The Honorable Kenneth Wilber, Chairman

NASHVILLE AREA
Metropolitan Planning Organization

Incorporating Public Health Considerations into Regional Planning

Southeastern Regional HIA Summit
Davidson, North Carolina
July 31, 2014

Transpo & Health: Obvious Connections

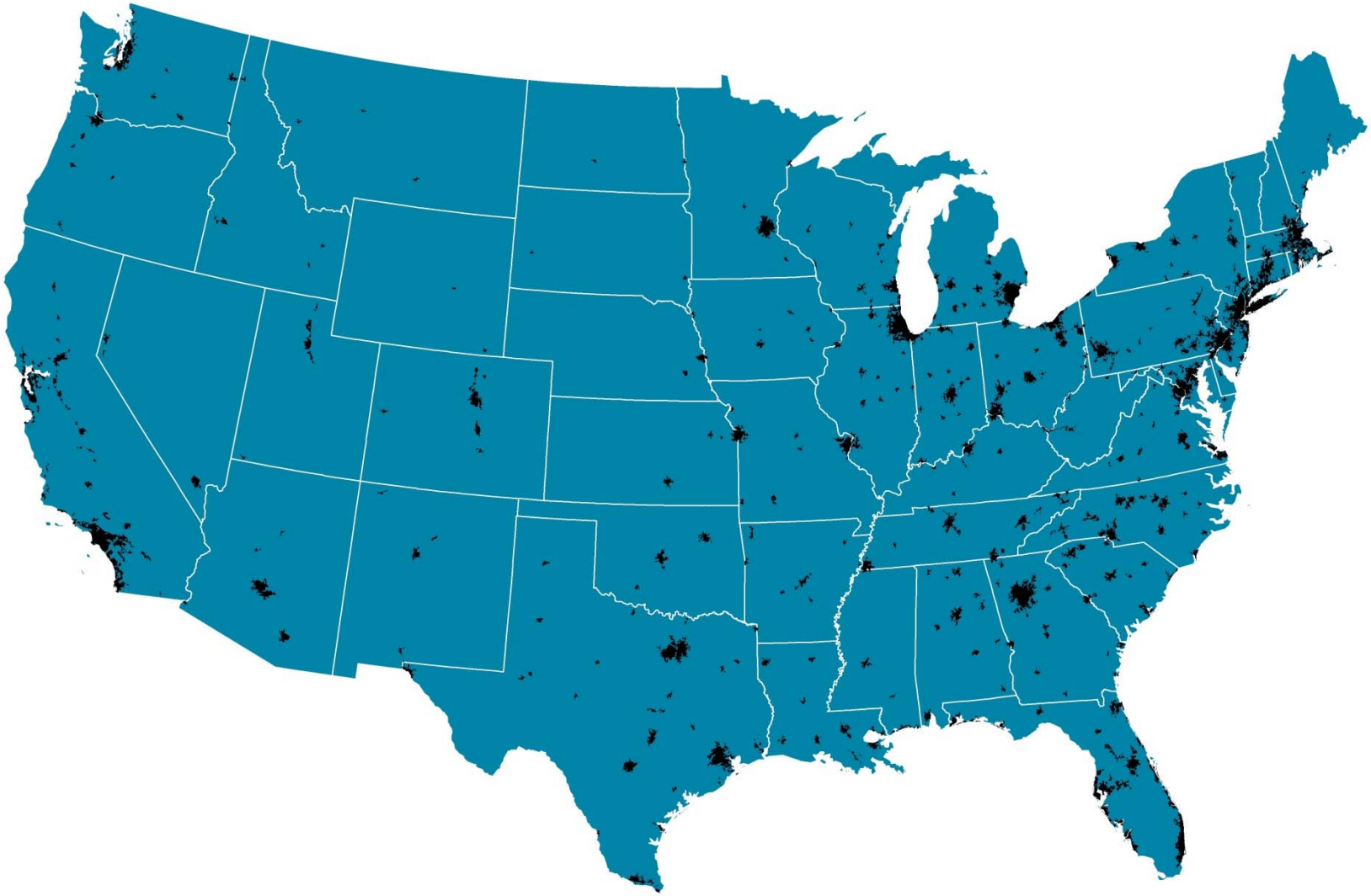
- Roadway Safety
- Air Quality
- Physical Activity
- Equity

