Strategic Sustainability Assessment (SSA) Initiative

Sharing Future Space

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What is the SSA?

- Provides Army leadership with analysis of the “state of the future.”
- Suggests strategies to close the gap between forecasts and desired futures.
- Bridges long-term strategic vision with short-term initiatives to meet objectives.
- Establishes dialogue with Army leaders, partners and stakeholders.

Tools and Data Sources

Data Sources

Analytical Tools

landuse leam and impact assessment evolution model

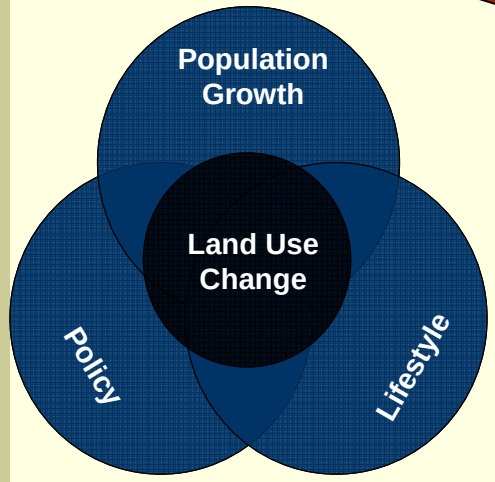
SIRRA
Sustainable Installations Regional Resource Assessment

L-THIA
Long-Term Hydrologic Impact Assessment

E-GAS
Economic Growth Analysis System

**Leverages existing national data sets and DoD tools

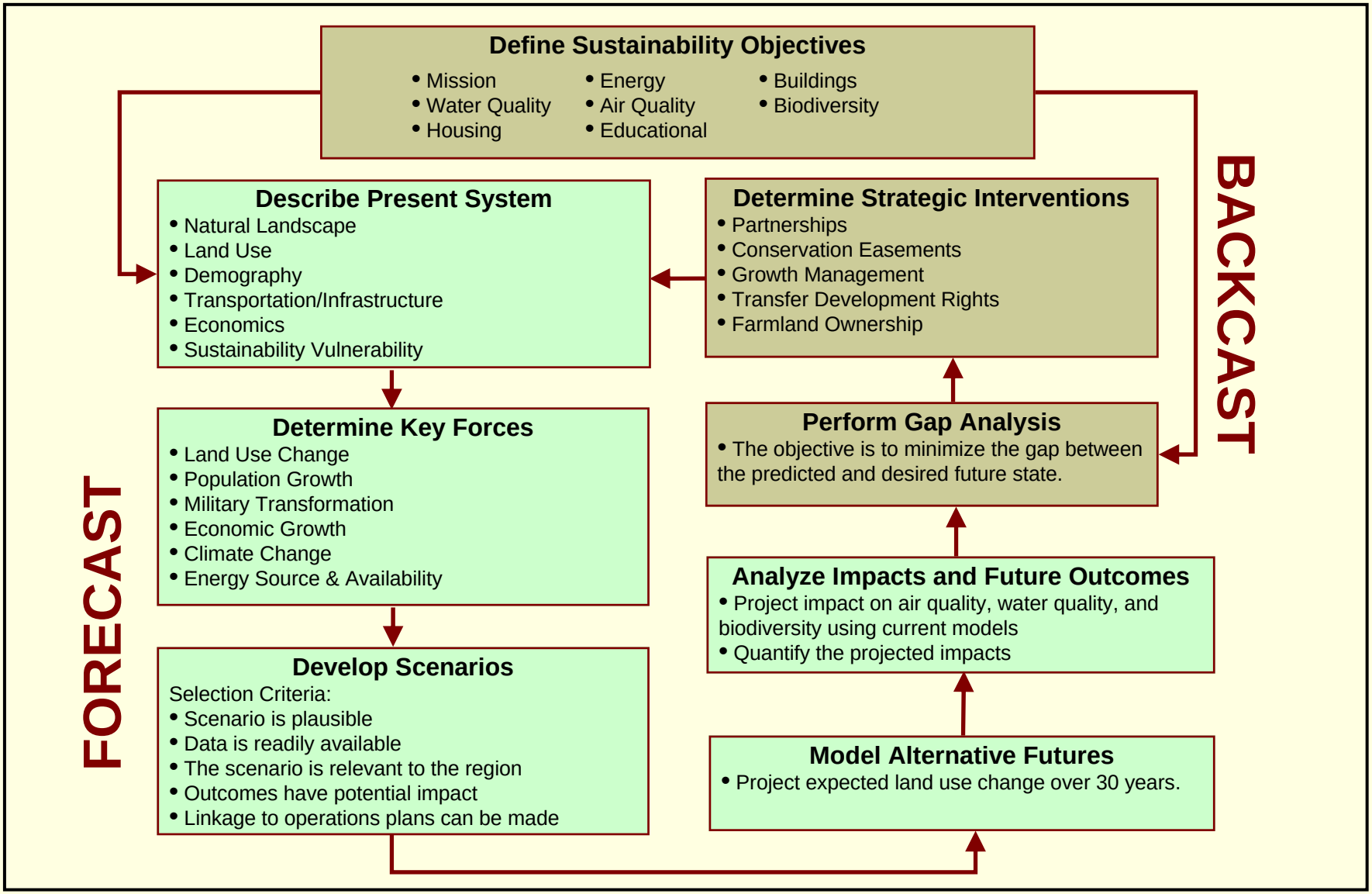
Evaluating Regional Change



Key Forces

Pressures are accelerating

Impacts



Steps Completed: Forecast (lightly shaded boxes)

Steps In-Process: Backcast—the first analysis identifying gaps between forecast and desired future is complete.

Future Steps: Complete and Reiterate Backcast—forecast 30 years out incorporating recommended policy changes and mitigation strategies as assumptions. Revise sustainability objectives as necessary. Repeat process.

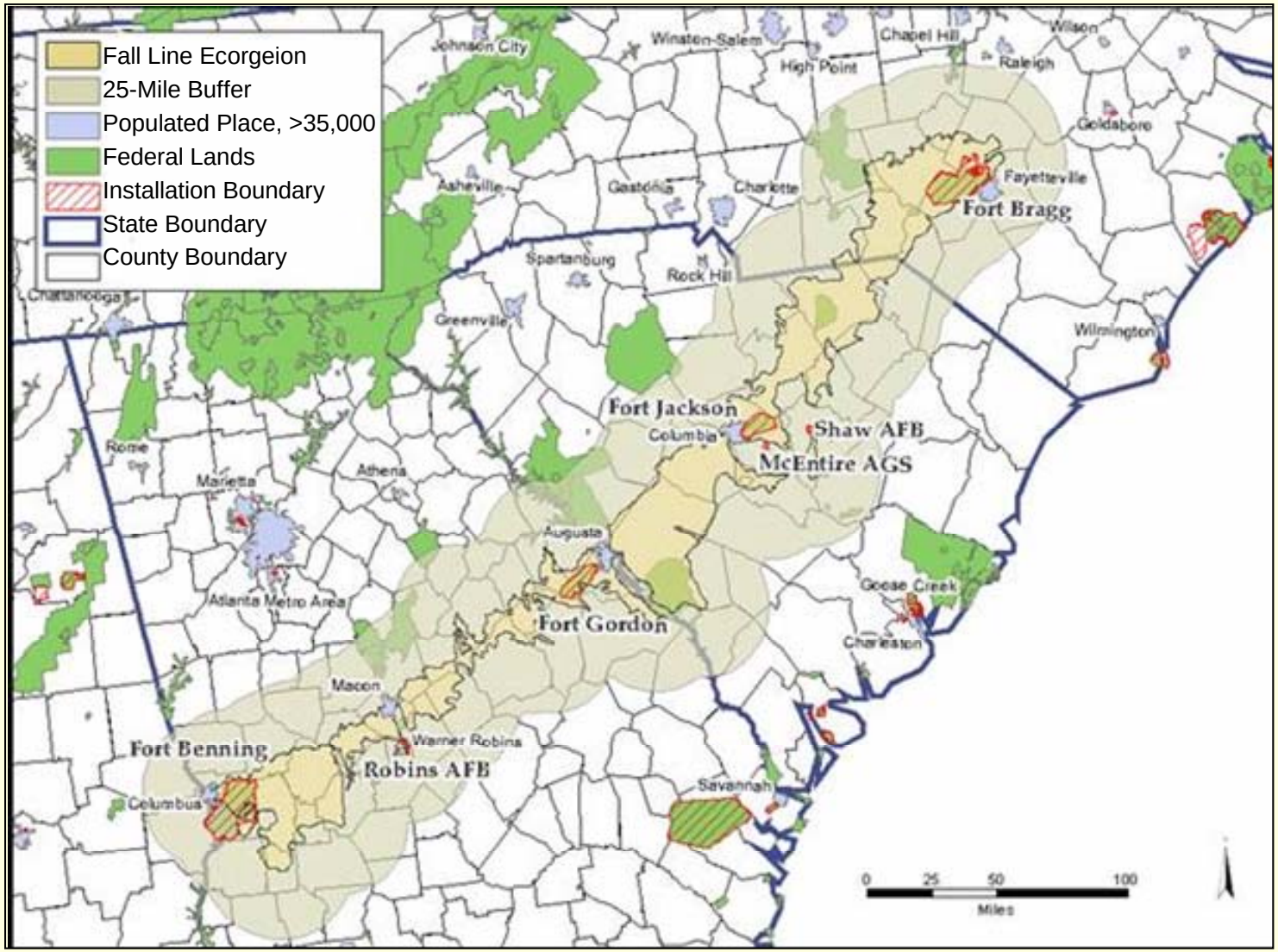
Process

- Define sustainability objectives:
  - Mission, Water, Housing, Energy, AQ, Education
- Describe the Present System
- Determine Key Forces:
  - Land Use Change, Population, Transformation, Economic, Climate, Energy Source and Availability
- Develop scenarios
- Model alternative futures:
  - Forecast expected land use change over 30 years
- Analyze Impacts and Future Outcomes
- Perform Gap Analysis
- Determine Strategic Interventions

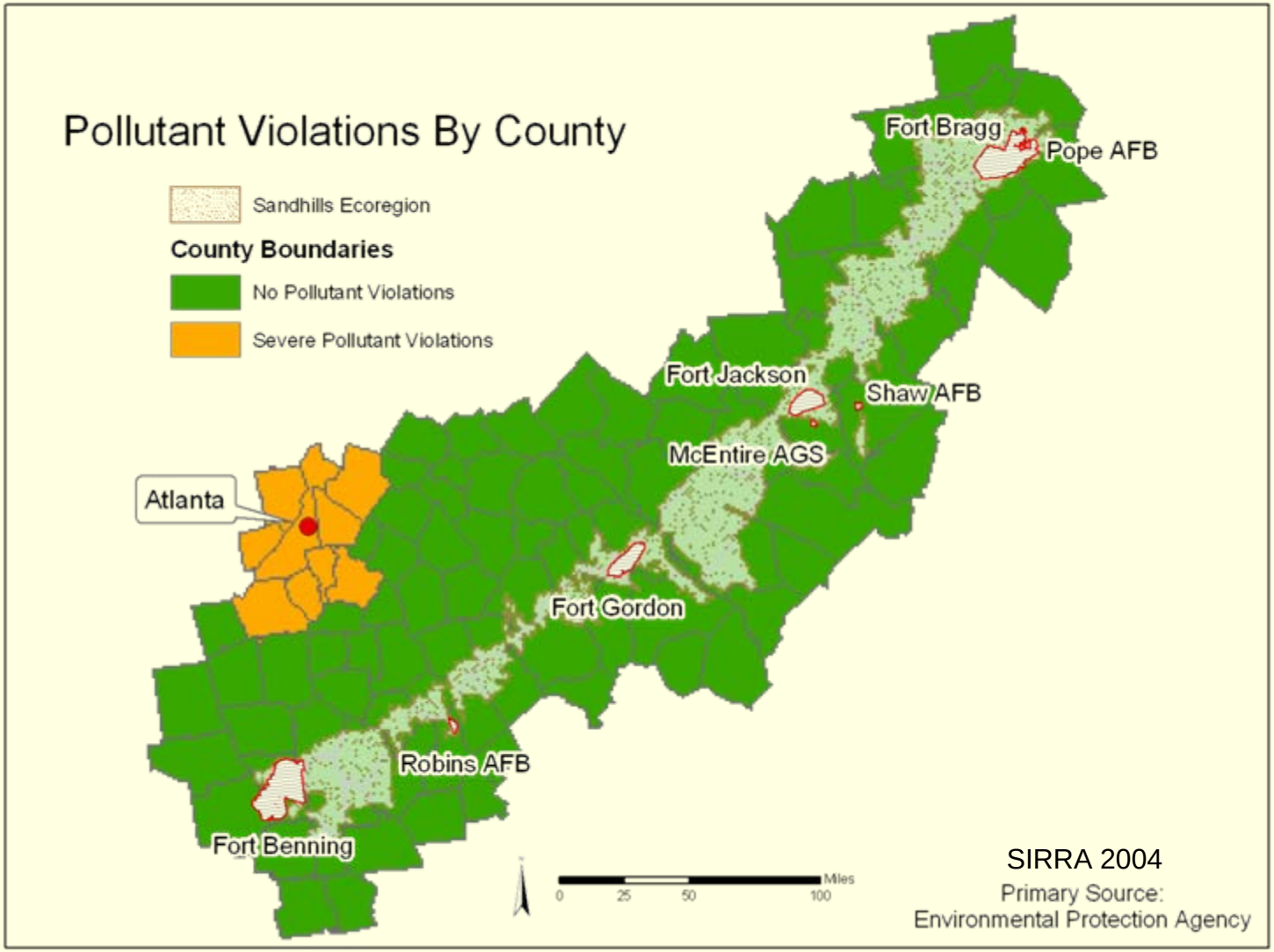
Define Sustainability Objectives

- Mission Objectives:
  - Improve ability to organize, equip, train, & deploy.
- Water Objectives:
  - Water is plentiful and meets standards.
- Housing affordability and availability:
  - Viable stock of available and affordable housing.
- Energy:
  - Reliable, secure, domestic, and renewable energy sources.
- Air quality:
  - Region meets ambient standards year-round.
- Education:
  - School agencies meet required space objectives.
- Biodiversity:
  - Biodiversity is increasing; habitat is maintained & growing.

