



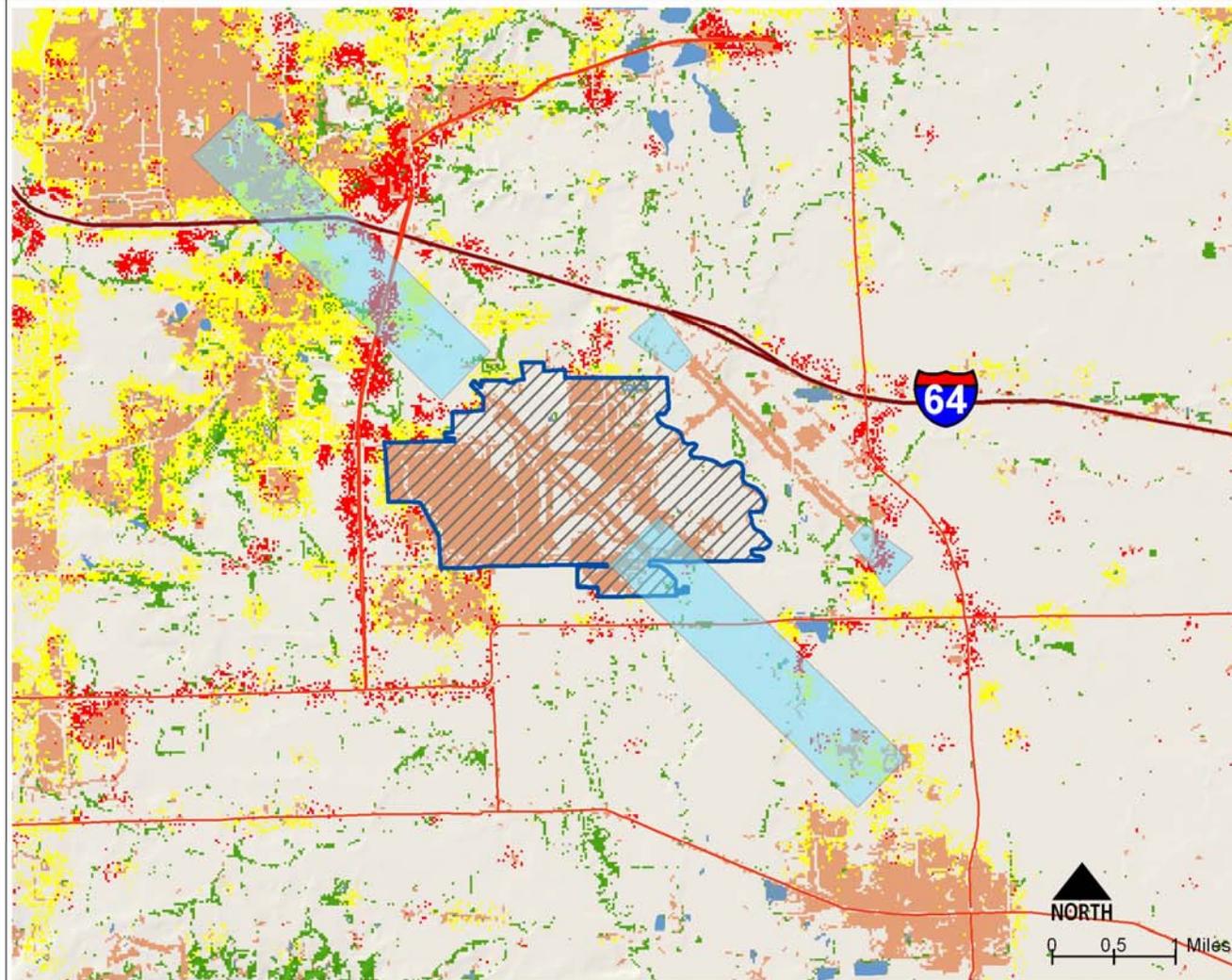
# Understanding the Future

## a dynamic planning approach

Dr Brian Deal  
University of Illinois

- How does a 50% plus up at Scott AFB affect its local community? Its County? The region?

# Scott AFB Personnel Increase LEAM Local Results



## Immediate Scott AFB Region

2030 Landuse Change  
Scott AFB  
50% Plusup

- Interstate
- US route
- State route
- State Line
- County Boundary
- Scott AFB
- Adjusted AICUZ
- New Residential
- New Commercial
- Developed
- Forest
- Others
- Water

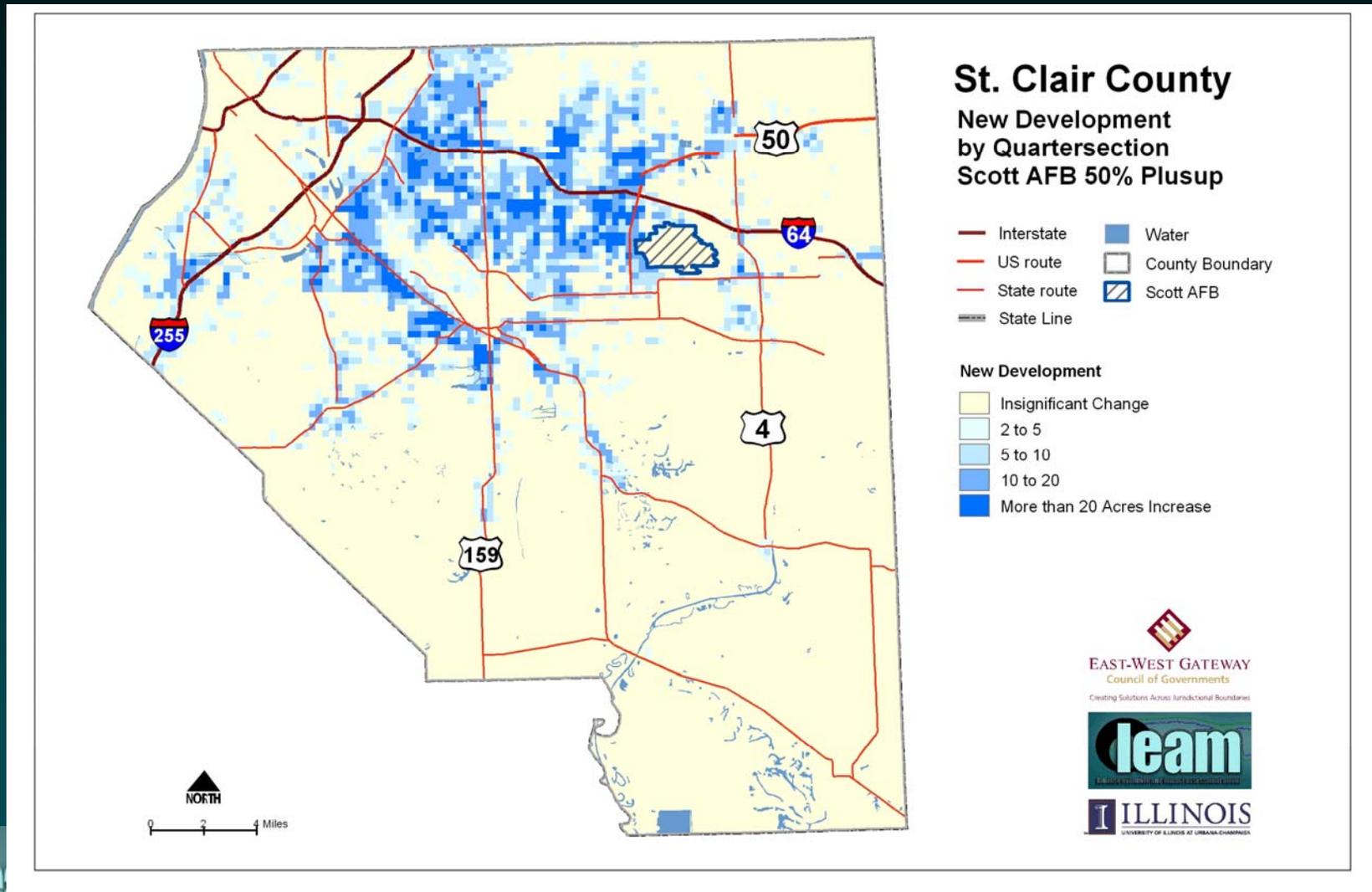


  
EAST-WEST GATEWAY  
Council of Governments  
Creating Solid New Areas in the Heart of Brandeis

  
LEAM  
Local Environmental Assessment Method

  
ILLINOIS  
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

# Scott AFB Personnel Increase LEAM Aggregate County Results

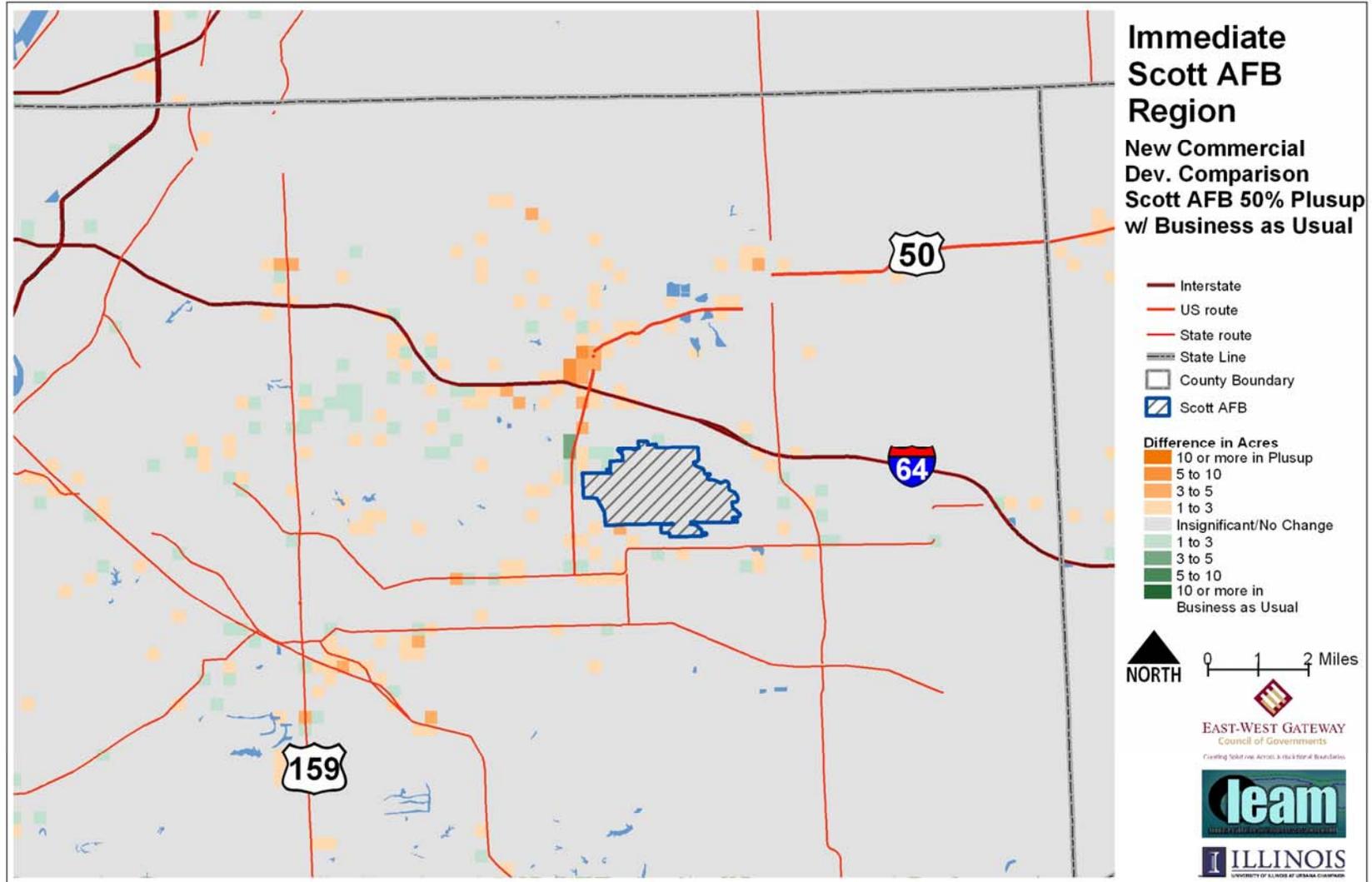


  
**EAST-WEST GATEWAY**  
 Council of Governments  
 Creating Solutions Across Jurisdictional Boundaries

  
**leam**  
 Land Use Evaluation and Assessment

  
**ILLINOIS**  
 UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

# Scott AFB Personnel Increase Commercial Land Use Change Comparison



# Overview

- The problem?
  - Understanding and dealing with the future
- Future landscapes
  - Tools
  - Implications
- Applications
- Conclusions