- Built Environment
- Human Behavior and Lifestyle Choices

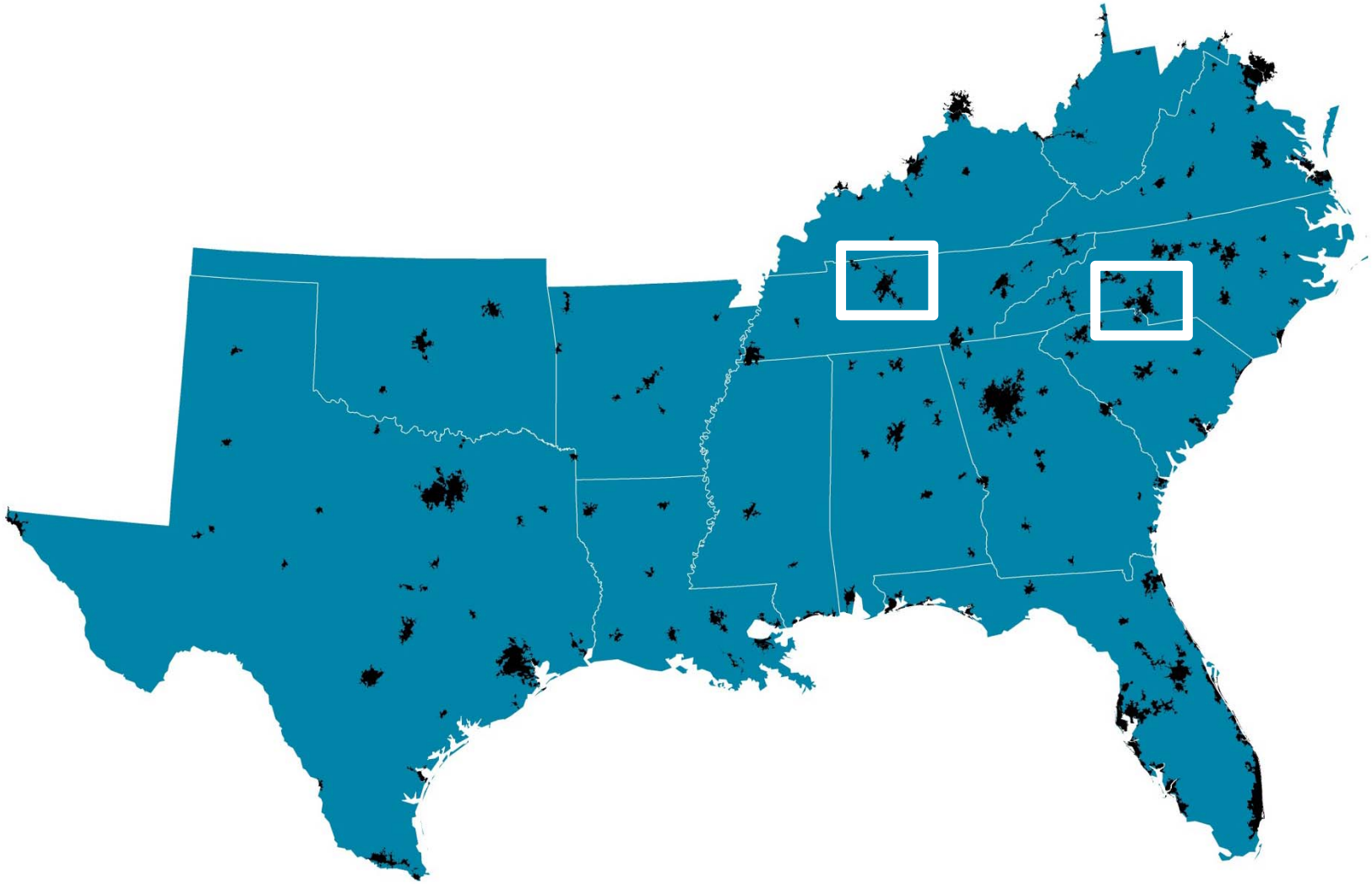
Historical Perspective

- U.S. urban planners owe their profession to public health concerns
- Suburbanization of America expanded urban economies and travel sheds to a regional/ metropolitan scale
- MPOs first established by the Highway Act of 1962
  - Initially to facilitate the construction U.S. Interstate System in urban areas
  - Expanded scope authority through subsequent transportation, housing, and environmental acts

Urbanized Areas of the USA



Urbanized Areas of the Southeast



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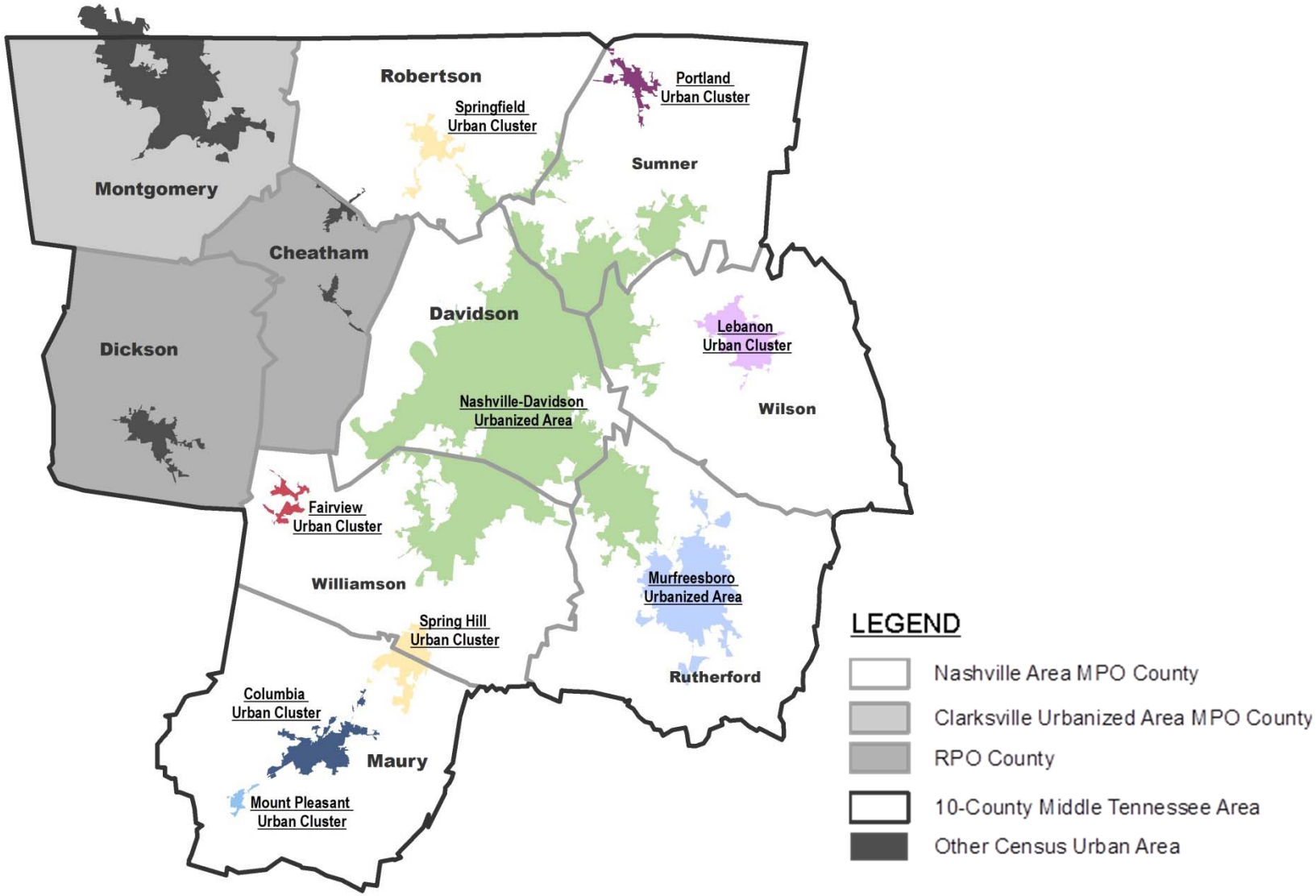
Middle Tennessee



