

# *Regional Water and Wastewater*

# *Infrastructure*

# *Model*



# *Briefing Topics*

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- Terms and Definitions
- Water/Wastewater Infrastructure Planning Model Overview
- Fort Bragg Overview and Regional Growth Projections
- Fort Bragg Water and Wastewater Needs
- River Basin Overview
  - Cape Fear River
  - Lumber River
- Regional Modeling Discussion and Considerations
- Regional Models
  - Rationale for each Option
- Discussion

# *Project Terms and Definitions*

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**Regional Capacity-** The ability to hold, receive or absorb, or a measure of the ability to supply services necessary for the continued economic growth of a region or community. There 3 elements of capacity- regulatory, resource and design.

**Infrastructure-** Basic physical and organizational structures needed for the operation of a region, or the services and facilities necessary to support the community with basic needs such as water.

**Inter-basin Transfer (IBT)-** A transfer of water from one river basin to another. An important issue for regional and municipal water and wastewater systems in that water may be pulled from one system to use with the wastewater discharged into another. Regulatory limits are usually established regulating the level of inter-basin transfers

**River Basin-** The entire geographical area drained by a river and its tributaries. River basins are typically separated by ridge lines which represent high points.

**Watershed-** The area of land where all of the water that is under it or drains off of it goes into the same place.

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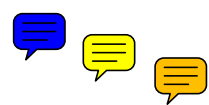
# *Water/Wastewater Infrastructure Planning Model Overview*

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A model for regionally-based water and wastewater infrastructure:

- To maintain capacity to support Ft. Bragg and Camp Mackall's expanded mission needs for water and wastewater services for decades to come.
- To support the region's off-base military community and dependents.
- To sustain continued regional economic growth for decades in regions that currently do not possess infrastructure.





# *Water/Wastewater Infrastructure Modeling Project*

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Regionalized infrastructure security increasingly important:

- Ft. Bragg increasingly dependent of surrounding community for services.

Project emphasizes:

- Current Regional Capacity and Status
  - watershed capacity
  - by county
  - current infrastructure could be built upon to create a regionally based plan
- Regional Water and Wastewater Infrastructure Model.



# Briefing Topics

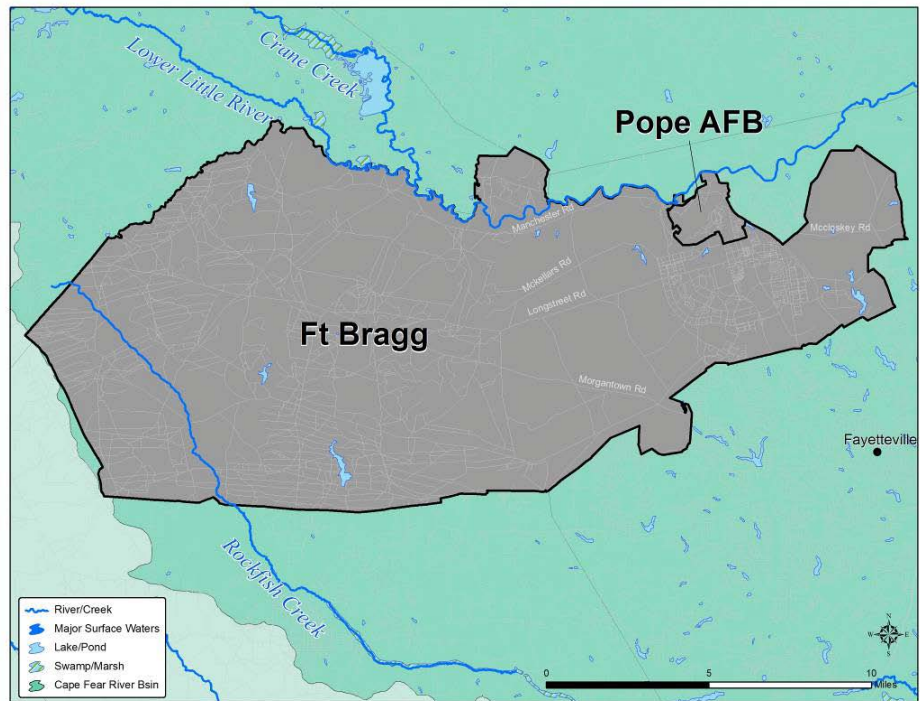
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# Fort Bragg Overview

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- Fort Bragg is the home for the XVIII Airborne Corps and the 82nd Airborne Division.
- The U.S. Army Special Operations Command and the U.S. Army Parachute Team (the Golden Knights) also call Fort Bragg home.
- A key mission is to maintain the XVIII Airborne Corps as a strategic crisis response force, manned and trained to deploy rapidly by air, sea and land anywhere in the world





# Fort Bragg Projected Growth

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## Growth projections on and around Fort Bragg / Pope AFB

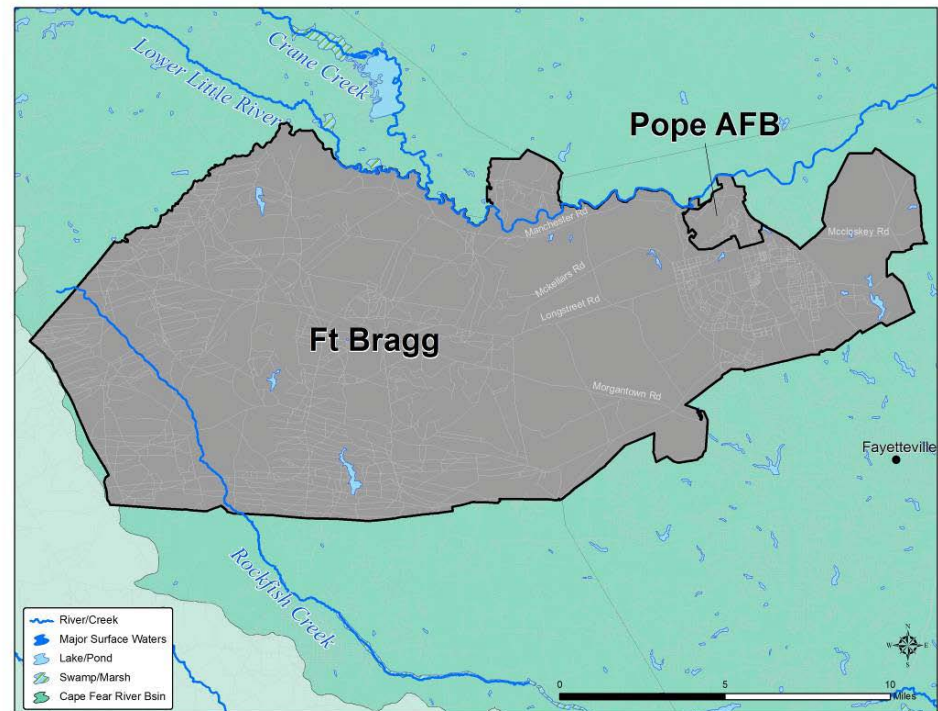
–An expected growth of 4,647 active-duty soldiers with an additional 7,150 military dependents for a total of 11,797

- Of these, approximately 8,961 will live in military housing

–A projected additional 16,639 individuals will live in one of the surrounding counties, made up of:

- 12,357 civilian
- 4,282 military

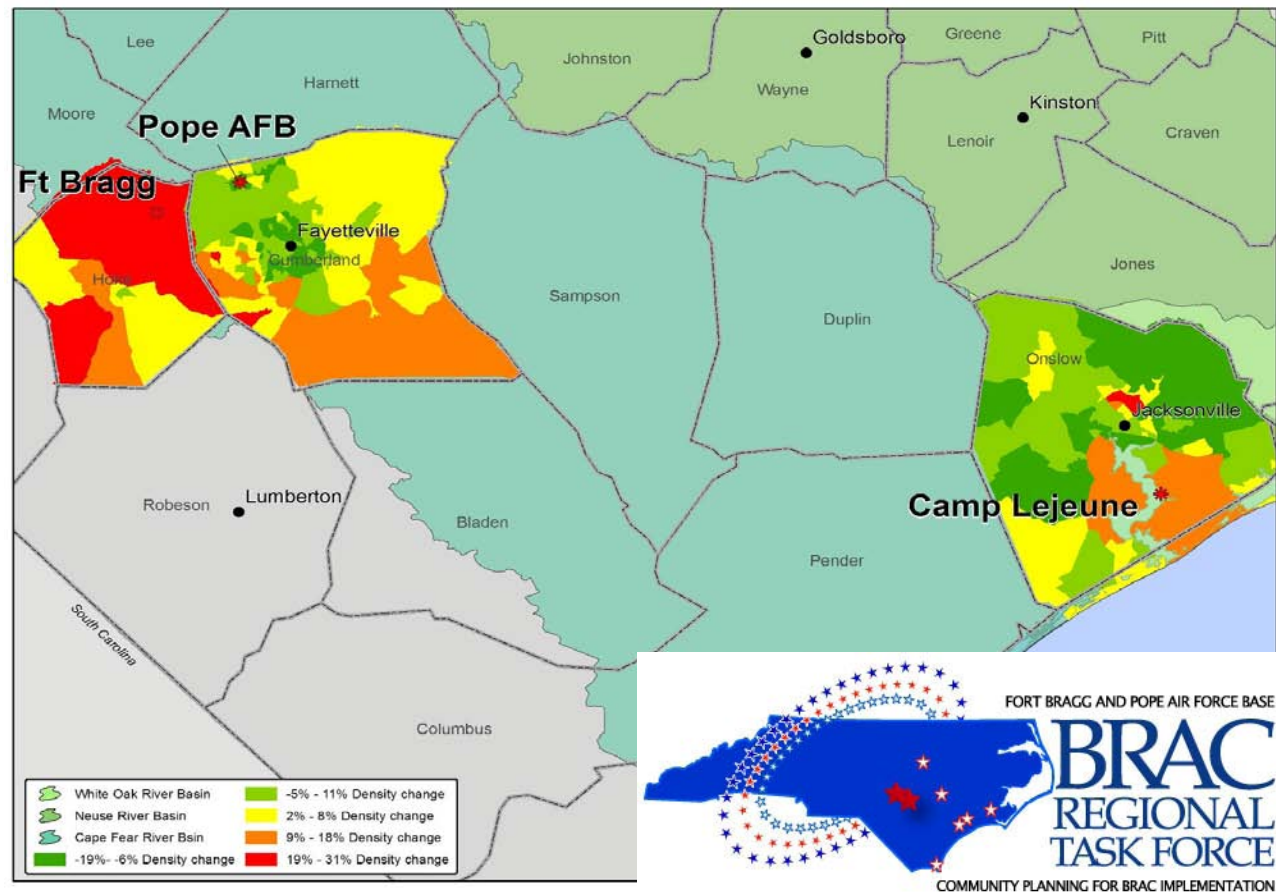
Due to BRAC, Ft. Bragg is receiving Army Forces Command and Army Reserve Command, resulting in substantial growth on and around the installation.