# Dealing with the Future

- We have good tools for analyzing historic and current conditions
- Our tools for dealing with the future are, at best, crude
  - Wishful thinking is not very useful
    - Community Visioning processes
  - We have a poor grasp of future consequences of different actions and future changes

# What Does the Future Hold?

- A trend line can be extrapolated for a single future
  - But what if it does not come about?
  - There is a need for richer descriptions
- Multiple descriptions of the future (scenarios) provide a more substantial basis
  - Can frame probable futures
  - Can deal with complex issues
  - Economic, social, and environmental forces
  - Public policies and investment decisions
- Modeling Landscape Evolution
  - Simulate multiple ways in which a regional landscape evolves

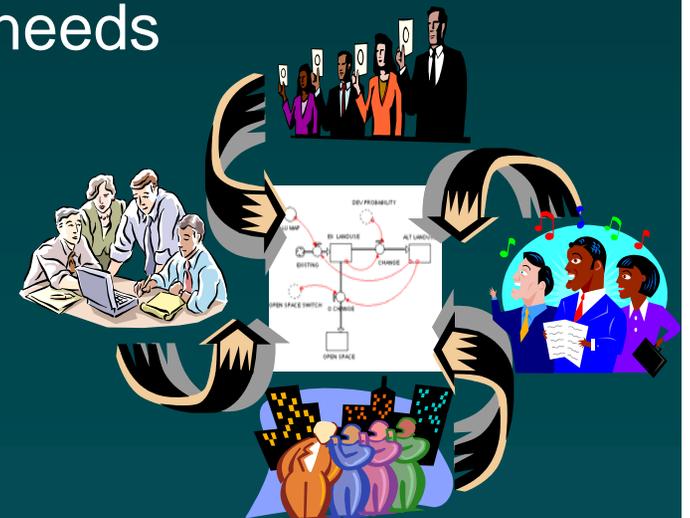
# The Landuse Evolution and Impact Assessment Model

# LEAM

A Community Planning Tool

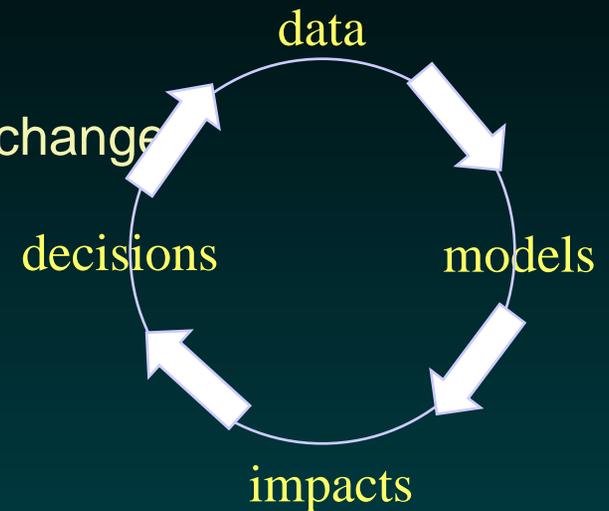
# Understanding Development Pressure

- What factors cause change and how?
  - Translate this into mathematical equations
- Computers simulate changes over space and time
  - Alter equations to play out different scenarios
  - Helps articulate the future
  - Can assist in determining future needs

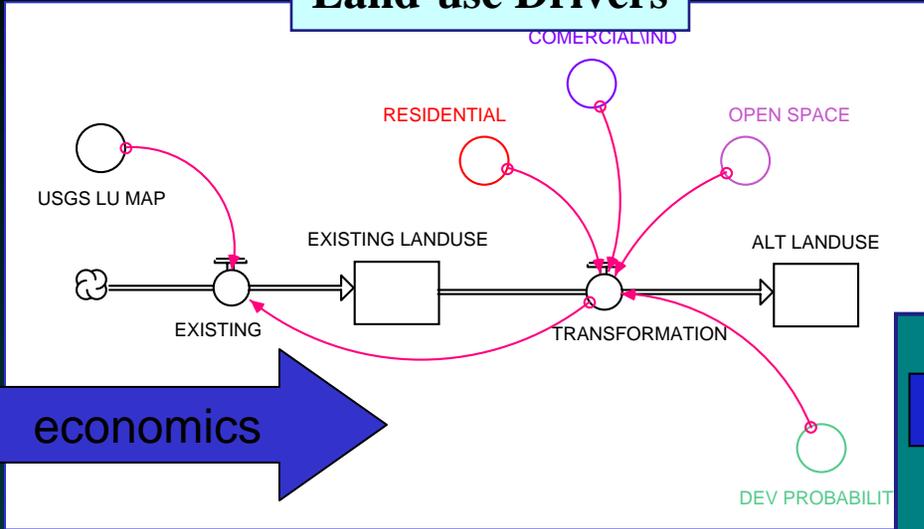


# LEAM Approach

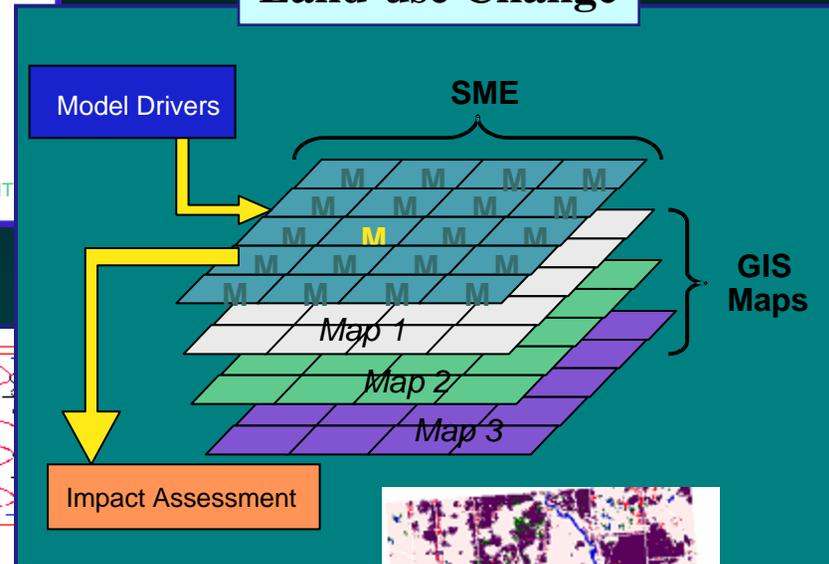
- Captures causal mechanisms of land-use change
  - What if?
    - Environmental, Social, Economic
    - Appropriate scales
- Captures dynamics of complex systems
  - Feedbacks
  - Lags
- Captures impacts of land use change - So What?
  - Causal relationships
  - Environmental, Social, Economic
- Incorporates calibration and validation
  - Quantify uncertainty
- A hybrid approach
  - Cellular automata (agents - landowners)
  - On a non-uniform (probability) surface



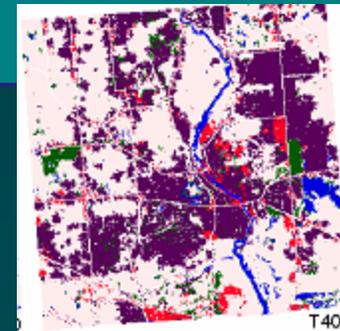
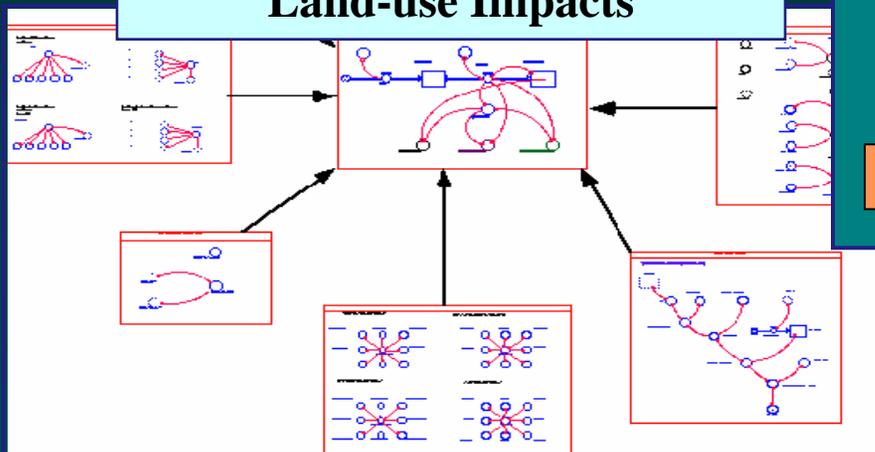
## Land-use Drivers



