From: Zaremba, Arthur H. <Arthur.Zaremba@duke-energy.com>
Sent: Friday, April 11, 2025 3:01 PM
To: Billy Gleaves; Sean Gallagher
Cc: Grzeck, Lee
Subject: [External_Sender] April 17 Meeting Slides
Attachments: 04-11-2025 NRC Public Meeting - Site Selection Process - FINAL.pdf

Billy, Attached is the presentation for the NRC/Duke public meeting. Thank you.

Art Zaremba
Sr. Licensing Consultant
315-777-6832

Hearing Identifier: BelewsCreek_LADocs_Public
Email Number: 3

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Subject: [External_Sender] April 17 Meeting Slides
Sent Date: 4/11/2025 3:01:16 PM
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From: Zaremba, Arthur H.

Created By: Arthur.Zaremba@duke-energy.com

Recipients:
"Grzeck, Lee" <Lee.Grzeck@duke-energy.com>
Tracking Status: None
"Billy Gleaves" <Bill.Gleaves@nrc.gov>
Tracking Status: None
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Pre-Application Activities
Early Site Permit Application (ESPA)
Site Near Belews Creek Steam Station

Site Selection Process

APRIL 17, 2025

DUKE ENERGY®

BUILDING A SMARTER ENERGY FUTURE®

Duke Energy Participants

- **Rounette Nader** Vice President, New Nuclear Generation & License Renewal
- **Chris Nolan** Vice President, New Nuclear Generation Strategy & Regulatory Engagement
- **Art Zaremba** Licensing Consultant, New Nuclear Generation
- **Shannon Langley** Principal Consultant, Environmental Health and Safety
- **Norm Kunkel** Director, Nuclear Engineering, New Nuclear Generation
- **Mark Hunt** Manager, Nuclear Engineering, New Nuclear Generation

Sargent & Lundy Participants

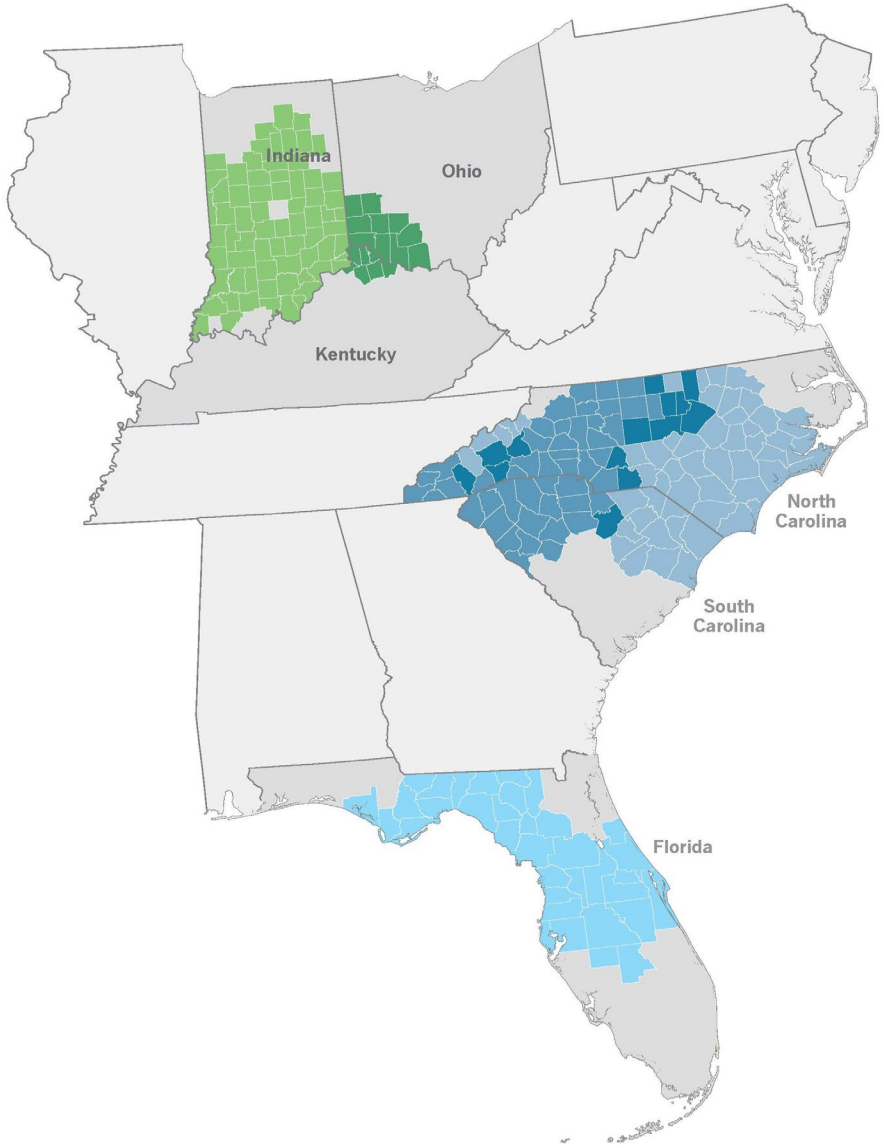
- **Joe Zmuda** Project Manager
- **Michael Launi** Licensing Manager
- **Russell Light** Environmental Manager
- **Maria Albright** Senior Environmental Associate

Agenda

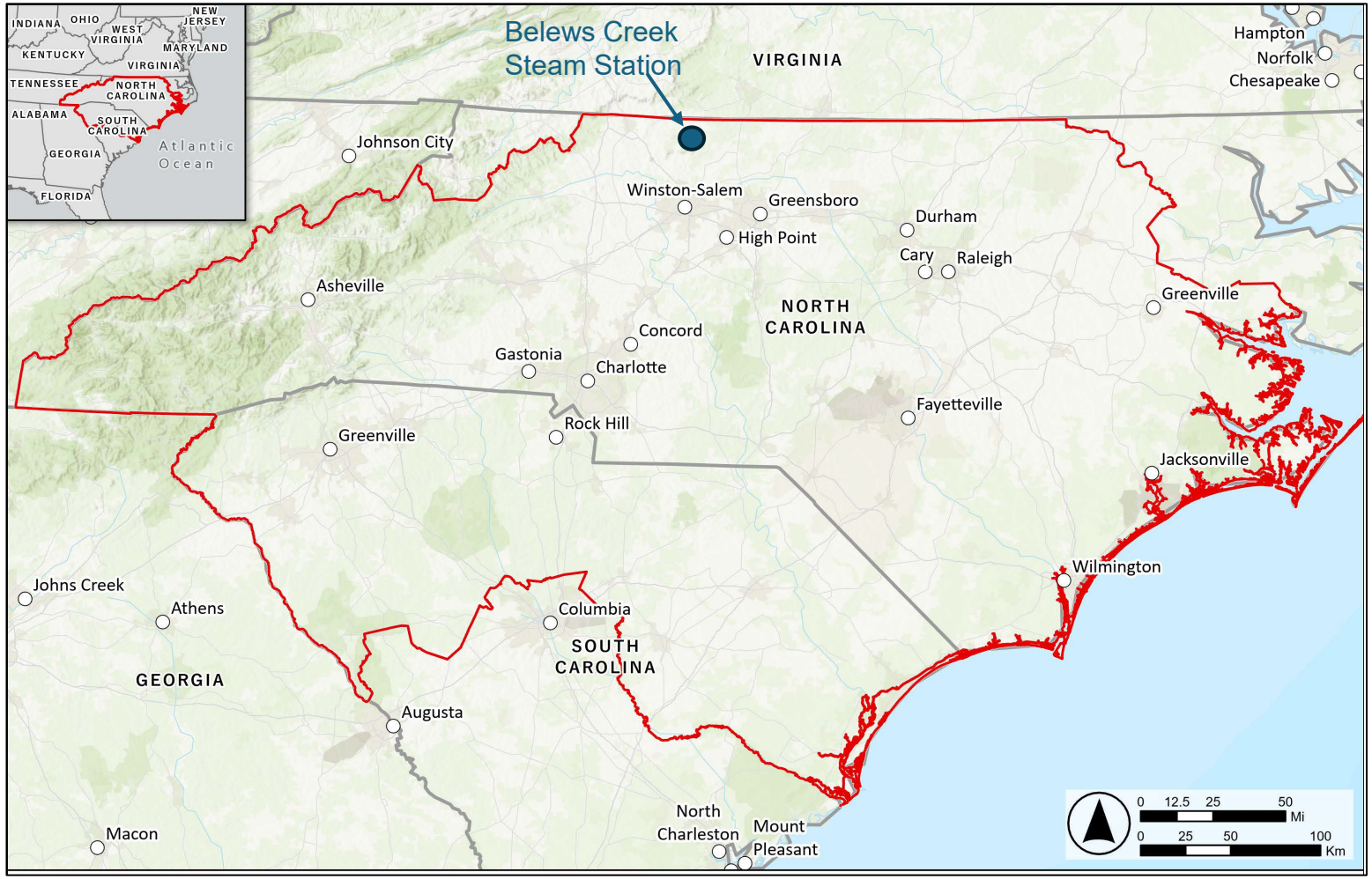
Welcome and Introductions	Art Zaremba
Duke Energy Overview	Chris Nolan
Site Selection Process	Maria Albright and Russell Light
Site Near Belews Creek Steam Station	Chris Nolan
Questions and Closing Comments	Chris Nolan

Duke Energy Overview

- 8.6 million customers
- Carolinas, Florida, Midwest
- Energy capacity: 55,100 MW
- 26,000 employees
- Clean energy transformation
  - 2030: 50% reduction in carbon emissions
  - 2050: Net-zero carbon emissions
- “All of the above” new generation strategy