# Regional Growth Projections

## Regional Needs:

- Fort Bragg's mission is expanding and receiving increased personnel to the region.
- Increasing needs for surrounding community facing military growth due to population increases as shown by projected population density changes, 2008-2013.



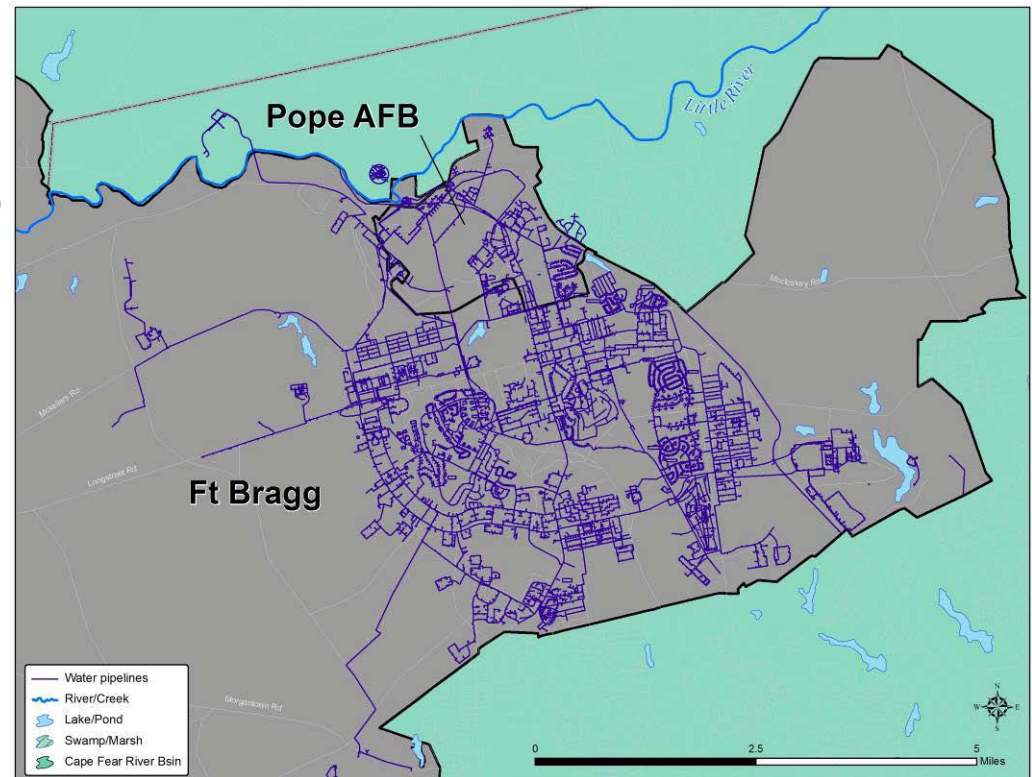
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# Fort Bragg Current Water Needs

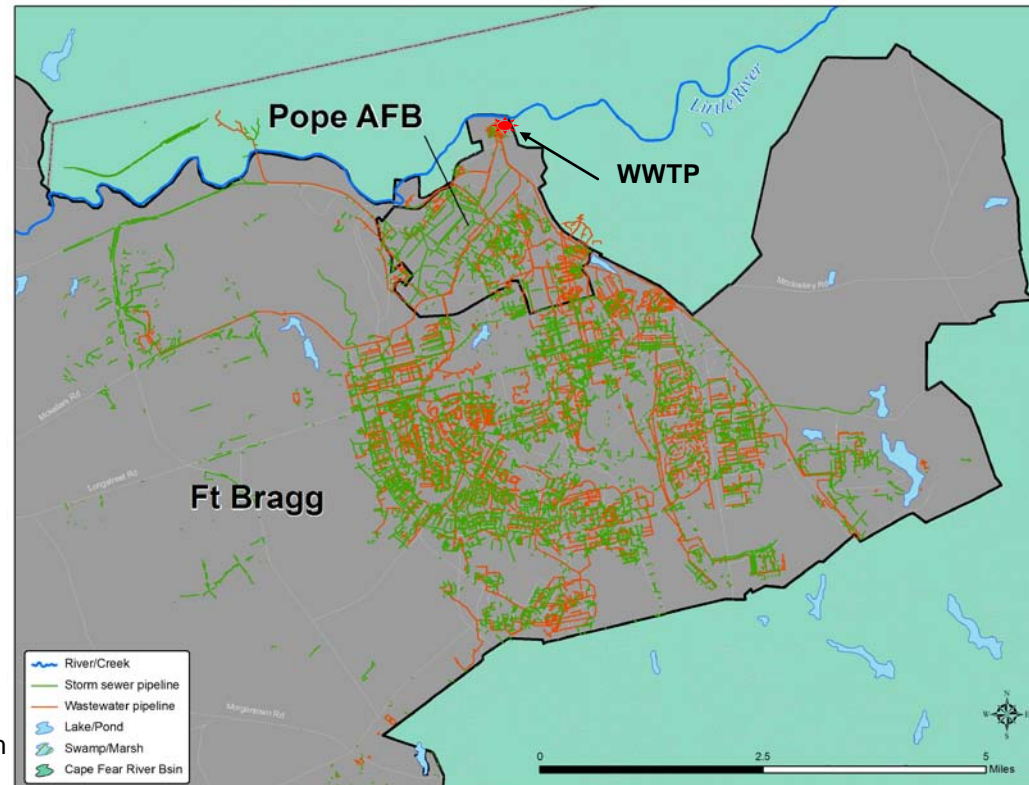
- Fort Bragg is contracted to receive up to 16 MGD from Fayetteville PWC and Harnett County.
- Up to 3.0 MGD additional water can be supplied on an emergency basis by Fayetteville Public Works Commission (PWC)
- Average demand is 4.56 MGD; peak day demand is 8.06 MGD (ISR-NI 2008 data)
- Total storage capacity is 4.75 MG, located entirely on Fort Bragg
- Old North Utilities manages over 2 million linear feet of pipeline on base



Fort Bragg Water System

# Fort Bragg Current Wastewater Needs

- WWTP is to be closed in 2010. Harnett County will provide wastewater treatment services via a contracted 10 MGD expansion to its Cape Fear River regional WWTP
- Current WWTP has 8 MGD permitted capacity, discharges to the Lower Little River
- Old North Utilities manages the collection system
- Average discharge is 5.215 MGD; peak day discharge is 12.68 MGD (ISR-NI 2008 data)