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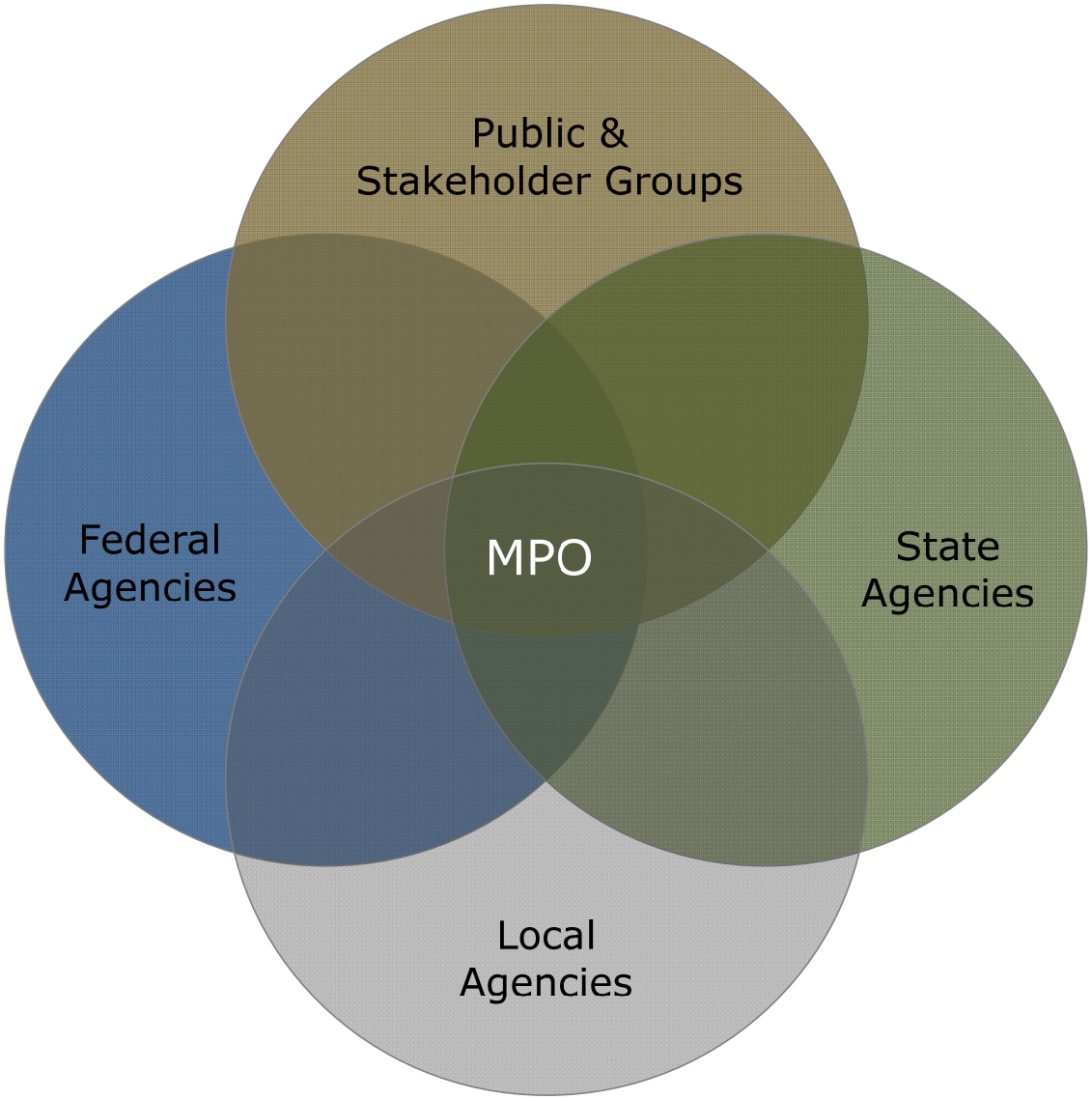
The Nashville Area