## Land-use Change



## Land-use Impacts



T40

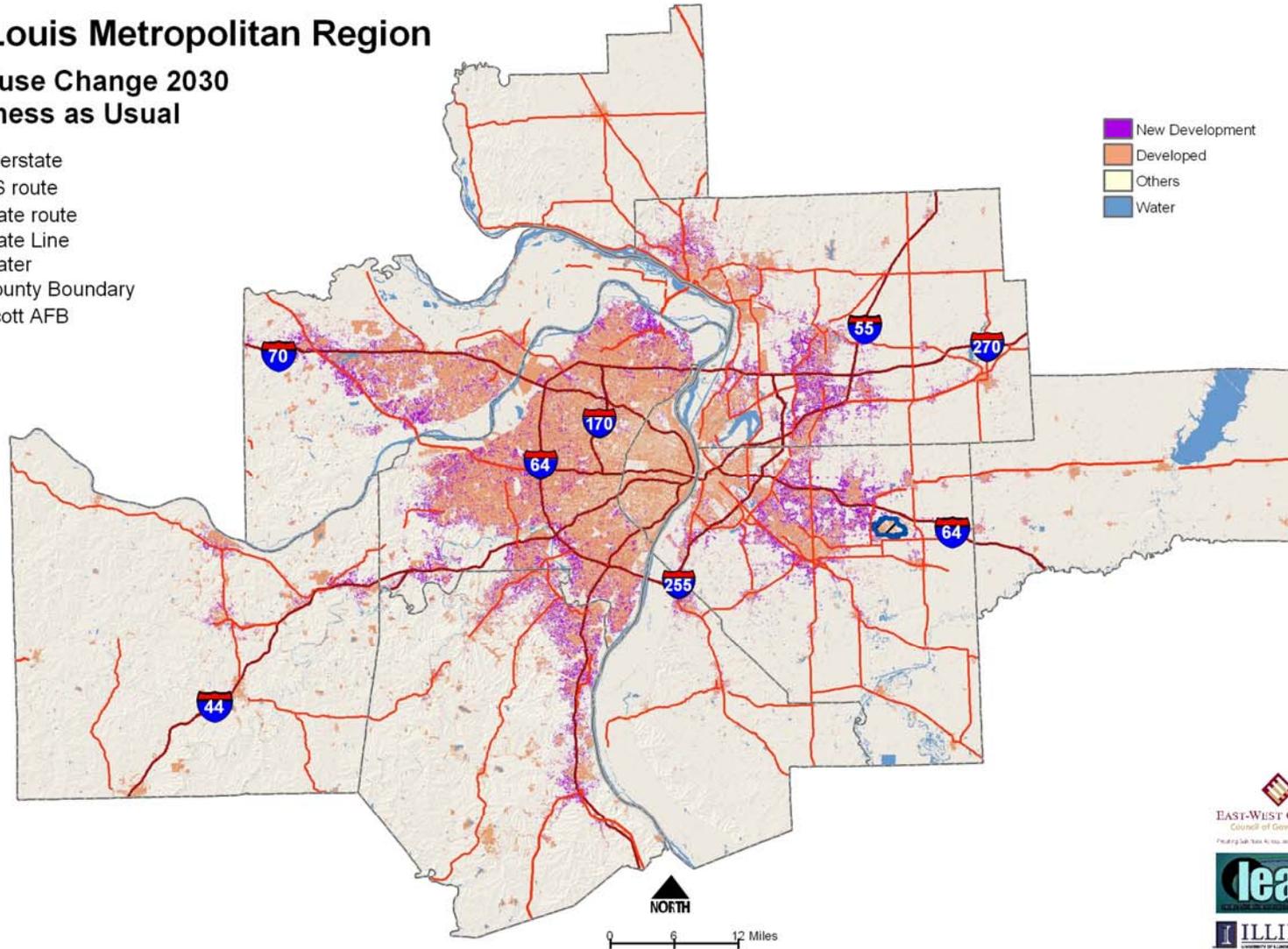
# St. Louis Region Landuse Change

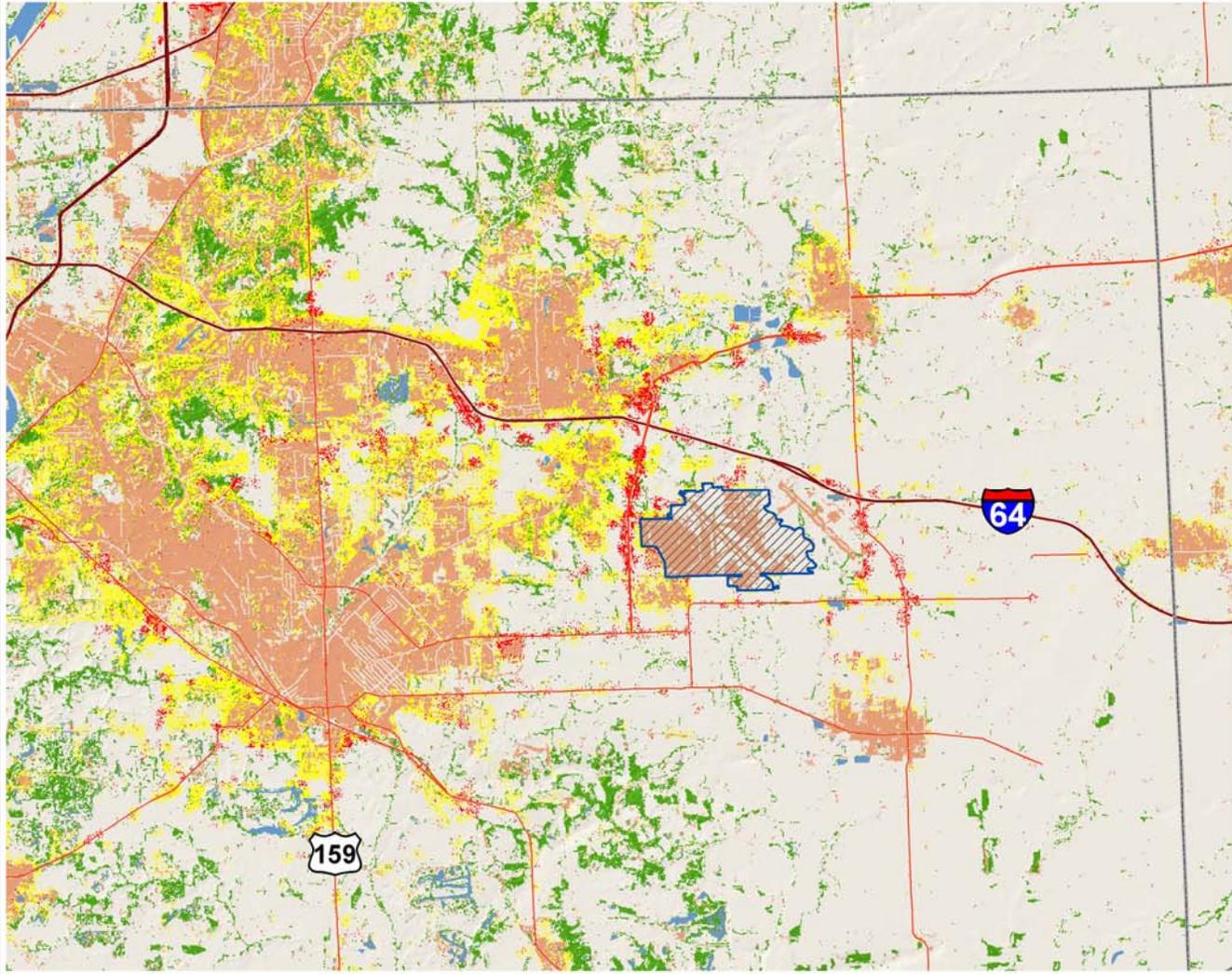
## St. Louis Metropolitan Region

### Landuse Change 2030 Business as Usual

- Interstate
- US route
- State route
- State Line
- Water
- County Boundary
- Scott AFB

- New Development
- Developed
- Others
- Water





# Immediate Scott AFB Region

2030 Landuse Change Business as Usual

- Interstate
- US route
- State route
- State Line
- County Boundary
- ▨ Scott AFB
- New Residential
- New Commercial
- Developed
- Forest
- Others
- Water



0 0.9 1.8 Miles



EAST-WEST GATEWAY  
Council of Governments  
Creating Solutions Across Jurisdictional Boundaries



# Implications

# Environmental, Social, Economic Implications

- General Impacts
  - Land use change, impervious surface, loss of key resources
  - Convert developed cells into population/HH, spatialize data by various boundaries (school district, water & sewer area) to estimate infrastructure needs
- Impact models allow for further assessment of the consequences of land-use change
- We have implemented
  - Traffic volume
  - Fiscal impacts
  - School costs
  - Water & air quality impacts
  - Economic impacts
  - Habitat fragmentation
  - Stormwater/flooding

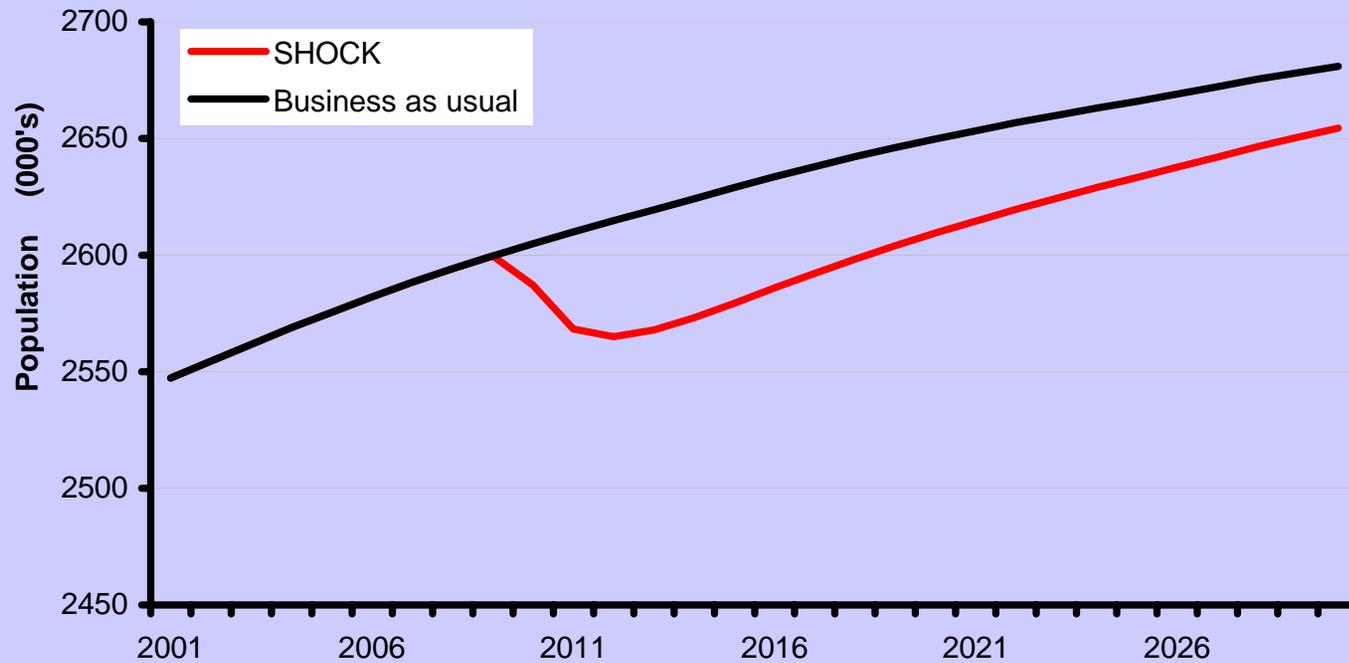
Landcover Classification	1993 Landcover	2025 High	2025 Mid	2025 Low
Water	93,781	93,781	93,781	93,781
Residential	183,408	226,230	218,187	213,641
Commercial/Industrial	232,747	241,615	239,717	238,901
Agricultural	1,677,371	1,644,462	1,650,485	1,653,606
Urban Openspace	164,252	181,133	181,539	181,750
Forested	963,332	930,195	933,314	935,110
Grasslands	37,969	36,684	36,828	36,905
Others	142,001	140,262	140,513	140,669
<b>Total</b>	<b>3,494,861</b>	<b>3,494,861</b>	<b>3,494,861</b>	<b>3,494,861</b>