Duke Energy's Carolinas Service Territory



Site Selection Process

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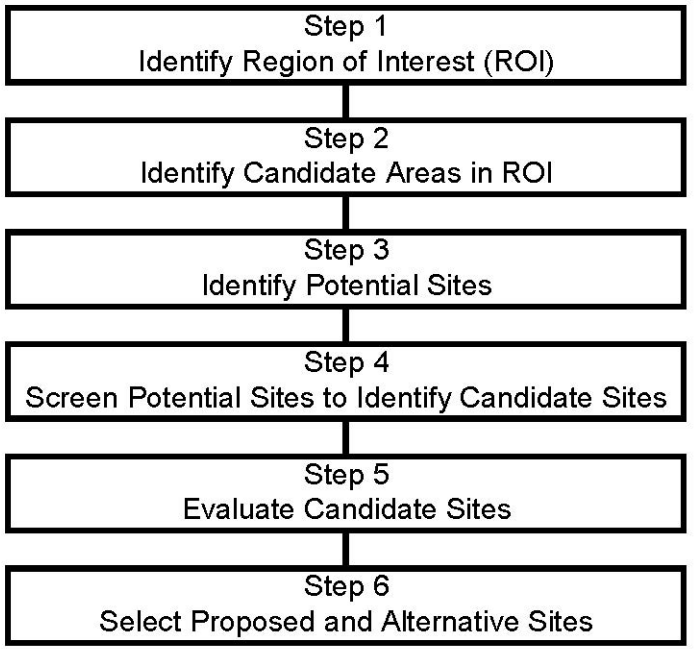
Objectives

- Identify and evaluate alternative sites in a systematic, flexible, defensible and quantifiable/quantitative manner
- Provide information to use in selecting a preferred site with desirable environmental, technical and economic conditions
- Demonstrate that no “obviously superior” sites exist in the designated region of interest (ROI)

Site Selection Process

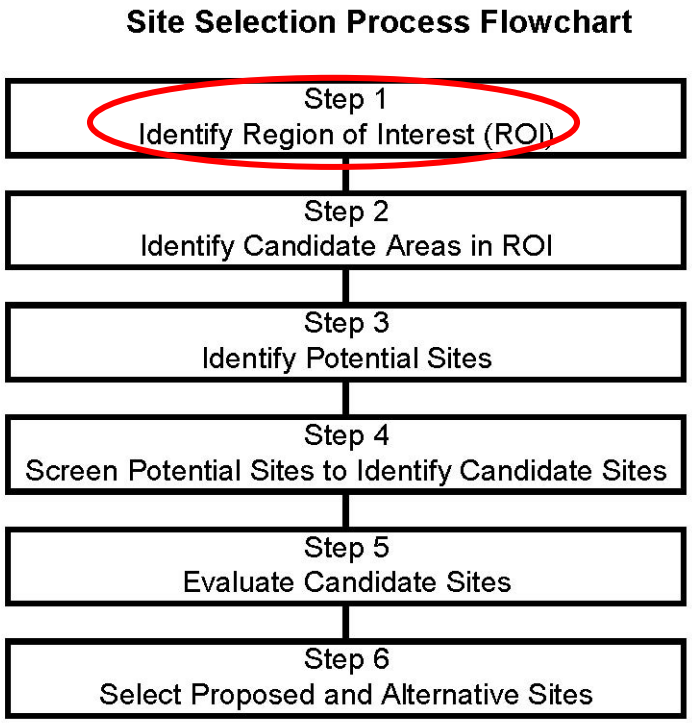
- Reference documents
  - **NUREG-1555:** Standard Review Plans for Environmental Reviews for Nuclear Power Plants: Environmental Standard Review Plan
  - **Regulatory Guide 4.2:** Preparation of Environmental Reports for Nuclear Power Stations
  - **Regulatory Guide 4.7:** General Site Suitability Criteria for Nuclear Power Stations
  - **EPRI Siting Guide (2022):** Advanced Nuclear Technology: Site Selection and Evaluation Criteria for New Nuclear Energy Generation Facilities
- Siting study steps
  1. Identify region of interest
  2. Identify candidate areas
  3. Identify potential sites
  4. Screen potential sites to identify candidate sites
  5. Evaluate candidate sites
     - Modified Delphi Method
  6. Select proposed and alternative sites

Site Selection Process Flowchart



Adapted from: EPRI Advanced Nuclear Technology: Site Selection and Evaluation Criteria for New Nuclear Energy Generation Facilities (Siting Guide)

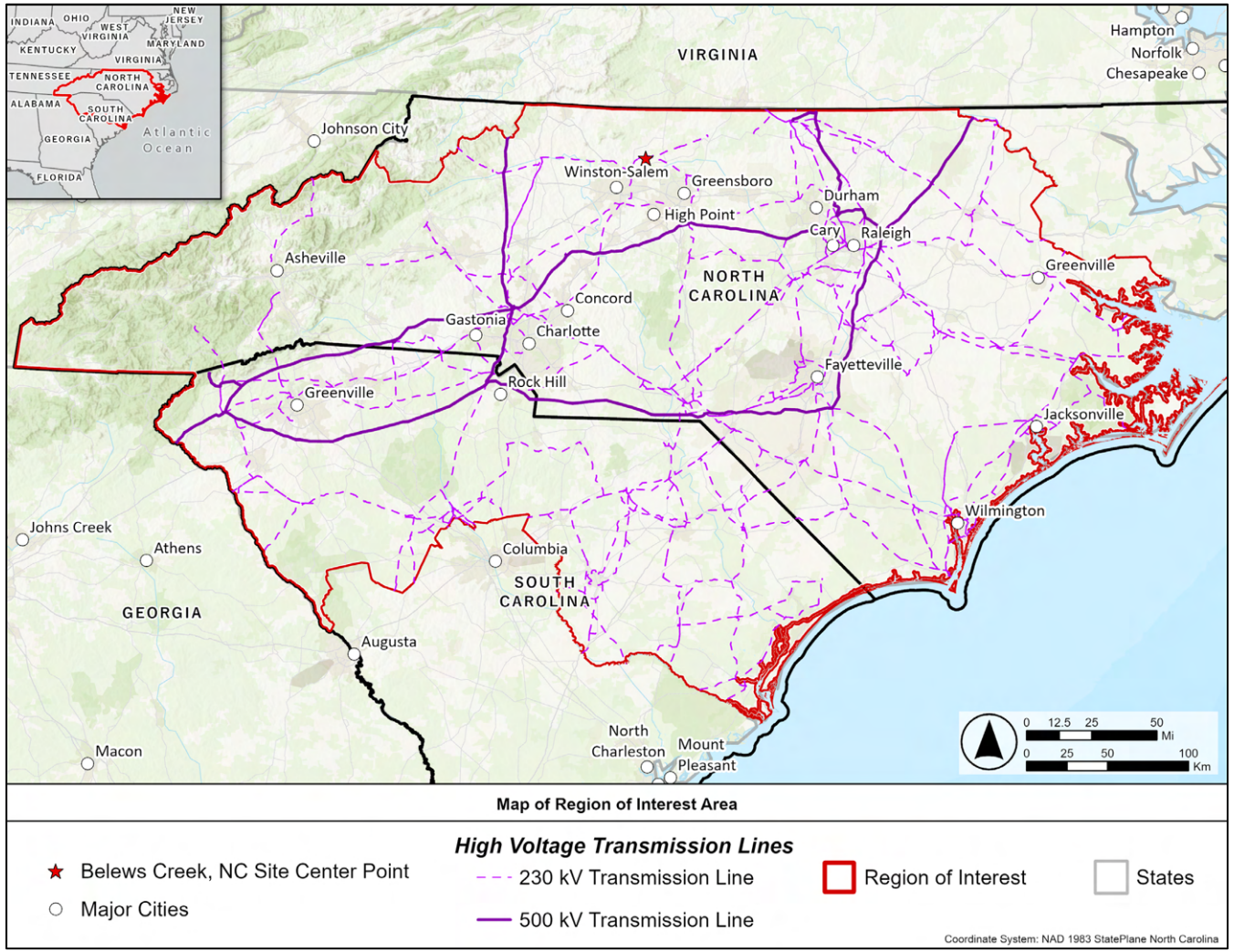
Step 1: Identify Region of Interest



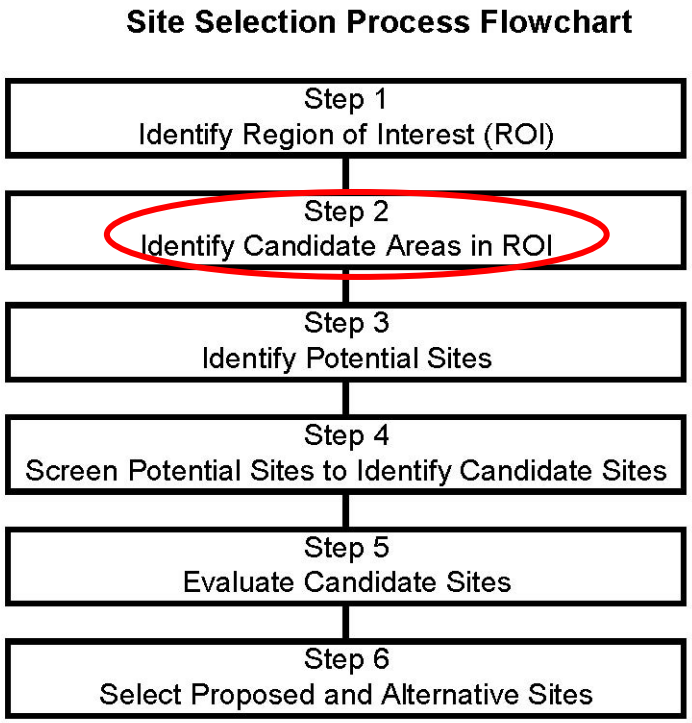
Adapted from: EPRI Advanced Nuclear Technology: Site Selection and Evaluation Criteria for New Nuclear Energy Generation Facilities (Siting Guide)

- As defined in NUREG-1555, the ROI is defined as the geographic area to be considered in searching for potential power plant sites.
- For this study, the ROI was defined as the combined service territory of Duke Energy Carolinas, LLC (DEC) and Duke Energy Progress, LLC (DEP).
  - Covers most of North Carolina and South Carolina

Transmission Lines



Step 2: Identify Candidate Areas



Adapted from: EPRI Advanced Nuclear Technology: Site Selection and Evaluation Criteria for New Nuclear Energy Generation Facilities (Siting Guide)

- As defined in NUREG-1555, candidate areas are areas within the ROI that remain after unsuitable areas are eliminated.
- The ROI was screened for exclusionary factors to eliminate those areas in which it is less feasible to site a small modular reactor facility due to regulatory, institutional, facility design and/or environmental constraints.

