dispatch Enhancements,**
- **Others that are already being considered.**





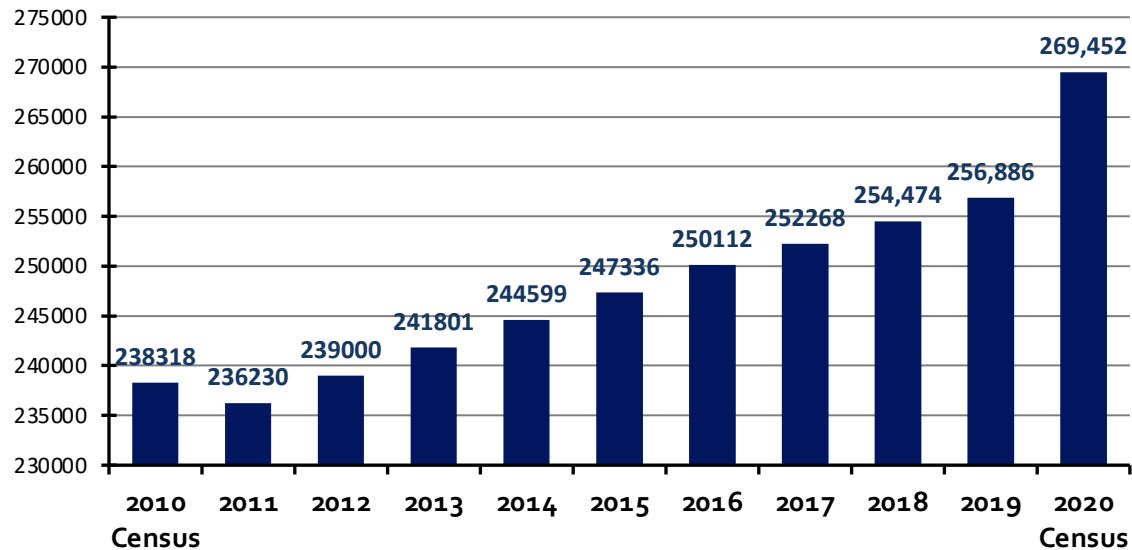
# Community Risk Analysis:



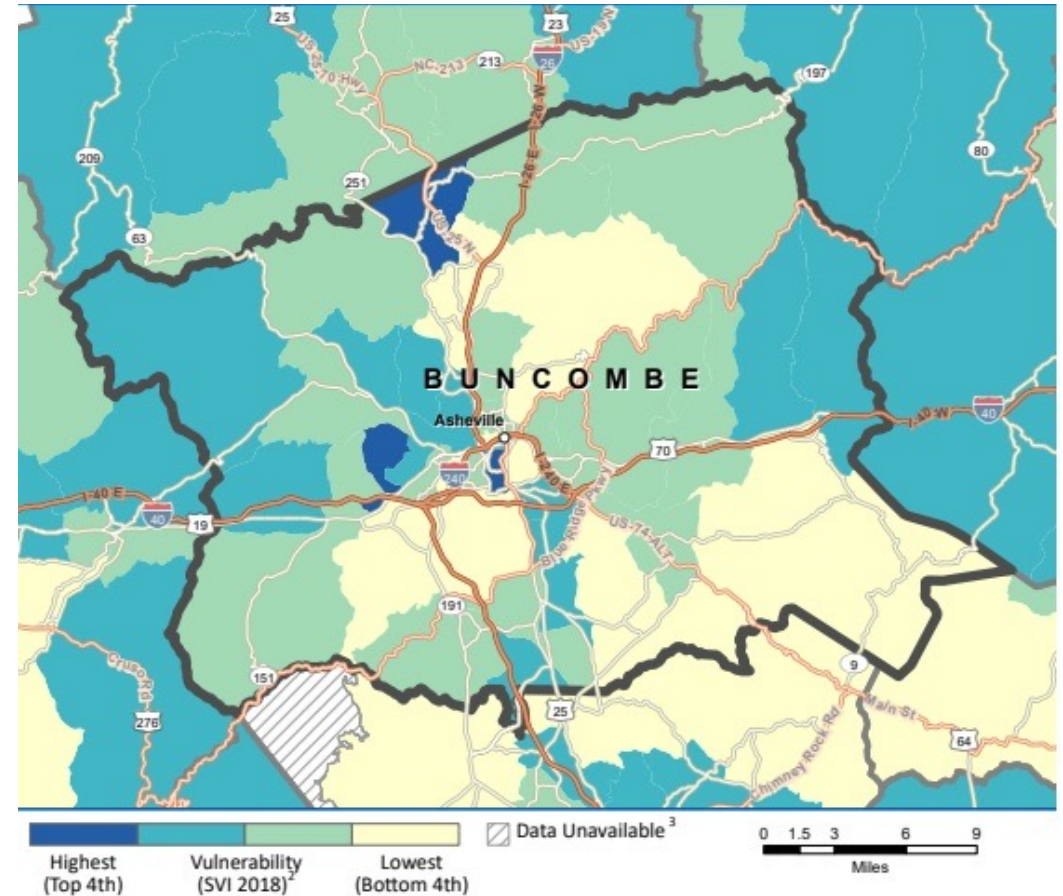
The assessment team noted several important considerations relative to EMS Services for Buncombe County including:

- Age of population,
- Growth within the county,
- Many high-risk factors to plan and prepare for as well as mitigate and recover from,
- The substantial influx of persons from the region into the county daily beyond the resident population for tourism, industry, healthcare, commercial, etc.

# Buncombe County Population Growth and Vulnerabilities:



Considerations for population, poverty, unemployed, per capita income, types of housing, aged 65 and over, aged 17 and younger, single parent households, disabilities, minorities and others.







# Review of Current EMS Facilities:

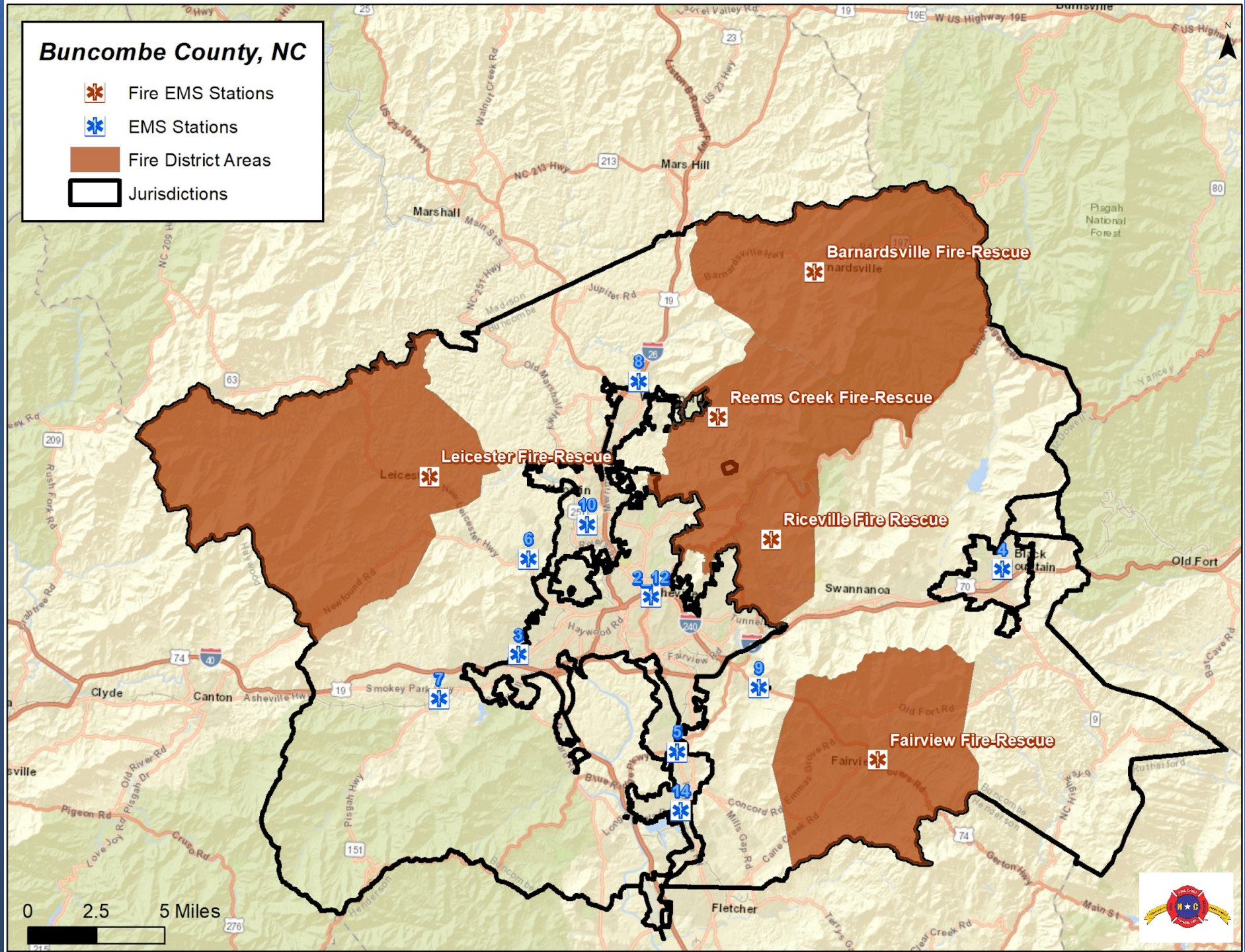
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- There is currently a lack of EMS infrastructure.
- EMS is principally a guest within existing fire stations.
- Fire department need for space and growth is pressing space for availability for EMS. As Buncombe County grows, fire station space is needed to meet fire and rescue needs and maintain insurance (ISO) ratings.
- Relationships are strong, but space is at a premium.
- Buncombe County prioritizes the well being of their EMS staff and the current facilities do not support that initiative.