Fort Bragg Wastewater System

# Briefing Topics

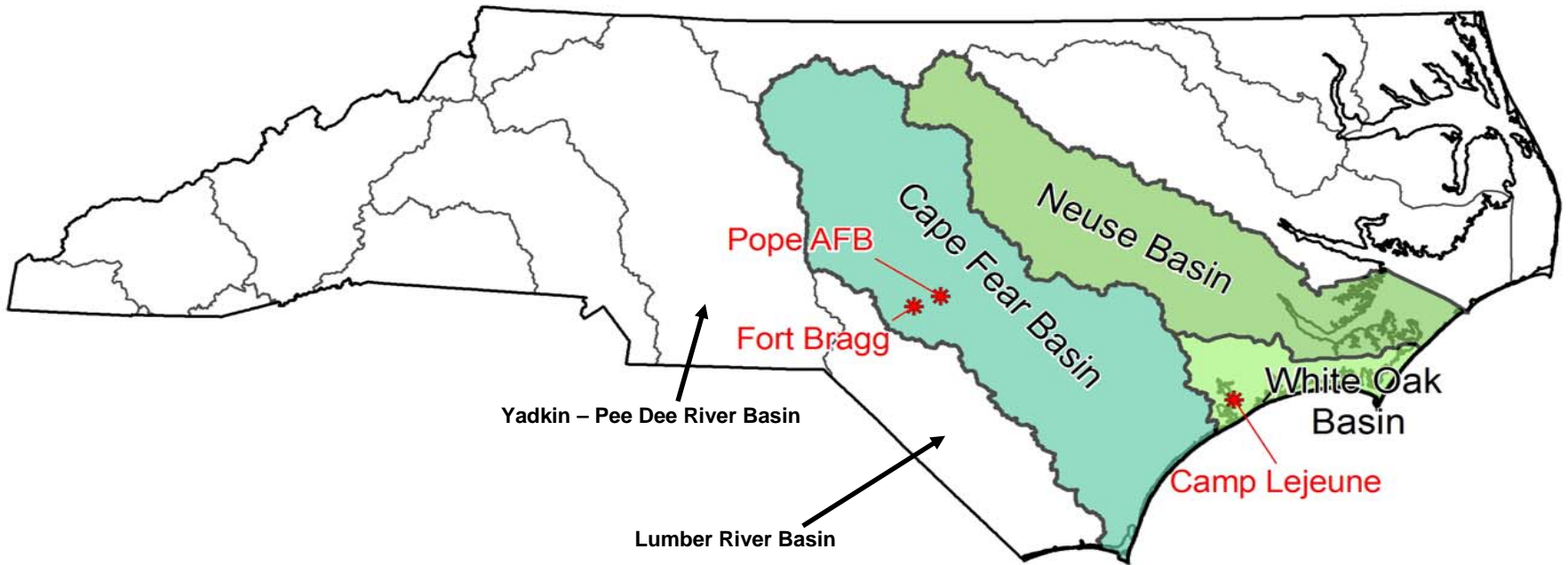
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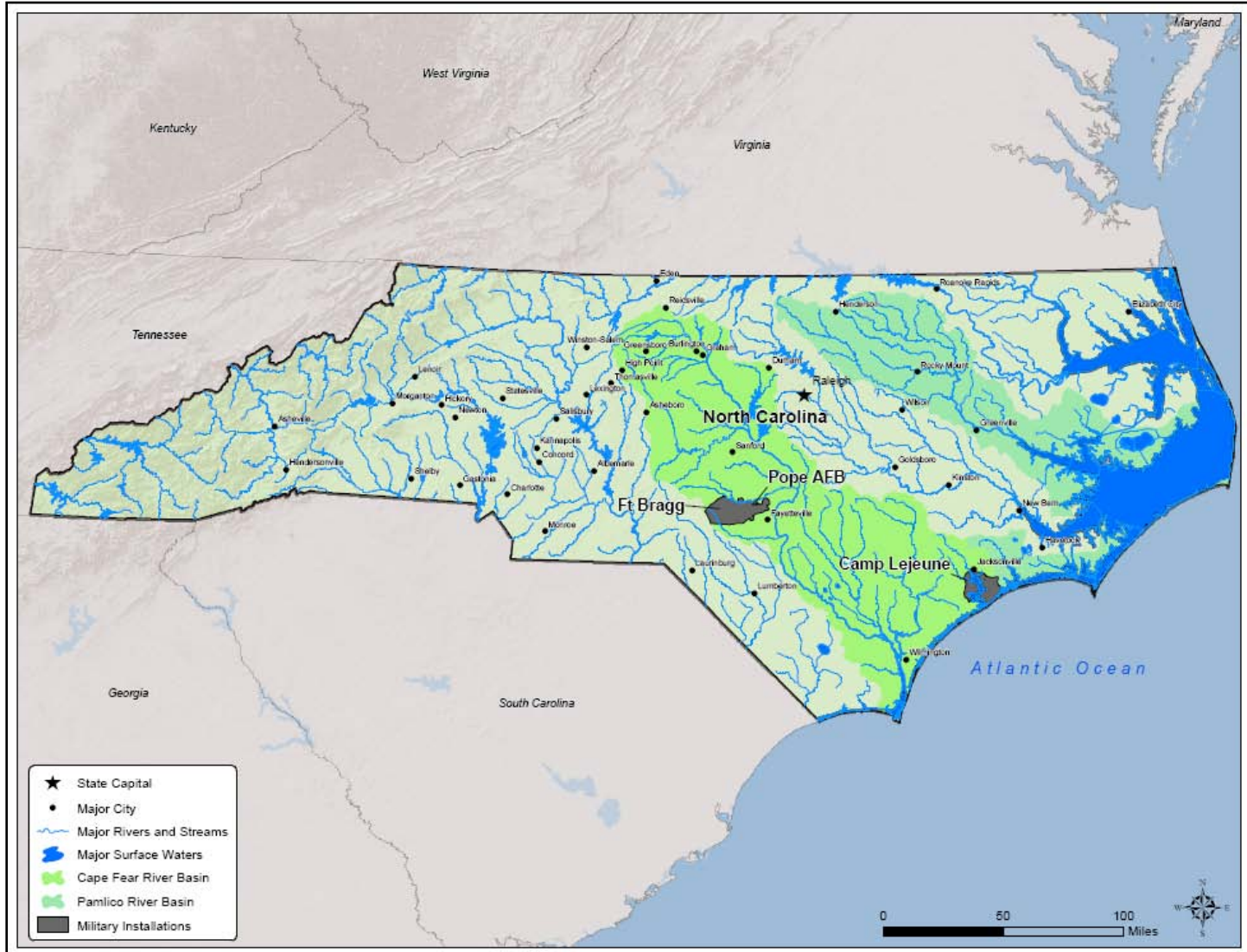


# River Basin Overview

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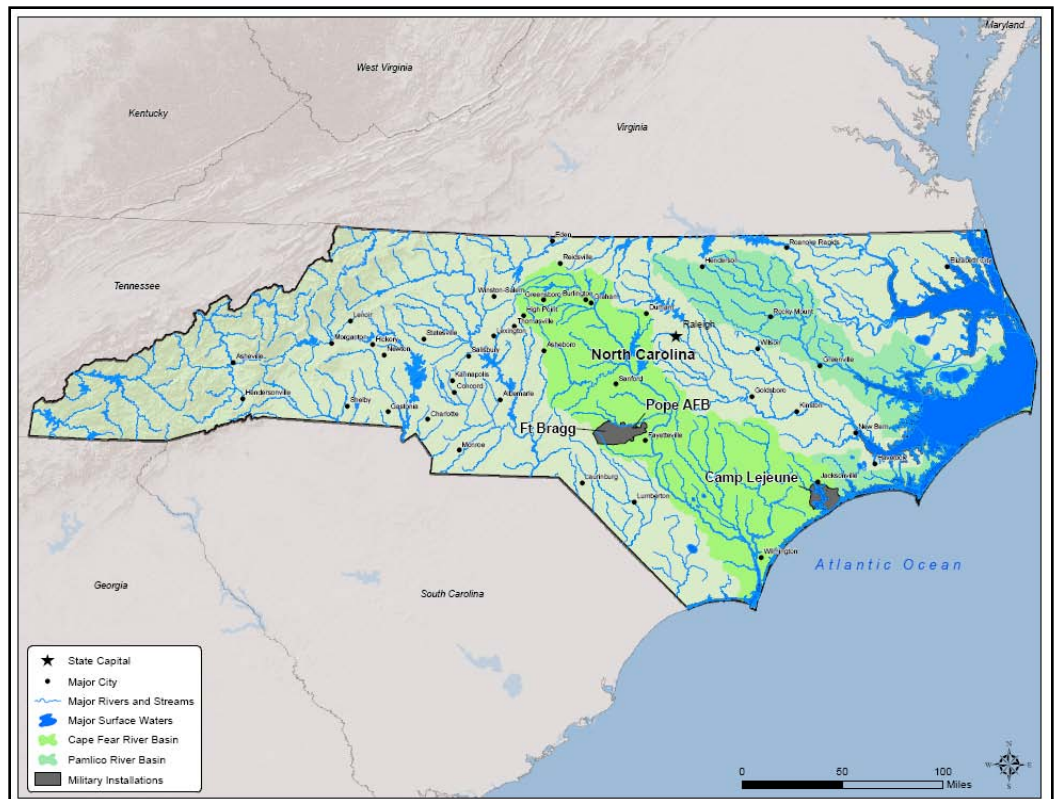
# Cape Fear River Basin