Exclusionary Criteria

- Areas within a 3-mile buffer with a population density of 500 people per square mile or more
- Areas within 25 miles of capable faults
- Areas that exceed a peak ground acceleration of 0.6 gravity (g) based on 2% probability of exceedance within 50 years
- Areas within active military bases
- Areas within protected lands
- Areas not within 10 miles of a river with a mean annual flow of 800 cubic feet per second (CFS) or greater – or adjacent to a waterbody of 2,000 acres or greater
- Areas not within 20 miles of barge or rail transport

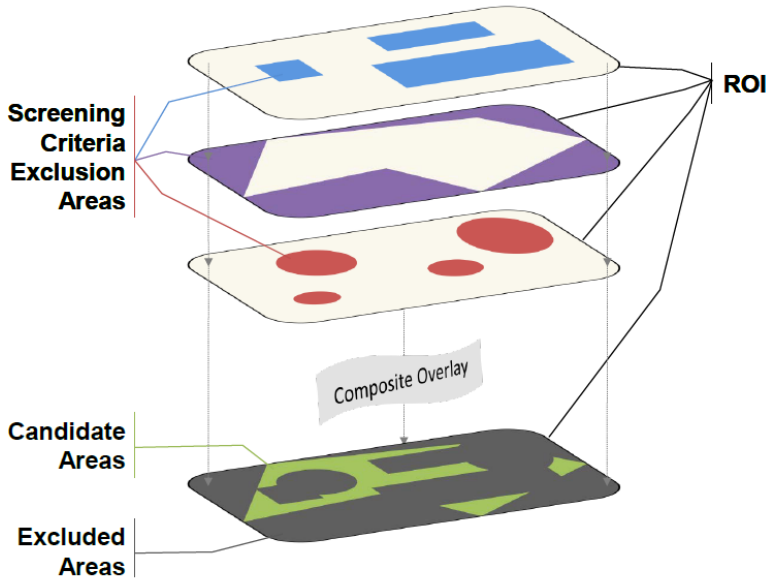
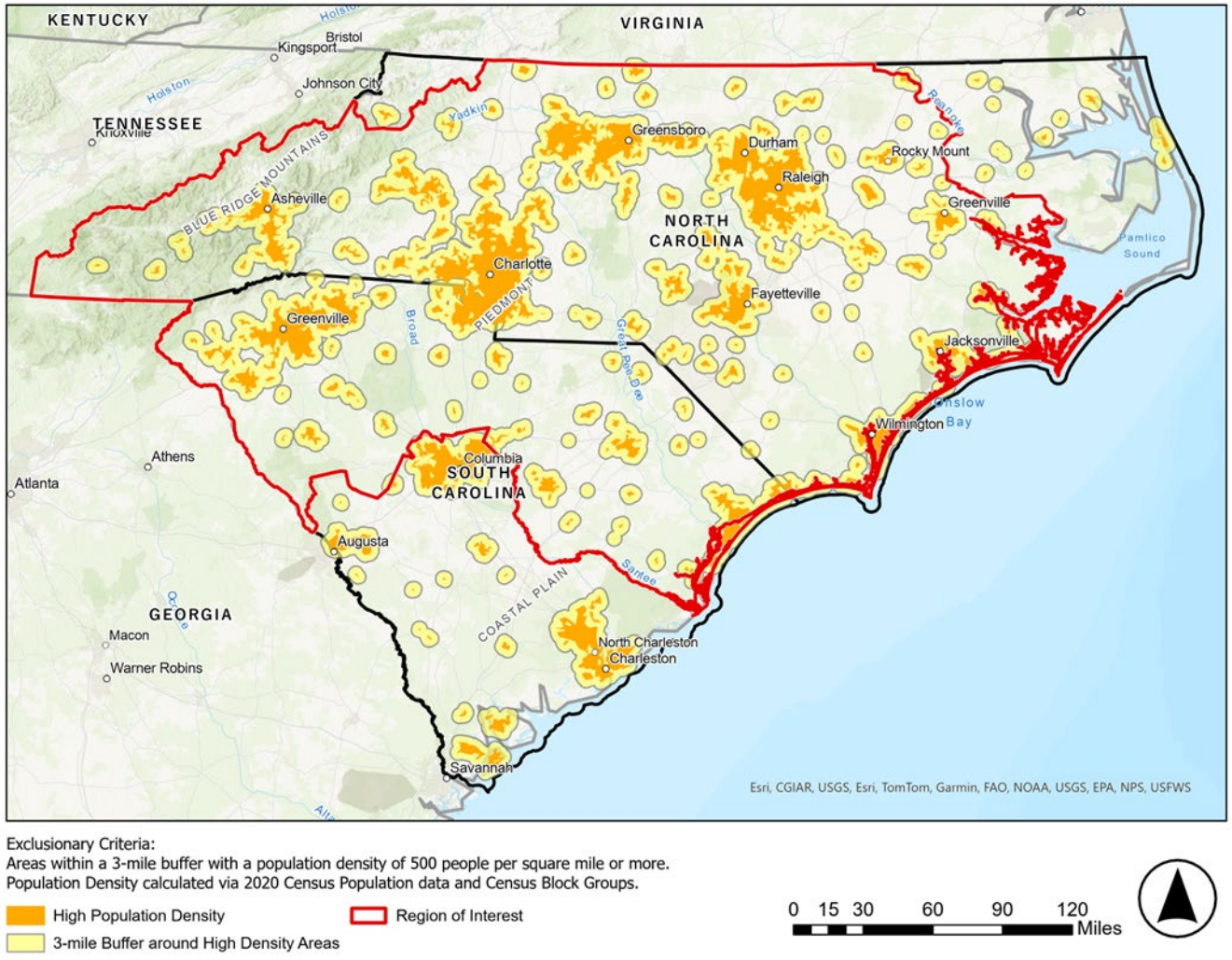


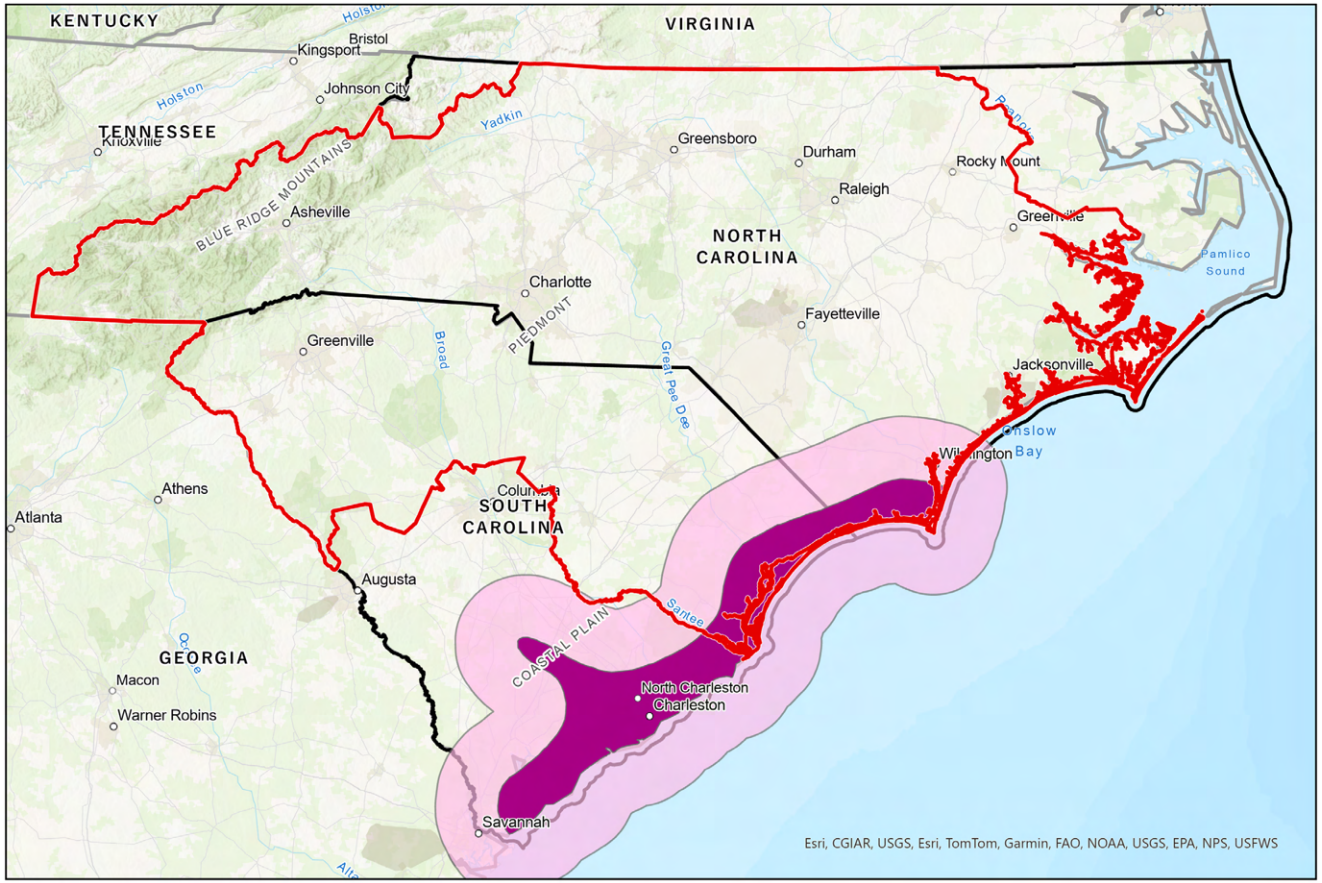
Image source: EPRI Advanced Nuclear Technology: Site Selection and Evaluation Criteria for New Nuclear Energy Generation Facilities (Siting Guide)