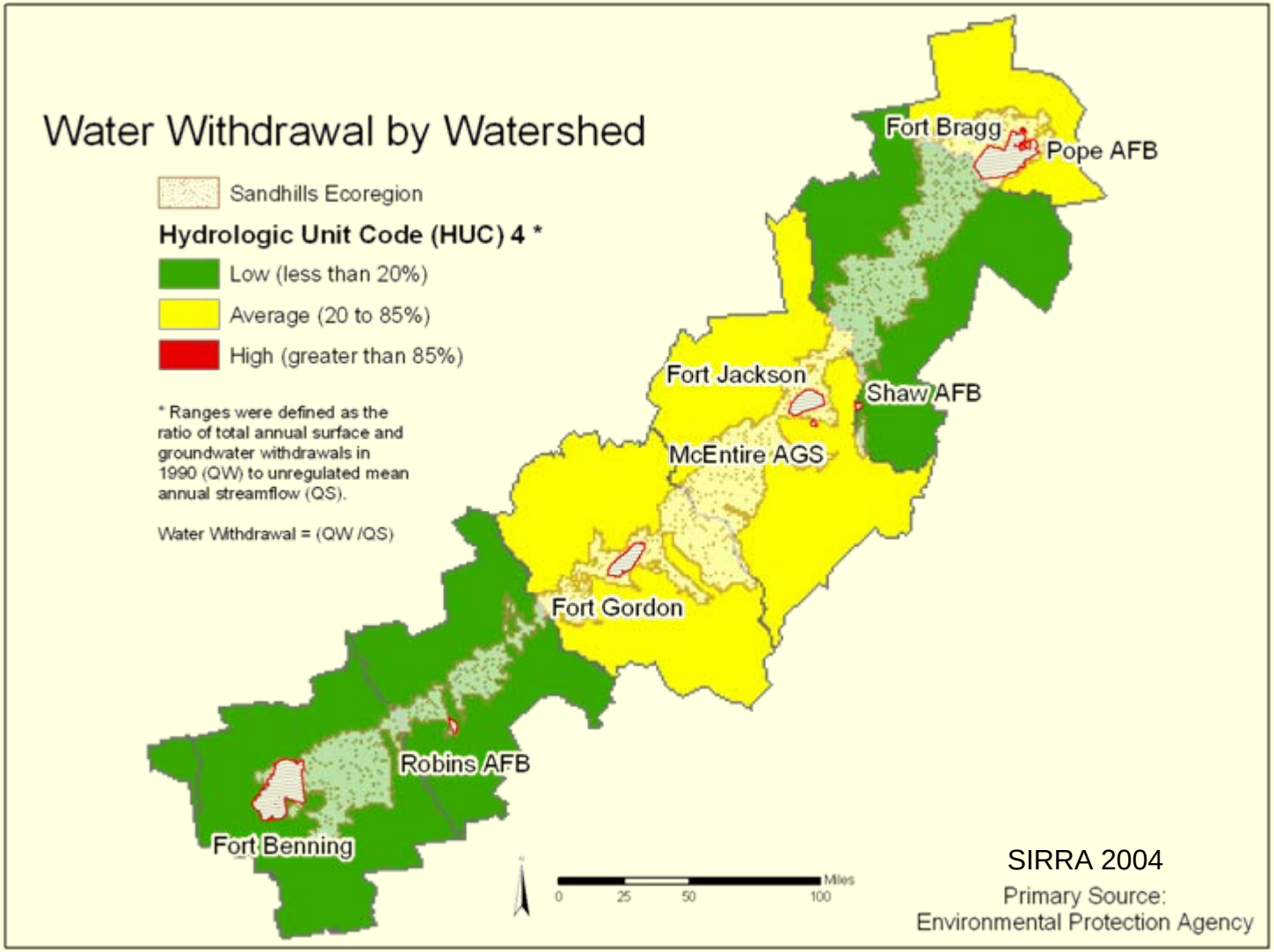
Defining the Region: “Fall Line”