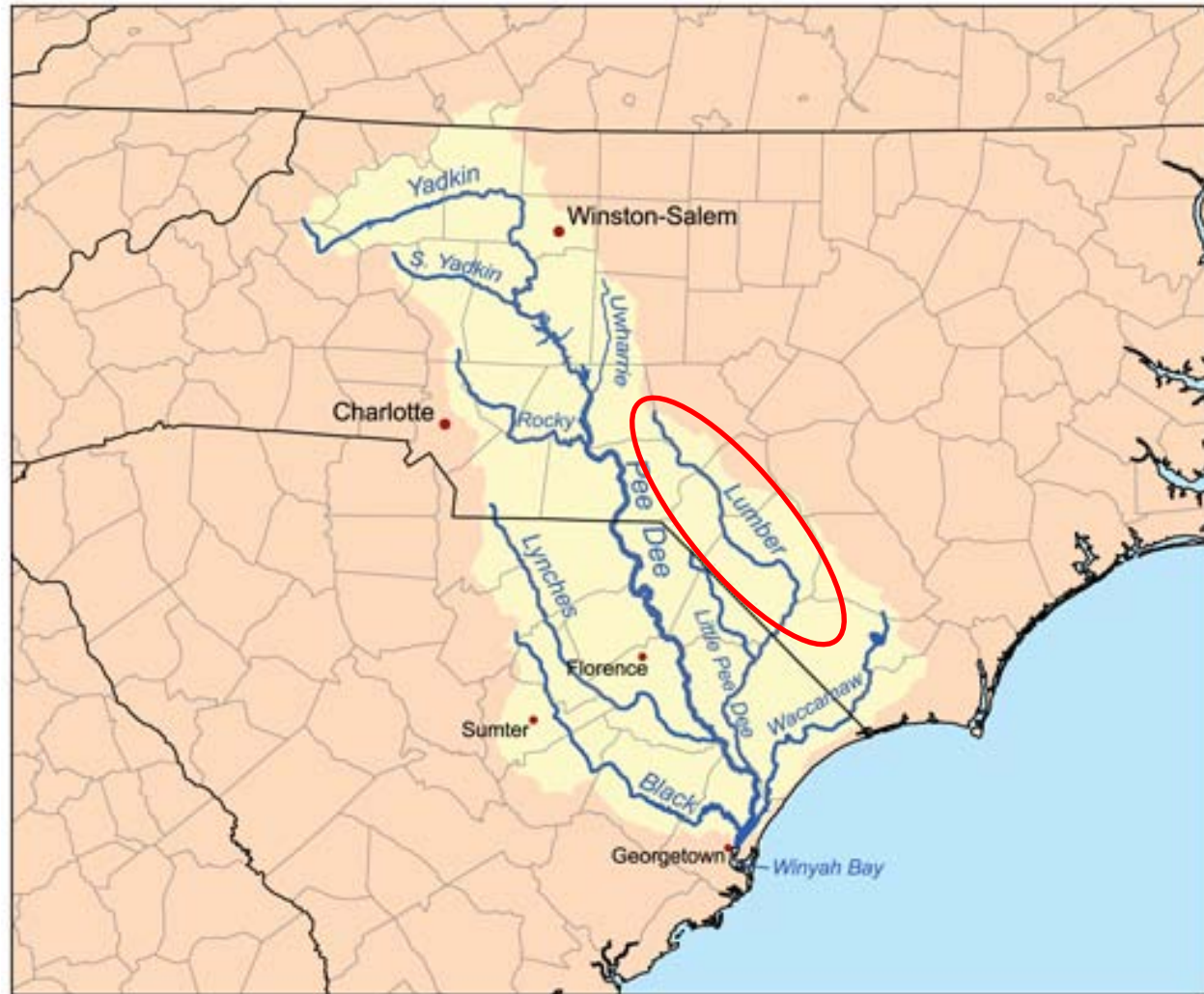
# Cape Fear River Basin

- Largest river basin in NC
- Drains 9,149 square miles
- Encompasses all or parts of 27 counties
- Provides water to 110 municipal water systems
  - Average of 220 MGD taken from the Cape Fear
- Roughly 50% of the basin area is forested
- Jordan Lake provides substantial storage capacity upstream Fort Bragg region



# Lumber River Basin

- Lumber River Basin is part of the greater Yadkin-Pee Dee River Basin
- Drains roughly 3,335.5 square miles and encompasses all or portions of nine counties and 51 municipalities.
- Populations of the counties wholly or partly contained within the basin increased by over 501,308 people between 1990 and 2000 with Hoke, Moore and Robeson counties growing the fastest



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# *Water/Wastewater Infrastructure Modeling Project*

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Regionalized infrastructure security increasingly important:

- Ft. Bragg increasingly dependent of surrounding community for services.

Project emphasizes:

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# Considerations for Infrastructure Modeling

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- Supports Fort Bragg mission's need for water and wastewater services for decades
- Supports off-base military community and dependents' needs for water and wastewater services
- Not as costly to implement
- Reduces the chance for Inter-basin Transfers (keeping inter-basin transfer levels low facilitates the ability to augment capacity in future upgrades)
- Use current infrastructure as much as possible
- Builds on current collaborations and inter-governmental relationships
- Integrates well with other planning objectives (e.g. compatible land use planning)





# *Water/Wastewater Infrastructure Modeling Project*

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BRAC RTF Proposes to present color-coded regional models en lieu of detailed infrastructure

Rationale for presenting color-coded model :

- Infrastructure Protection and Security

BRAC RTF possesses and maintains detailed infrastructure for planning purposes and facilitating intergovernmental discussion but not to show publically







## *Counties within region for Infrastructure Modeling*

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Emphasis of Study for Regional Modeling:

- Cumberland
- Harnett
- Hoke
- Moore

Project also Looked at:

- Lee
- Richmond
- Robeson

Montgomery and Scotland counties were also looked at within context of regionalizing water and wastewater infrastructure with counties emphasized in study.