Exclusionary Criteria – Population Density



Data source: U.S. Census Bureau

Exclusionary Criteria – Capable Faults



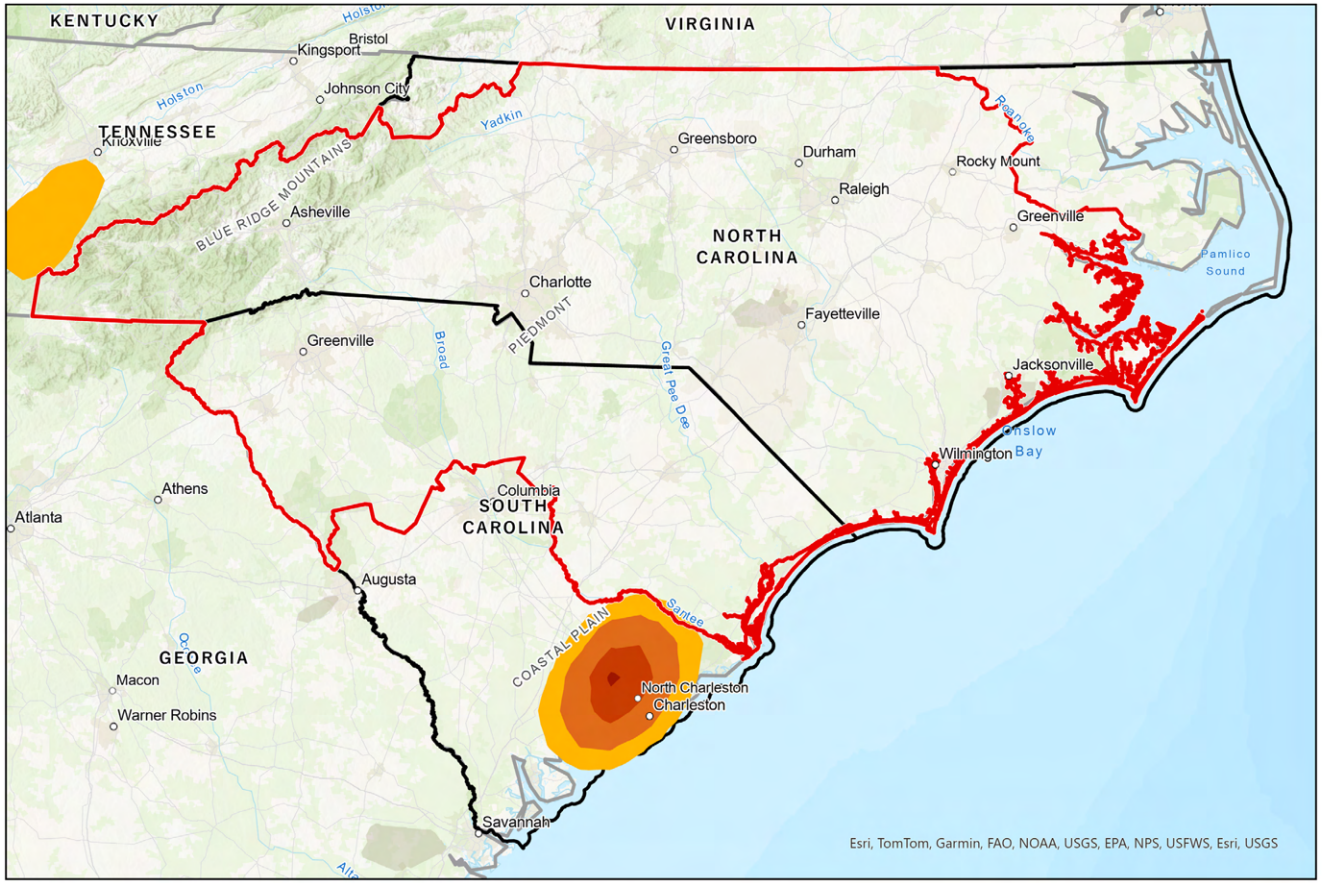
Exclusionary Criteria:
Areas within 25 miles of Capable Faults excluded. Due to the lack of quaternary surface faults on the East Coast, earthquake induced liquefaction features were used to determine geologic hazard areas

Charleston Liquefaction Features
Region of Interest
25 mi Geologic Hazard Buffer

0 15 30 60 90 120 Miles

Data source: U.S. Geological Survey (USGS) Earthquake Hazards Program

Exclusionary Criteria – Peak Ground Acceleration



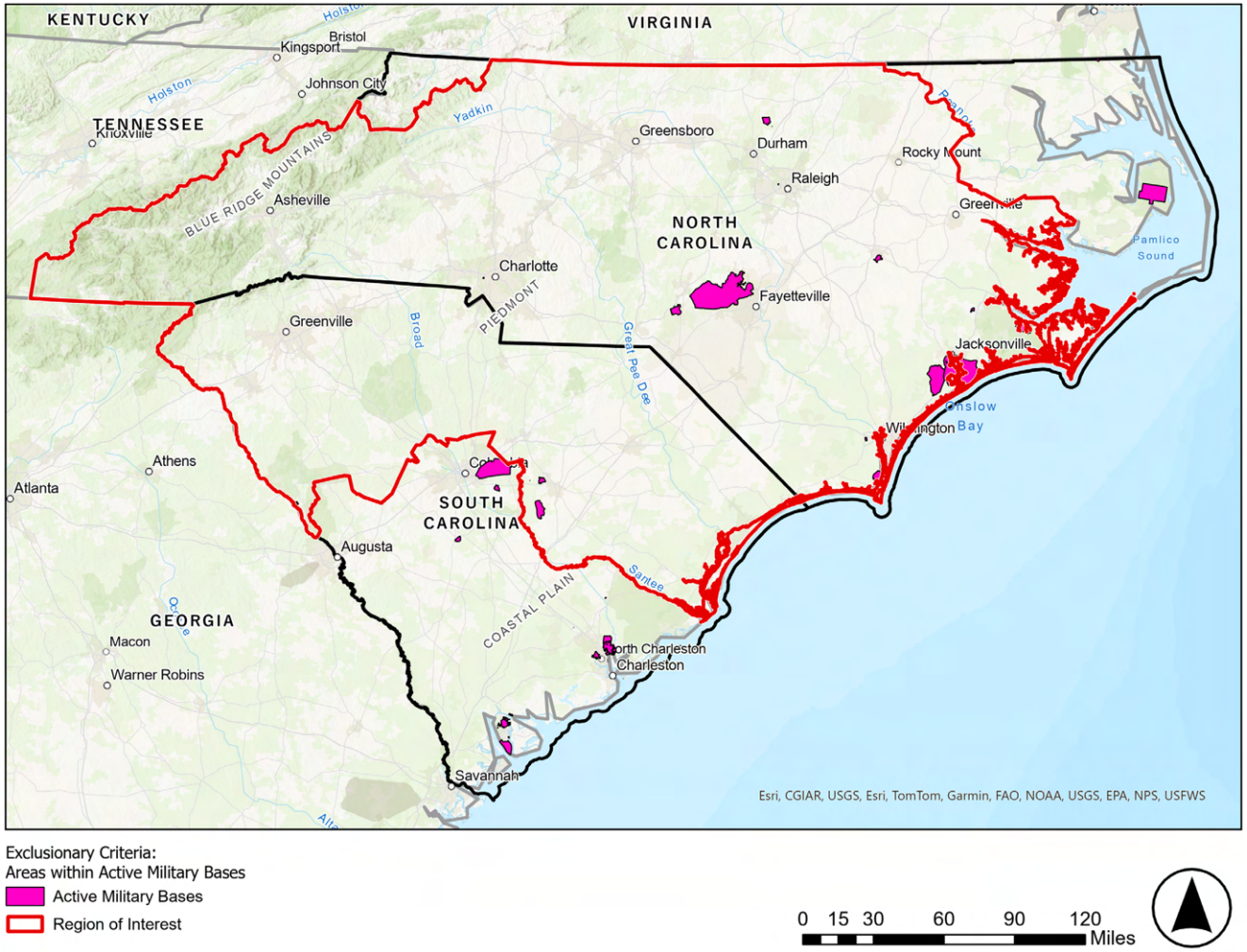
Exclusionary Criteria:
Areas that exceed a peak ground acceleration of 0.6 g based on 2% probability of exceedance within 50 years

Peak Ground Acceleration (g)
- 0.6 – 0.8 g
- 0.8 – 1.2 g
- 1.2 – 1.6 g
- 1.6 – 2 g
- Region of Interest