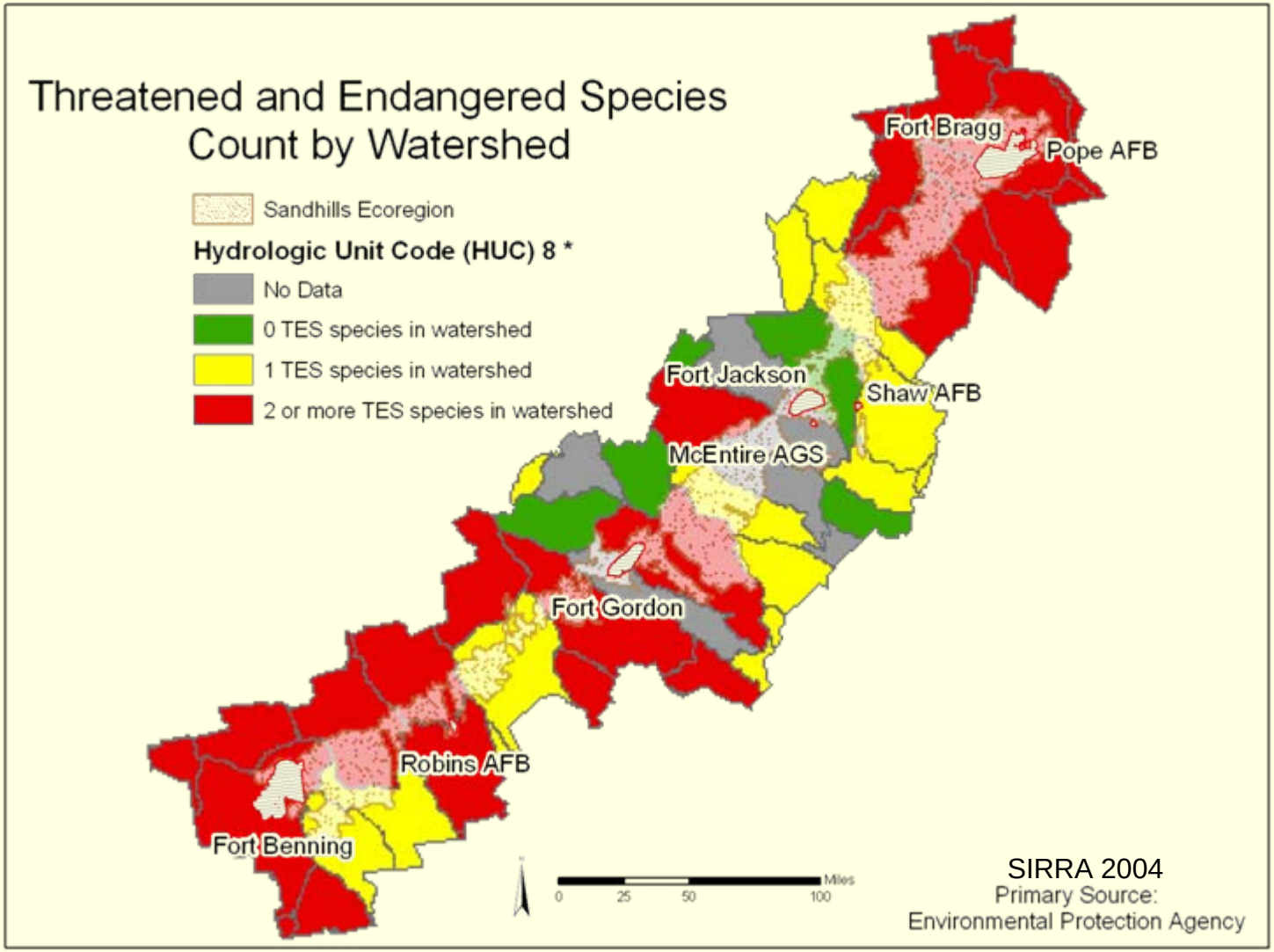
Describe Present System: Air Quality



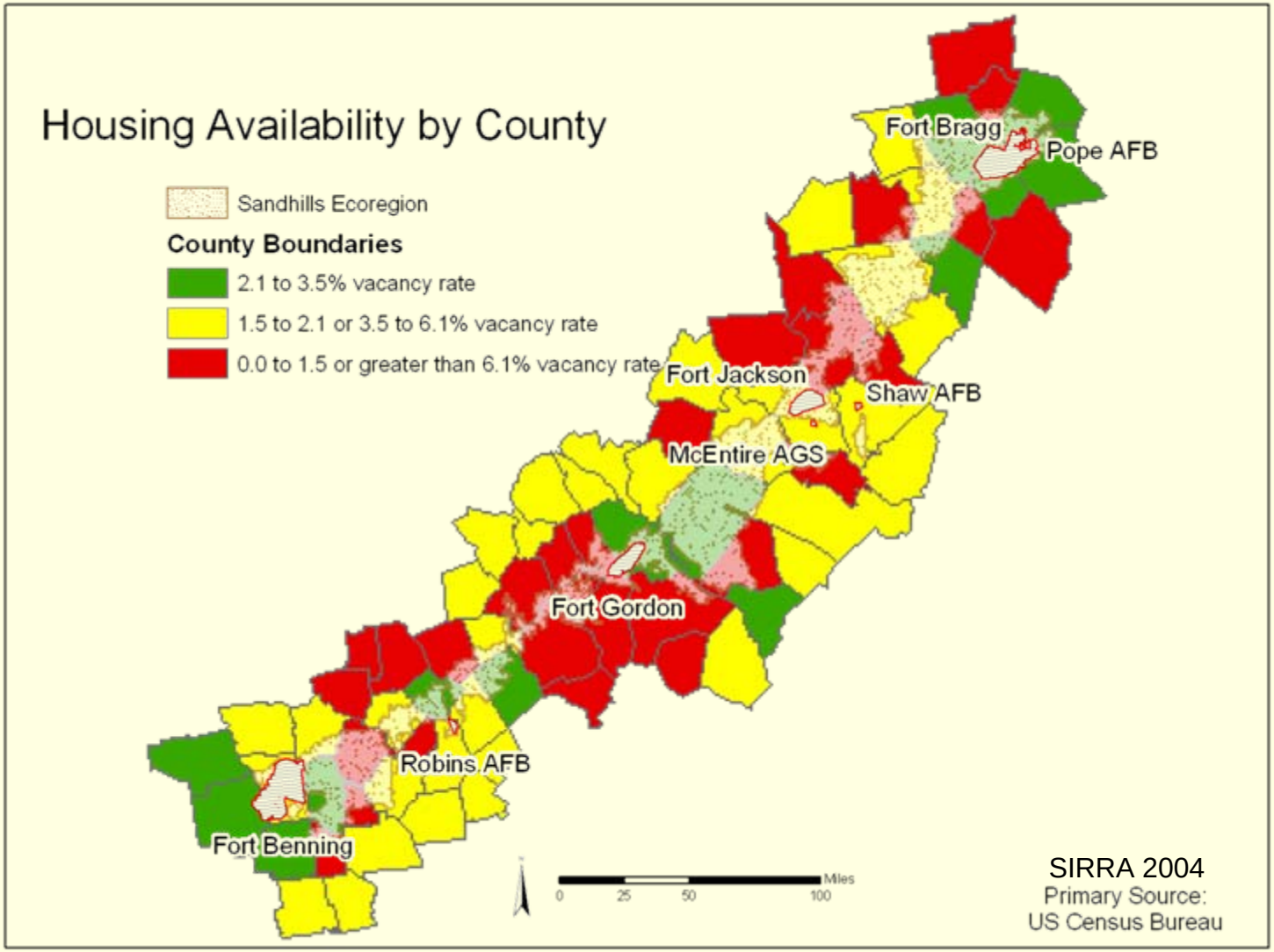
Describe Present System: Water



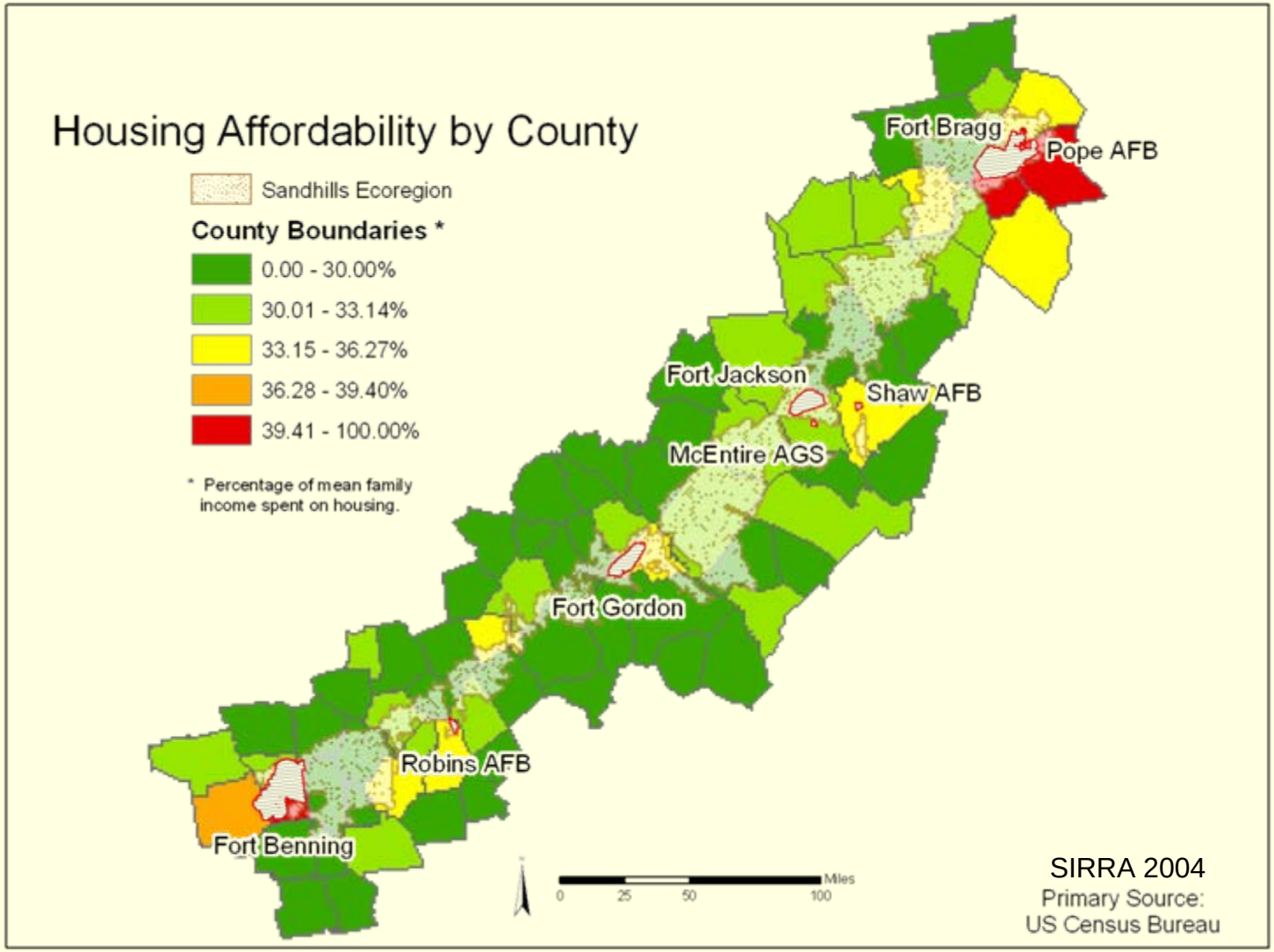
Describe Present System: TES

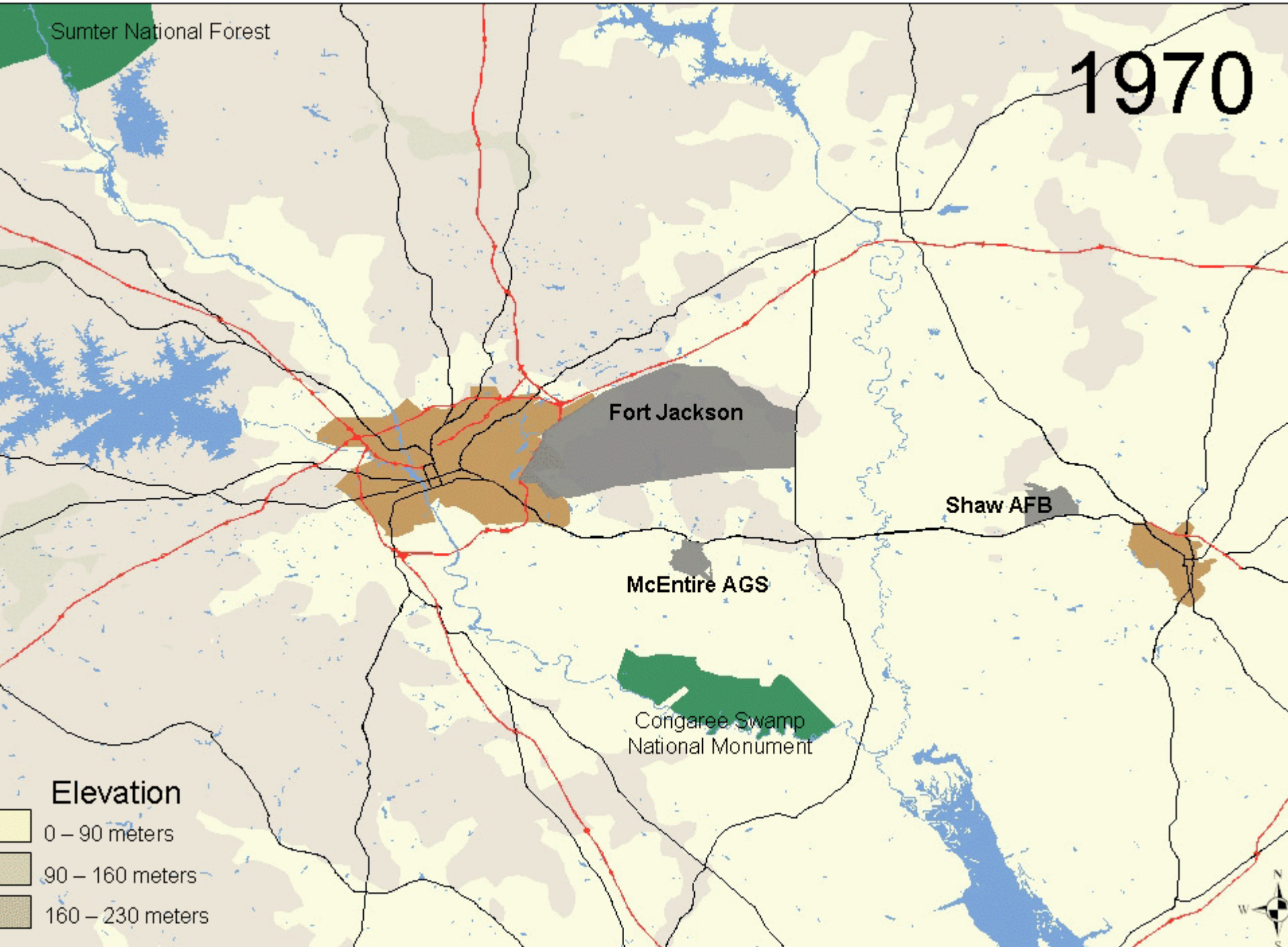


Describe Present System: Housing



Describe Present System: Housing

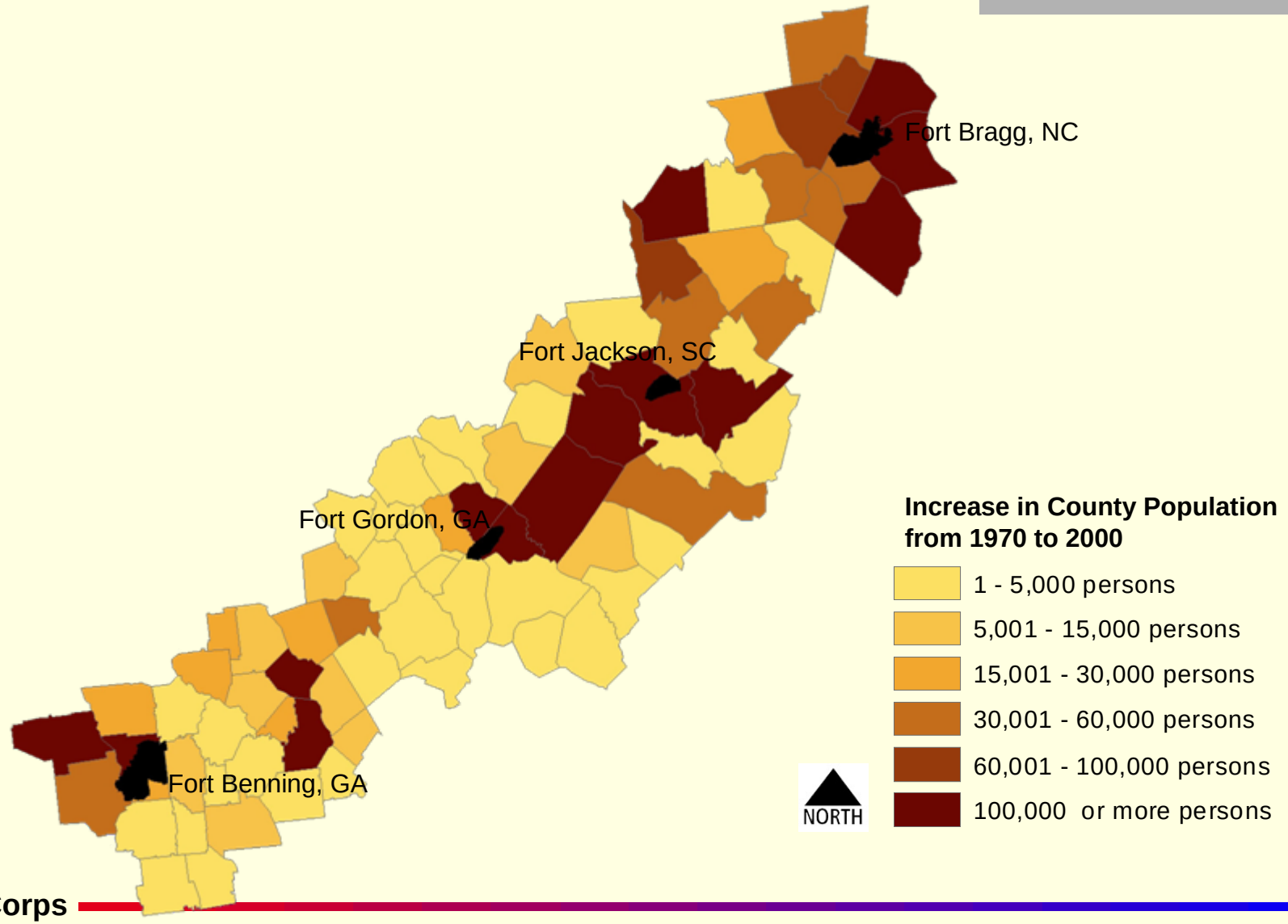



1970
Sumter National Forest
Fort Jackson
Shaw AFB
McEntire AGS
Congaree Swamp
National Monument
Elevation
0 – 90 meters
90 – 160 meters
160 – 230 meters

Determine Key Forces

- Land Use Change.
- Population Growth.
- Military Transformation.
- Economic Growth.
- Climate Change.
- Energy Source and Availability.

Determine Key Forces: Population Change



Develop Scenarios

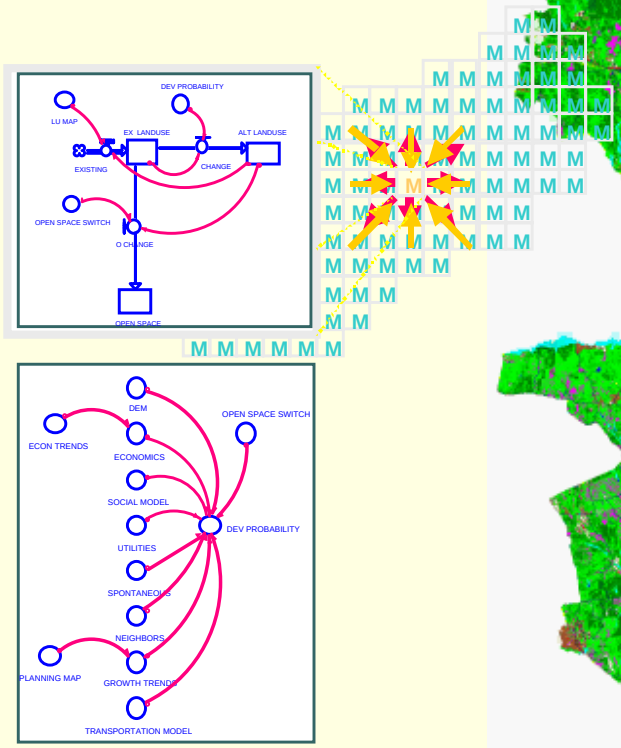
- Status quo: continuing historical growth trend
- Plus up: 5,660 Personnel, 9,430 Students, and 6,665 family members from ’06-’11
- Weather: increased precipitation then drought brought on by abrupt climate change
- Other potential scenarios
  - Energy: available fuels, increasing cost
  - Forest: longleaf pine senescence
  - Population: shift due to climate change

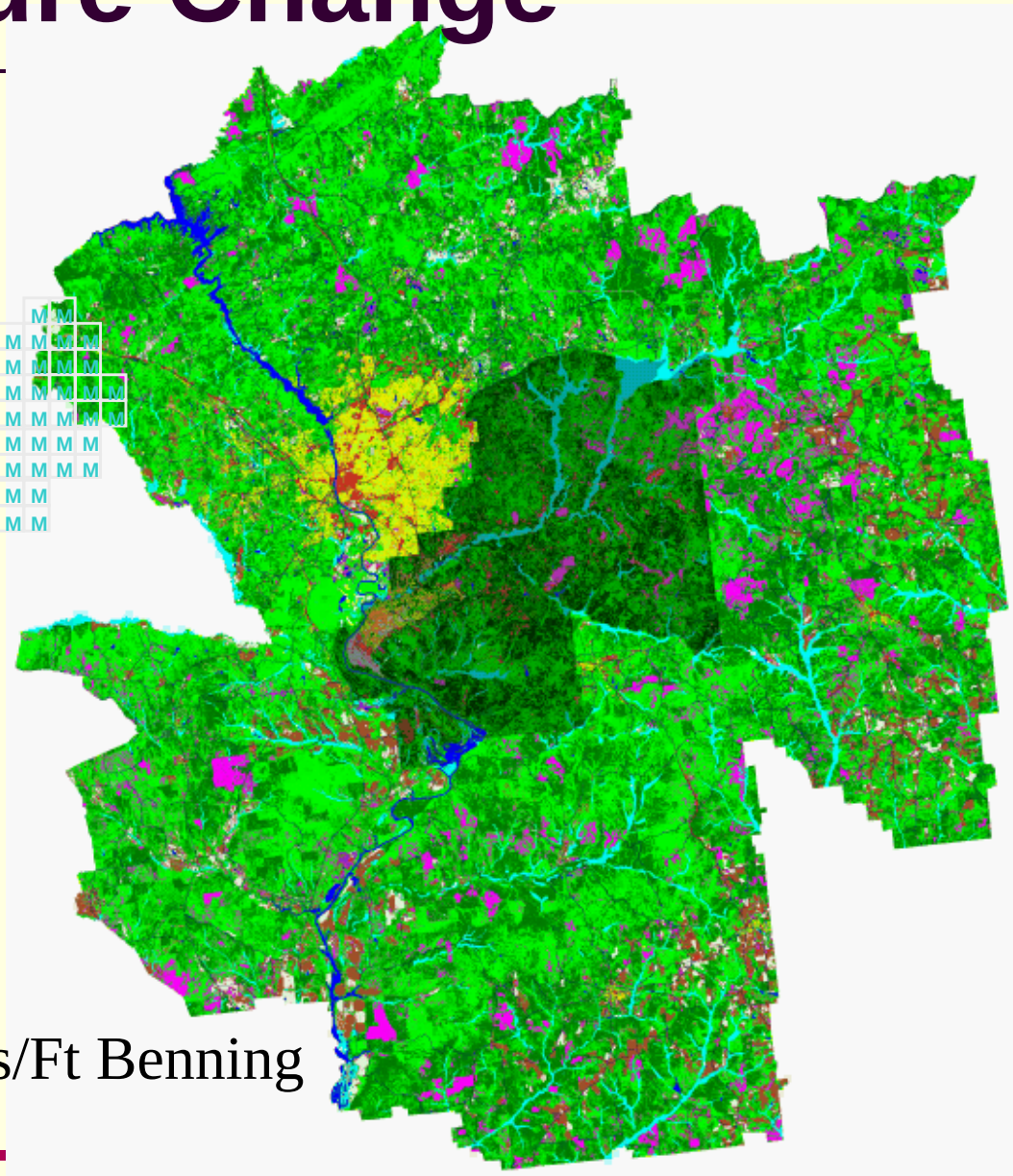
Model Alternative Futures

- Forecast expected land use change over 30 years based on factors that influence population growth:
  - Historic Population Change
    - Base and high growth rates
    - Impact of BRAC plus-ups
  - Economics
    - Impact of population change on economic sectors
  - Three Sub-Regions
    - Fort Benning/Columbus, GA
    - Fort Jackson/Columbia, SC
    - Fort Bragg/Fayetteville, NC