The Nashville Area

MPOs are a Collaborative Forum



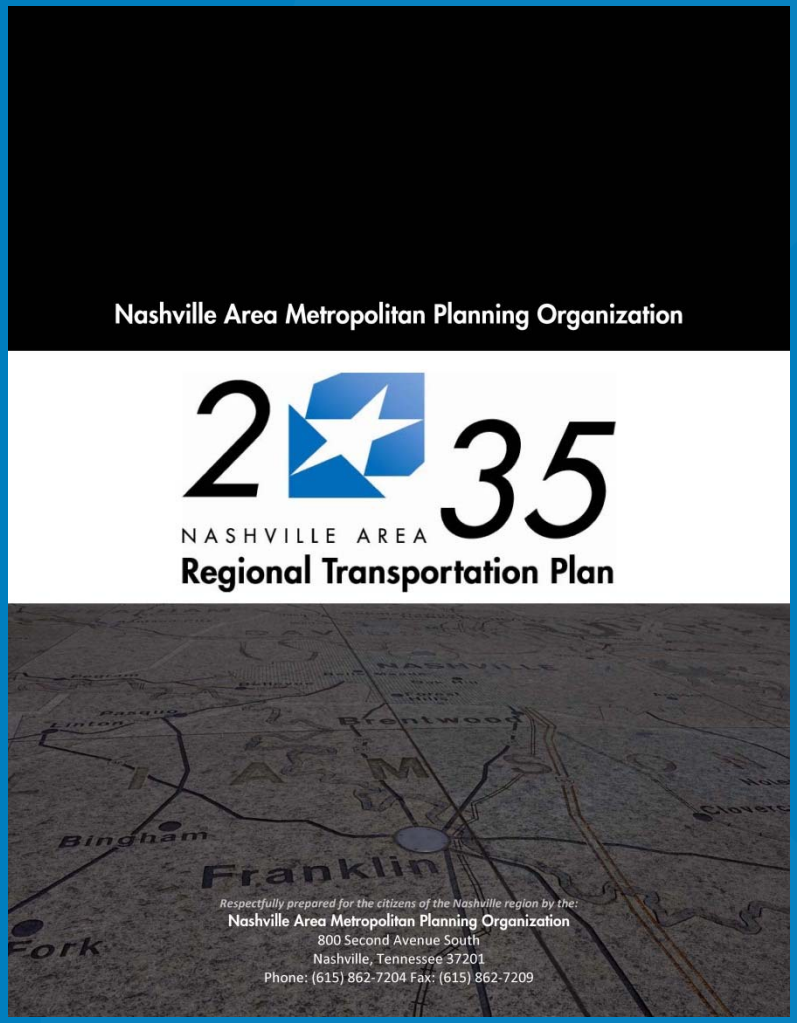
MPO Structure

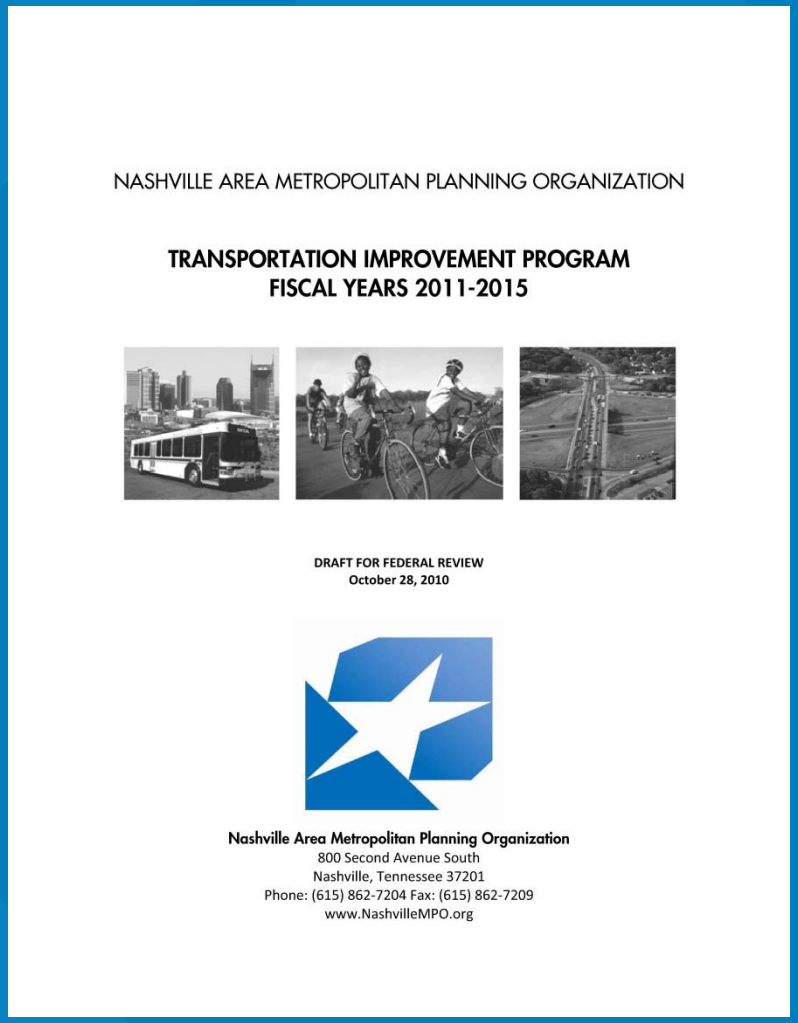
- **Multi-Jurisdictional Planning Area**
  - About half are COGs
- **Policy Board/ Governing Board**
  - Primarily comprised of local elected leadership
- **Technical Committee**
  - Local planners, engineers, transit operators, air quality specialists, state and federal agencies
- **Citizen Committees**
  - Ad hoc or standing, broad or issue-based
- **Professional Staff/ Consultants**
  - Planning, public policy, engineering, economic, environmental backgrounds

MPO Funding

- **Provided through FHWA and FTA**
  - Authorized by federal legislation (MAP-21)
  - Appropriated by Congress
- **Federal Planning Funds**
  - Programmed into an annual or bi-annual Unified Planning Work Program that lists all studies and planning activities scheduled funded with federal planning grants
- **Federal Transportation Program Funds**
  - Identified by a fiscally-constrained long-term vision document/ regional transportation plan
  - Programmed into at short-range Transportation Improvement Program by year and phase of work

$6 Billion through 2035 ➡ $1 Billion through 2015





http://www.nashvillempo.org/20**35**

http://www.nashvillempo.org/20**40**

http://www.nashvillempo.org/plans_programs/tip/

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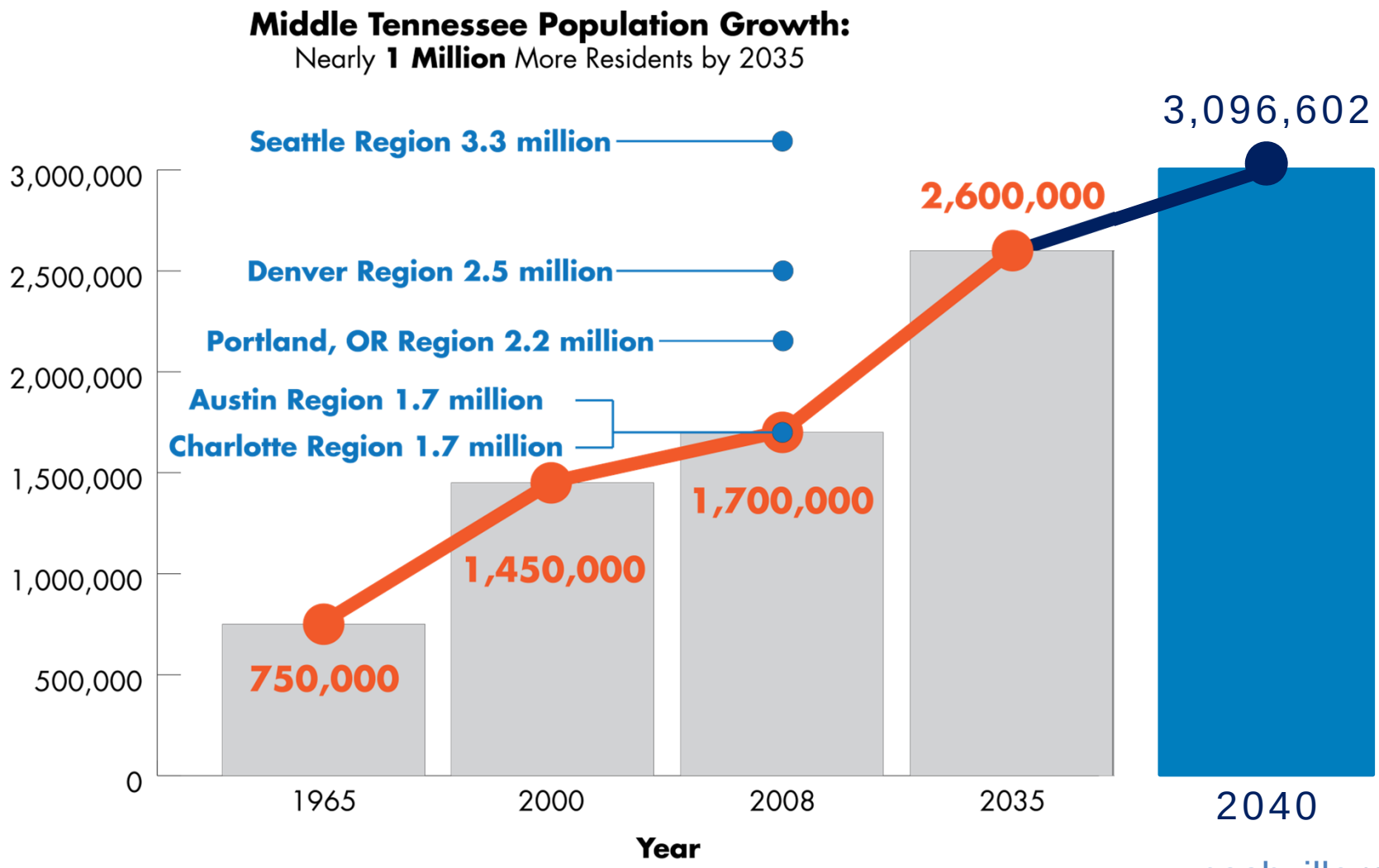
Benefits of Partnership with MPO