0 15 30 60 90 120 Miles

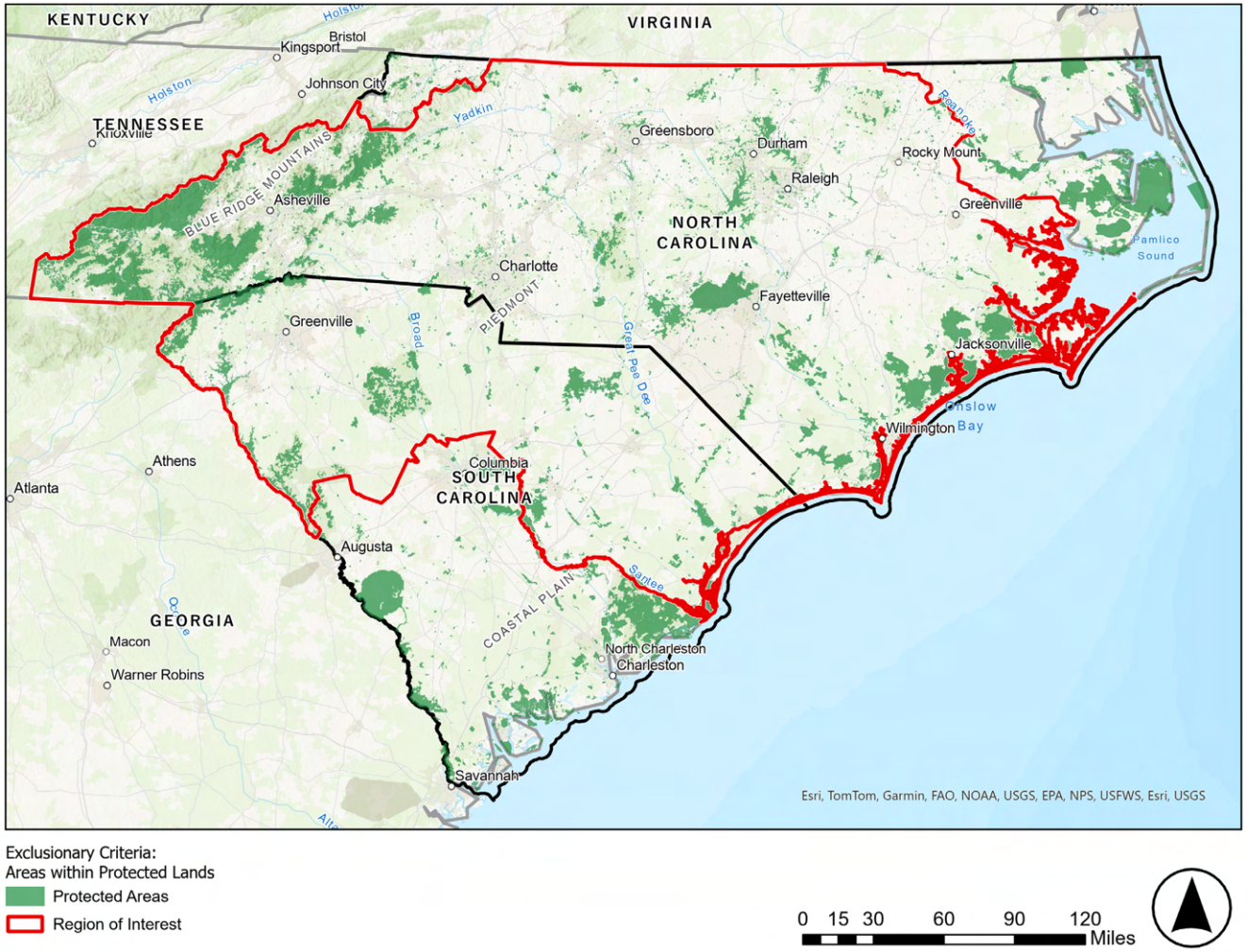
Data source: USGS uniform-hazard ground motion maps for the conterminous U.S., Alaska and Hawaii

Exclusionary Criteria – Military bases



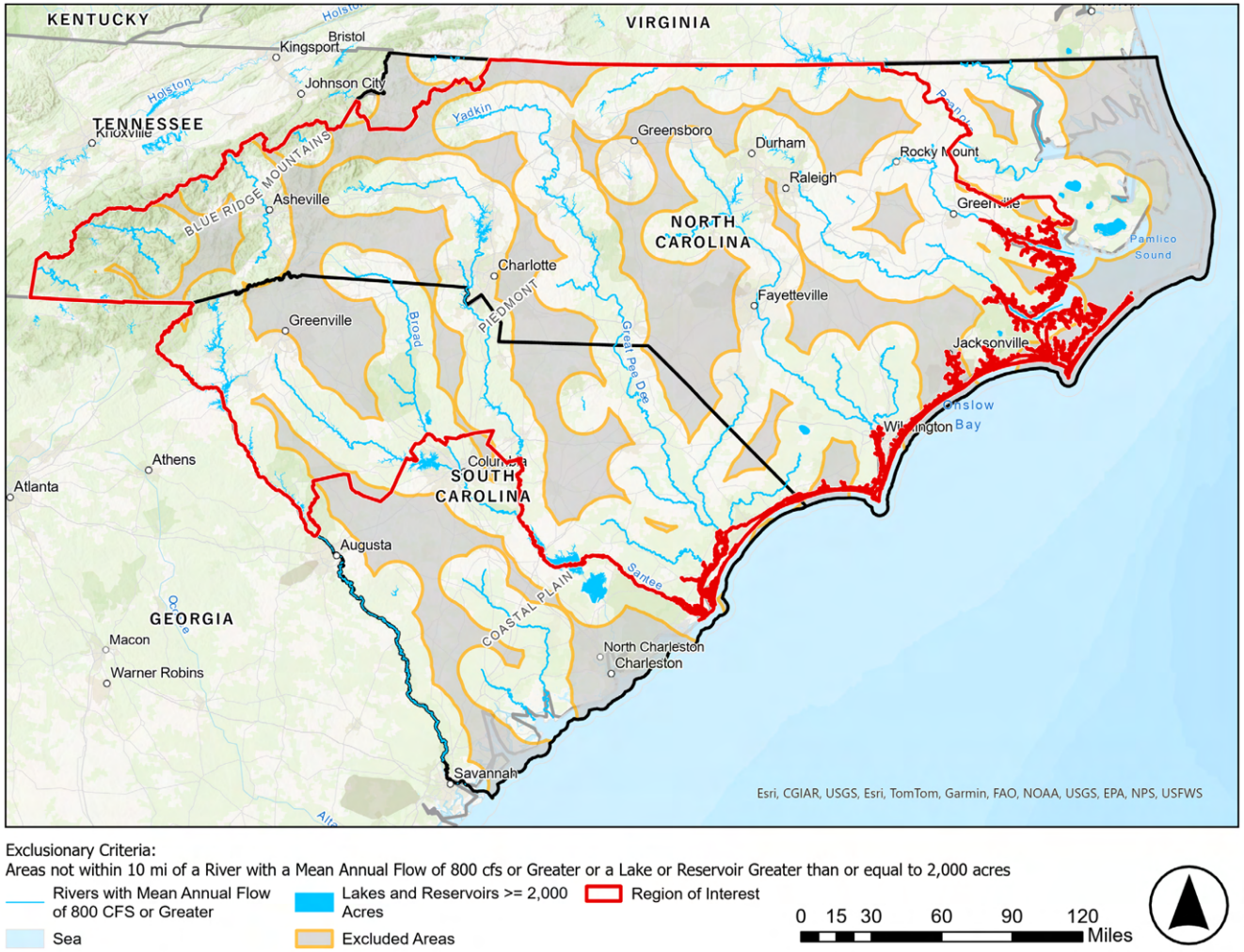
Data source: U.S. Department of Transportation/National Transportation Atlas Database

Exclusionary Criteria – Protected Lands



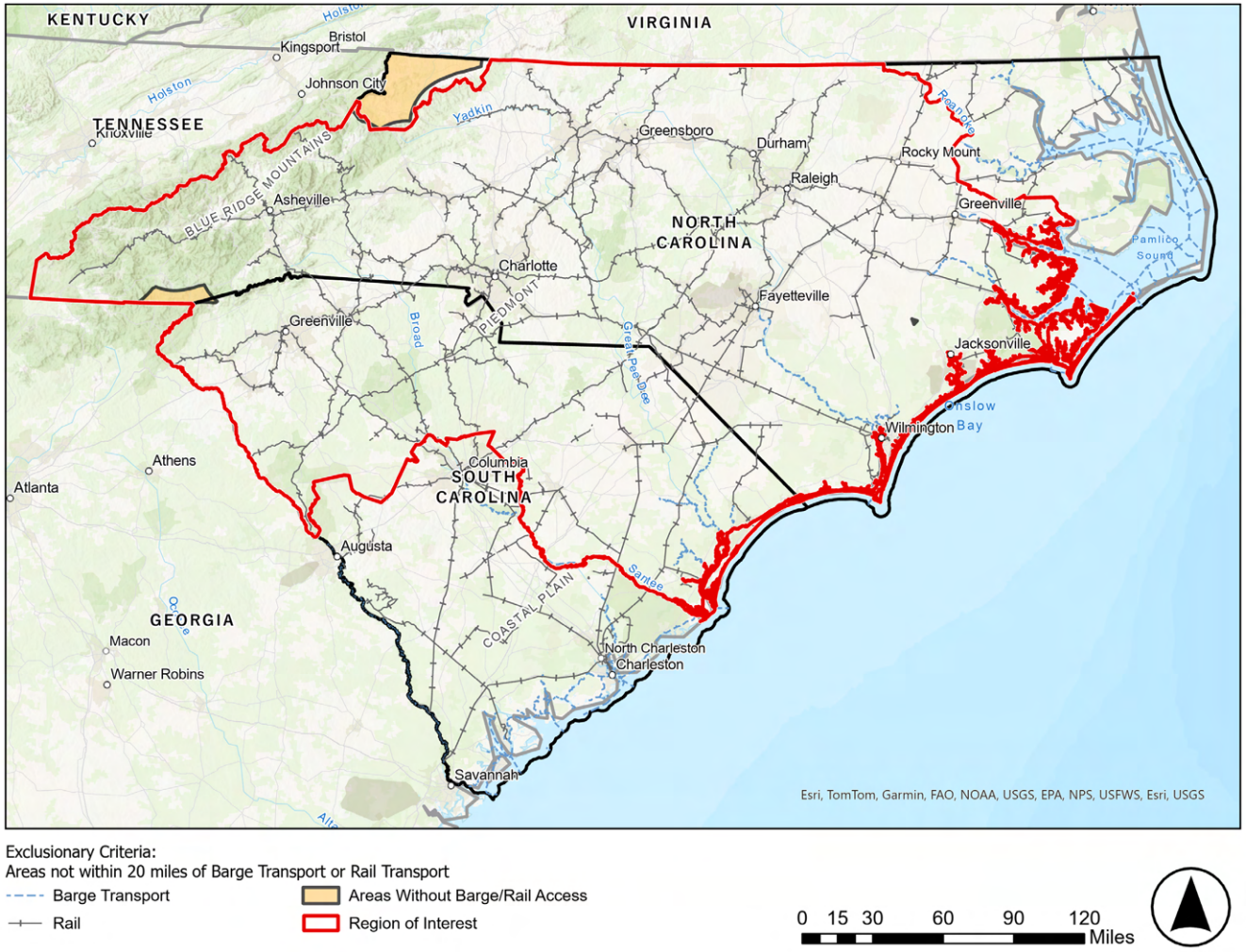
Data source: USGS Protected Areas Database