# LEAMecon

## 'What if? Scenario Building

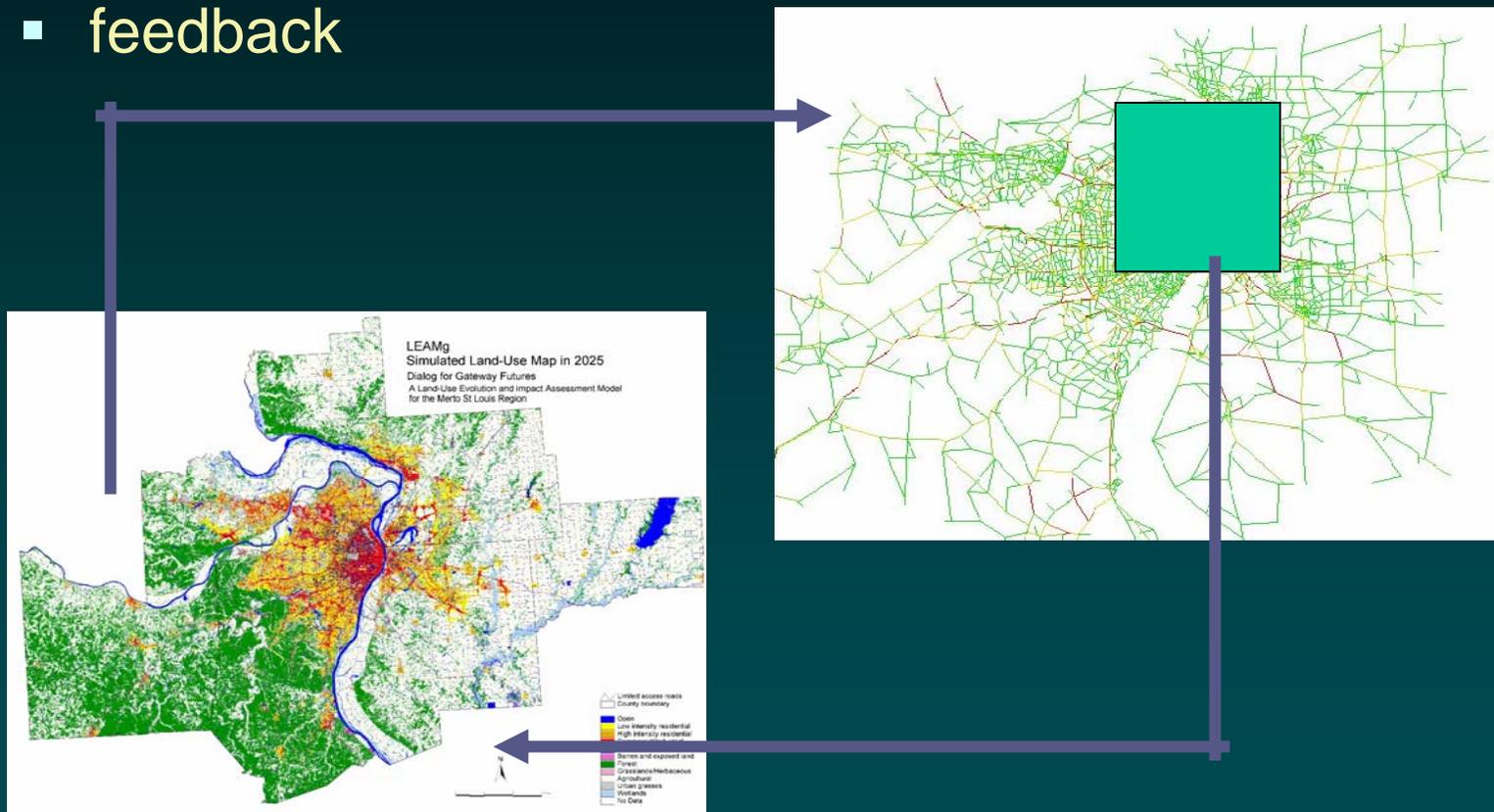
Closing Scott AFB, MO

Total Population



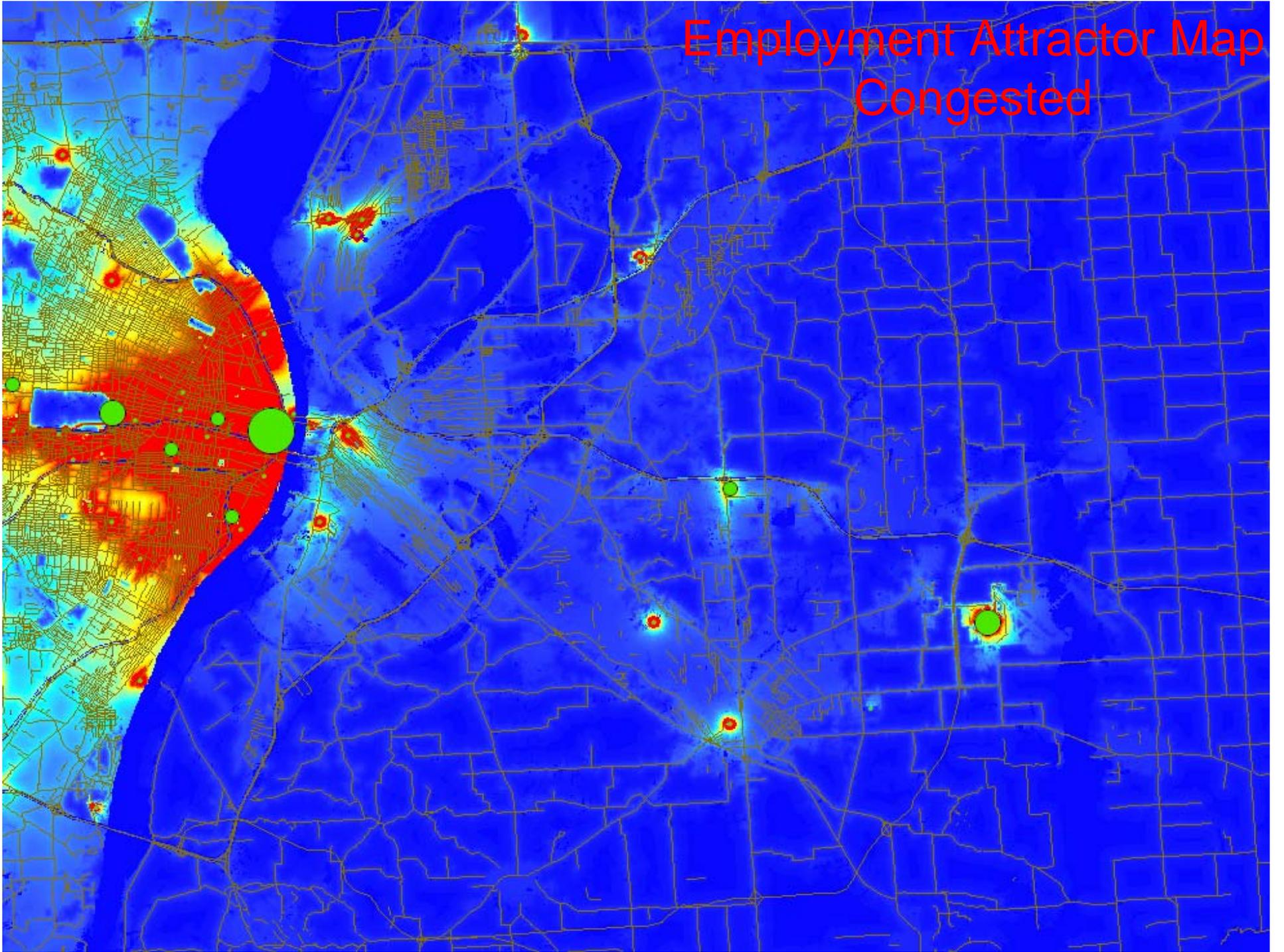
# Transportation and Landuse

- Inextricable connection
- feedback



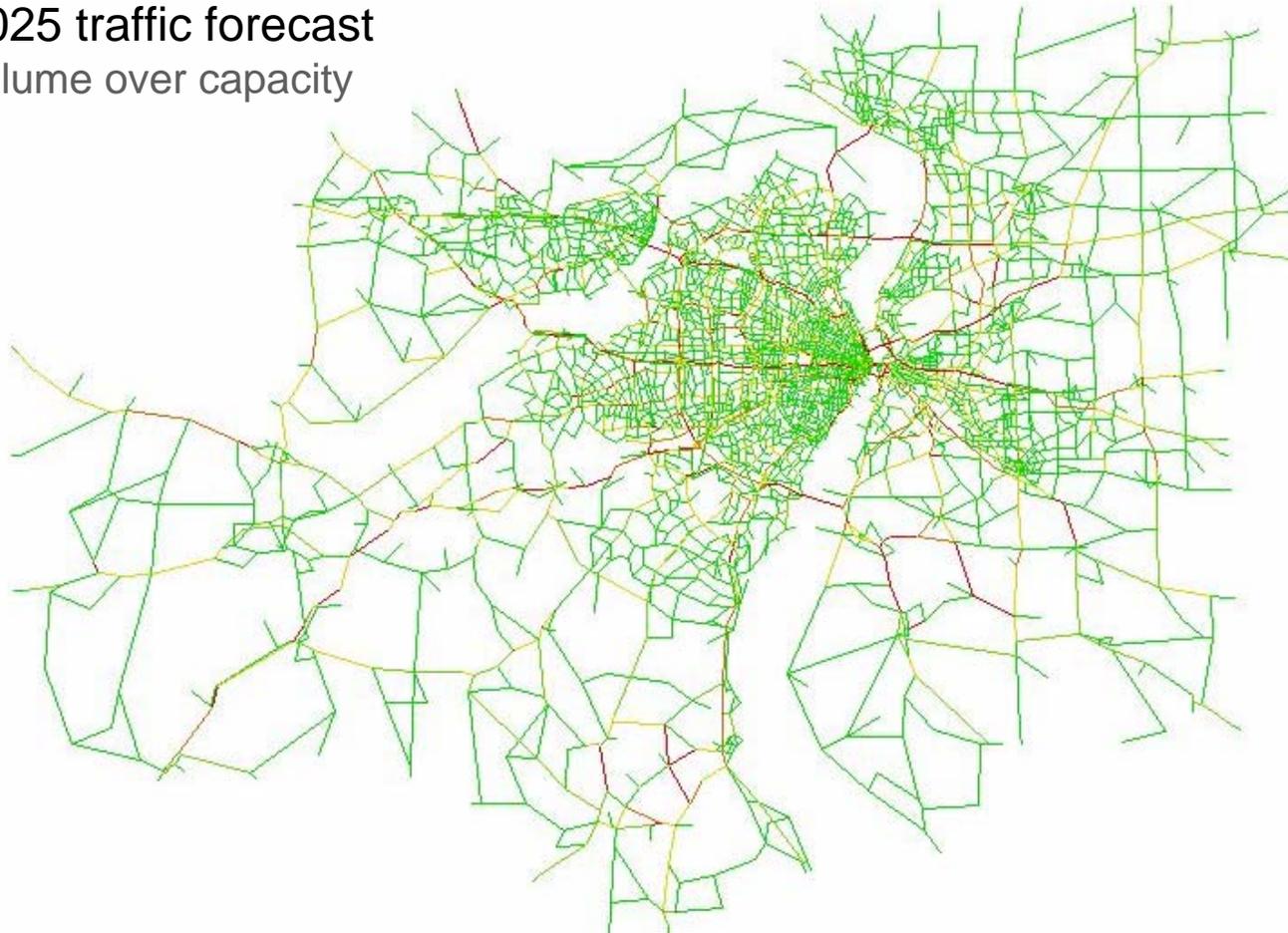


# Employment Attractor Map Congested



# Transportation Impacts

2025 traffic forecast  