- **Access to Local and State Political Leadership**
  - Interact with city and county mayors, state agencies, state legislature on mutually beneficial initiatives
- **Interaction with Local Planners and Engineers**
  - Influence local comprehensive plans, land use policies, zoning ordinances, building codes, street design
- **Data Collection and Research Capacity**
  - Clearinghouse for information about the built and natural environments, land development forecasts, travel behaviors, etc.
- **Influence Transport Policies, Plans, & Investments**
  - Ensure public dollars are spent on investments that help foster healthier communities and lifestyles

Land Use & Travel Demand Modeling

Population Growth



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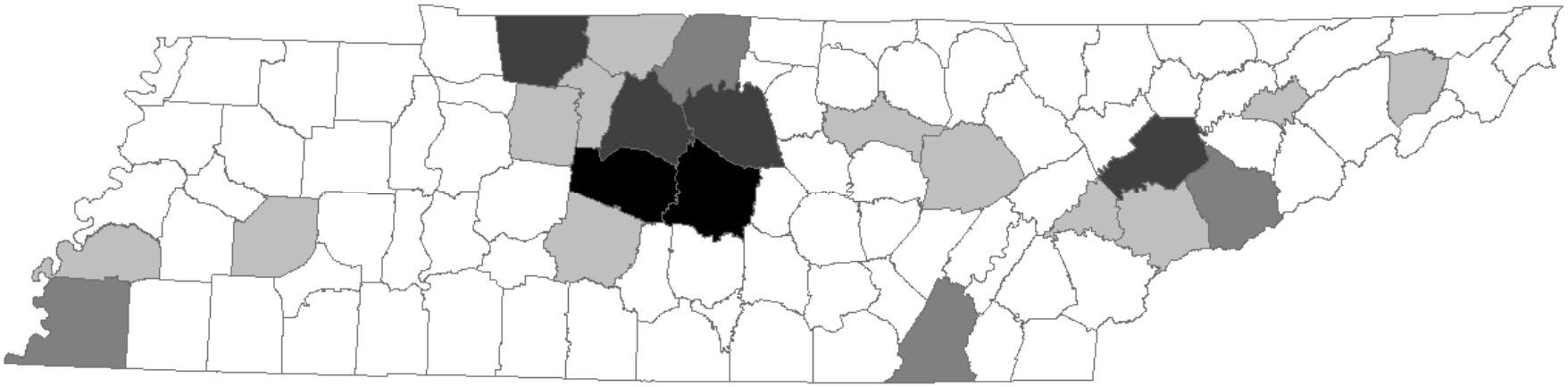
Net Population 2010 to 2040



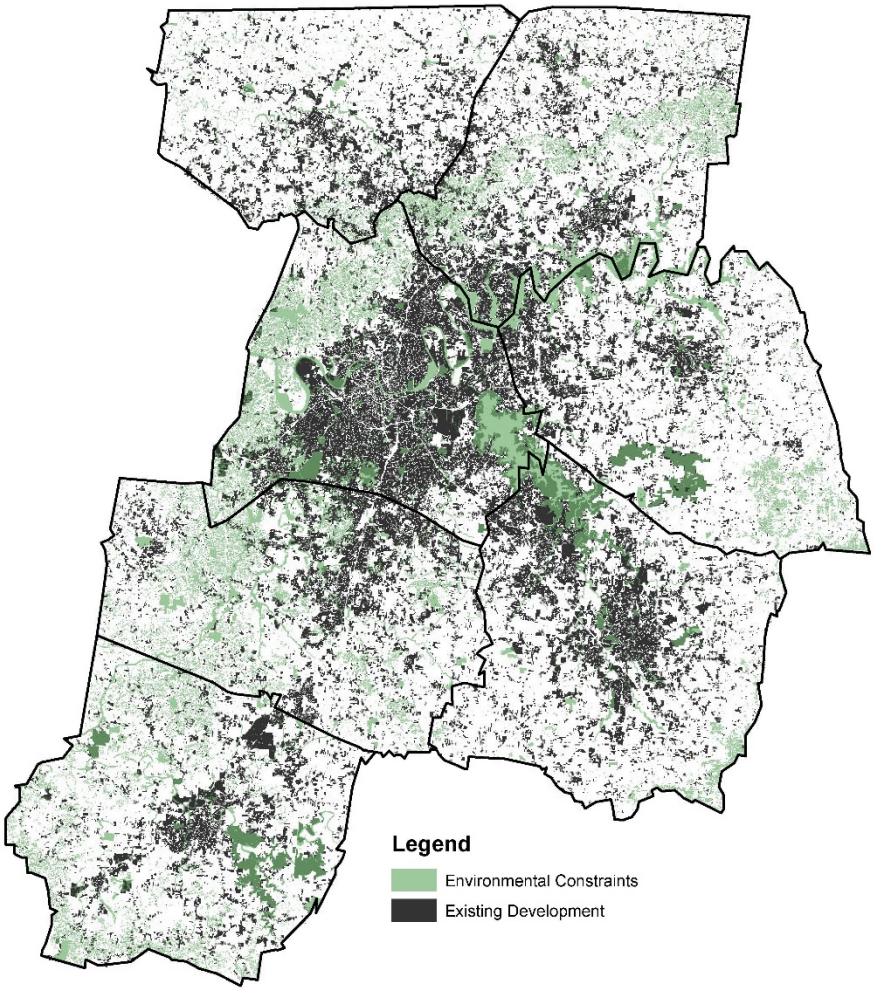
25,000 or Less
25,000 to 50,000
50,000 to 100,000
100,000 to 250,000
250,000 or More