Exclusionary Criteria – Waterbody



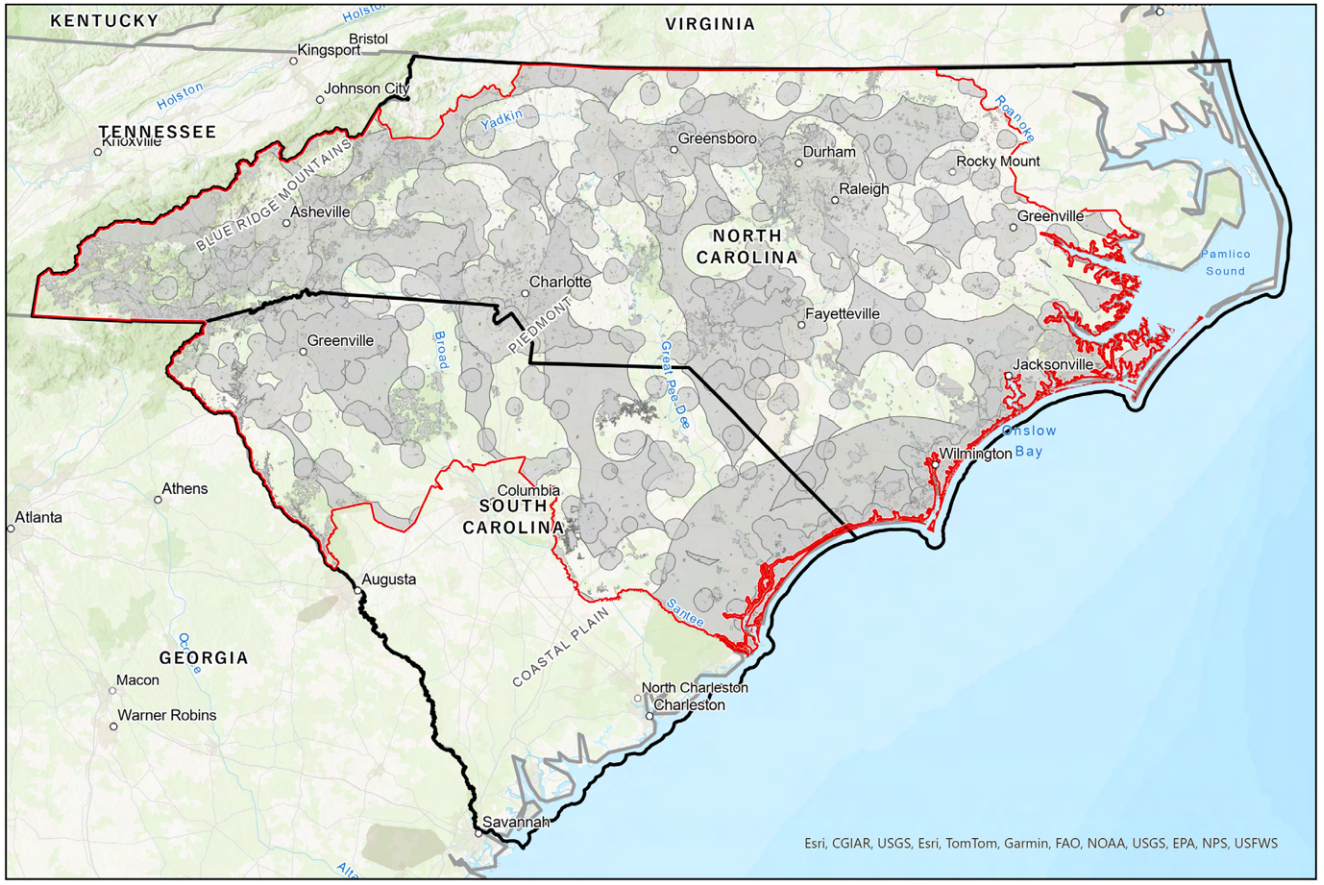
Data source: USGS National Hydrography Dataset

Exclusionary Criteria – Barge or Rail Access

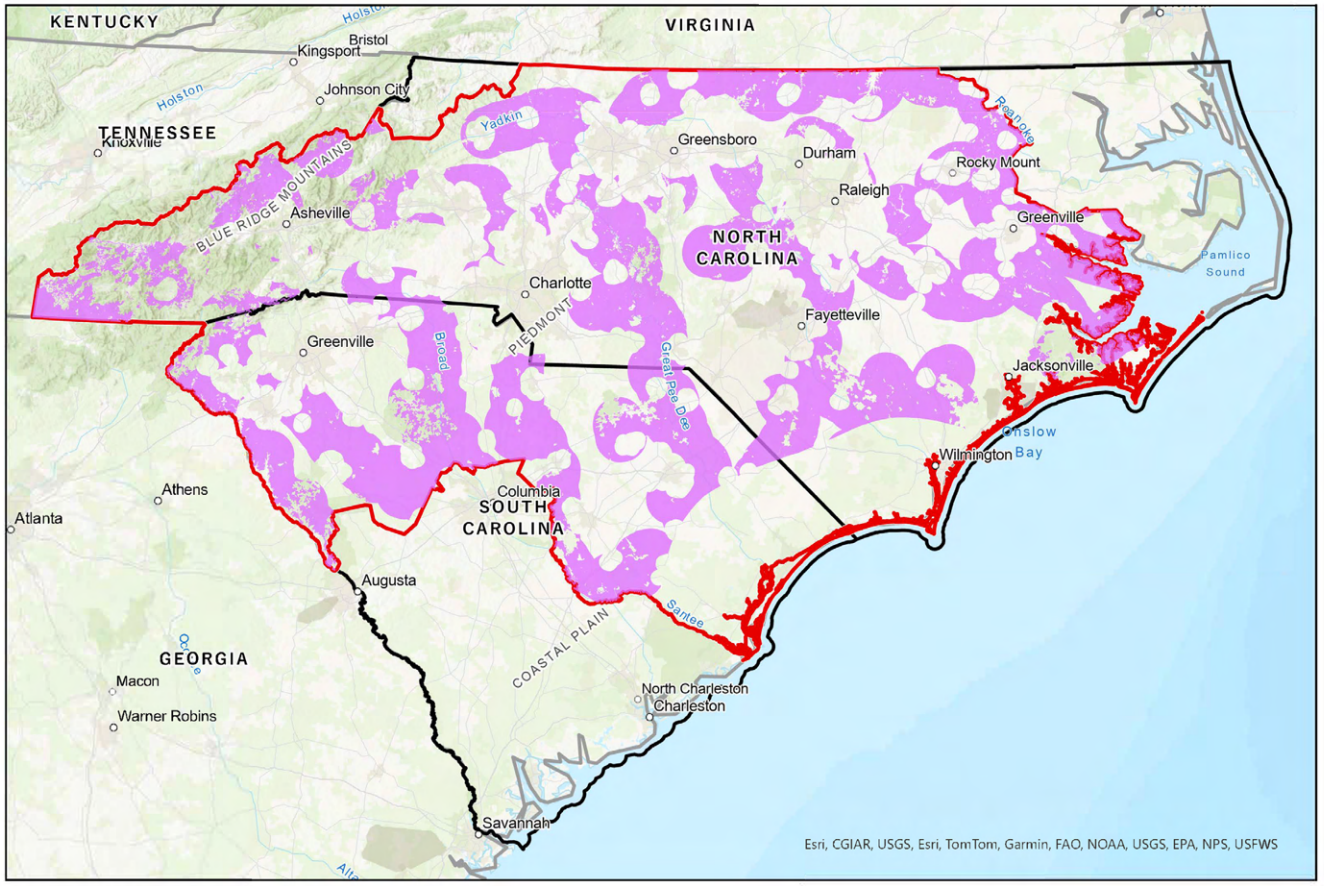


Data source: National Pipeline Mapping System (Department of Transportation) and U.S. Census Bureau

Exclusionary Criteria – Composite



Candidate Areas



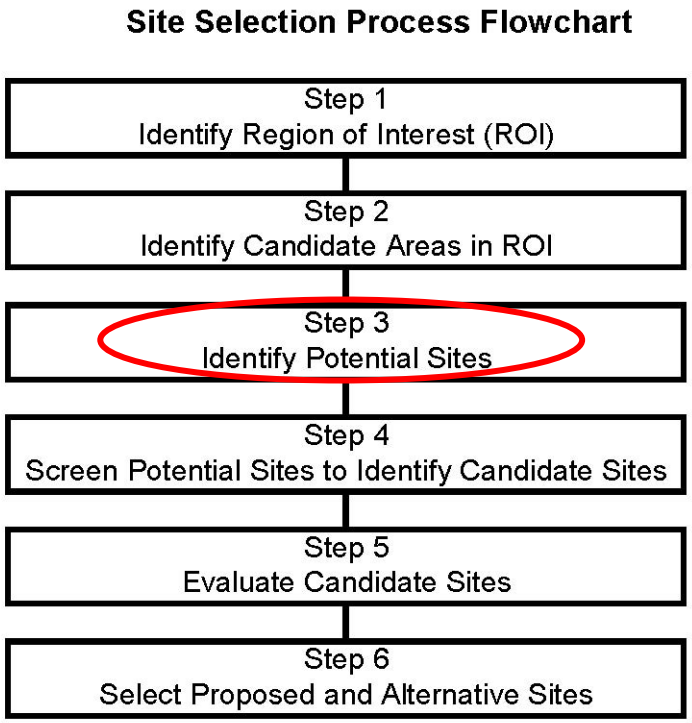
Candidate Areas:
Areas not impacted by any Exclusionary Criteria

Candidate Areas

Region of Interest

0 15 30 60 90 120 Miles

Step 3: Identify Potential Sites



Adapted from: EPRI Advanced Nuclear Technology: Site Selection and Evaluation Criteria for New Nuclear Energy Generation Facilities (Siting Guide)

- As defined in NUREG-1555, potential sites are specific locations within the candidate areas that are identified for preliminary assessment in establishing candidate sites.
- Potential sites were identified by canvassing the candidate areas to locate discrete areas that would be more favorable for the siting of a new nuclear plant.