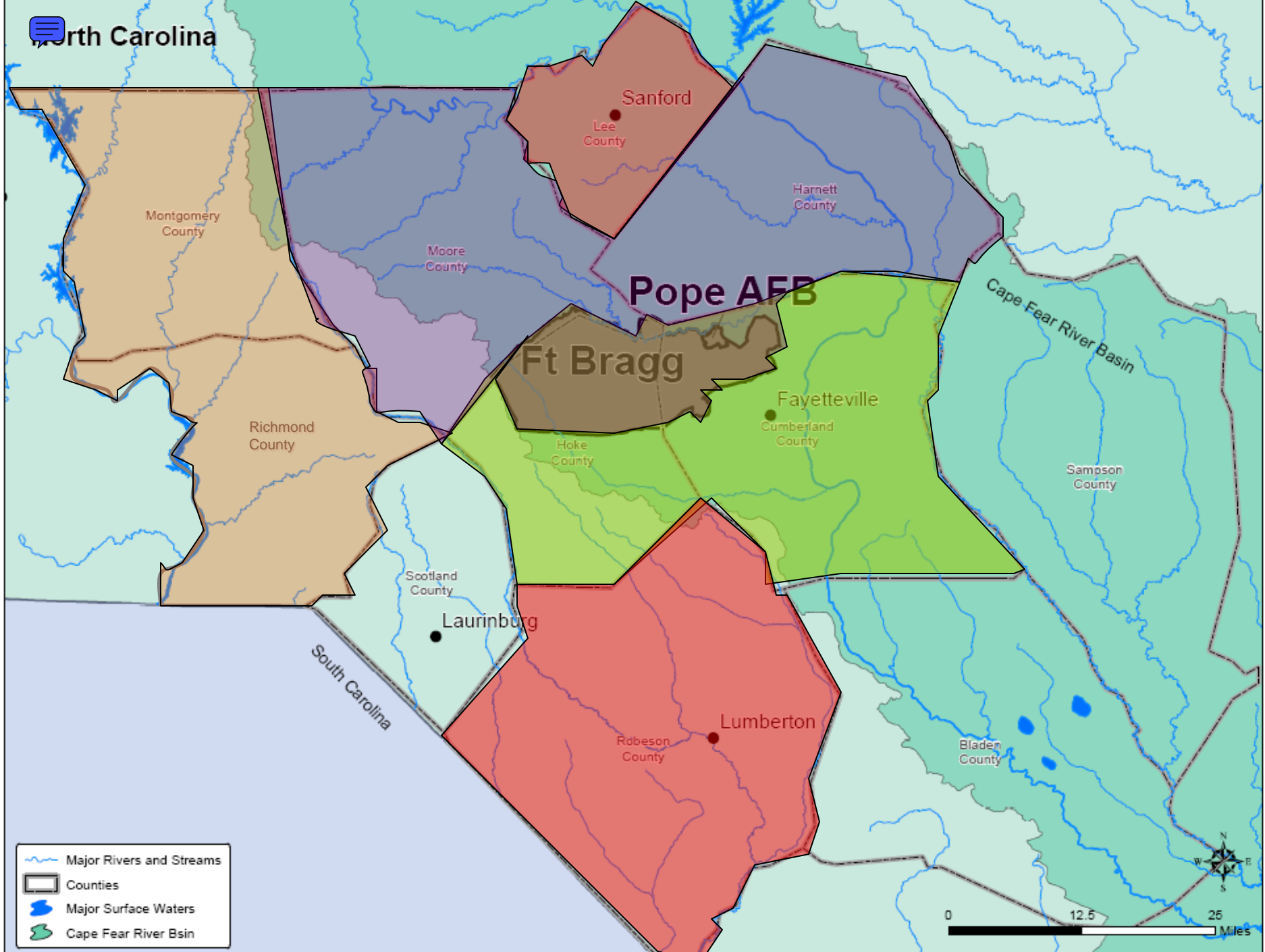




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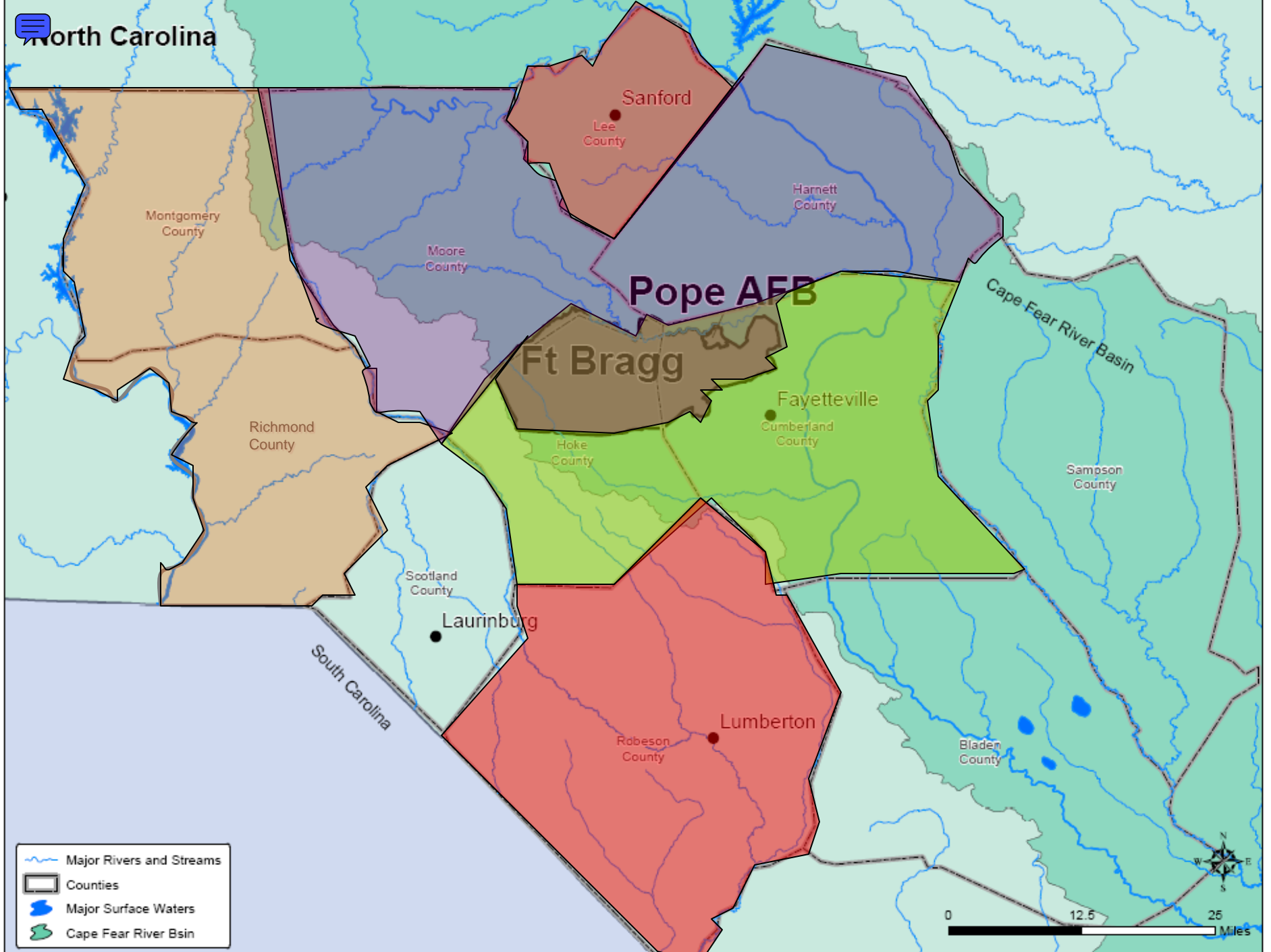


- Major Rivers and Streams
- Counties
- Major Surface Waters
- Cape Fear River Bsin

0 12.5 25 Miles



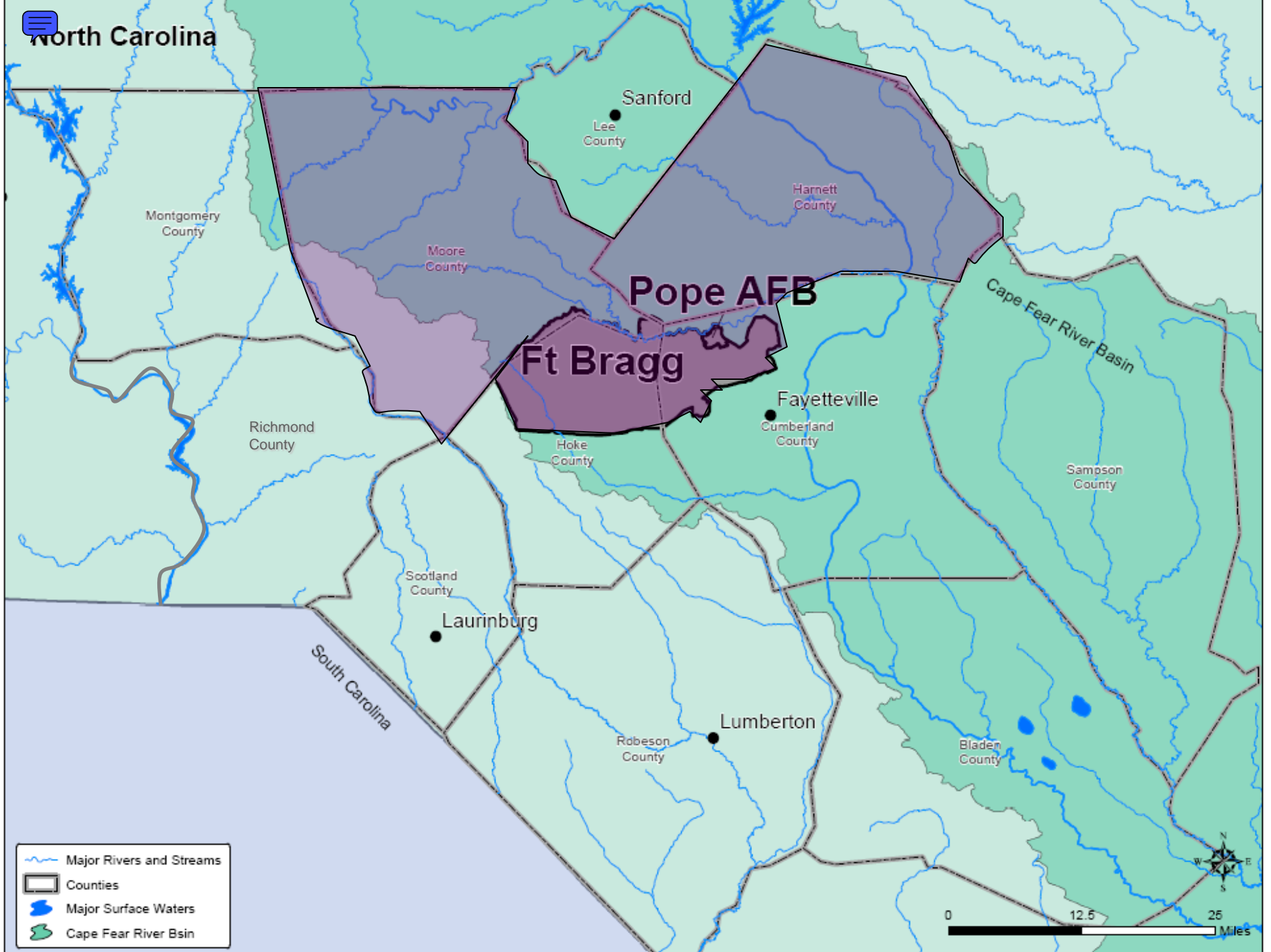
# Most Viable



- Major Rivers and Streams
- Counties
- Major Surface Waters
- Cape Fear River Bsin

0 12.5 25 Miles





Legend:

- Major Rivers and Streams
- Counties
- Major Surface Waters
- Cape Fear River Basin

0 12.5 25 Miles



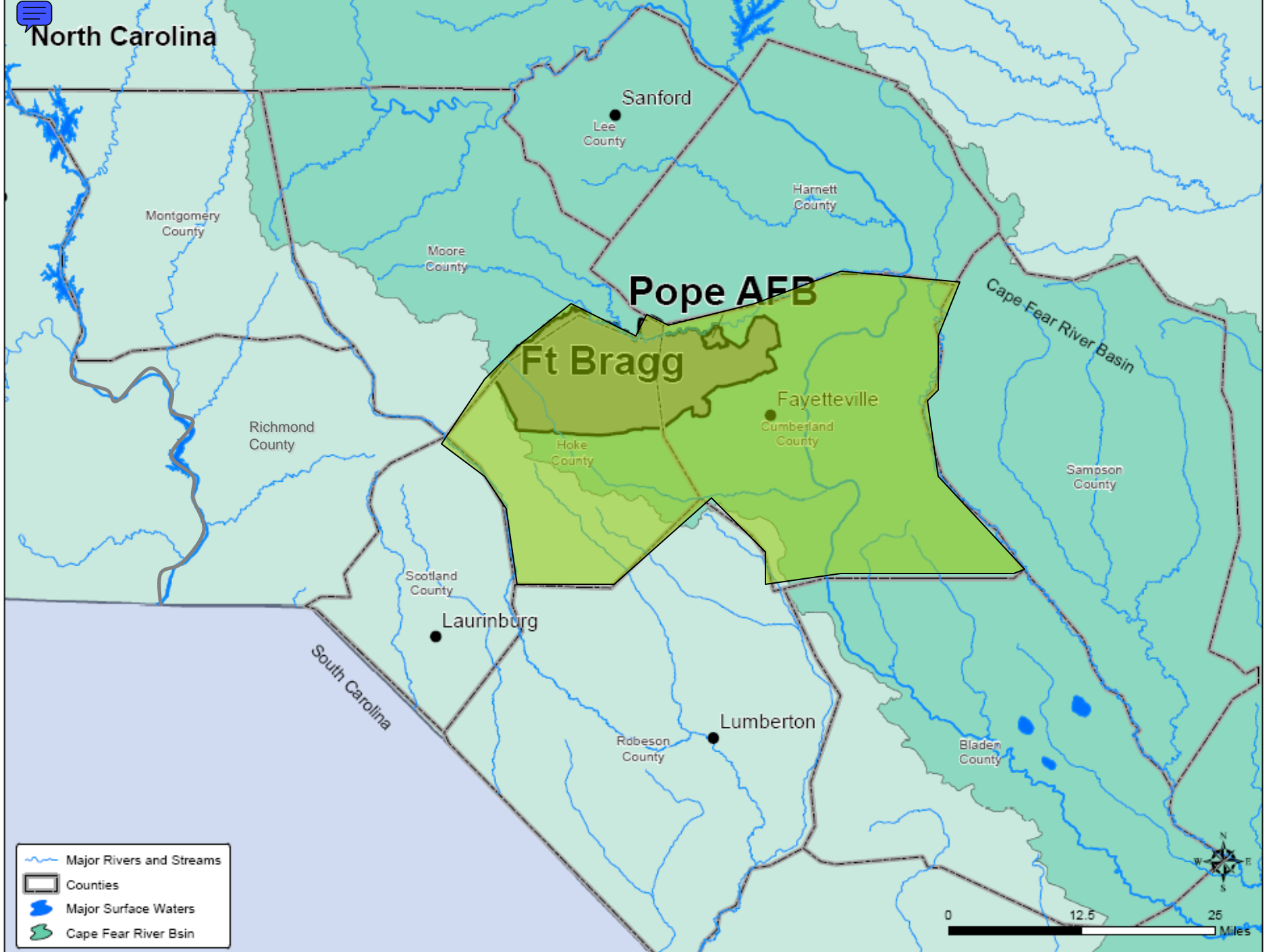
# *Harnett-Moore Regional Water/Wastewater Infrastructure Model*