Project Future Change

Land Use Evolution and Impact Assessment Model (LEAM)





Columbus/Ft Benning

US Army Corps of Engineers

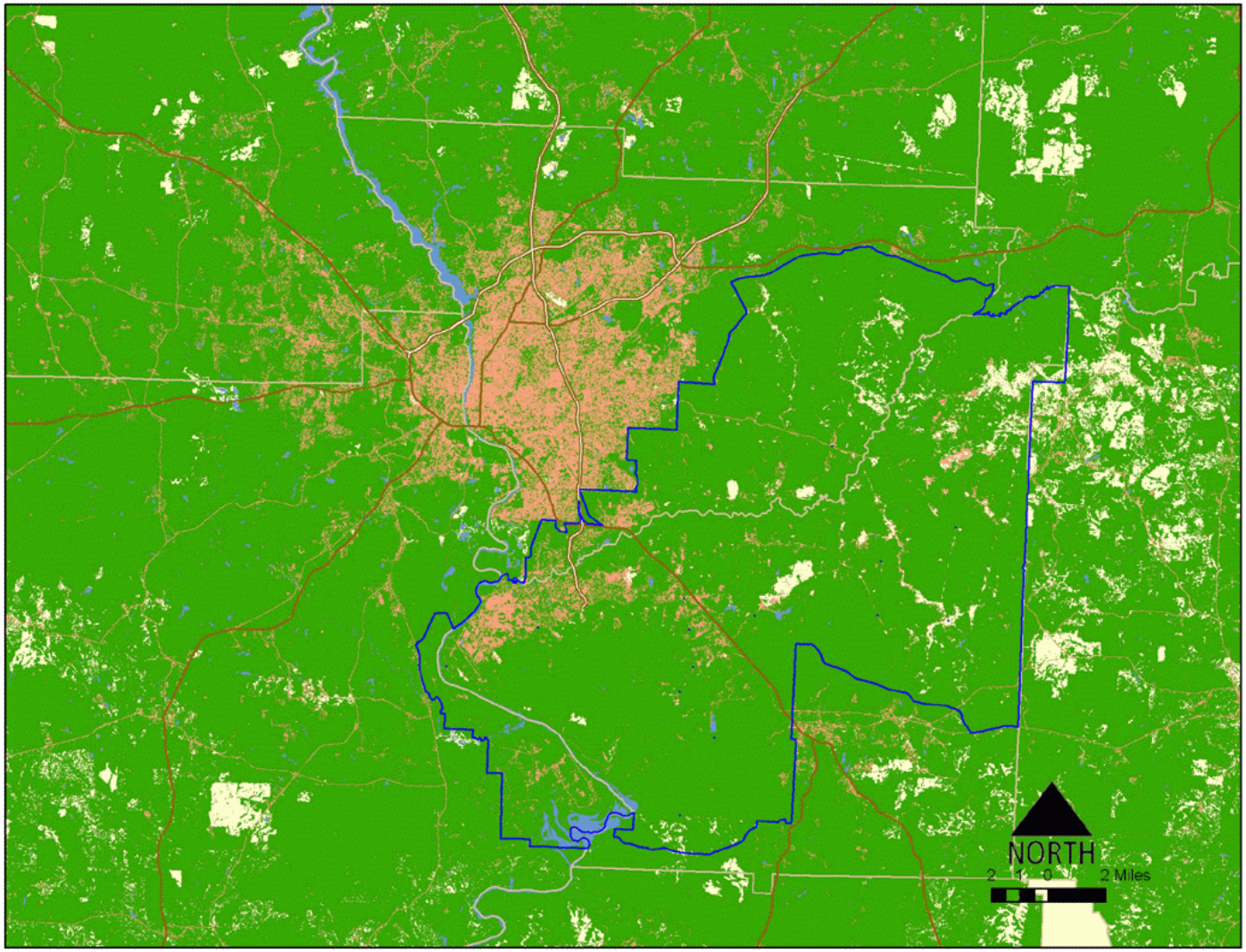
Engineer Research and Development Center

LEAM Growth Attractors

- Regional Economic Projections.
- Residential Land Demand.
- Cities Attractor.
- Transportation.
- Slope.
- Water.
- Nearest Neighbor Development.
- Utilities.
- No-Growth Zones.

Regional Land Use Change

Fort Benning: 2000 - 2030



Analyze Impacts and Future Outcomes

- Evaluate impact using existing tools and methodologies:
  - Water:
    - Relationship of quality to impervious surface
  - Air quality:
    - EPA criteria pollutants and secondary pollutants
  - Habitat:
    - Analysis of parcel size and edge
  - Education:
    - Impact of BRAC plus-ups on public schools

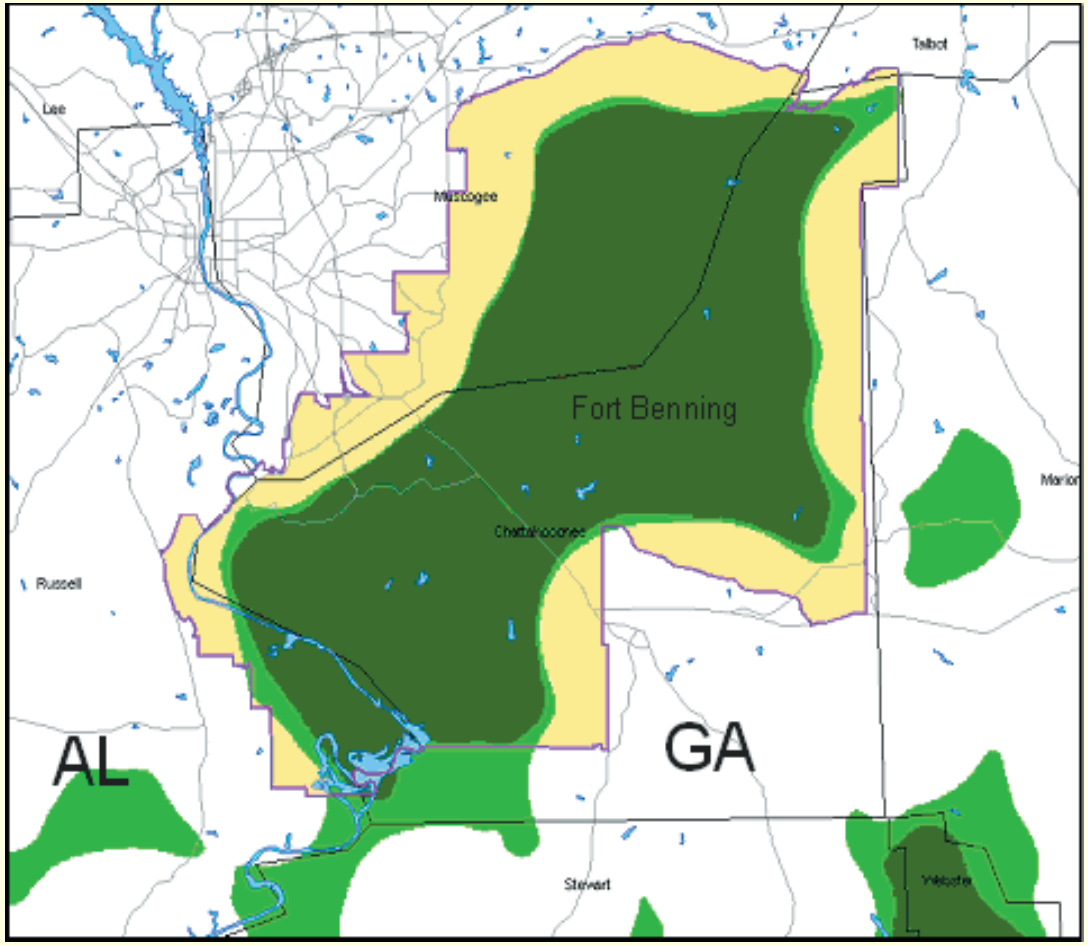
Perform Gap Analysis

Evaluate difference between desired and forecasted future state:

- Backcast to develop strategies
- The objective is to minimize the gap between the predicted and desired future state

Impact: Mission

Potential Loss of Training Land Use, 2030



Source: LEAM tom

- **1990**- Benning supported 10,000 soldier training events/days
- **2000**- Benning supported 13,000 soldier training events/days
- **2010**- Benning is predicted to support 18,200 soldier training events/days

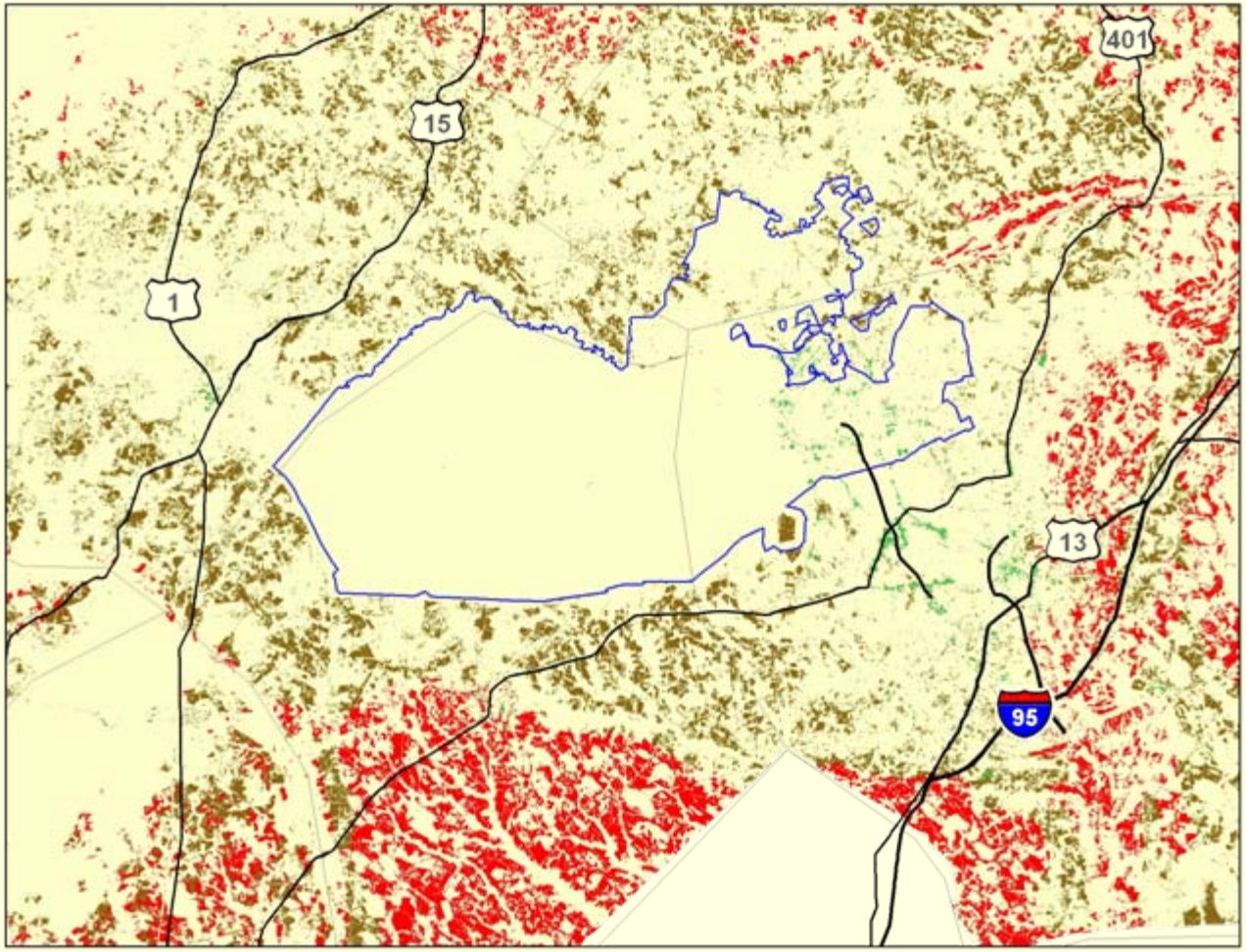
Impact: Water Quality

- L-THIA: Long-Term Hydrologic Impact Assessment.
- GIS-based ‘quick and simple’ tool for long-term water quality assessment.
- Simulates surface runoff, total nitrogen, total suspended particles, and several other pollutant loads.
- Requires land-use, daily precipitation series, and hydrological soil group data.
- “What-if” mitigation scenarios:
  - Established buffers through purchase of development rights.
  - Protect/re-establish wetlands.
  - Require stormwater best management practices.

Example Water Analysis

- Sandy soils of the Fall-Line region allow rapid infiltration of precipitation and pollutants.
- Rapid urbanization increases surface water run-off and residential/commercial pollutants.
- Rapid population growth increases water consumption.