Identify Potential Sites

- More than 30 preliminary sites identified within the ROI
- 21 preliminary sites in the candidate areas
- Of the 21 preliminary sites, 10 determined to be less feasible based on:
  - Proximity to a cooling water source
  - Location in higher seismic risk areas
  - Proximity to transmission
  - Proximity from high-population and high-population-density areas
  - Compatible land use
  - Avoidance of ecologically sensitive and special designation areas
  - Avoidance of wetlands (to the extent practical)
  - Avoidance of special dedicated land uses, such as national parks, indigenous lands, historic areas and cemeteries
  - Proximity to transportation and heavy-haul infrastructure
- Potential sites identified: 11

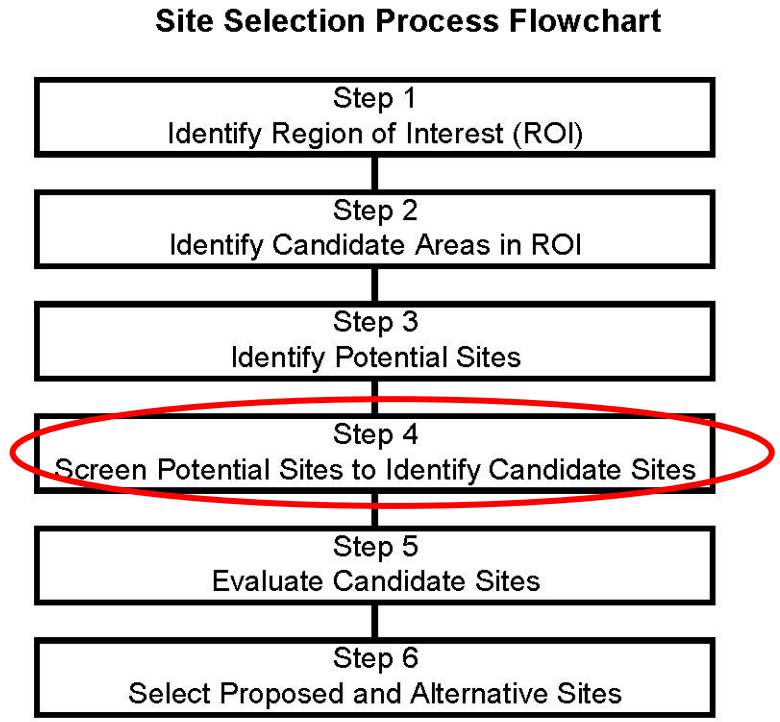
Step 4: Screen Potential Sites to Identify Candidate Sites

Potential Sites

11

Candidate Sites

5



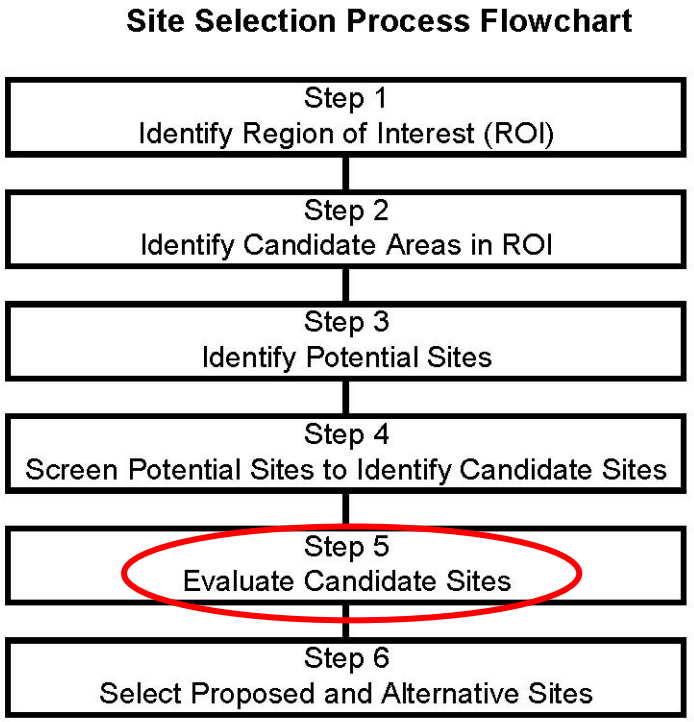
Adapted from: EPRI Advanced Nuclear Technology: Site Selection and Evaluation Criteria for New Nuclear Energy Generation Facilities (Siting Guide)

Screen Potential Sites to Identify Candidate Sites

- Potential sites screened against the following:
  - **Site safety:** Major nuclear licensing issues, such as proximity to population centers, proximity to capable faults, peak ground acceleration values at the site and proximity to hazardous land issues
  - **Environmental acceptability:** Major environmental issues, such as proximity to environmentally sensitive areas, cultural resources, species of concern and aquatic resources, such as wetlands and streams
  - **Engineering and cost:** Major engineering and cost issues, such as cooling water availability, drought tolerance, buildability and proximity to heavy haul, transmission and existing coal or nuclear facilities at the site
- Weighting factors:
  - Sites with a lower number of potentially significant issues (e.g., 0, 1 or 2) were more desirable than sites with a higher number of potentially significant issues (e.g., 5 or higher).

Step 5: Evaluate Candidate Sites

- A total of 42 criteria from the EPRI Siting Guide (2022) were evaluated:
  - Health and safety aspects: 15 criteria
  - Ecological aspects: 10 criteria
  - Socioeconomic and land use aspects: 4 criteria
  - Engineering and cost aspects: 13 criteria
- Score the 5 candidate sites for the 42 criteria
  - 1-5, where 1 = least suitable and 5 = most suitable for each of the criteria being evaluated
  - Apply weighting factors to each criteria
    - 1-10, where 1 = least important and 10 = most important

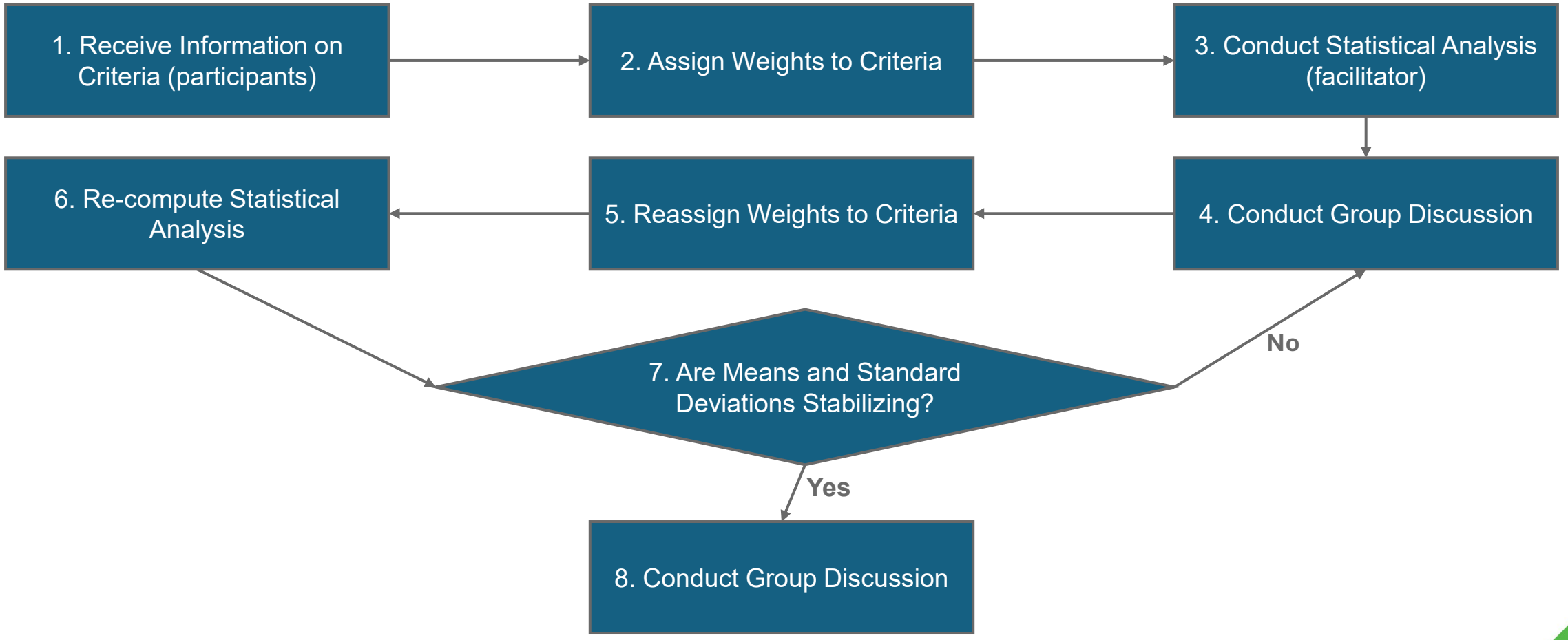


Adapted from: EPRI Advanced Nuclear Technology: Site Selection and Evaluation Criteria for New Nuclear Energy Generation Facilities (Siting Guide)

Modified Delphi Method

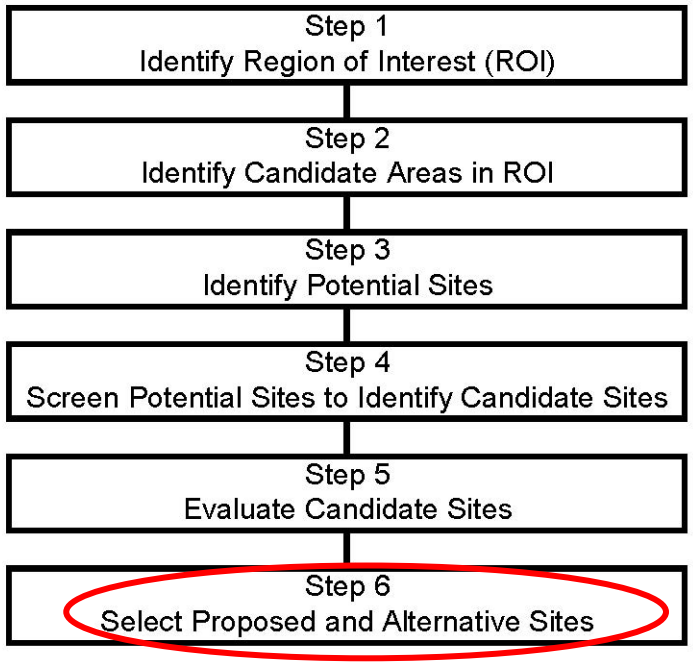
- Method overview
  - The Delphi Method is a structured communication technique developed as a systematic, interactive, decision-making process that relies on a panel of experts.
  - The intent is to establish the relative importance of each criterion for nuclear site selection through collective judgement of the selected group.
- Participants
  - Group of subject matter experts
    - Licensing
    - Mechanical
    - Environmental
    - Air resources
    - Water resources
    - Civil
    - Geotechnical
  - One (1) generalist
  - One (1) facilitator