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## Rationale:

- Least expensive option.
- Harnett County and Moore County systems currently connected by a main at Woodlake area.
- Moore County acquires its water from the Black Creek aquifer and needs a reliable source of surface water.
- Harnett County already sells an average of 1 MGD of water to Moore County with provisions to sell a total of 2 MGD.
- If Moore County system could consolidate with the major city systems (Southern Pines, Aberdeen, etc.)

North Carolina



- Major Rivers and Streams
- Counties
- Major Surface Waters
- Cape Fear River Basin

0 12.5 25 Miles





## ***Hoke-Fayetteville PWC Regional Water/Wastewater Infrastructure Model***

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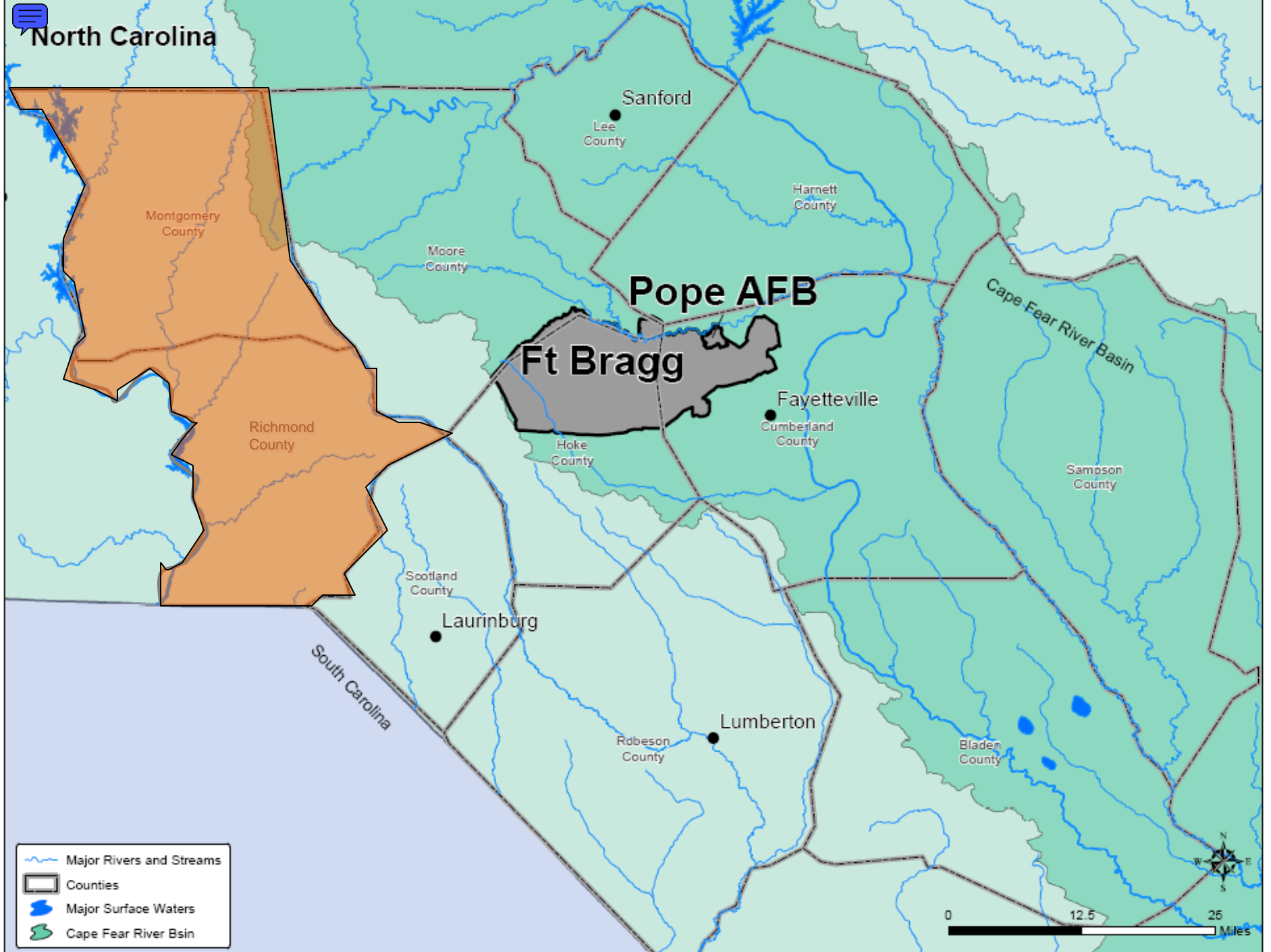
### Rationale:

- Least expensive option.
- Hoke County and PWC systems currently connected by a main leading out 401 south toward Raeford.
- Hoke County just received the okay to construct a WWTP on Rockfish Creek that could be used to augment Cumberland County's system.
- Cumberland County possesses the capacity.

### Issues:

- Hoke County water comes from the Black Creek aquifer requires different treatment than from PWC which receives water from the Cape Fear River.

North Carolina



- Major Rivers and Streams
- Counties
- Major Surface Waters
- Cape Fear River Basin

0 12.5 25 Miles



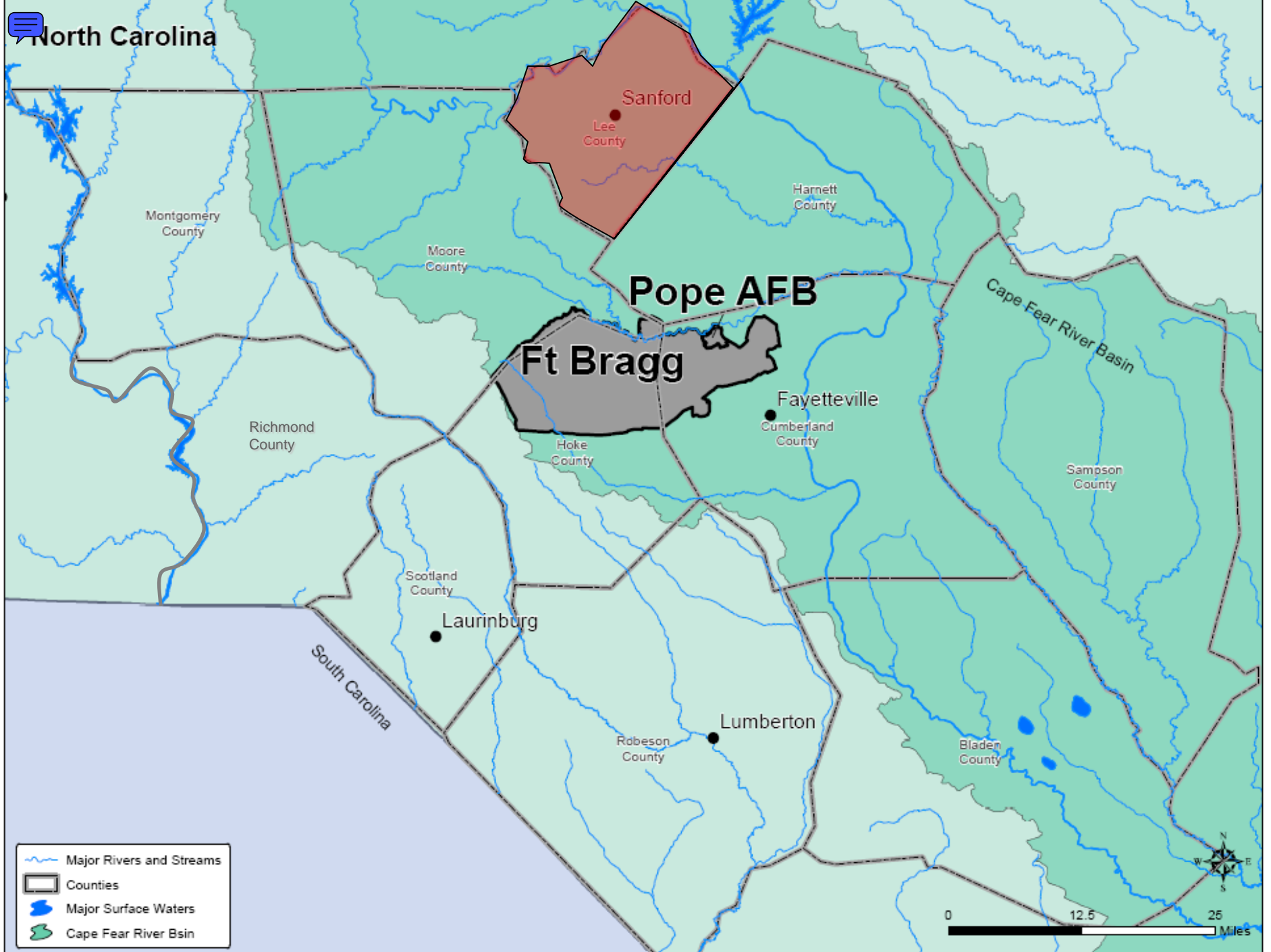
# *Richmond-Montgomery Regional Water/Wastewater Infrastructure Model*