Impact: Water Quality
(Total Suspended Particulates - 2000)



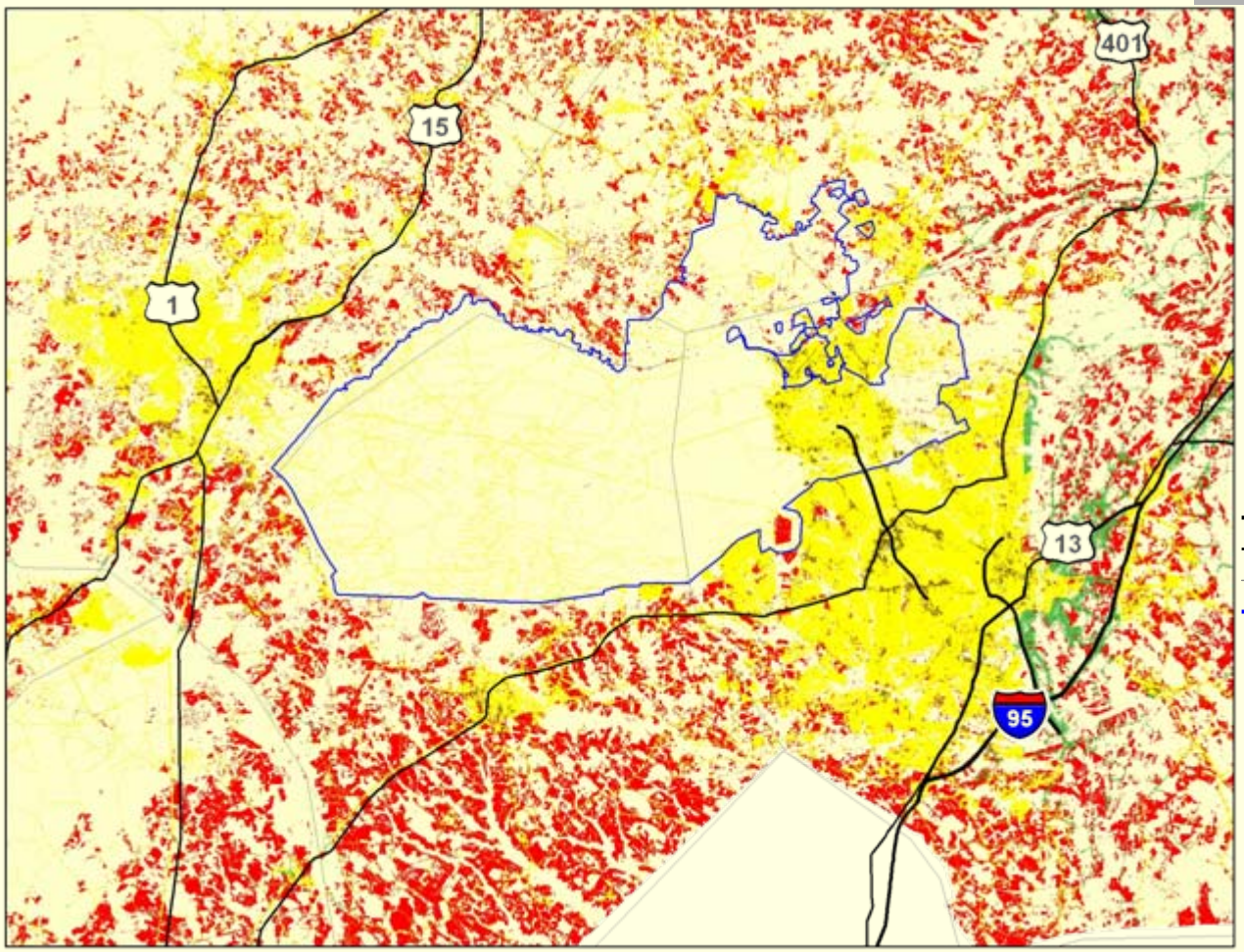
Fort Bragg Region

Interstate
Highway
County Boundary
Installation Boundary

TSP (mg/l)
0 - 50
50 – 70
70 – 90
90 – 110
> 110

NORTH

Impact: Water Quality
(Total Suspended Particulates – 2030)



Fort Bragg Region

Interstate
Highway
County Boundary
Installation Boundary

TSP (mg/l)
0 - 50
50 – 70
70 – 90
90 – 110
> 110

NORTH

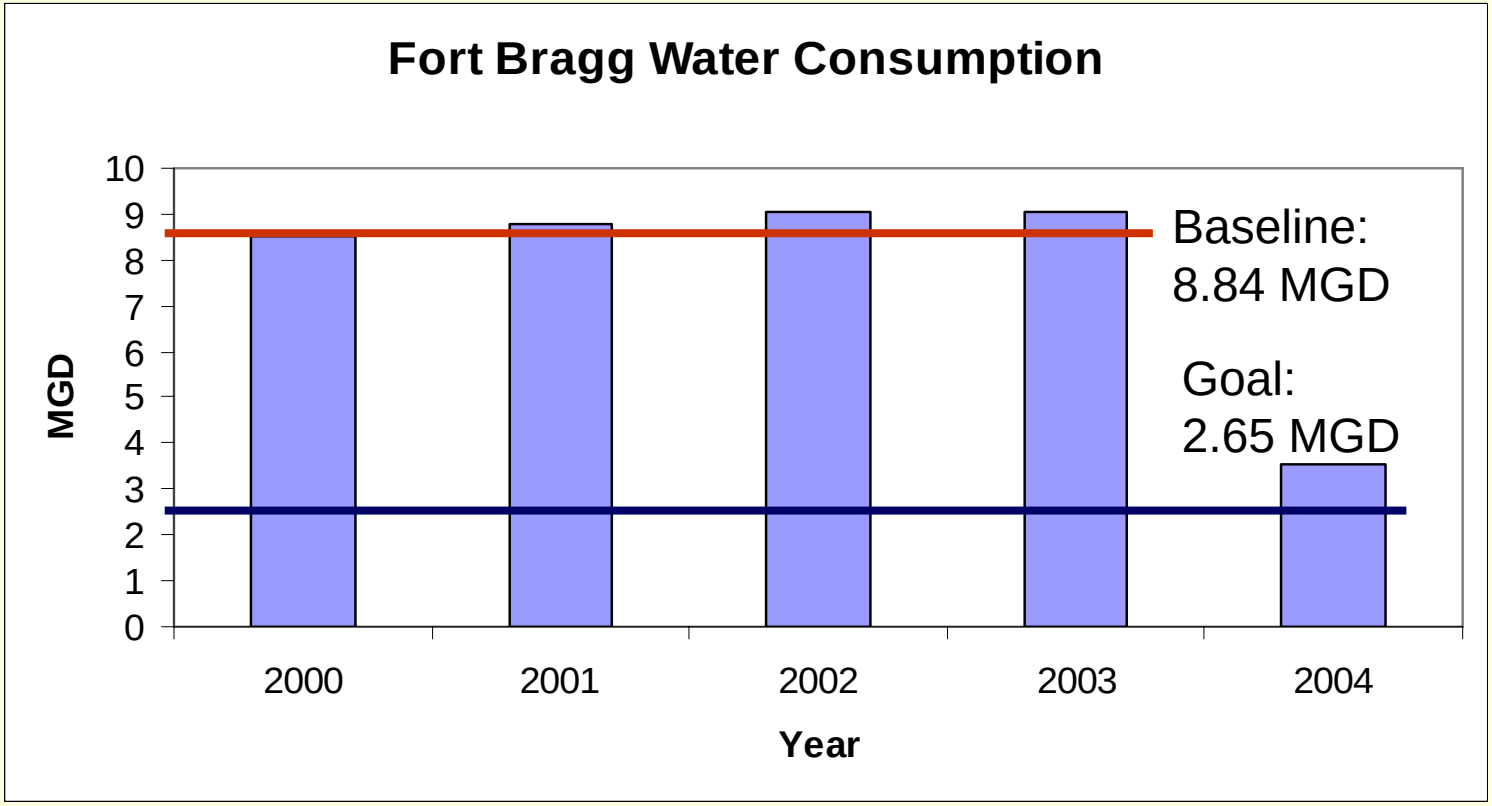
Water Quantity Gap

Fort Bragg Sustainability Goal:

"Reduce the amount of water taken from the Little River by 70%."

Gap = 6.19 MGD from Baseline

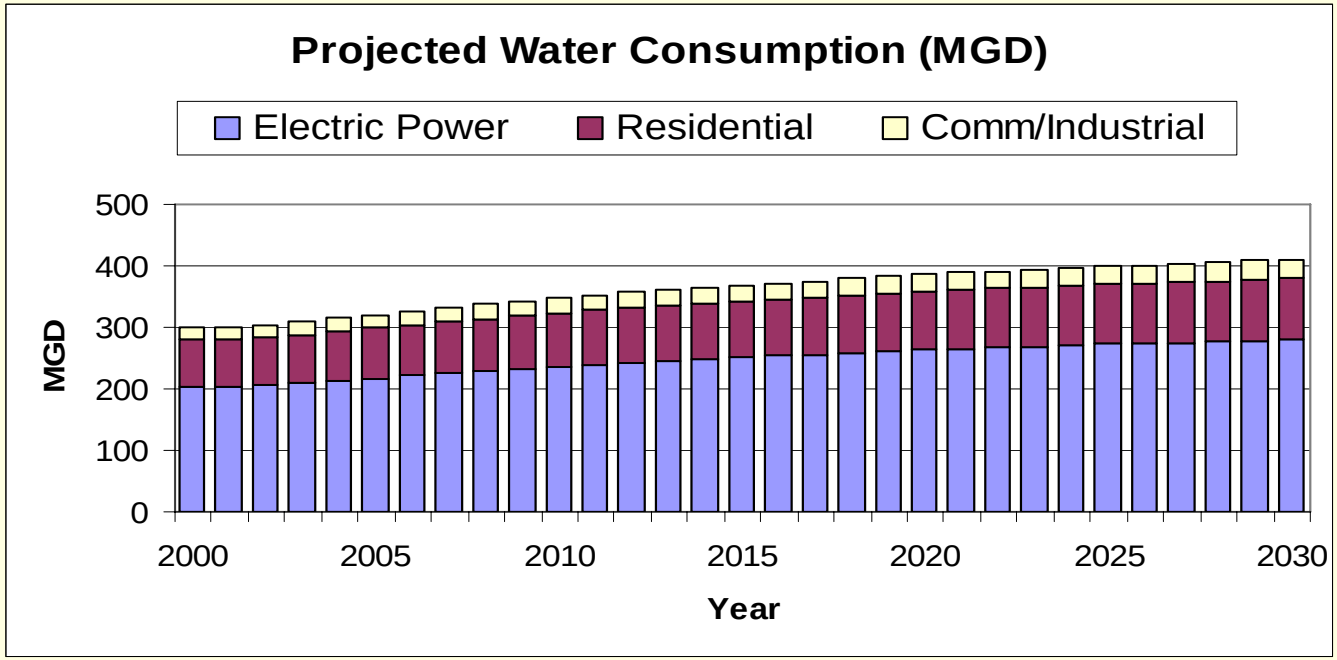
Current = 3.56 MGD



Water Quantity Gap

Fayetteville Region -- No specific water use reduction goals. Regional water use to grow by over 100MGD – 41% Growth in Res & Comm/Ind

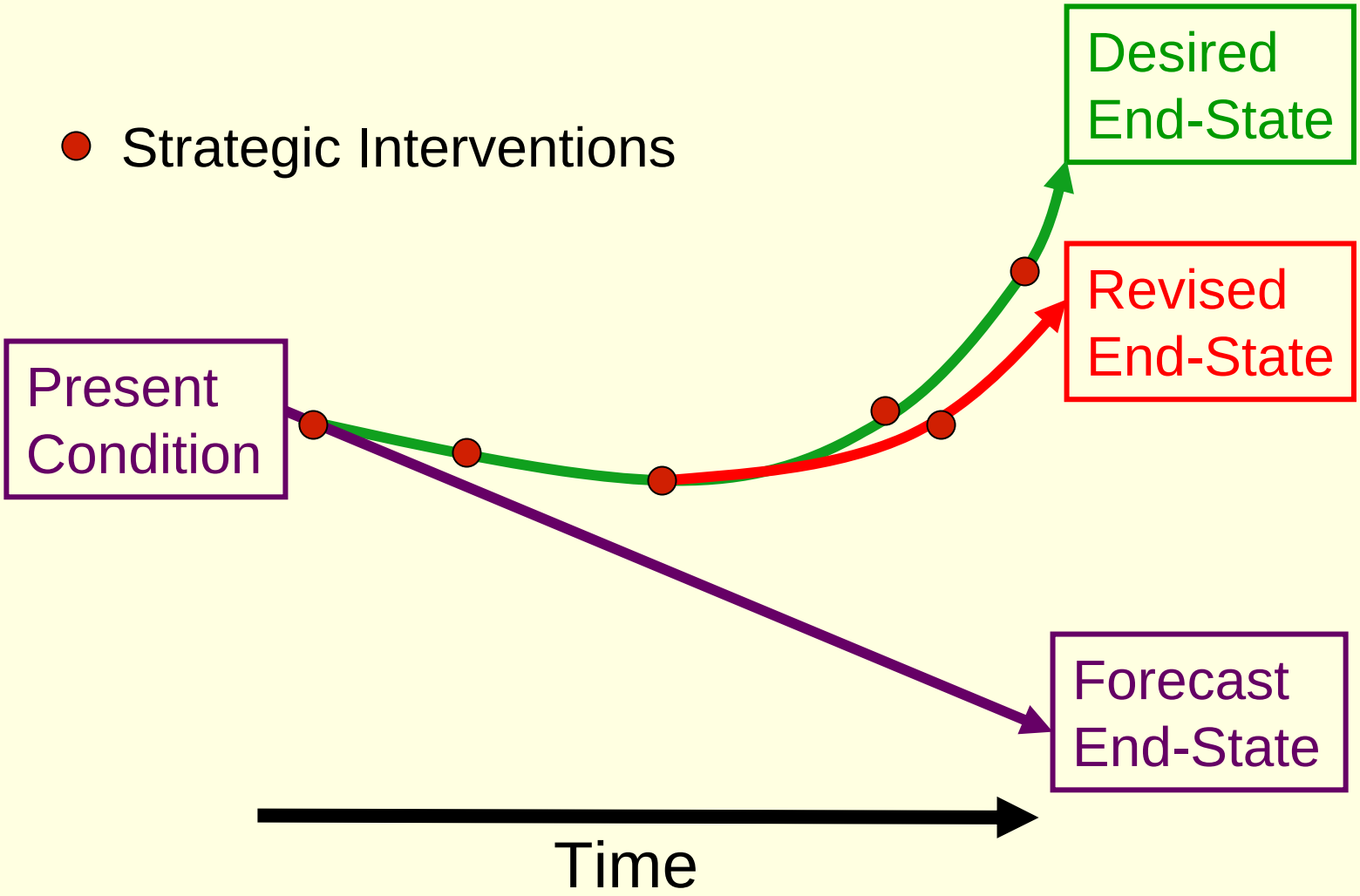
Trends indicate increasing regional water consumption.