volume over capacity

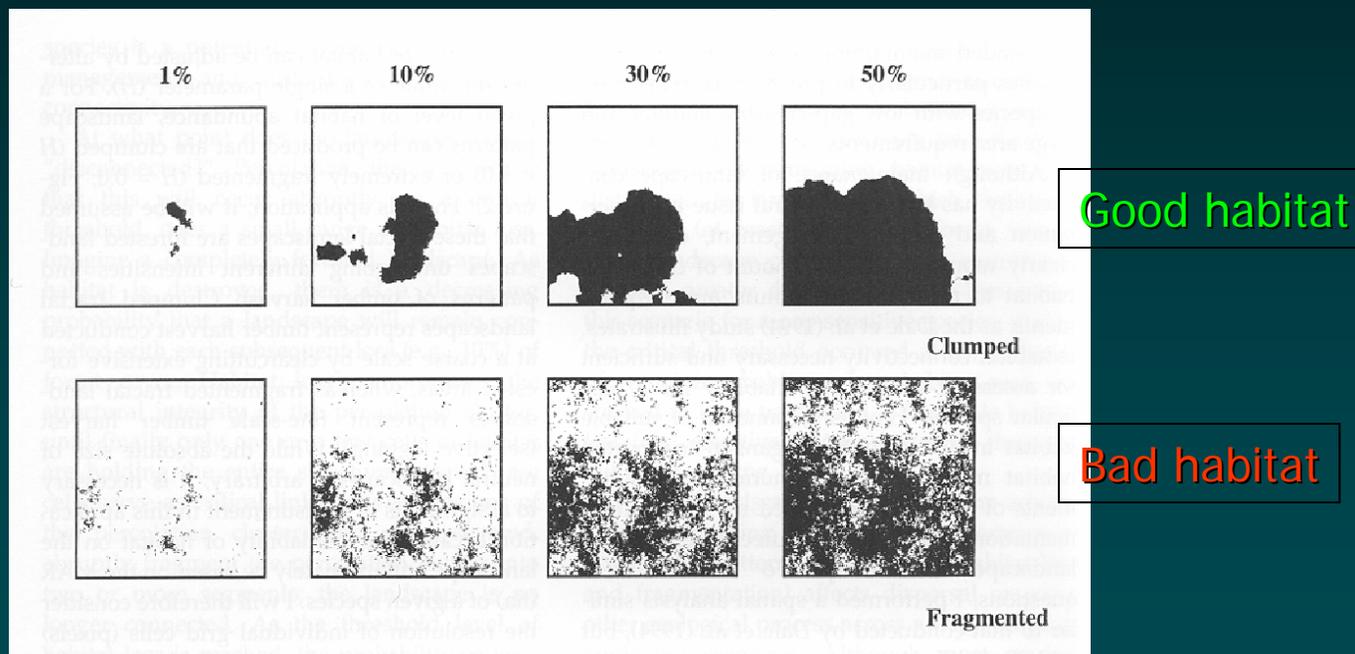


v/c values in percentag

- 0 - 25
- 24 - 50
- 51 - 79
- 80 - 95
- 96 - 183

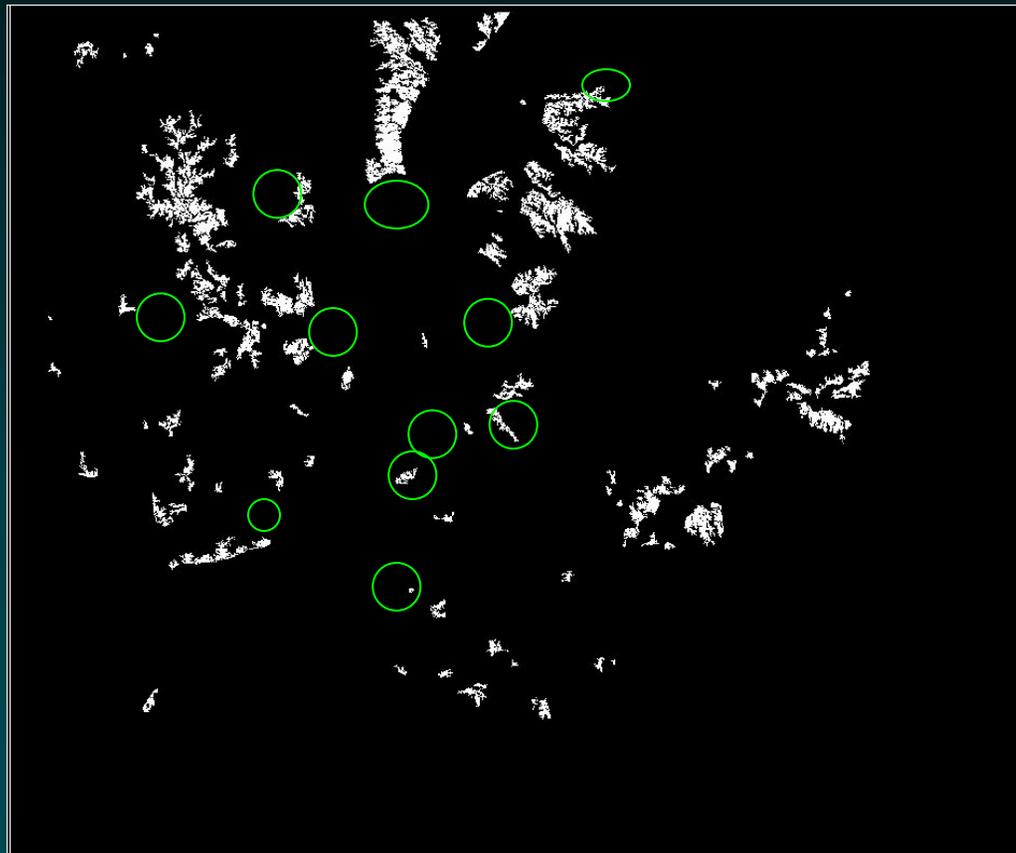
# Habitat Fragmentation

- Landscape consideration
  - spatial arrangement of potential habitat is important