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## Rationale:

- Richmond and Montgomery counties are located in the same river basins- Yadkin-Pee Dee and Lumber basins (no need for inter-basin transfers).
- Both use similar type water systems.
- Infrastructure matches up well.
- Wastewater line leading south from Ellerbee to Rockingham may be extended north to county line.





- Major Rivers and Streams
- Counties
- Major Surface Waters
- Cape Fear River Basin

0 12.5 25 Miles



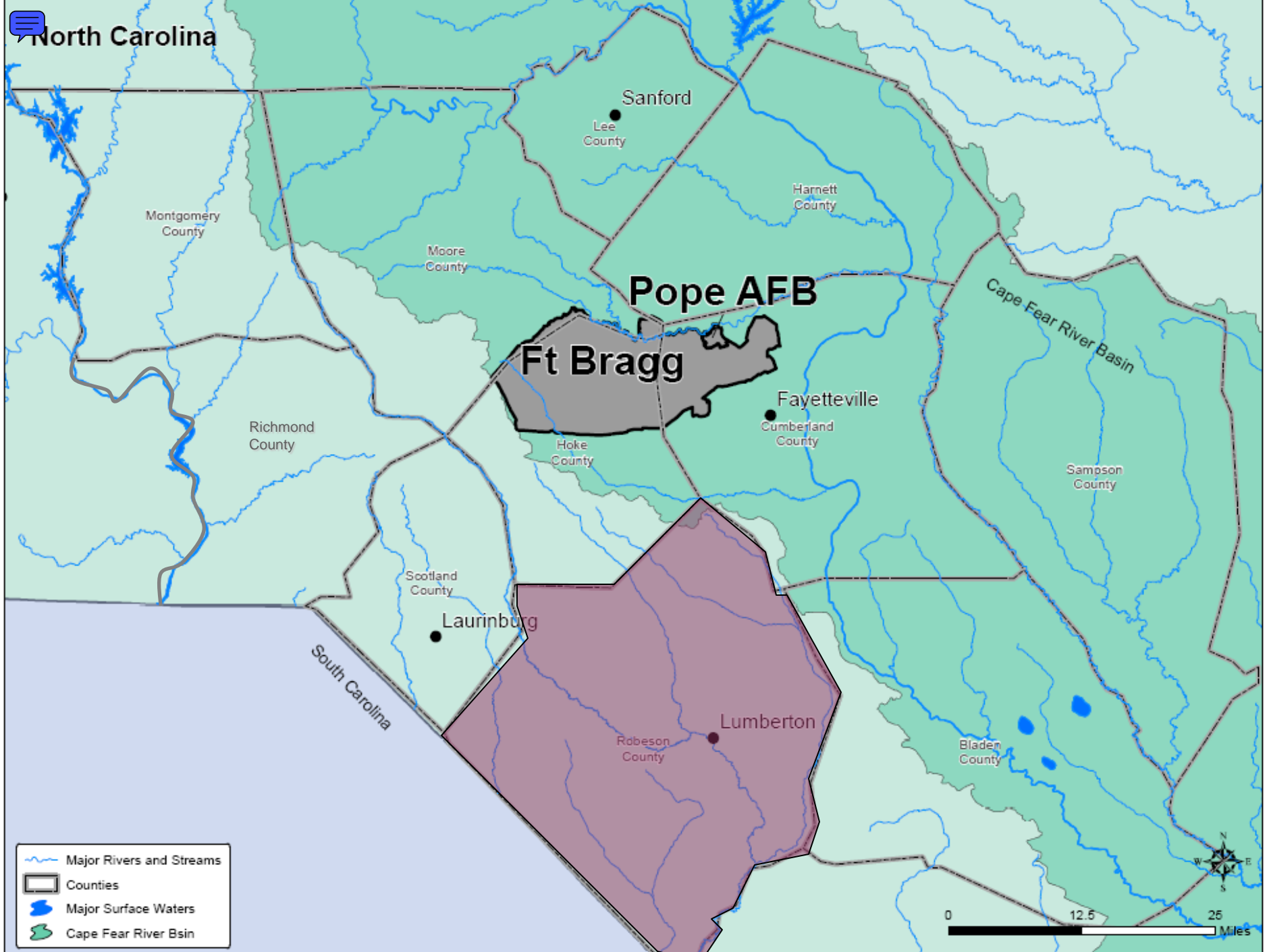
# *Sanford-Lee County Regional Water/Wastewater Infrastructure Model*

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## Rationale:

- Represents the current status quo (the Town of Sanford maintains all the water and wastewater infrastructure in Lee County).
- No real major infrastructure leads south (except for a small line running parallel to Hwy. 87 south).
- Sanford/Lee County system more organized to the north.





Major Rivers and Streams  
Counties  
Major Surface Waters  
Cape Fear River Basin

0 12.5 25 Miles



# *Lumberton-Robeson County Regional Water/Wastewater Infrastructure Model*

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## Rationale:

- Area system isolated from other systems within region.
- City of Lumberton draws water 50% from the Lumber River and 50% from the Black Creek.
- Robeson County water system draws 100% from groundwater (Black Creek aquifer).
- To provide the county system with a surface source of water.

## Issue:

Surface water source from the Lumber River is not considered a “clean” source of water and requires additional treatment.