Graph illustrates projected water use for the 7-county region surrounding Fort Bragg given a 25.6% regional growth rate.

Goal and Strategy Iteration

- Strategic Interventions



Determine Strategic Interventions

<u>For Example</u>: (training land & habitat)

- Partnerships
- Conservation Easements
- Growth Management/Smart Development
- Transfer/Purchase of Development Rights
- Farmland Ownership

Backcasting and Strategic Interventions

- Develop and predict impacts of Strategic Interventions.
- Use feedback from analysis to refine Regional Sustainability Goals.
- Model Points of Departure from Trends:
  - When must action be taken?
  - How quickly can trend change?
  - Determine and address unintended secondary & tertiary consequences:
    - Selling development rights constrains future military expansion and land use.
    - Local development patterns change.

Next Steps

- Recommend “Key Indicators” of regional sustainability relevant to the Army.
- Identify future sustainability impacts at multiple installations (beyond SE Region).
- Develop regional sustainability analysis methodology to apply in SE and SW Regions.
- Identify gaps between regional forecasts and sustainability objectives (i.e. desired end-states).
- Recommend courses of action the Army could/should pursue to address the gaps.

Next Pilot: Southwest Region

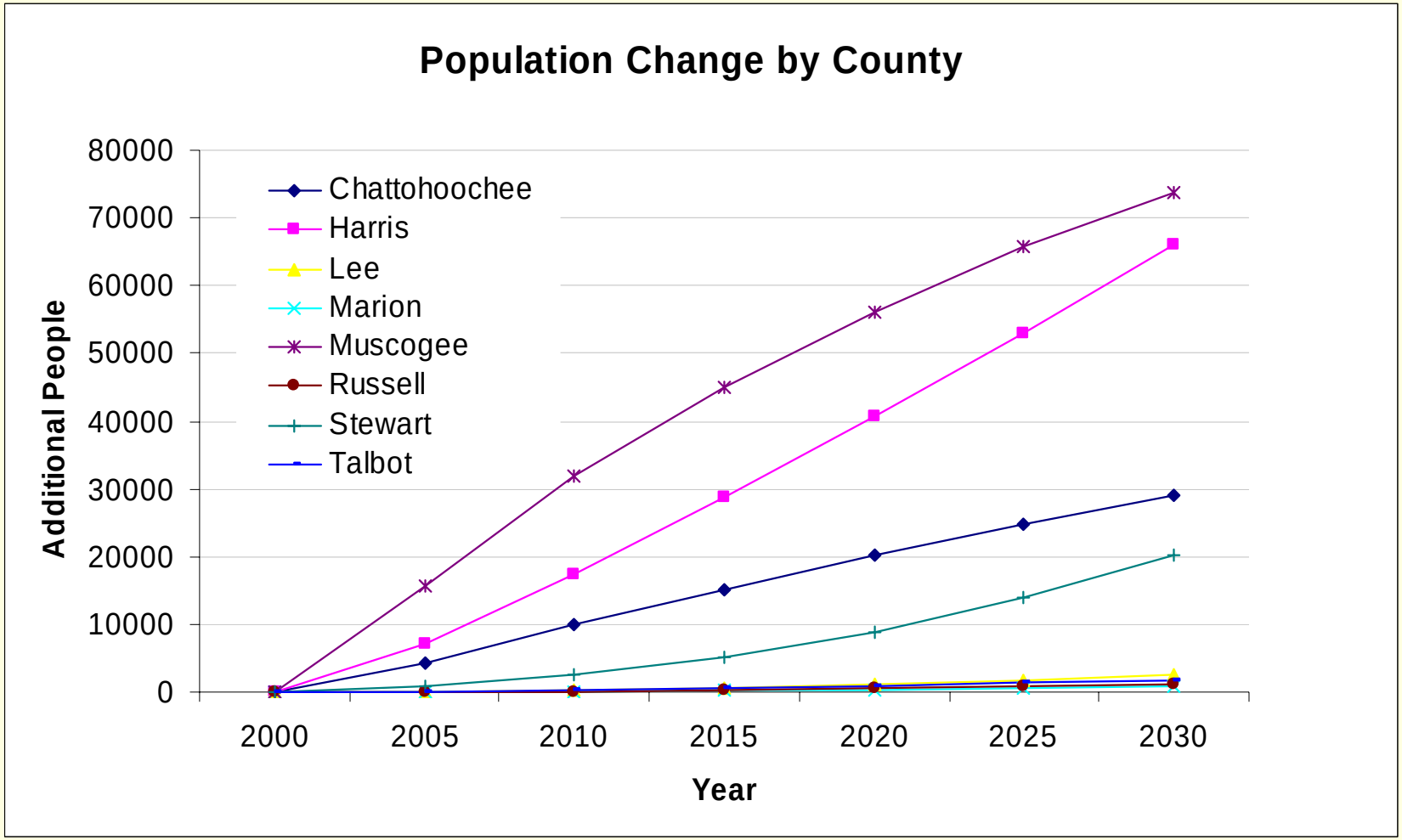
- Define the region of concern:
  - Issue Driven
  - Ability to Influence
- Characterize the region:
  - Environment
  - Demography
  - Transportation/Infrastructure
  - Economics
  - Sustainability Vulnerability
- Identify regional sustainability goals:
  - Military installations
  - State/Region/Community
- Determine key forces and issues:

Questions?

Back Up Slides

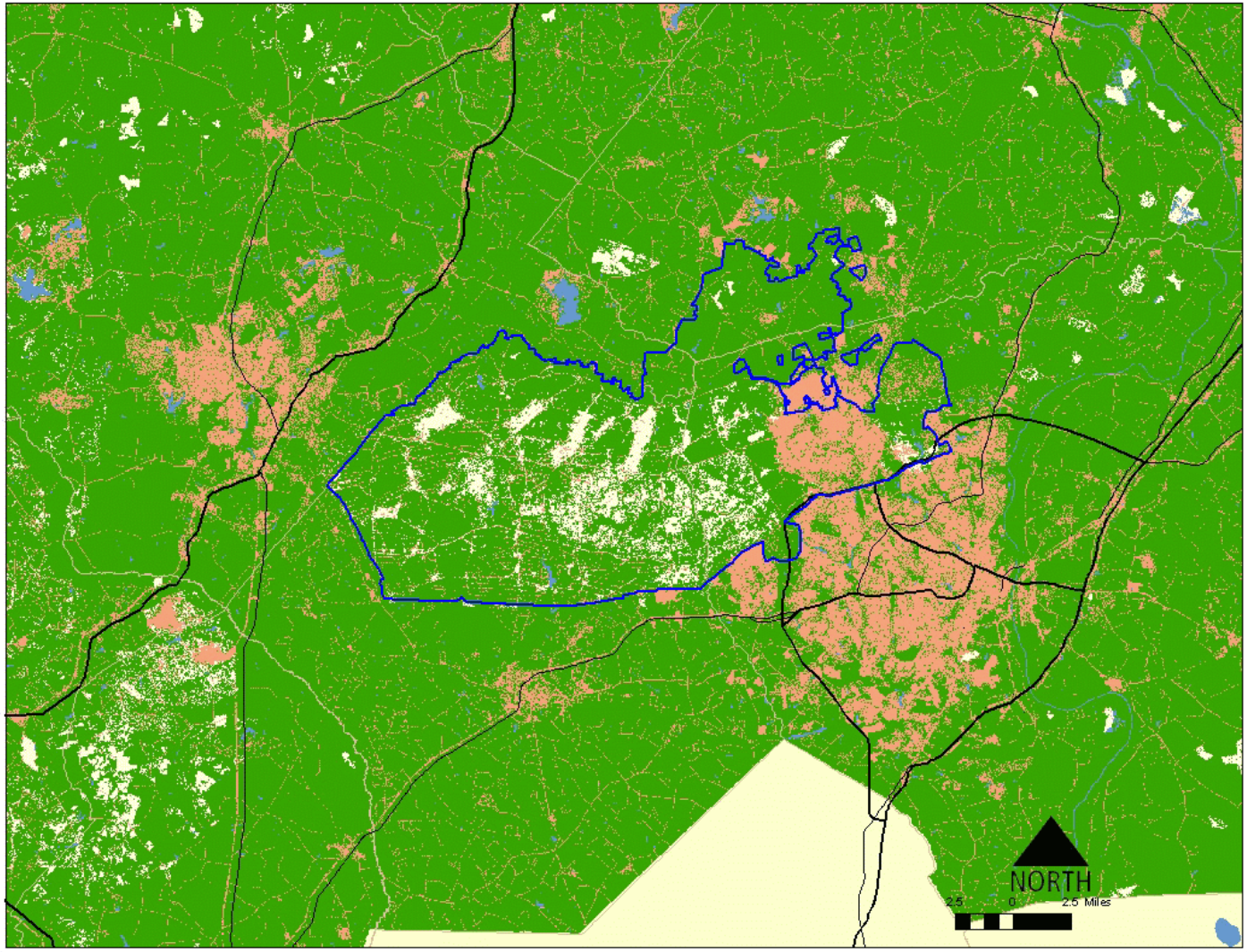
Growth by County

Fort Benning Region



Regional Land Use Change

Fort Bragg:
2000 - 2030
3% per year
(high)



Example Housing Analysis

Critical Issues:

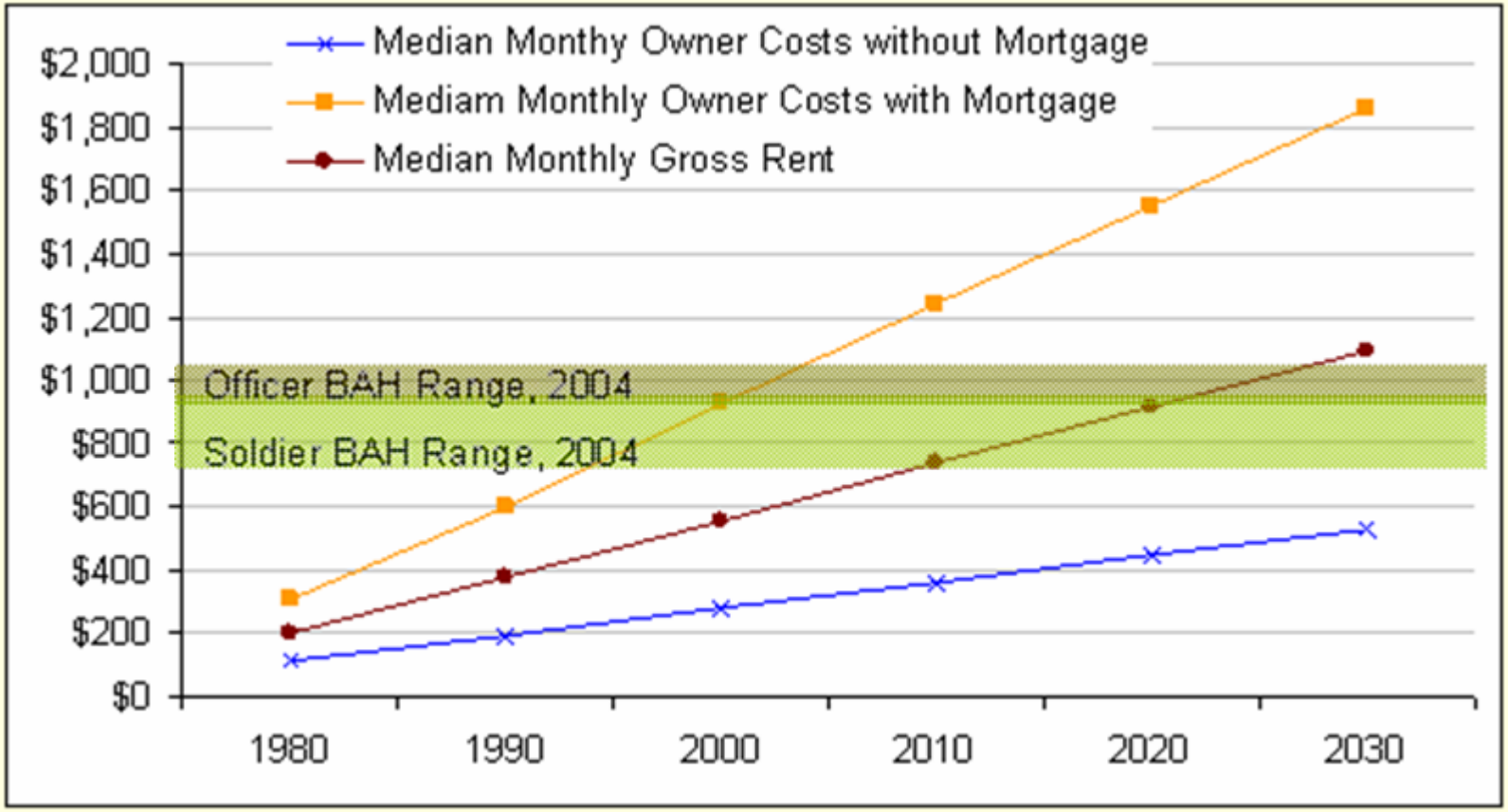
- DoD housing policy to maximize reliance on civilian housing
- The Army's Family Housing Master Plan set goal to eliminate all inadequate family housing by 2007, through a combination of traditional military construction, increases in the Basic Allowance for Housing (BAH), and privatization of housing units through the Residential Communities Initiative (RCI) program.