2.5 Million Statewide

1.3 Million (52%) in the MIDDLE

Source: U.S. Census Bureau, Woods & Poole Economics

Existing Development & Environmental Constraints



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10 5 0 Miles

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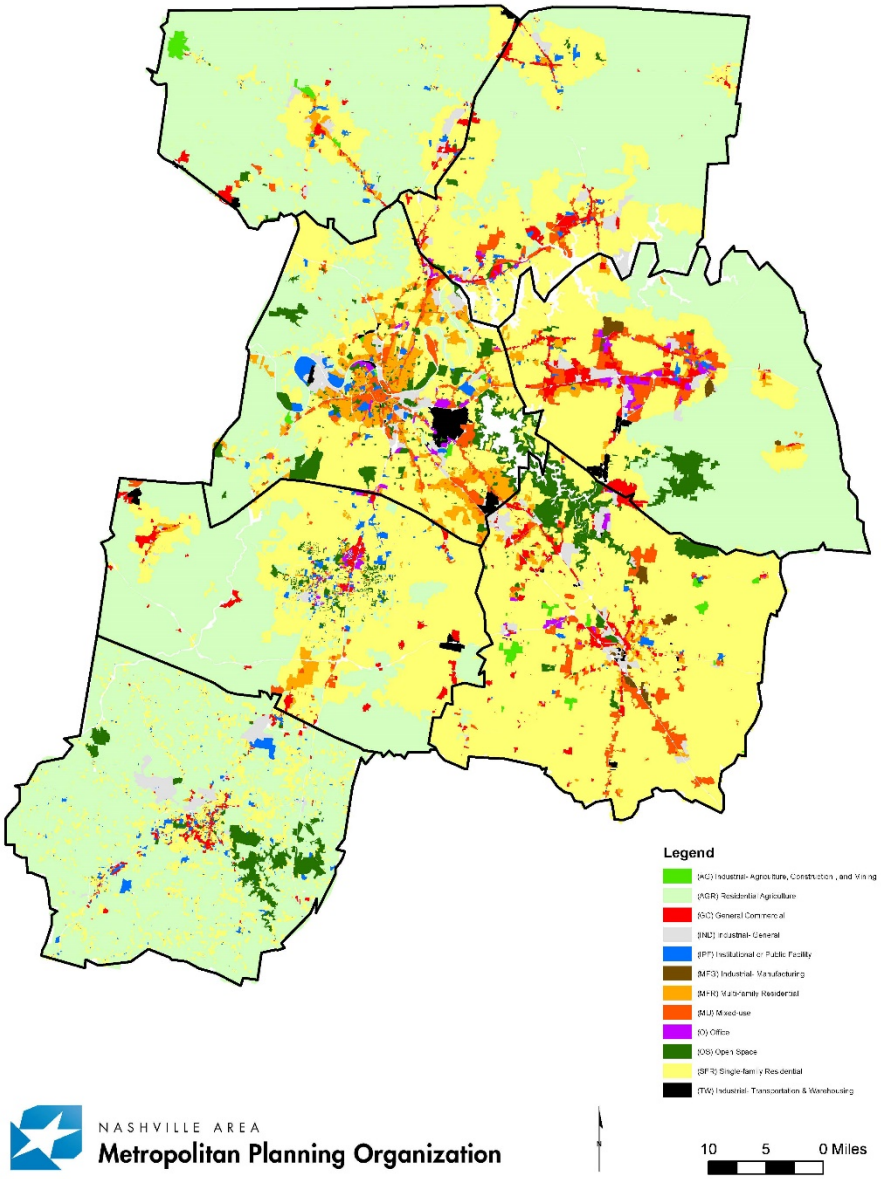
2040 Generalized Future Land Use



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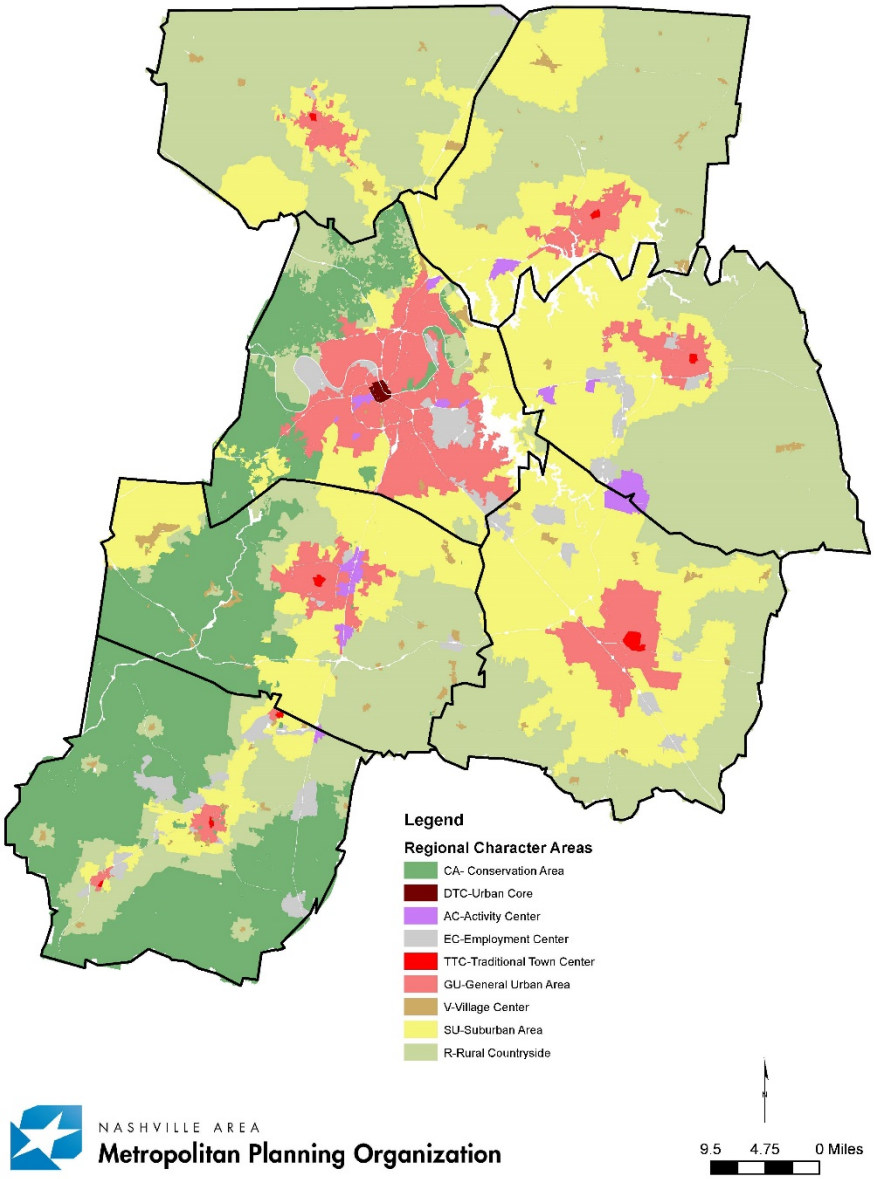
2040 Regional Character Areas