# Current Ambulance Distribution in Buncombe County

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# Geographic Information Services (GIS) Analysis:

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- State of the art system utilizing available comprehensive data.
- Demand for services, coverage distance, travel time, current EMS station locations, comparison of national standards, location of high risk and vulnerable populations including areas of those 65 and older and areas of higher poverty are all factors the system considers.

60% of EMS incidents result in patient transportation.



Buncombe County EMS is frequently responding to calls when out of position from their station locations, and/or



There are concurrent calls occurring which means that the next available BCEMS ambulance must respond to the call for service. Approximately 8% of the time, one-half of the EMS fleet is occupied on an incident, leaving 6 other ambulances to handle the next call, wherever it may be located.



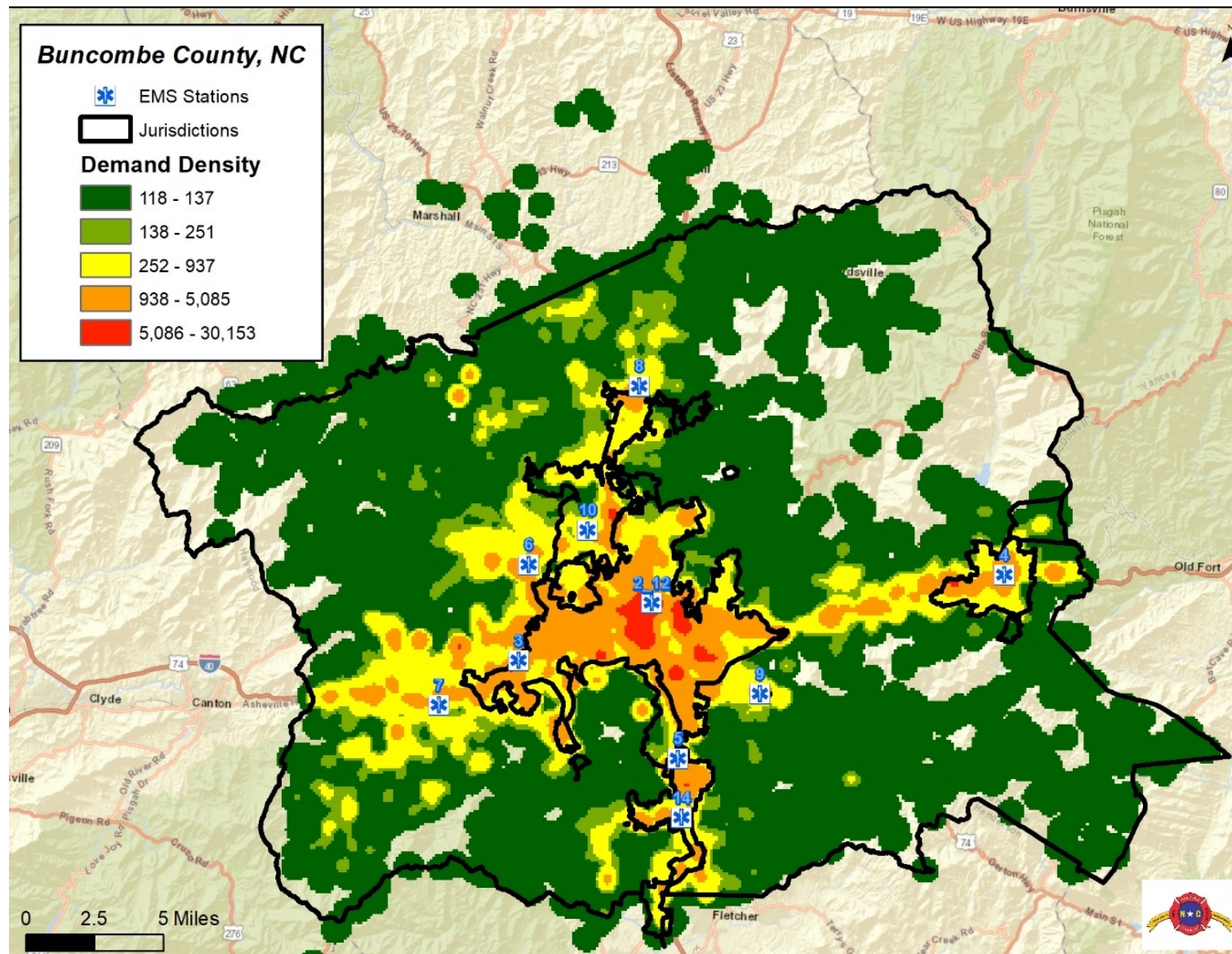
# Ambulances Needed in Buncombe County:

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Based on the 6 years of data analysis and current Buncombe County demographics:

- A core of thirteen (13) ambulances are necessary to cover peak demand during daytime hours in Buncombe County.
- However, due to the high level of concurrency, supported by travel times and out of service times to the hospital when transporting 60% of patients, and meeting the needs of a vulnerable and underserved population, a total of **nineteen (19) ambulances are needed in Buncombe County today.**
- Currently Buncombe County operates twelve (12) 24-hour ambulances and one (1) peak demand ambulance.





## Demand for Service Concentration in Buncombe County

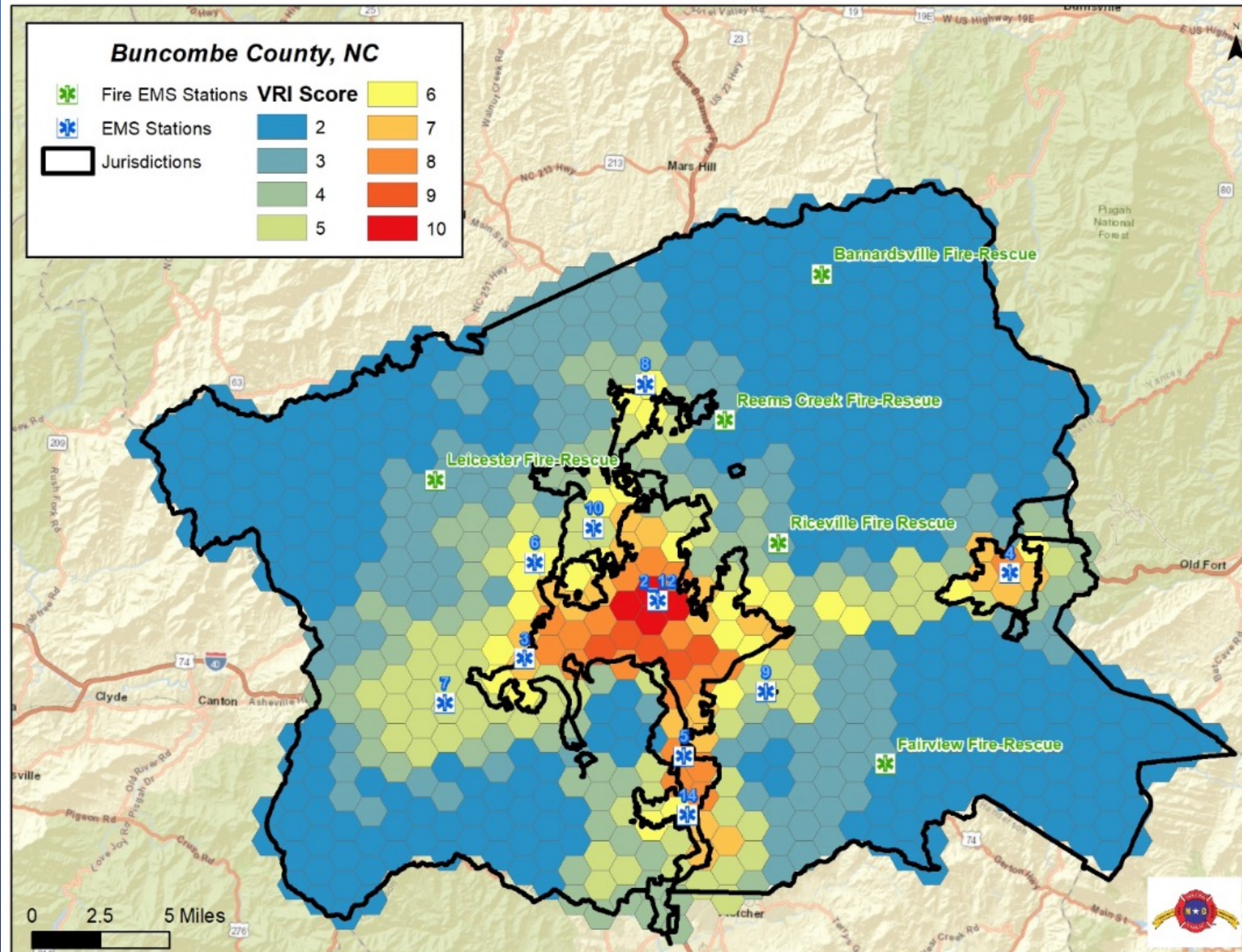
# Vulnerability Risk Index (VRI)

- Overall Population, Senior Population and Disabled Population.
- Hospitals, Skilled Assisted Living Facilities and Dialysis Centers.
- Areas of Higher Poverty.
- Public Housing Developments.
- Demand for Service Concentration.
- A matrix of square mile cells is constructed over the county area using a matrix score of population density and service demand density.
- The higher the VRI score, the more need for a station and ambulances.