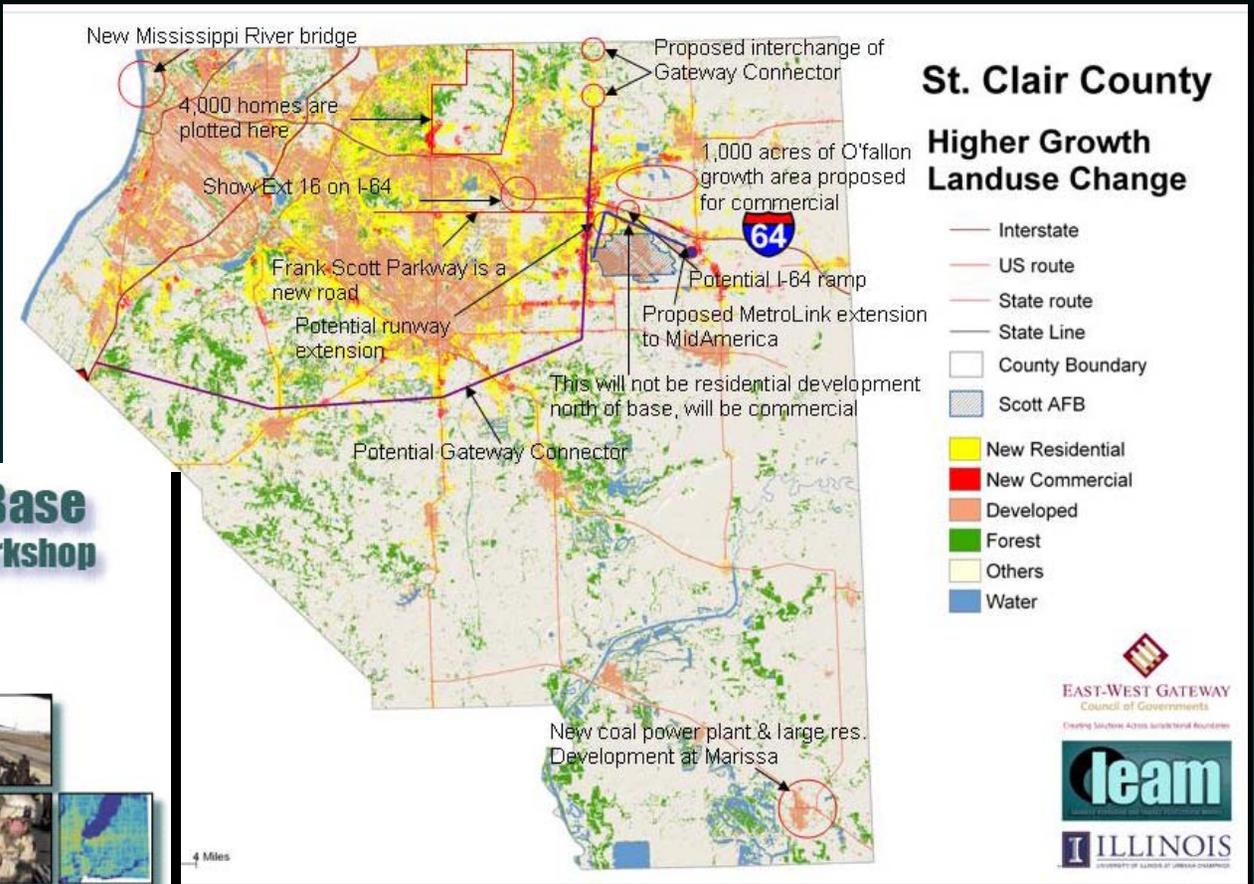


# pLEAM Fragmentation

Spatial results



# Applications



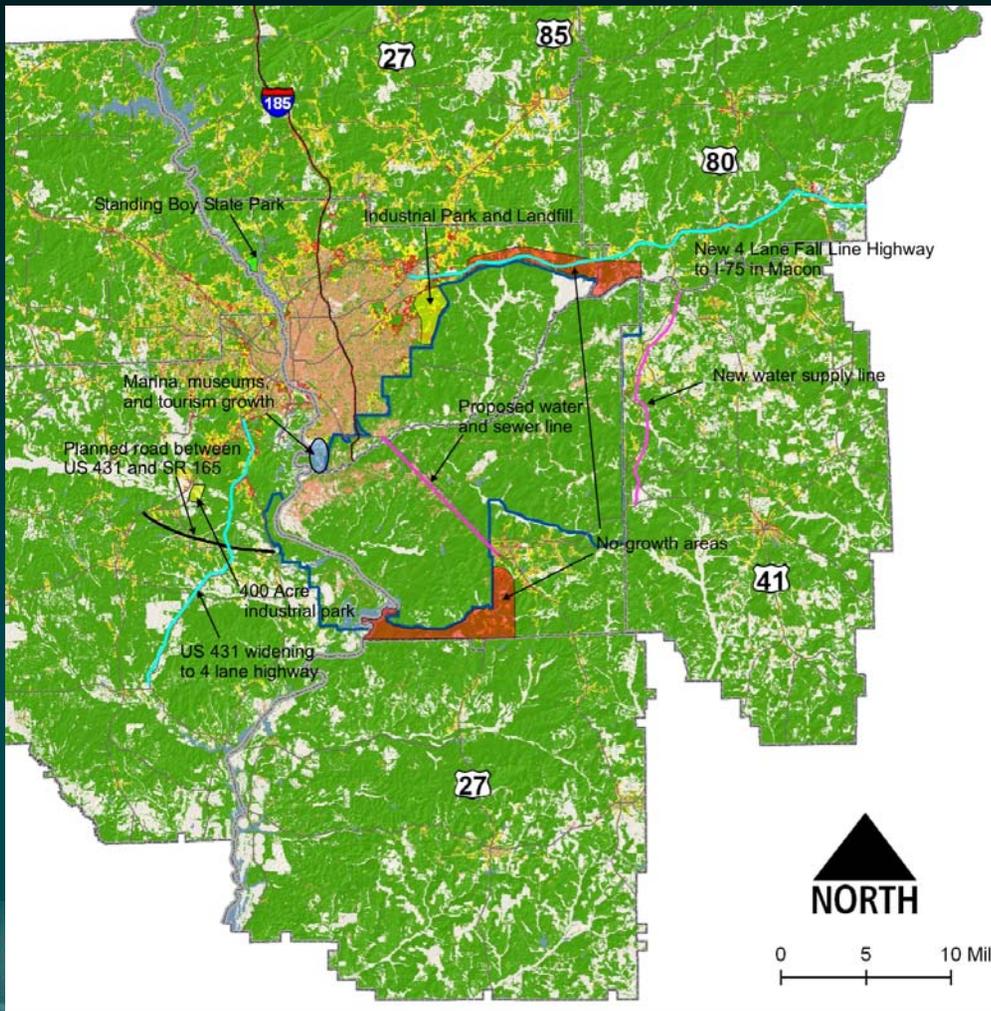
### Scott Air Force Base Regional Planning Workshop

Logos at the bottom of the collage include:

- eam
- EAST-WEST GATEWAY Council of Governments
- US Army Corps of Engineers, Engineer Research and Development Center

# safbLEAM

# Columbus/Fort Benning



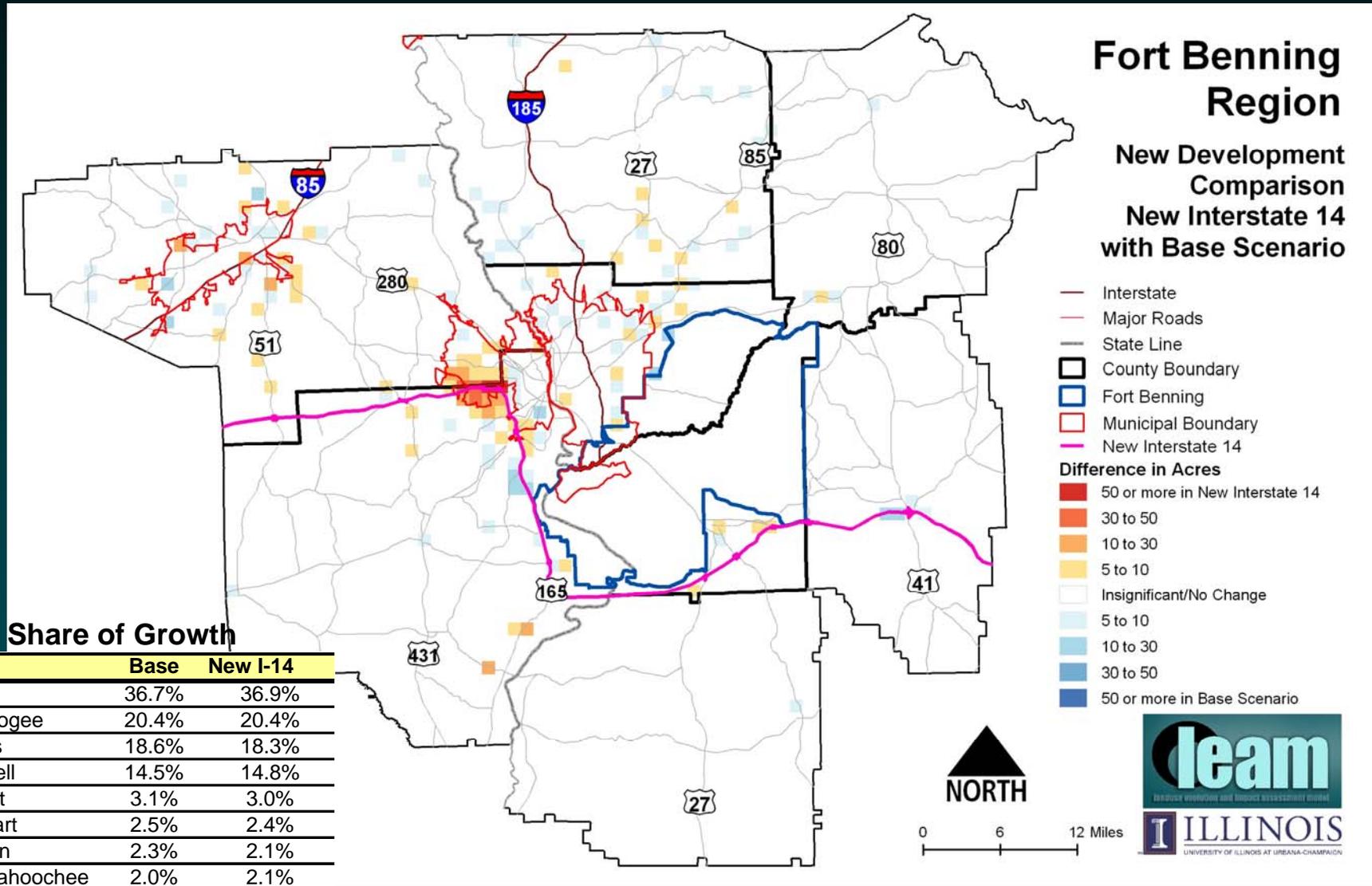
## Fort Benning

### Regional Planning Workshop Results

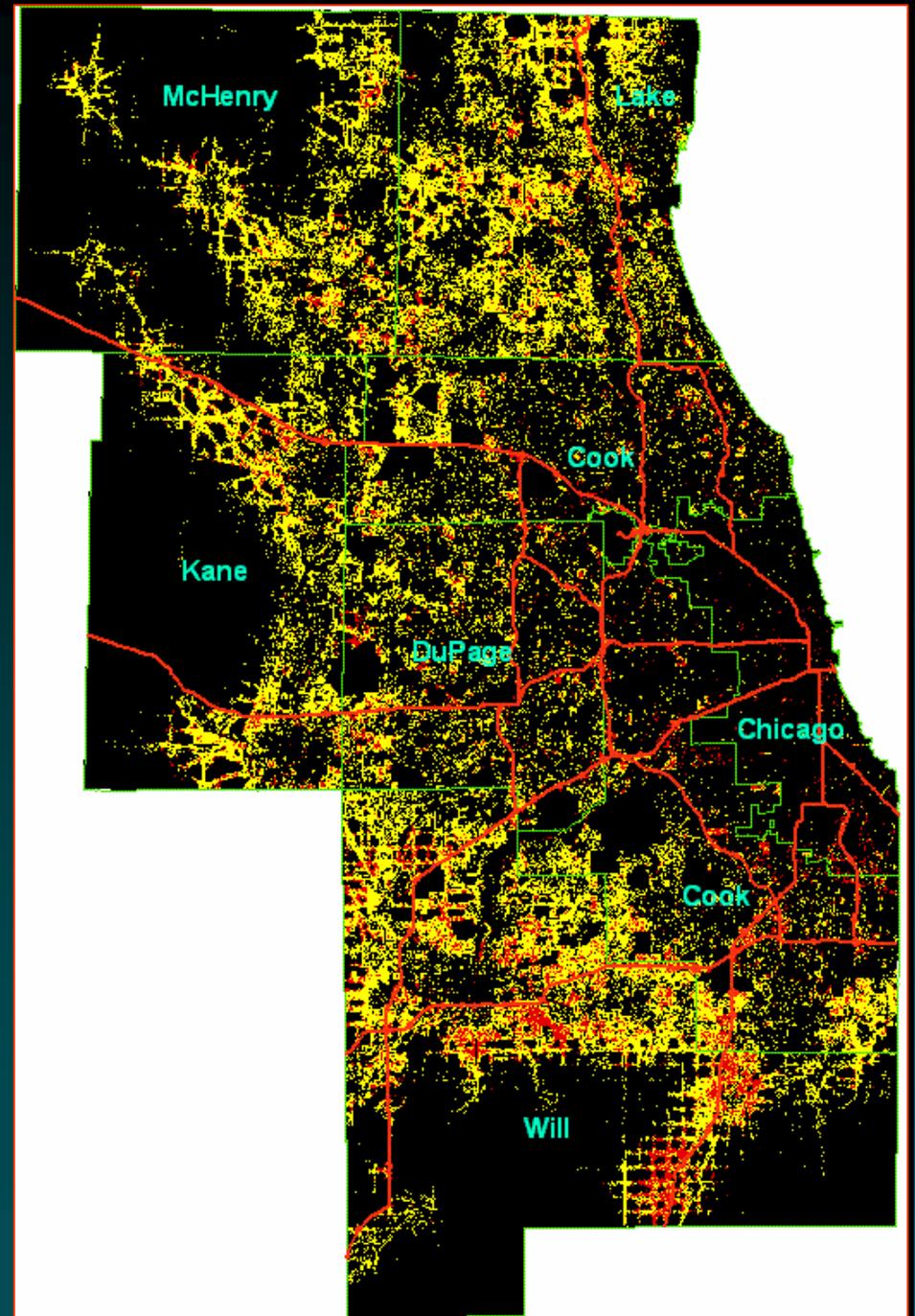
A grid of images representing the results of a regional planning workshop. The grid contains several images: a map of the region with a network of lines, photos of people in a meeting, a person in a field, and other infrastructure-related images. The grid is titled "Fort Benning Regional Planning Workshop Results". At the bottom right, there is a logo for "team" and the text "US Army Corps of Engineers Engineer Research and Development Center".