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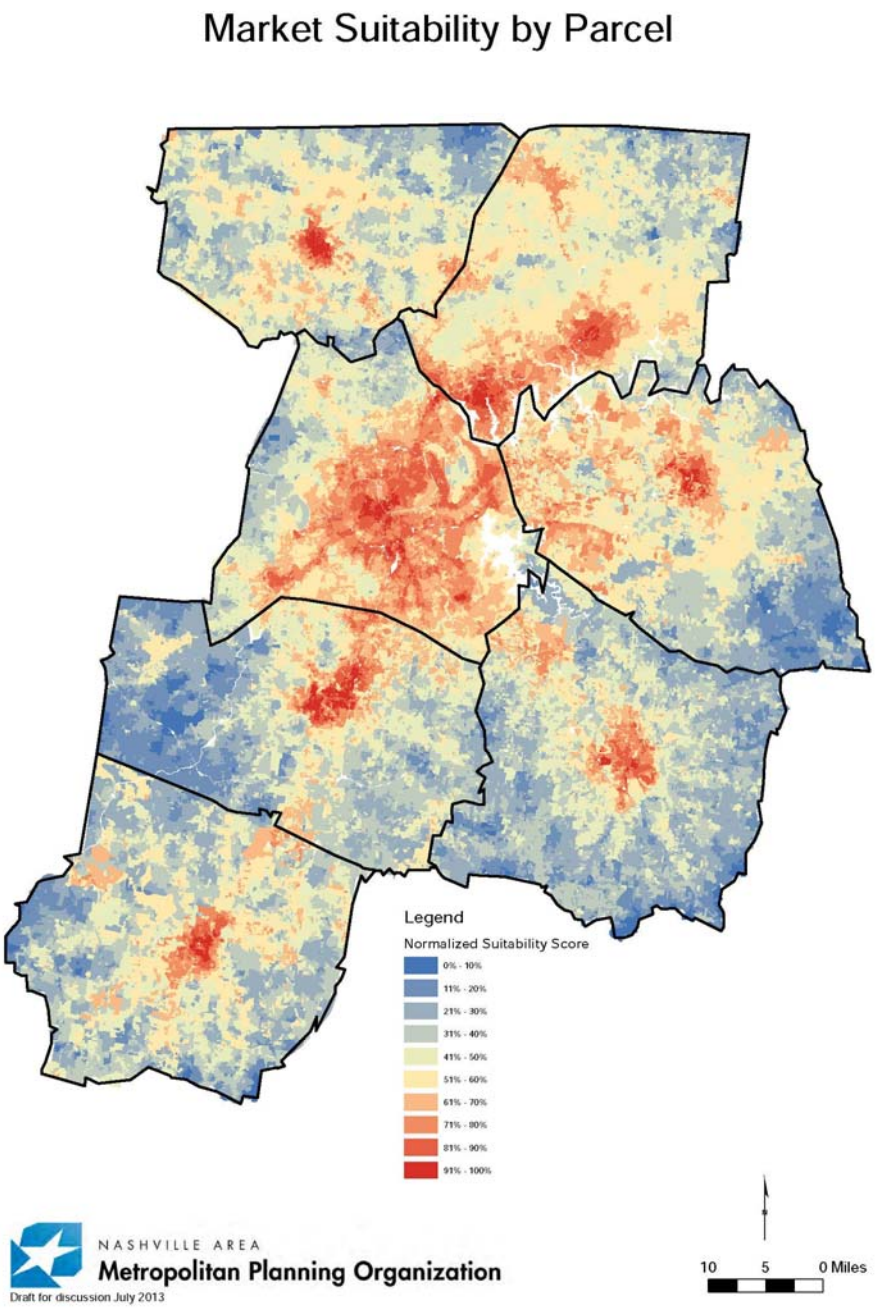
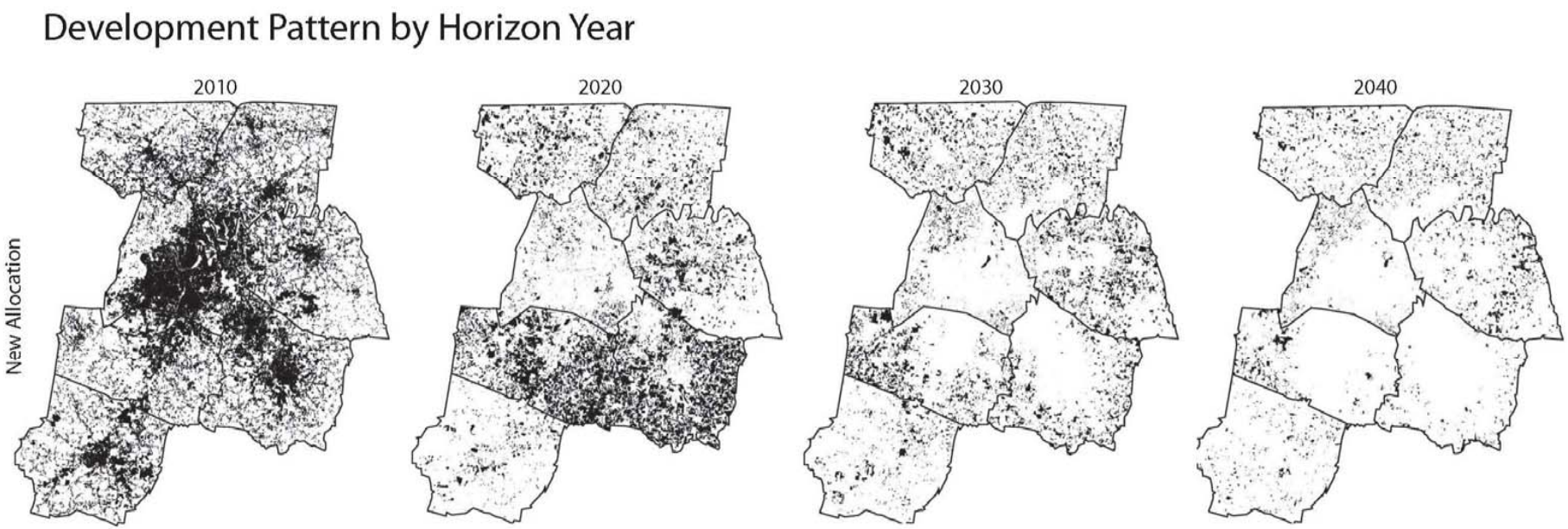