# Tiered Vulnerability Risk Index Modeling

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# Tiered Vulnerability Risk Index Modeling:

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- It is recognized that covering the entire county to achieve desired response times would be cost prohibitive.
- The assessment team took the approach of establishing service delivery levels for URBAN, SUBURBAN and RURAL areas.
- This modeling is consistent with national consensus standards.

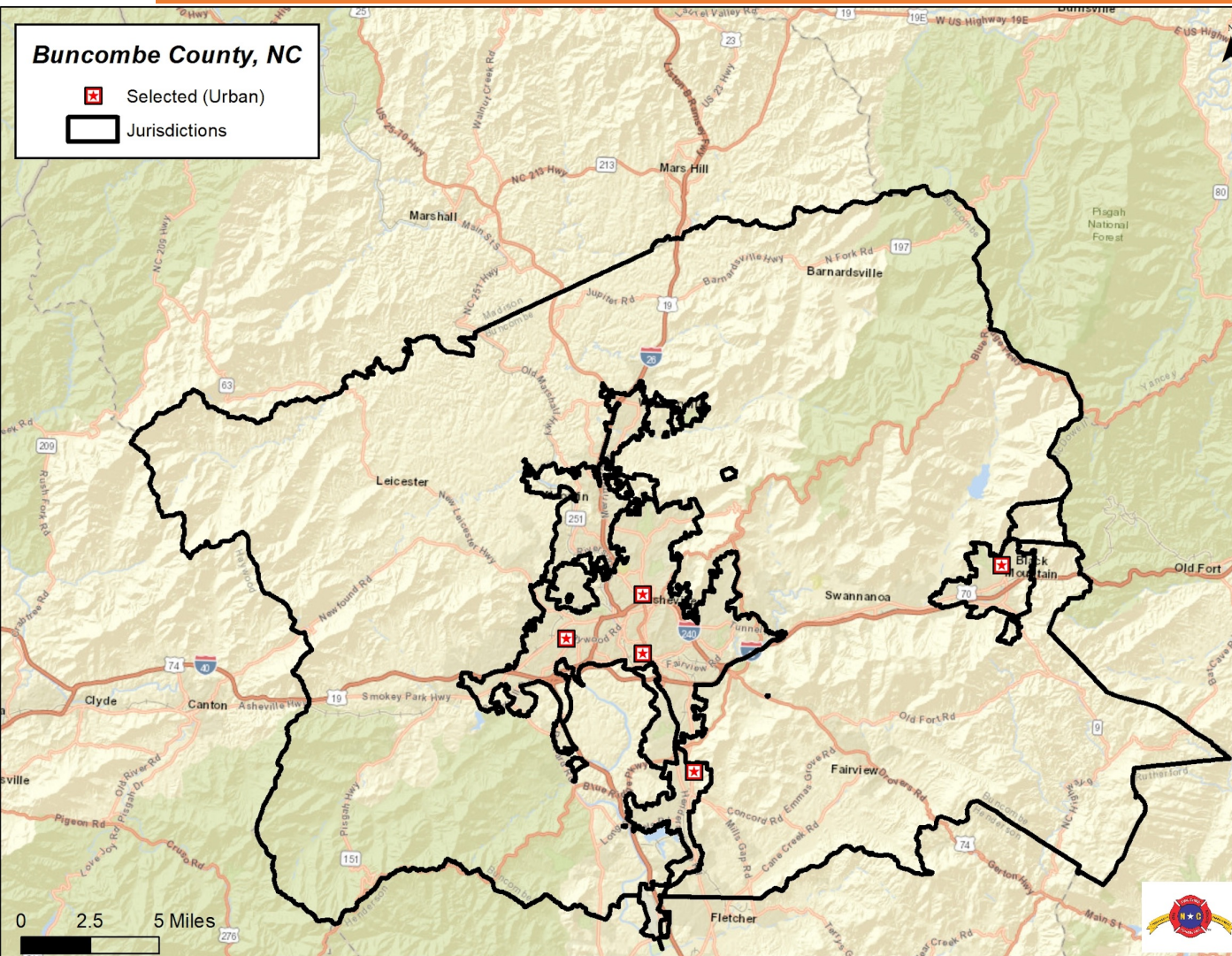
**URBAN =  
8-minute travel time at 90%**