# New Development Comparison: New Interstate 14 with Base Case

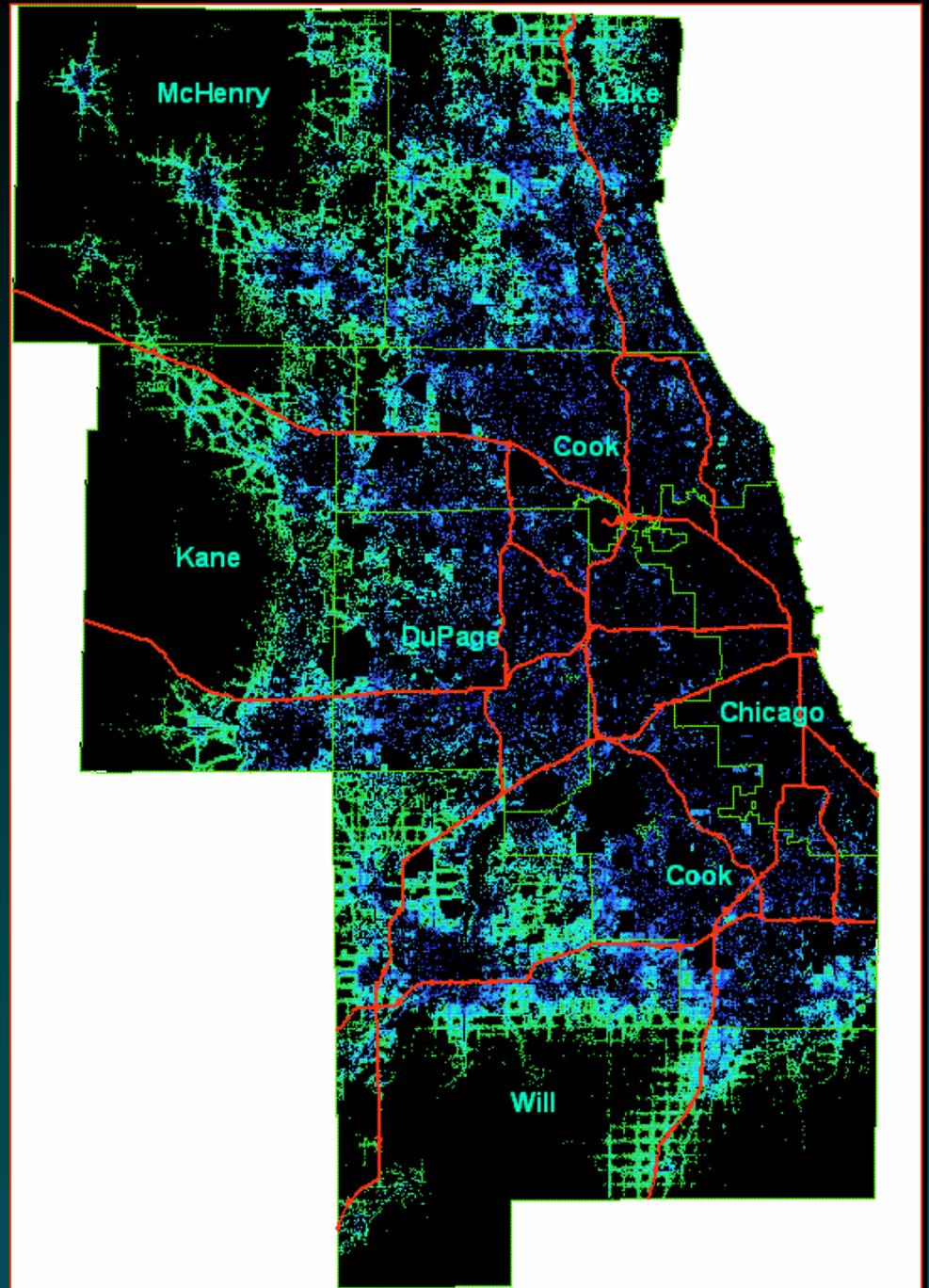


# Chicago Metro LEAM

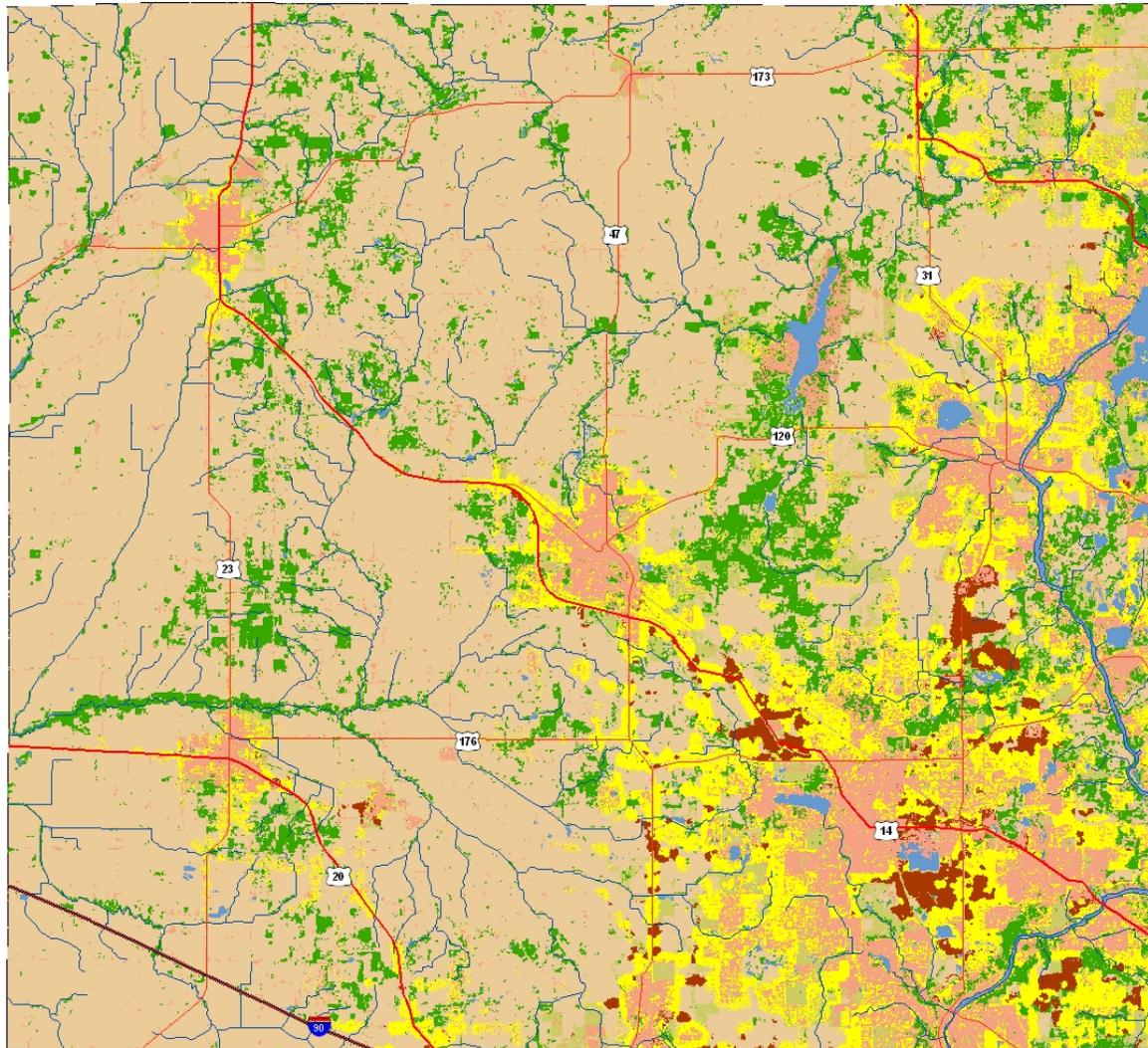


# Chicago Metro LEAM

Near Future  
Distant Future



# LEAMmchenry



## McHenry County 2030

Base Scenario:  
Landuse Change

- Stream
- Interstate
- US route
- State route

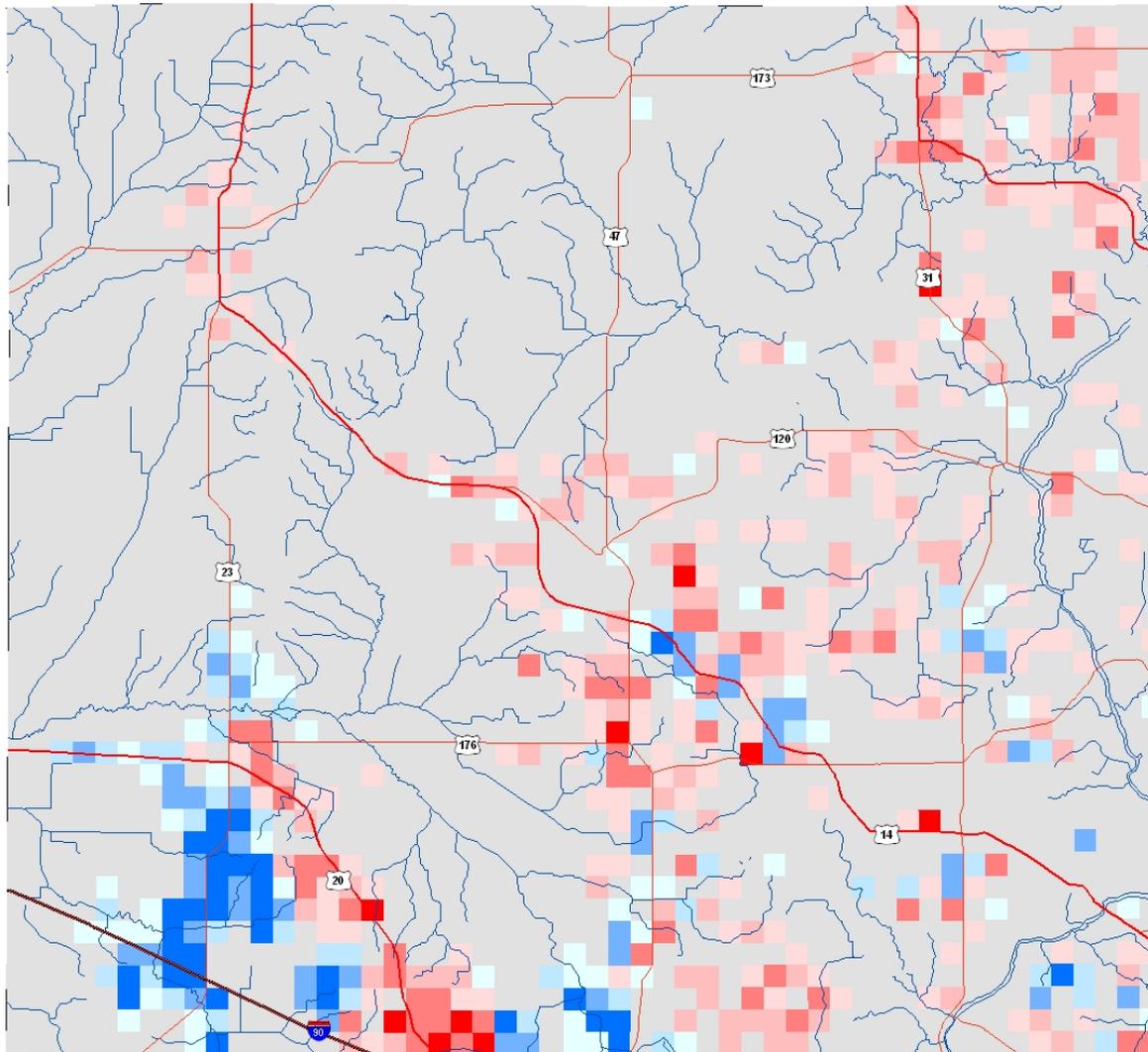
### Land Use 2030

- New Commercial Development
- New Residential Development
- Developed
- Urban Open Space
- Others
- Forest
- Water