Housing Gap

Fort Bragg

Sec of Defense asserted elimination of all out-of-pocket expenses by 2005.

GAP = $800-$1,000/mo. Homeowner out-of-pocket expenses

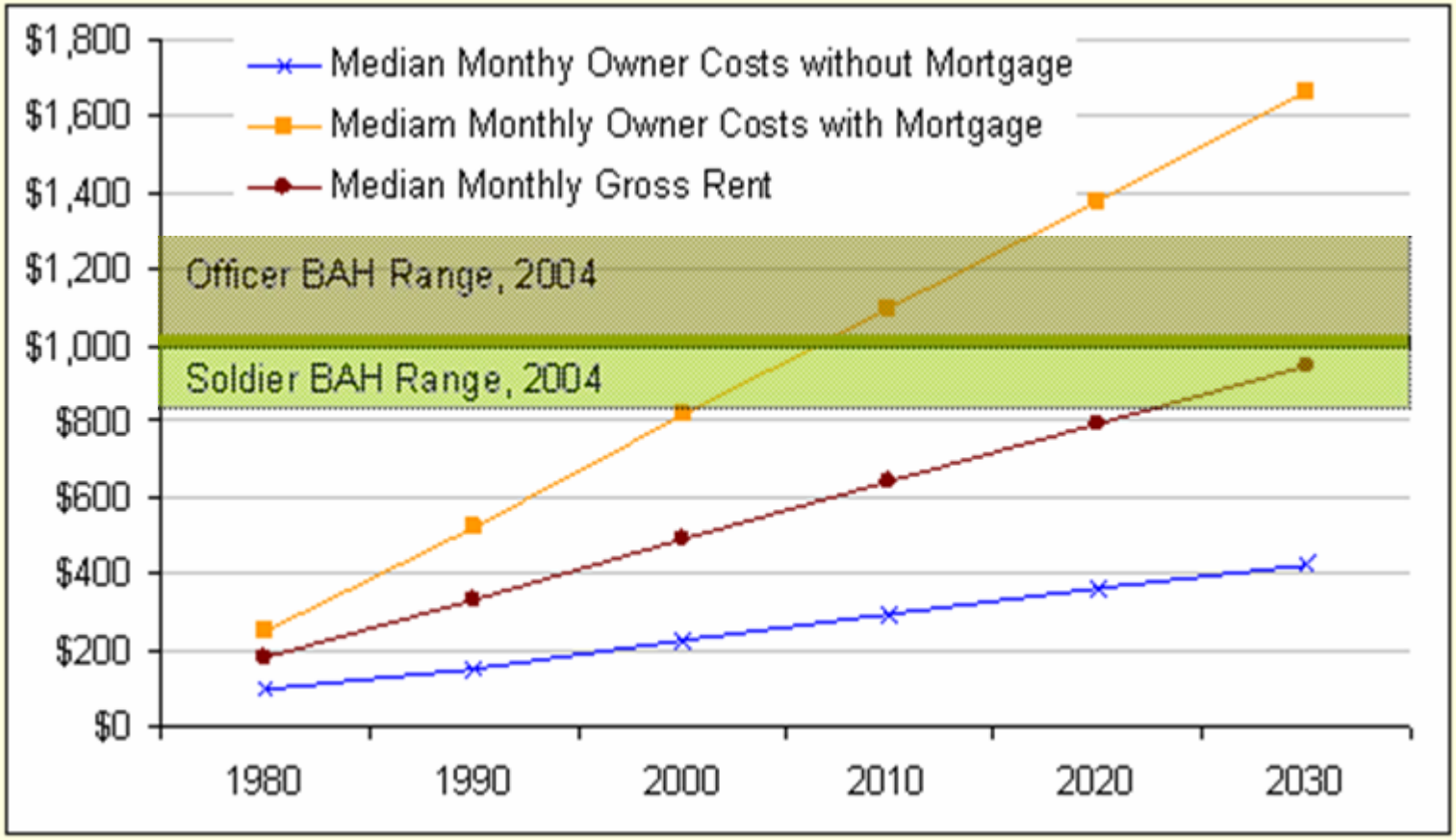


Housing Gap

Fort Benning

Sec of Defense asserted elimination of all out-of-pocket expenses by 2005.

GAP = $400-$900/mo. Homeowner out-of-pocket expenses

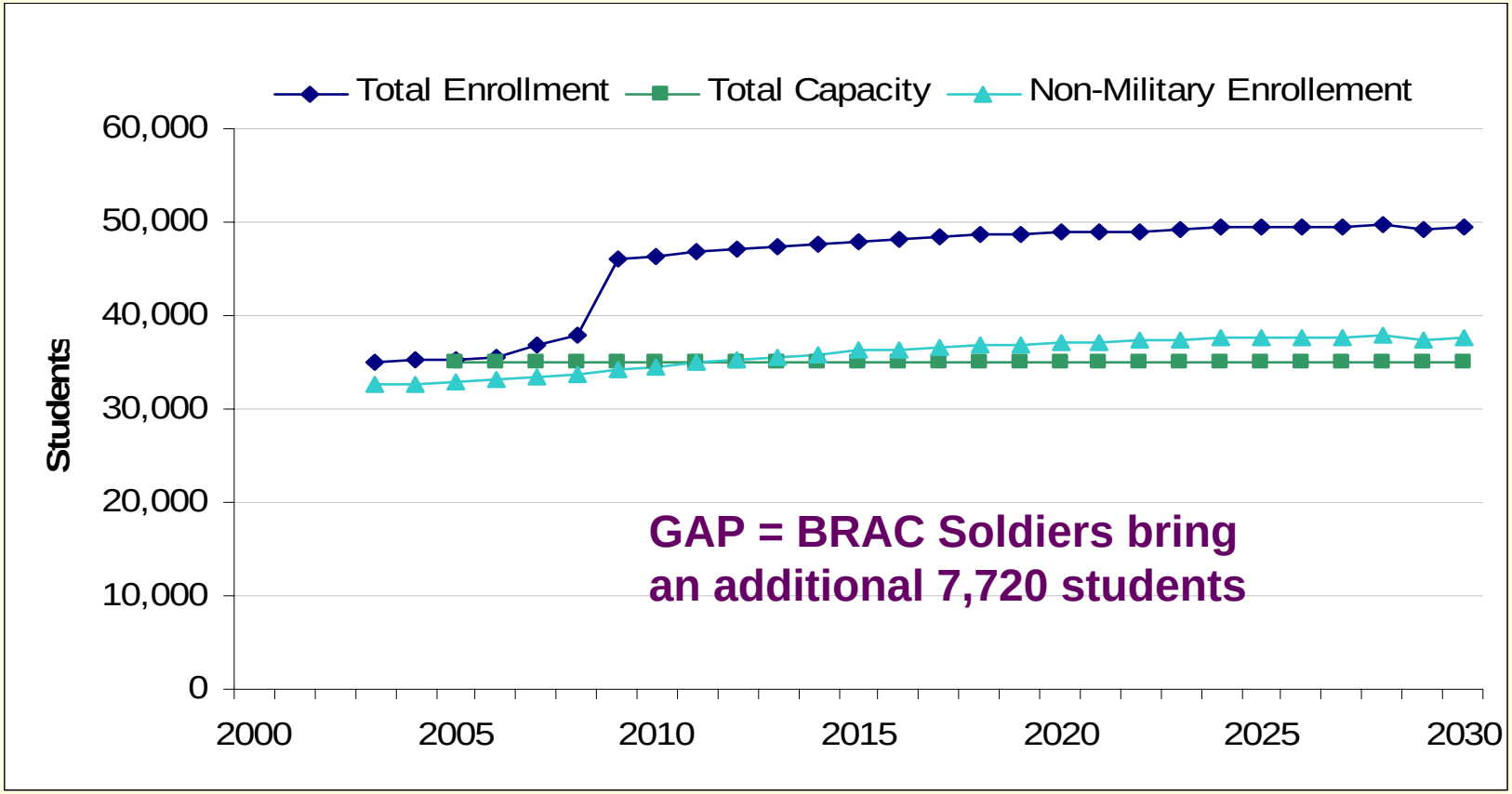


Gap Analysis Example: Education

- DoD presence decreases tax base—limiting school funds.
- Funding decisions based on previous year enrollment.
- Funding neglects construction projects.
- 74% of Fort Benning students attend school off-post.
  - Limited operating budget for County School Districts.
- Army Housing Privatization in 2008.
- Army Transformation increases students at Fort Benning.

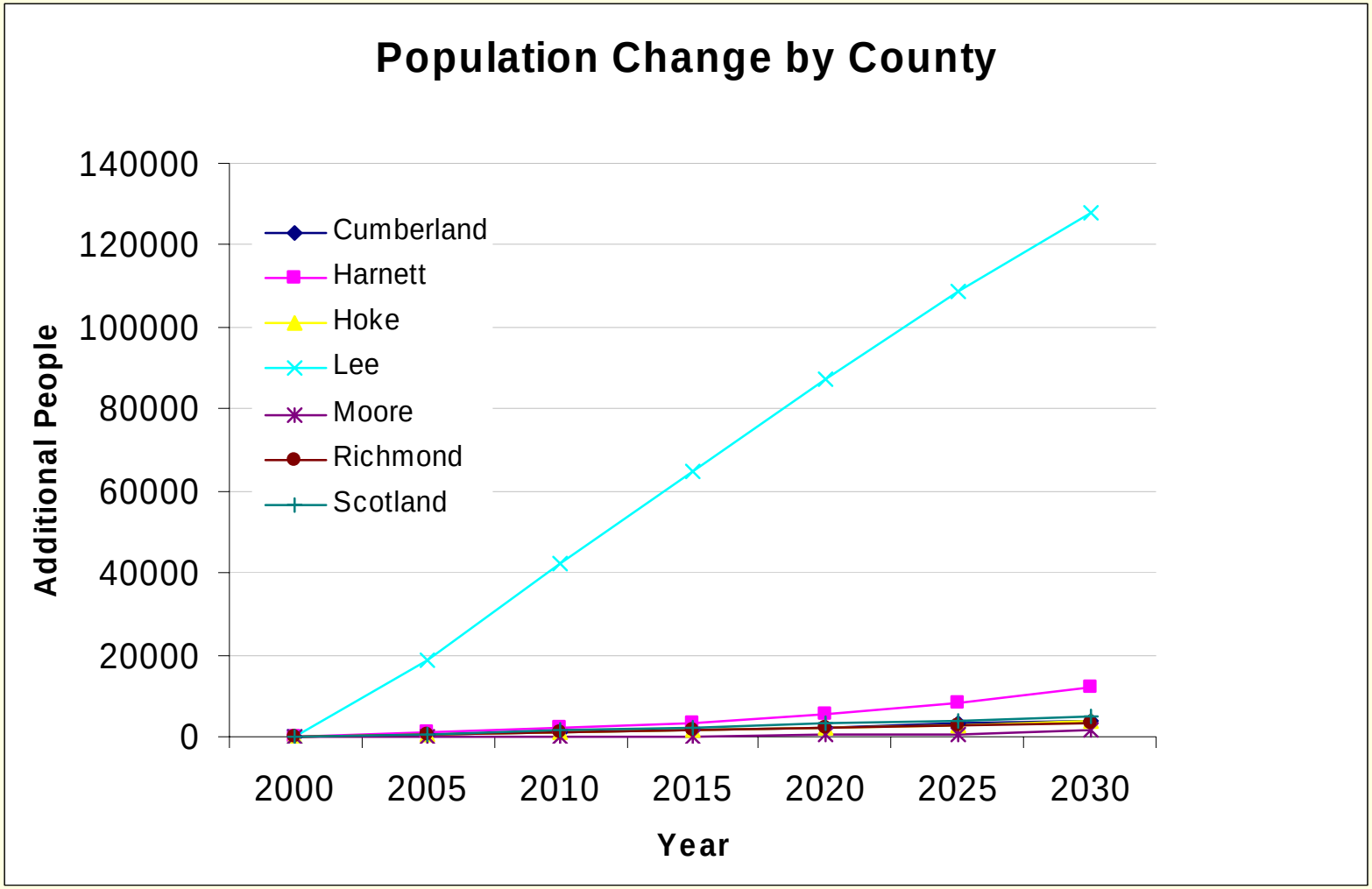
Education Gap

"Total" = Fort Benning DDESS + Muscogee County School District given 2005 BRAC recommendations and a 26.8% regional growth rate