**SUBURBAN =  
10-minute travel time at  
80%**

**RURAL =  
12-minute travel time at  
70%**



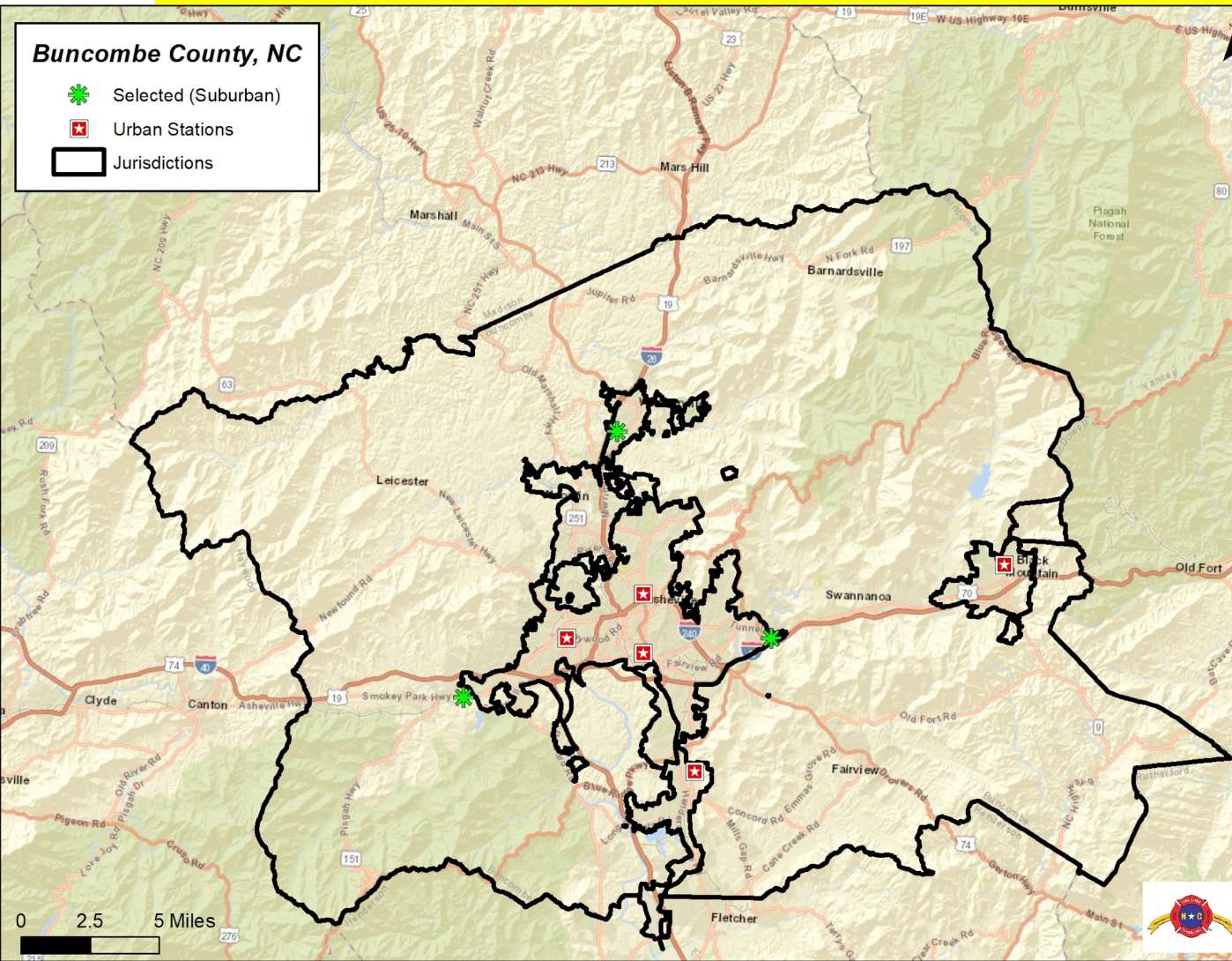
# Urban EMS Station Needs (5):



- South Asheville near Biltmore Village (will be affected by the McCormick EMS Station).
- Downtown Asheville near the current EMS Station 1 (will also be affected by the McCormick EMS Station).
- West Asheville.
- Skyland near EMS current EMS Station 5 (May be affected by the 2022 addition of EMS 14 at Skyland and the addition of the McCormick EMS Station).
- Black Mountain near current EMS Station 4.