0 1 2 3 4 5 Miles



# LEAM Scenario 2



## McHenry County 2030

Households Change:  
Scenario 1 / Scenario 2

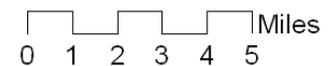
- Stream
- Interstate
- US route
- State route

### Household Change

- 50 or more in Scenario 1
- 20 to 50
- 10 to 20
- 5 to 10
- Insignificant/No Change
- 5 to 10
- 10 to 20
- 20 to 50
- 50 or more in Scenario 2

Scenario 1: Baseline Scenario

Scenario 2: New ramp and Metra Stations



# TALUS-LEAM Ultra-Growth Scenario

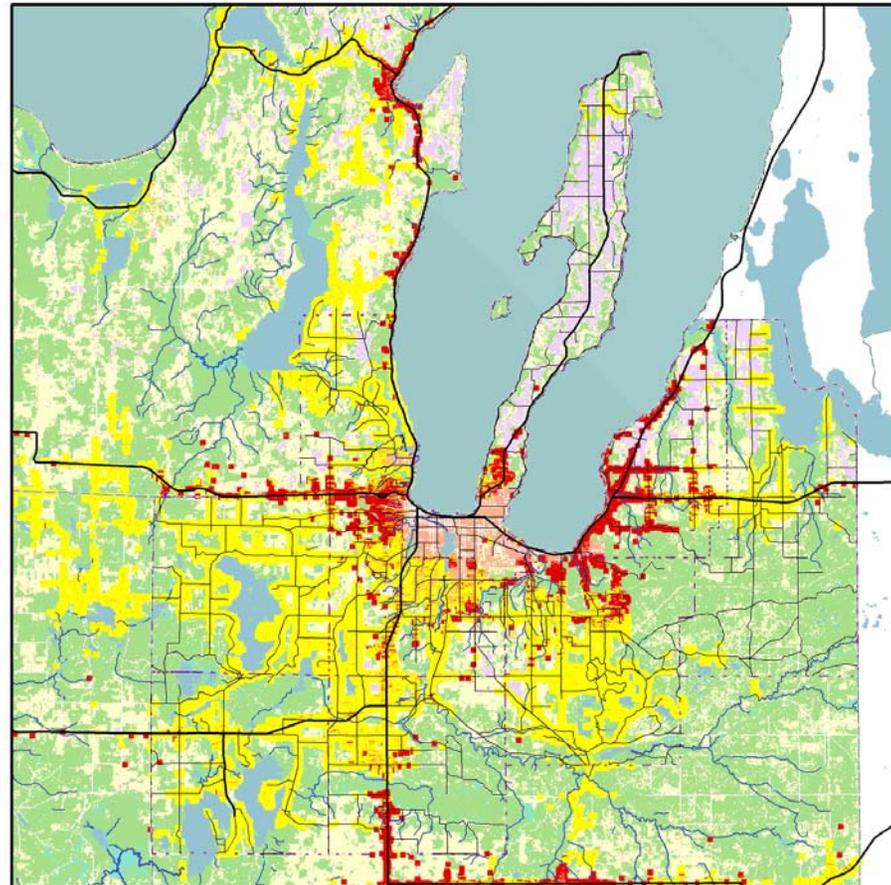
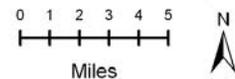
## TALUS-LEAM

Ultra Growth Scenario

2030 Land-Use

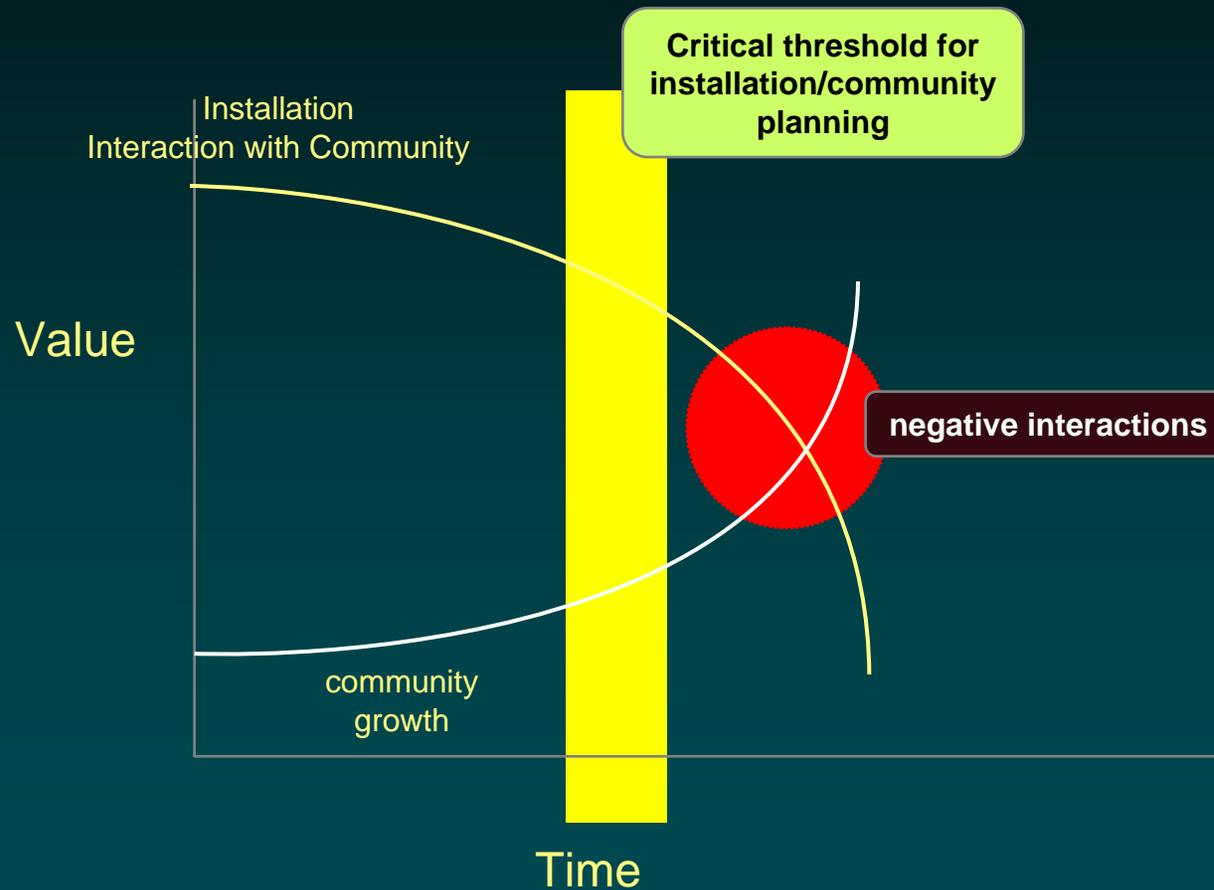
-  Residential Growth
-  Commercial Growth
-  Developed Land
-  Forest
-  Water
-  Orchard
-  Other
  
-  Townships in Study
-  Road
-  River / Stream
-  County Boundary

Oblique Mercator Projection,  
NAD83 Datum, GRS80 Ellipsoid



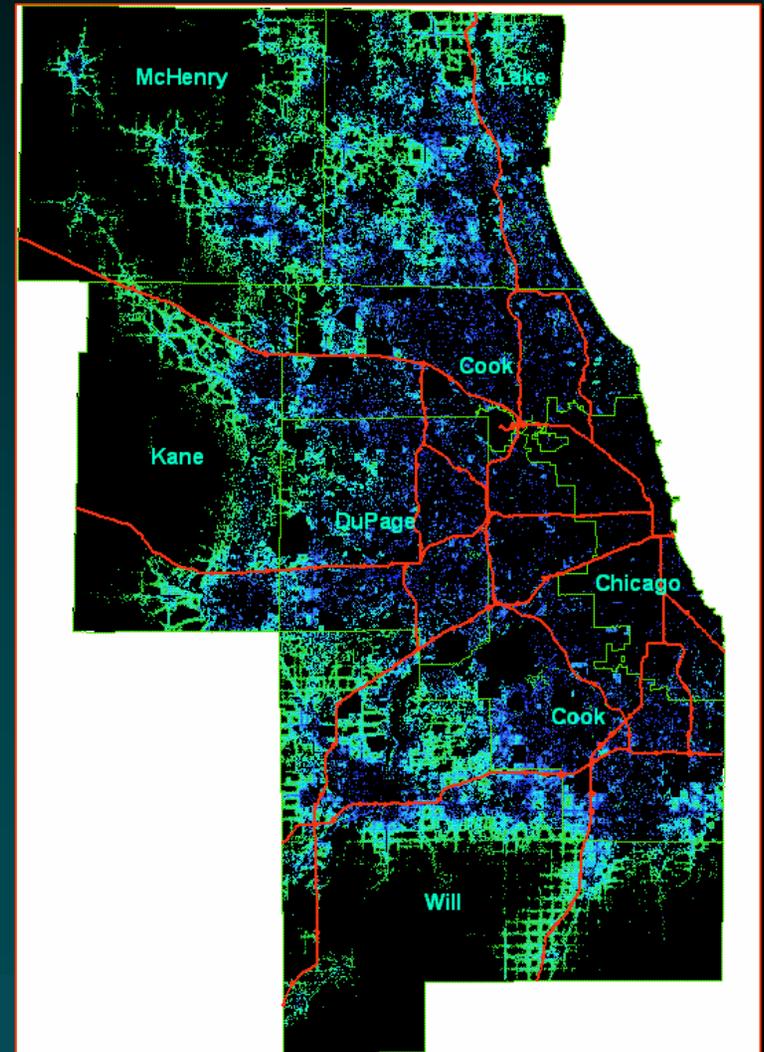
# Conclusions

# Community/DoD Interactions



# LEAMgroup Planning Approach

- Identify strengths, gaps, and inconsistencies in existing plans
  - Reinforce strengths, address gaps and inconsistencies
- Account for the future (LEAM)
  - Simulate different future land-use change scenarios
  - Assess impacts of these changes
- Involve stakeholders as ideas are being formed
  - make sure ideas resonate



# Contact Information

- LEAM
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