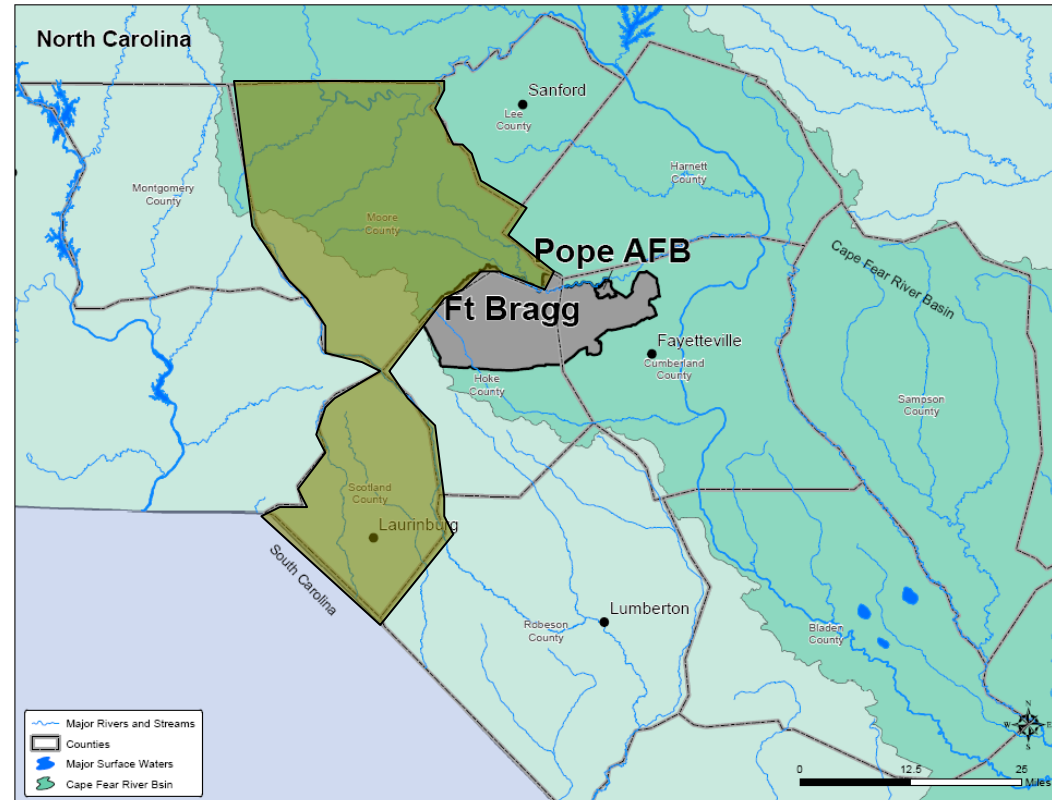




# Moore-Scotland Regional Water/Wastewater Infrastructure Model

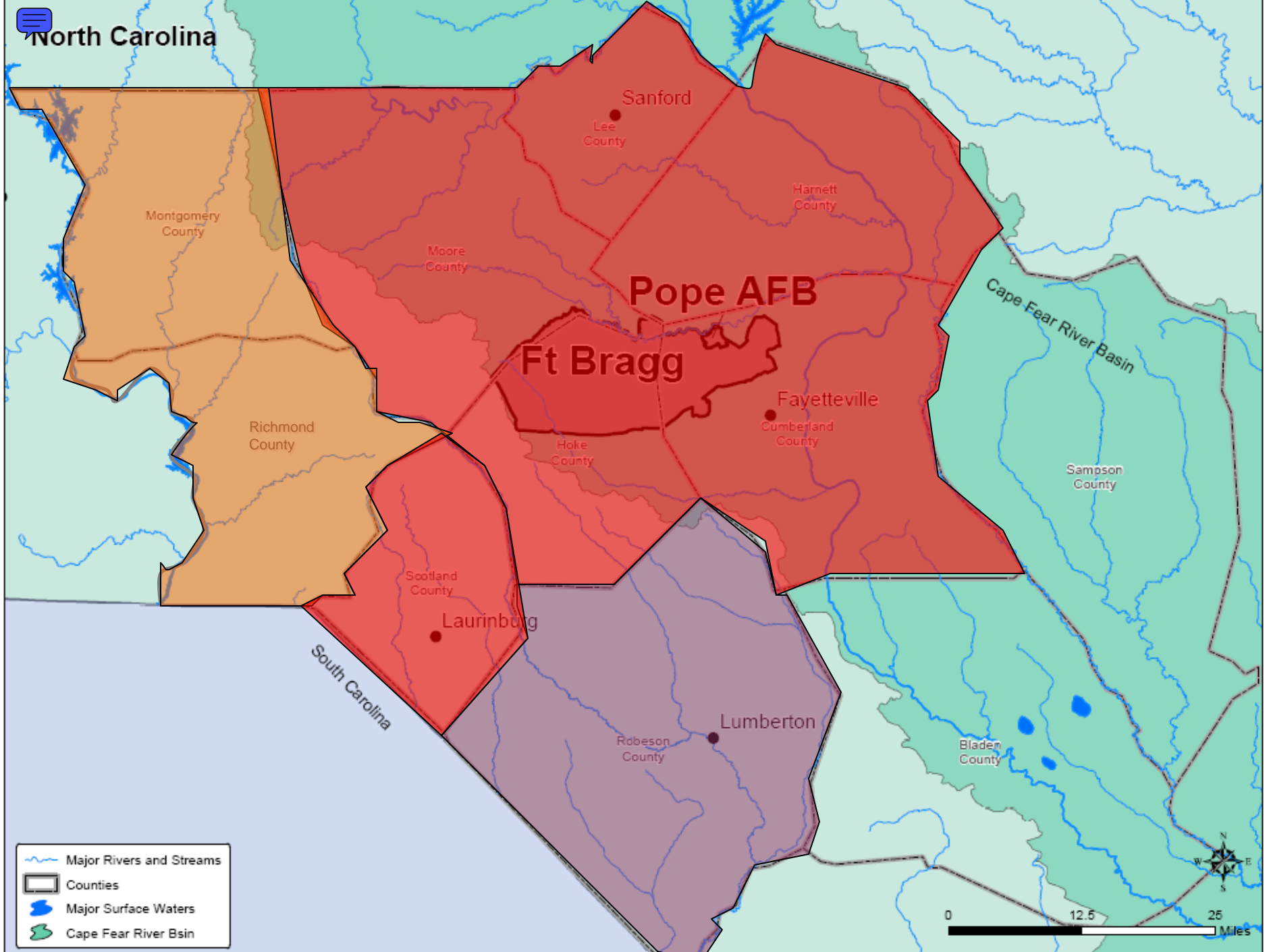
## Issues:

- Due to IBT (WWTP discharges into the Lumber river basin), Moore County is limited to 2 MGD maximum from Harnett County. This could be mitigated through construction of a line to discharge back into the Cape Fear River basin or to construct a WWTP in the Cape Fear River basin
- Moore County (with Aberdeen, Southern Pines, Pinehurst, etc.) also looking at coordinating with Scotland County/Laurinburg to refurbish and upgrade the Wagram Westpoint WTP for a source of water (price: \$105 M- Includes upgrading Pinehurst infrastructure).



An alternate, but very expensive, plan could be represented by Moore and Scotland Counties

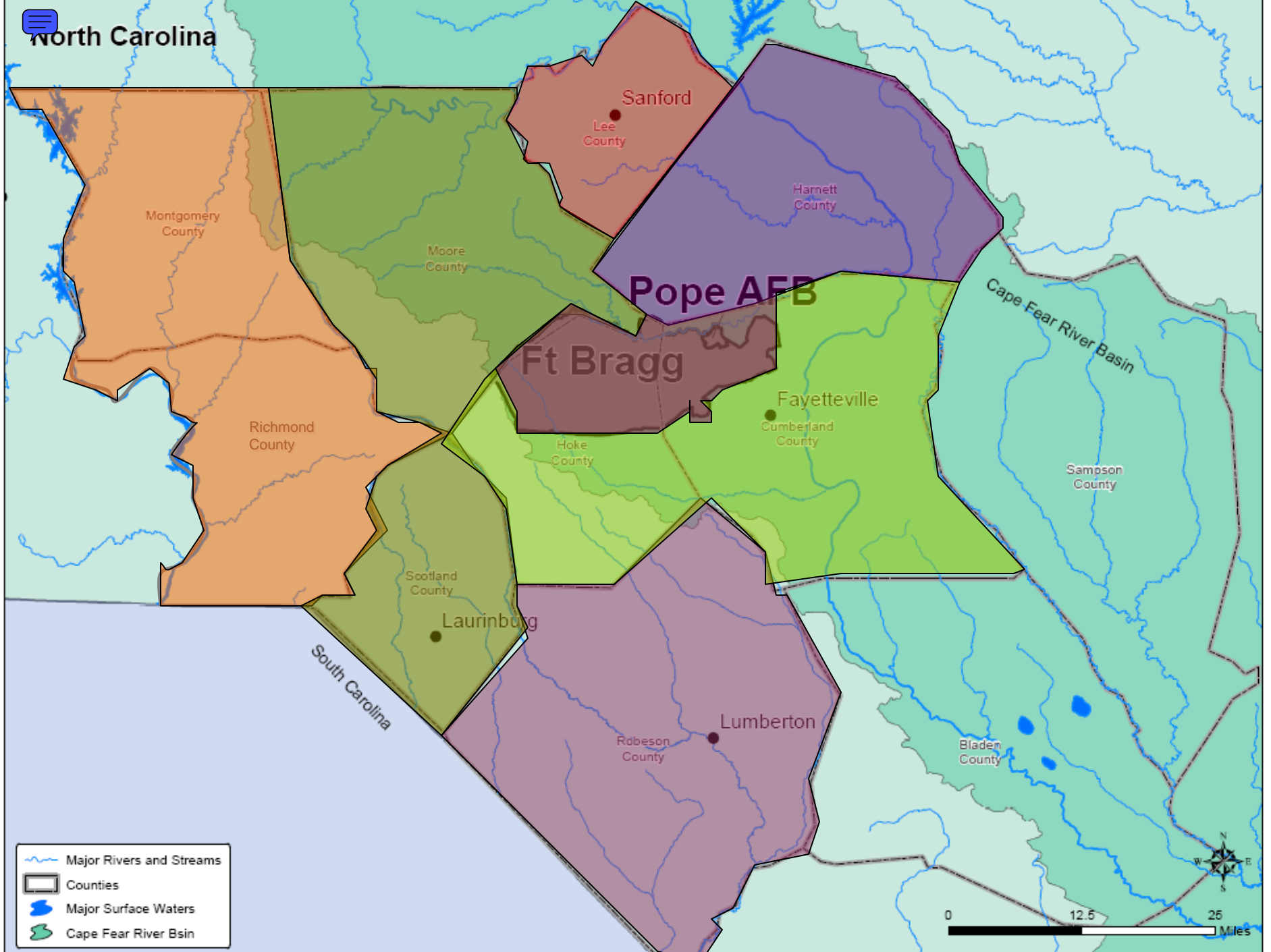
# Other Options



- Major Rivers and Streams
- Counties
- Major Surface Waters
- Cape Fear River Basin

0 12.5 25 Miles

# Another Option



- Major Rivers and Streams
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- Major Surface Waters
- Cape Fear River Basin



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# *Regional Water/Wastewater Infrastructure Planning Discussion*

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- Fort Bragg is set for water supply and wastewater service on both an average and a peak demand basis for the foreseeable future
- The area around Fort Bragg is also OK on supply for now, but lacks infrastructure in certain areas to support population/economic growth to serve military growth.
- Future shocks could compromise supplies for the Fort Bragg region
  - Climate change affecting water availability, substantial growth upstream taking water, overuse of regional aquifers (and subsequent use restrictions), inter-basin transfers taking water, etc.
- Continued regional capacity will require regional intergovernmental collaboration and strategic planning to support water and wastewater needs in support of sustained economic and military growth. Regional communities are currently working toward forming associations and relations to ensure capacity.