# Suburban EMS Station Needs (3):

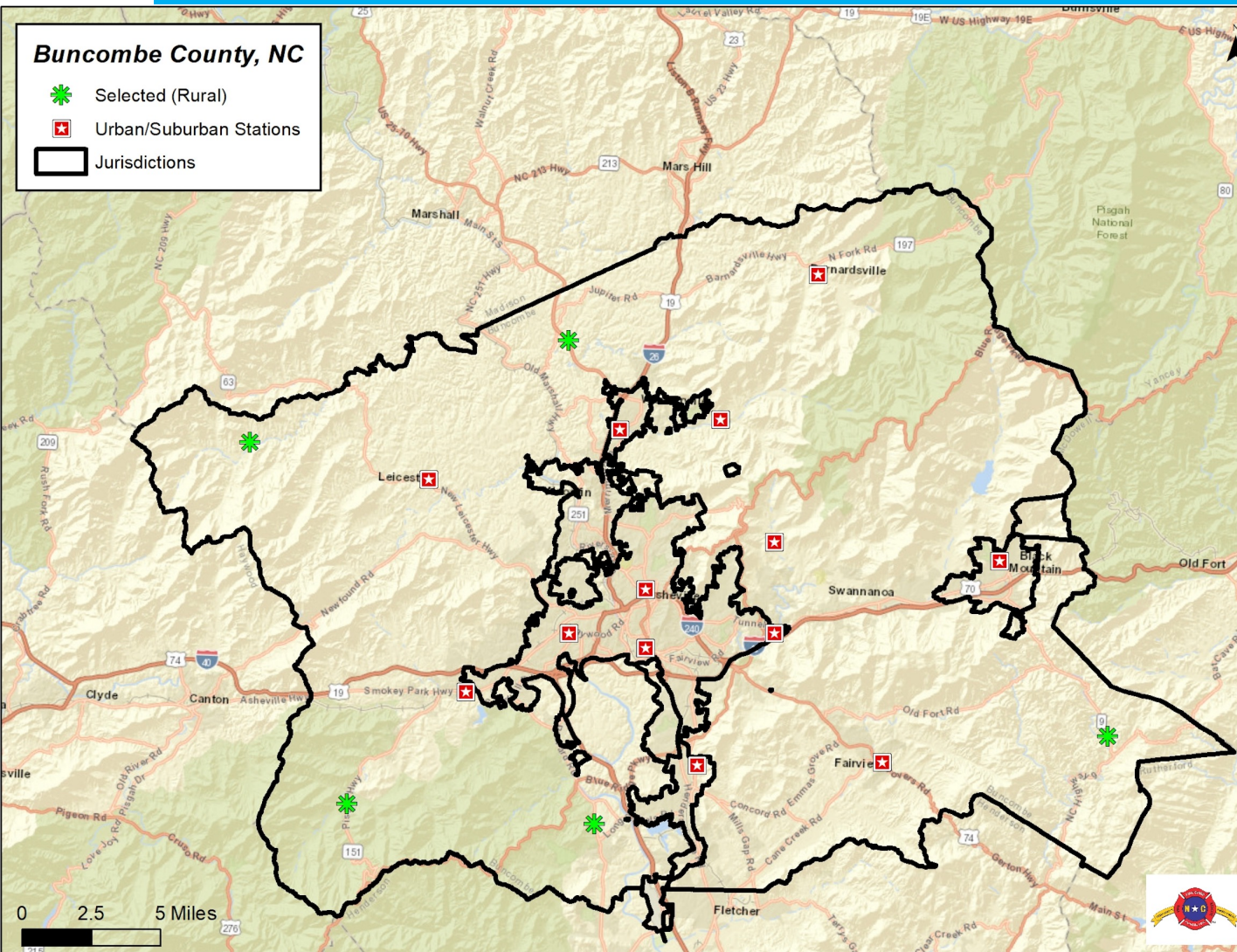


- Enka-Candler between current EMS Station 3 and 7.
- East Asheville north of current EMS Station 9.
- Weaverville south of current EMS Station 8.

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# Rural EMS Station Needs (4):