Modified Delphi Method



Step 6: Select Proposed and Alternative Sites

Site Selection Process Flowchart



Adapted from: EPRI Advanced Nuclear Technology: Site Selection and Evaluation Criteria for New Nuclear Energy Generation Facilities (Siting Guide)

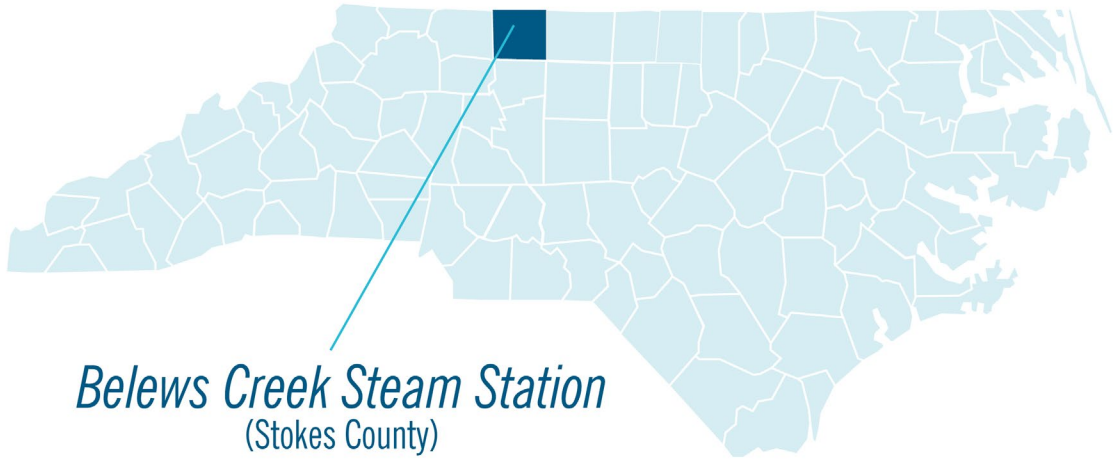
Candidate Sites

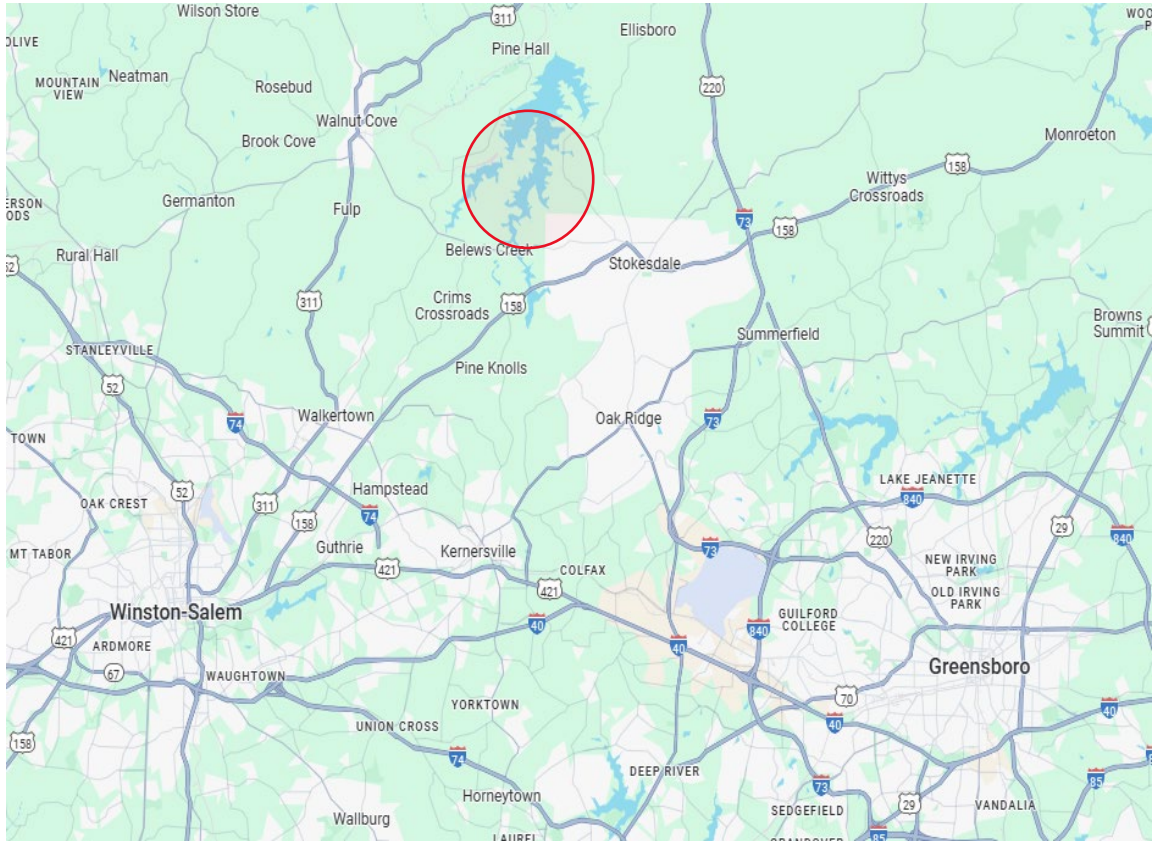
Rank	Site Name	Weighted Score
1	NC-16	**914**
2	NC-15	**910**
3	NC-19	**867**
4	NC-17	**829**
5	SC-04	**777**

Energy Community Sites

	Rank	Site Name	Weighted Score
Proposed Site	**1**	**NC-16**	**914**
	2	NC-15	**910**
Alternative Sites	**3**	**NC-19**	**867**
	4	**NC-17**	**829**
	5	SC-04	**777**

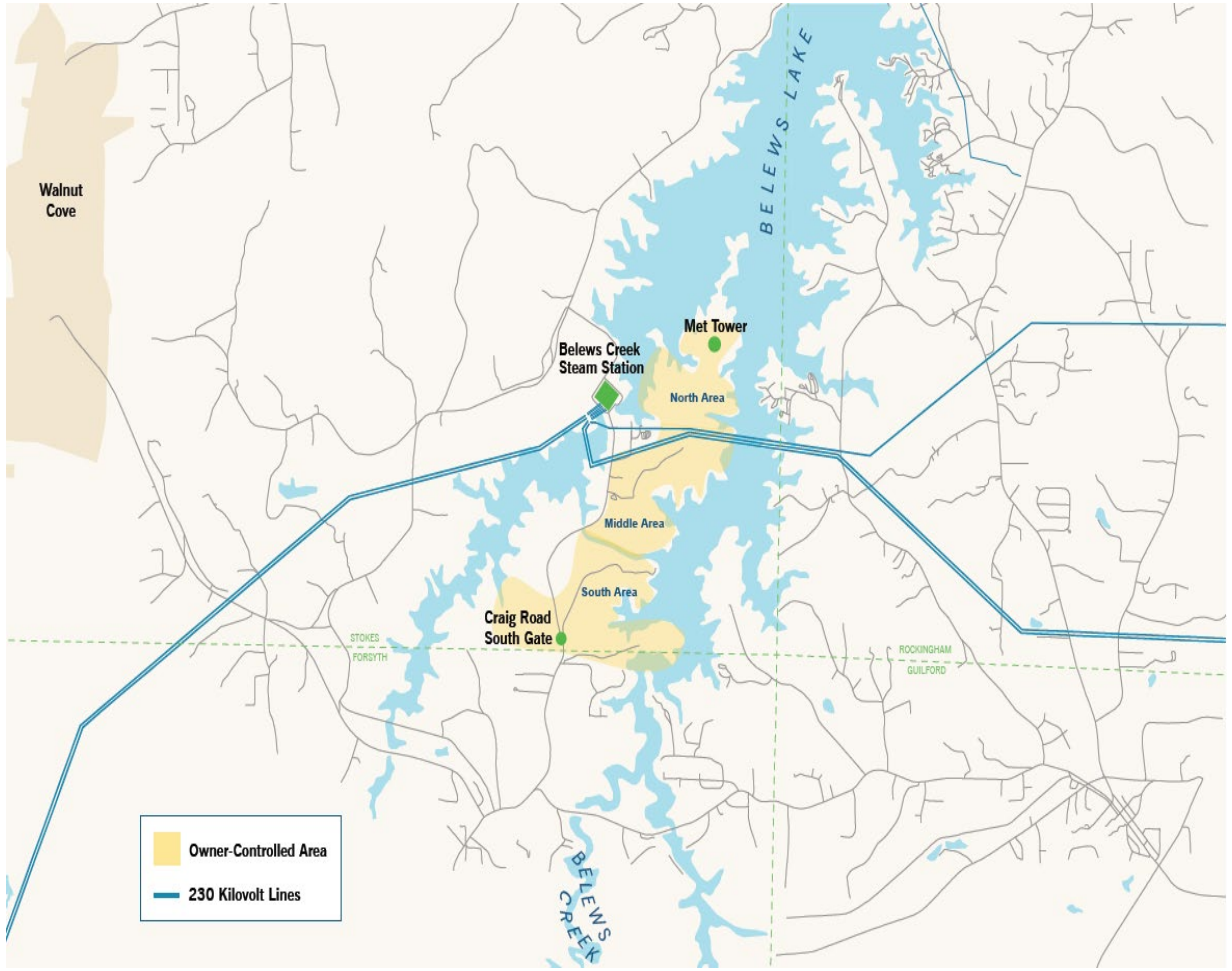
Site Near Belews Creek Steam Station





Site Near Belews Creek Steam Station

- Water source
- Railroad and transportation access
- Environmental and engineering advantages by using existing transmission infrastructure



QUESTIONS?