Driver: Population Growth

Region Surrounding Fort Bragg



Example Energy Analysis

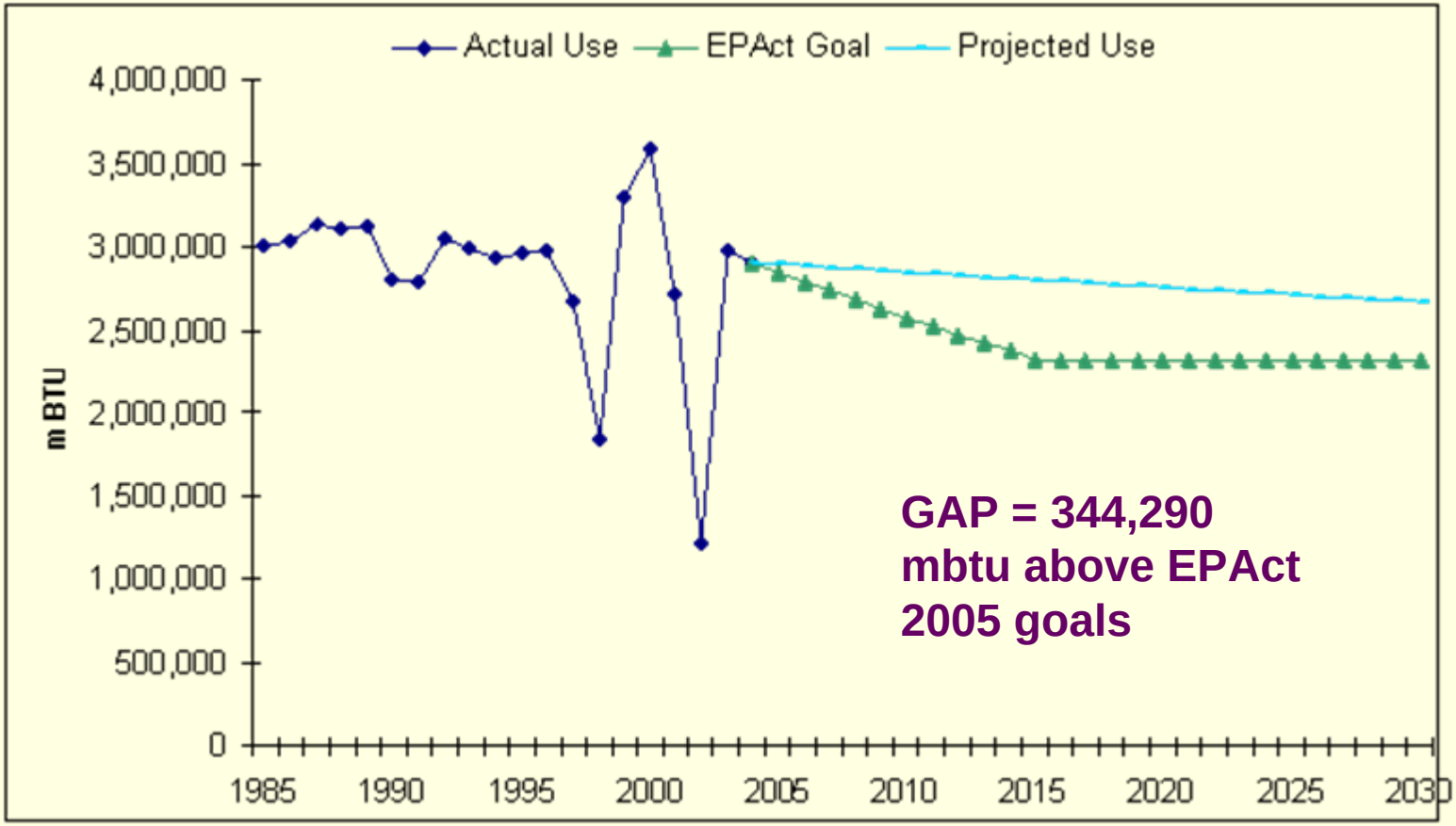
Critical Issues:

- Reliable and Affordable energy is essential to continued operations.
- EPAct 2005 requires installations to reduce energy consumption 2%/yr. from 2006-2015
- DoD Utilities Privatization Program transfers ownership, operation and maintenance of the Government's utility systems to free up resources.
- Local communities do not strive for specific energy use reductions, yet are the largest consumer of energy and their projected growth and usage dwarfs on-post issues.

Energy GAP

Fort Bragg

(ELC, FOR, FSD, FSR. FSX, NAG, and PPG consumption)

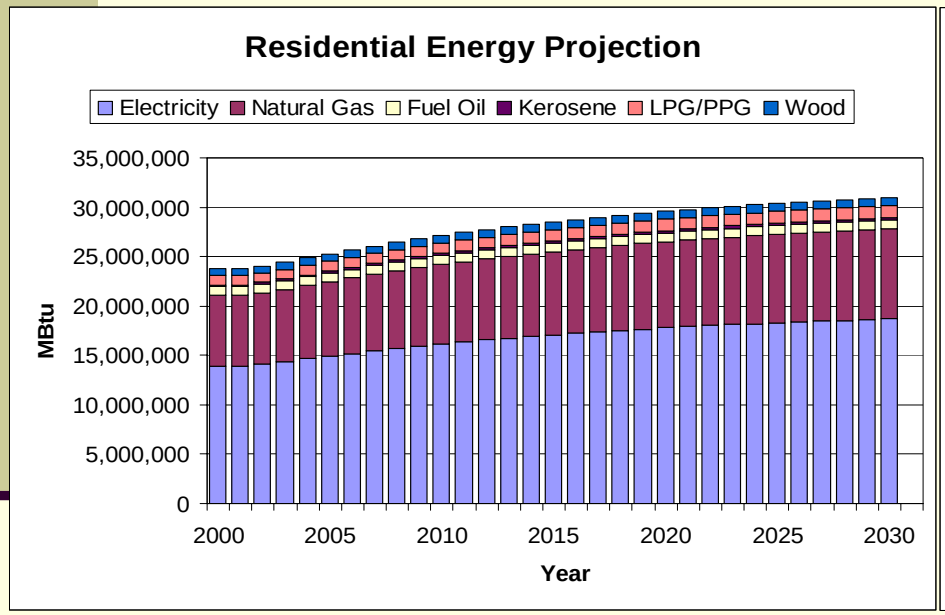


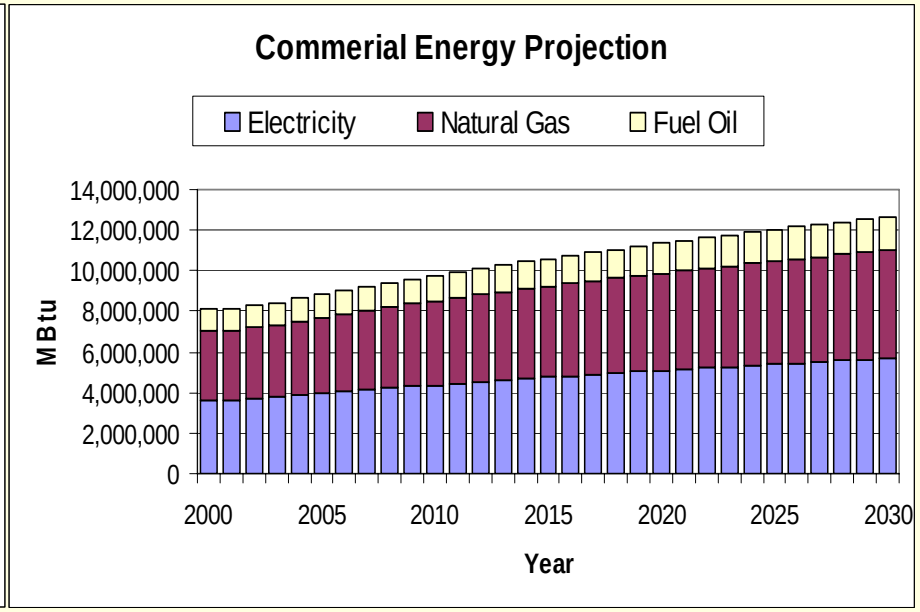
Energy GAP

Fayetteville, NC

No specific energy use reduction goals.

Trends indicate increasing regional energy consumption.



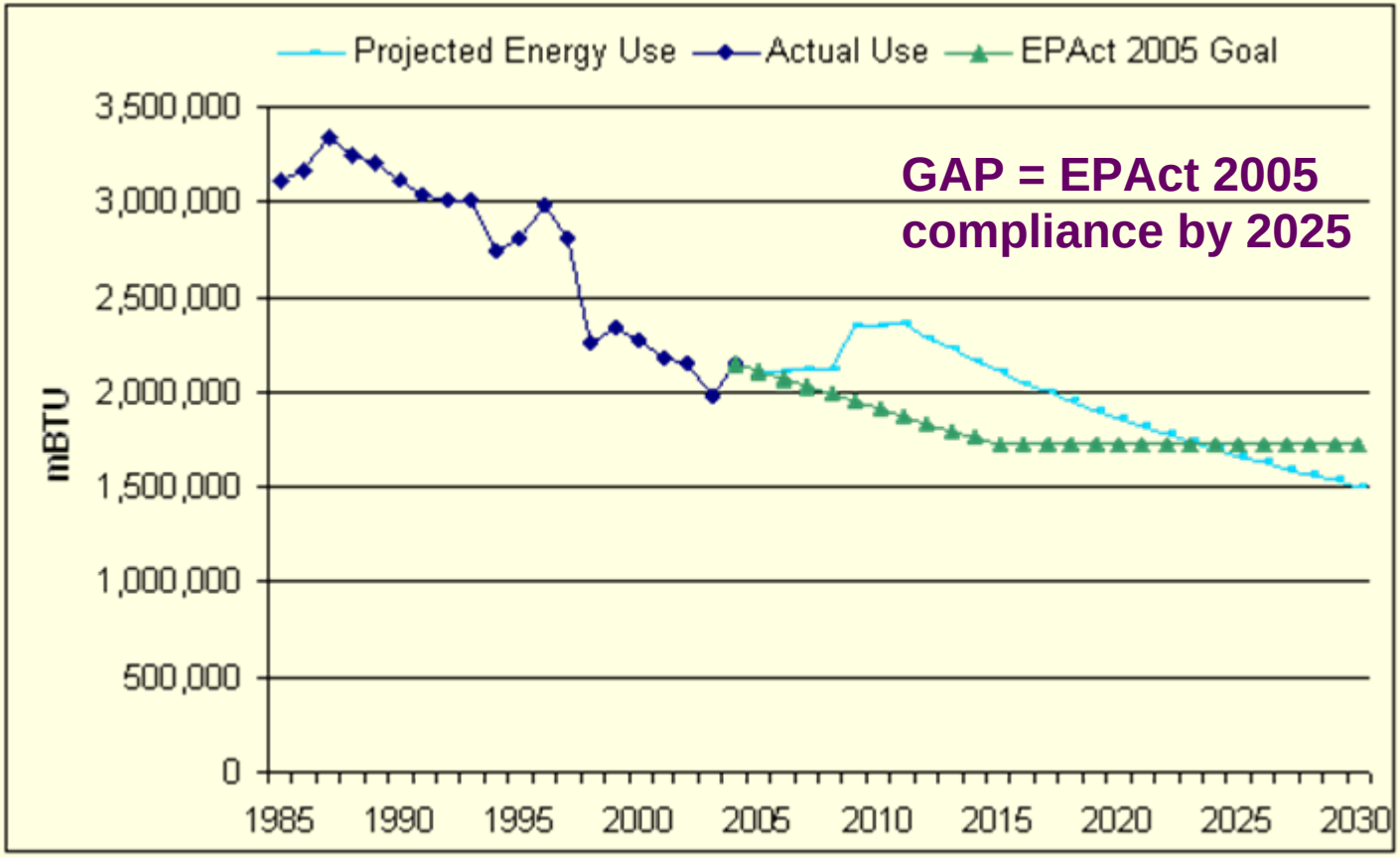


Graph illustrates projected energy use for the 7-county region surrounding Fort Bragg given a 25.6% regional growth rate.

Energy GAP

Fort Benning

(ELC, FOR, FSD, FSR. FSX, NAG, and PPG consumption)



Energy GAP

Columbus, GA

No specific energy use reduction goals.

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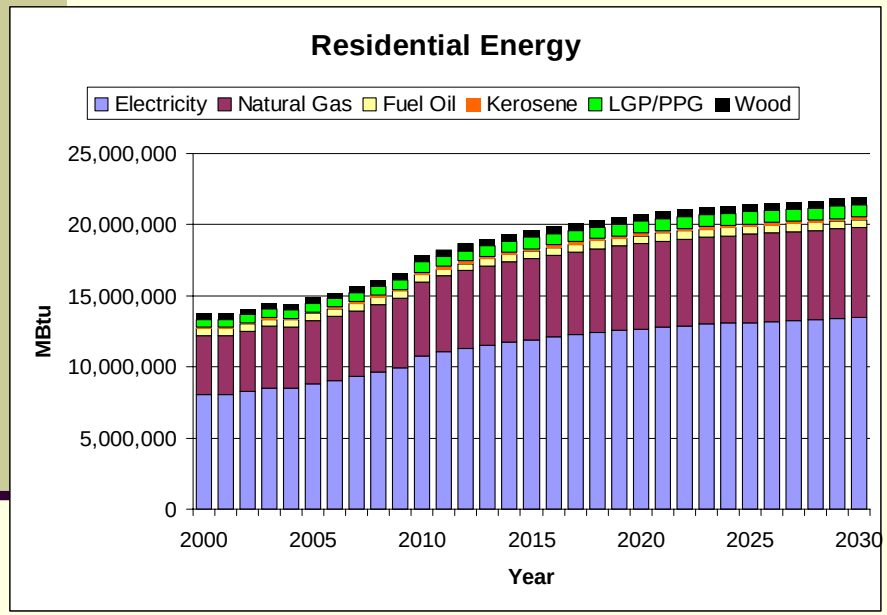

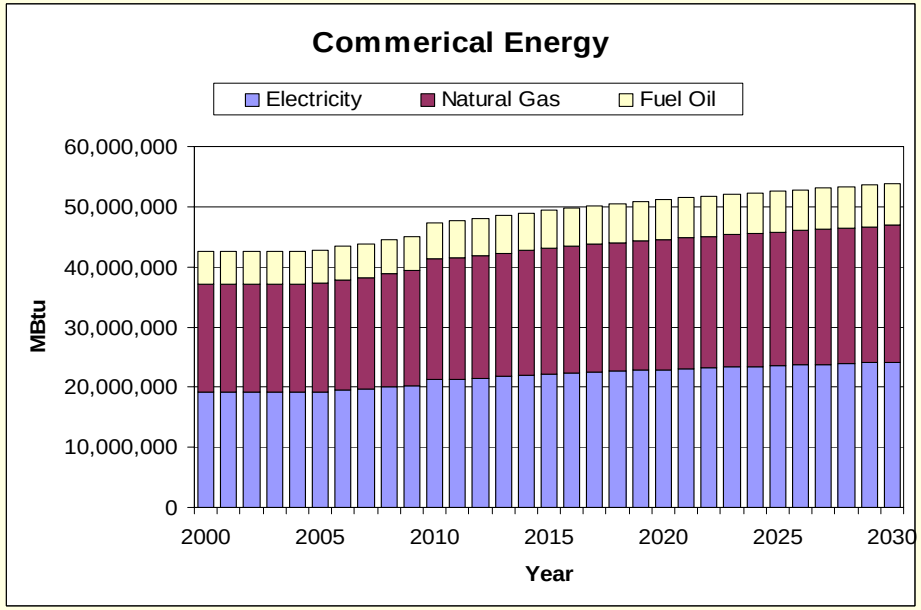

Graph illustrates projected energy use for the 8-county region surrounding Fort Benning given 2005 BRAC recommendations and a 26.8% regional growth rate.