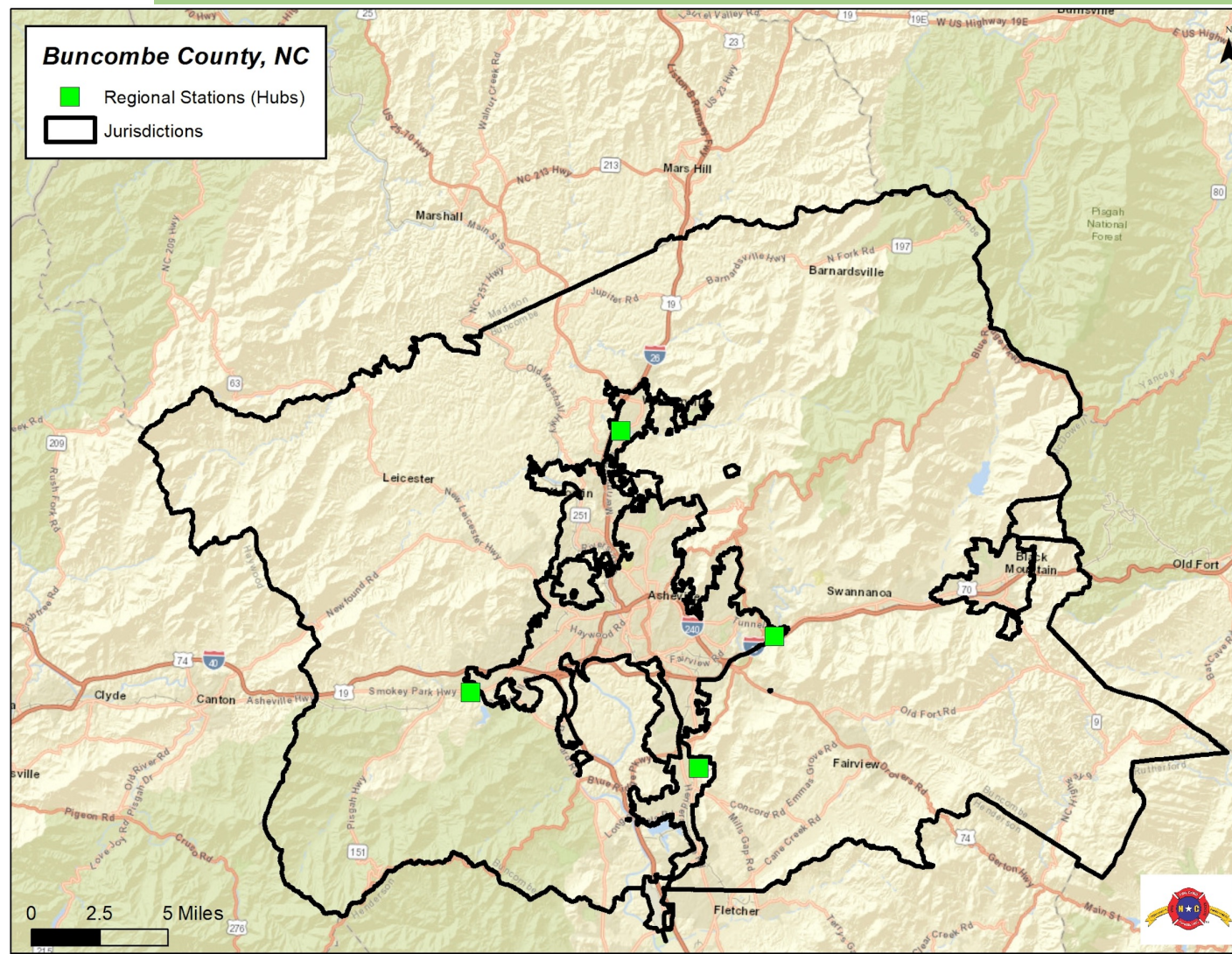


- North Weaverville.
- Southeast County near Broad River Station 3.
- Southwest County (Upper Hominy FD).
- Skyland West near Skyland Avery Creek Fire Station.

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# Regional EMS Station Hubs



- North: Weaverville
- South: Skyland
- West: Enka-Candler
- East: East Asheville

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## Final Needs Result

- Design a **master facility plan for EMS**, including the design of a regional EMS station and/or Emergency Services Department Headquarters infrastructure.
- All EMS stations are important. However, the **five EMS stations with the greatest needs** will take planning in the Capital Improvement Program (CIP).
- In addition, **land acquisition** to secure property for future infrastructure is also important, especially with the growth and land availability in Buncombe County.



# Four (4) Ways to Effectively Move Buncombe County EMS Forward:



## EMS Facilities

### **Prepare for EMS Station Construction.**

- Fulfill McCormick Place EMS Facility Needs.
- Address EMS Station need in West Asheville.
- Secure property for future EMS stations as conditions will allow.

## Secure Agreements

### **Secure Written Facility Use Agreements.**

- Establish written agreements where they do not exist to house Buncombe County EMS ambulances until improved facilities can be established.

## Optimize Call Intake and Data Collection

### **Take Measures to Reduce Call Processing Times and Turnout Times.**

**Measure demonstrated performance against urban, suburban and rural service delivery areas.**

## Plan for EMS Hubs

### **Move Forward with Planning and Implementing Regional EMS Station "Hubs".**

North – Weaverville  
South – Skyland  
West – Enka-Candler  
East – East Asheville





# Questions?







**THANK YOU!**

North Carolina Fire Chief Consulting  
336-266-7998 ♦ [www.NCFireChief.com](http://www.NCFireChief.com)