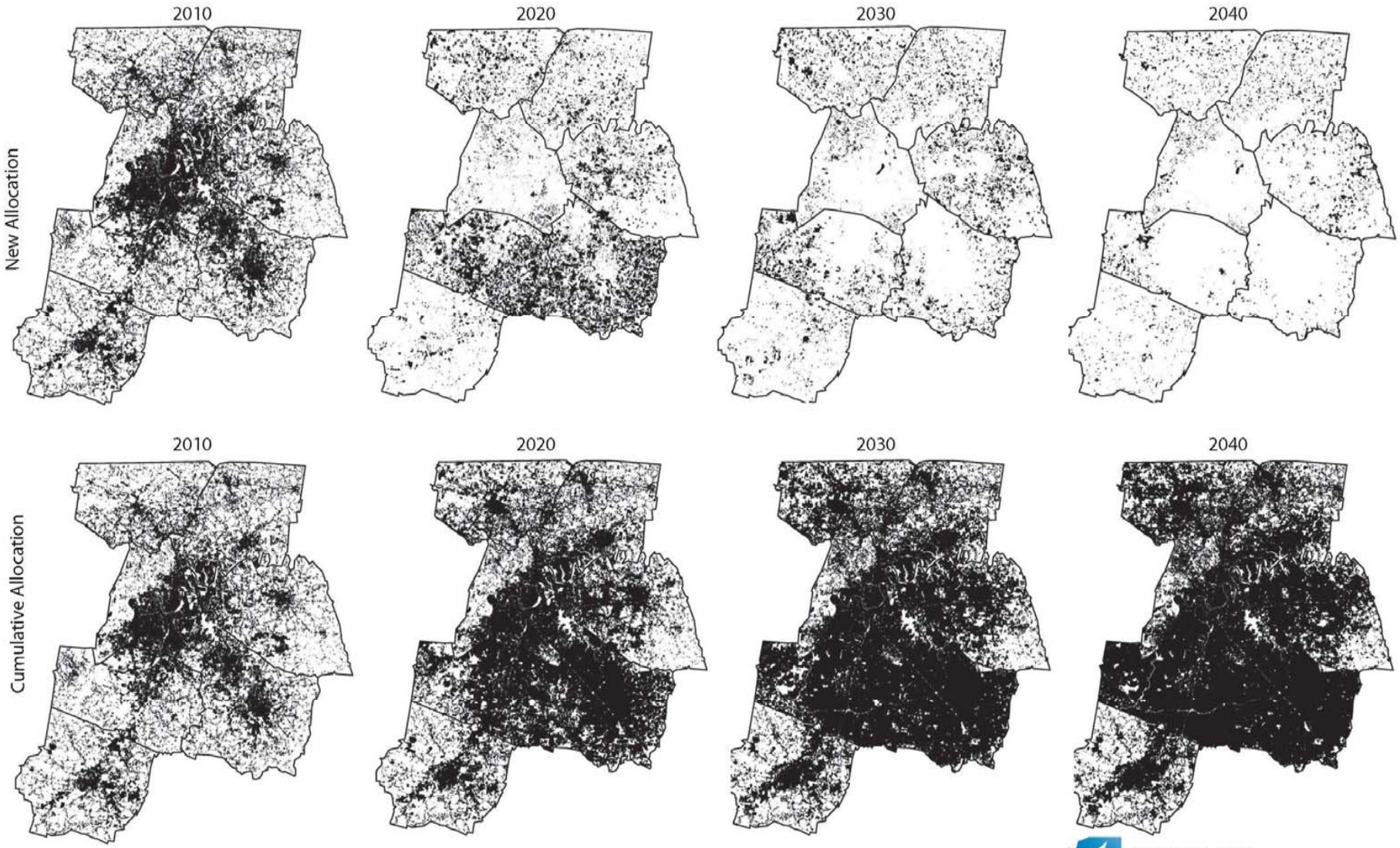
SUITABILITY FACTORS INCLUDE

- Land Values
- Water/ Sewer
- Schools
- Major Roads/ Intersections
- Retail Opportunities
- Traffic Congestion
- Transit Service/ Stations
- Hospitals
- Parks & Recreation
- Environmental Conflicts



The Resulting Forecast

Development Pattern by Horizon Year



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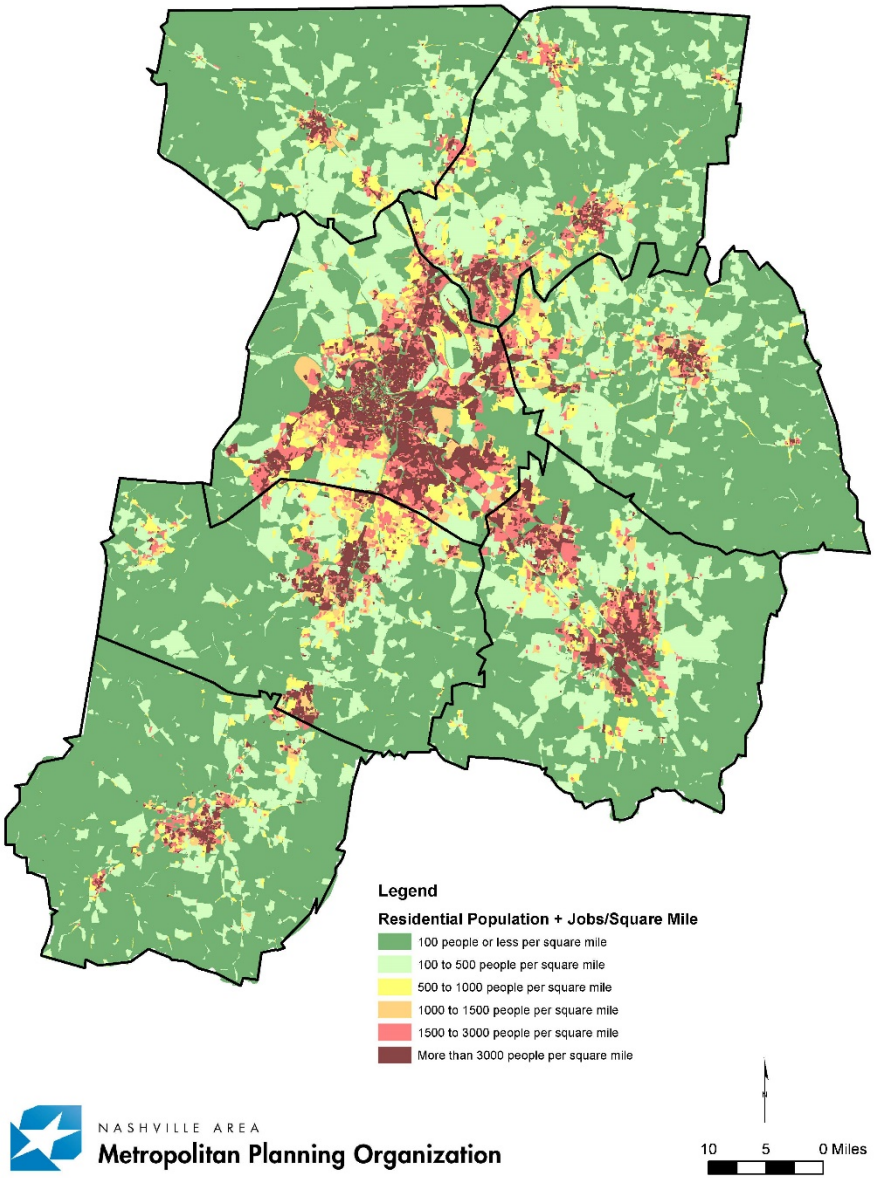
2010 Total Density by Census Block

Residential Population and Jobs



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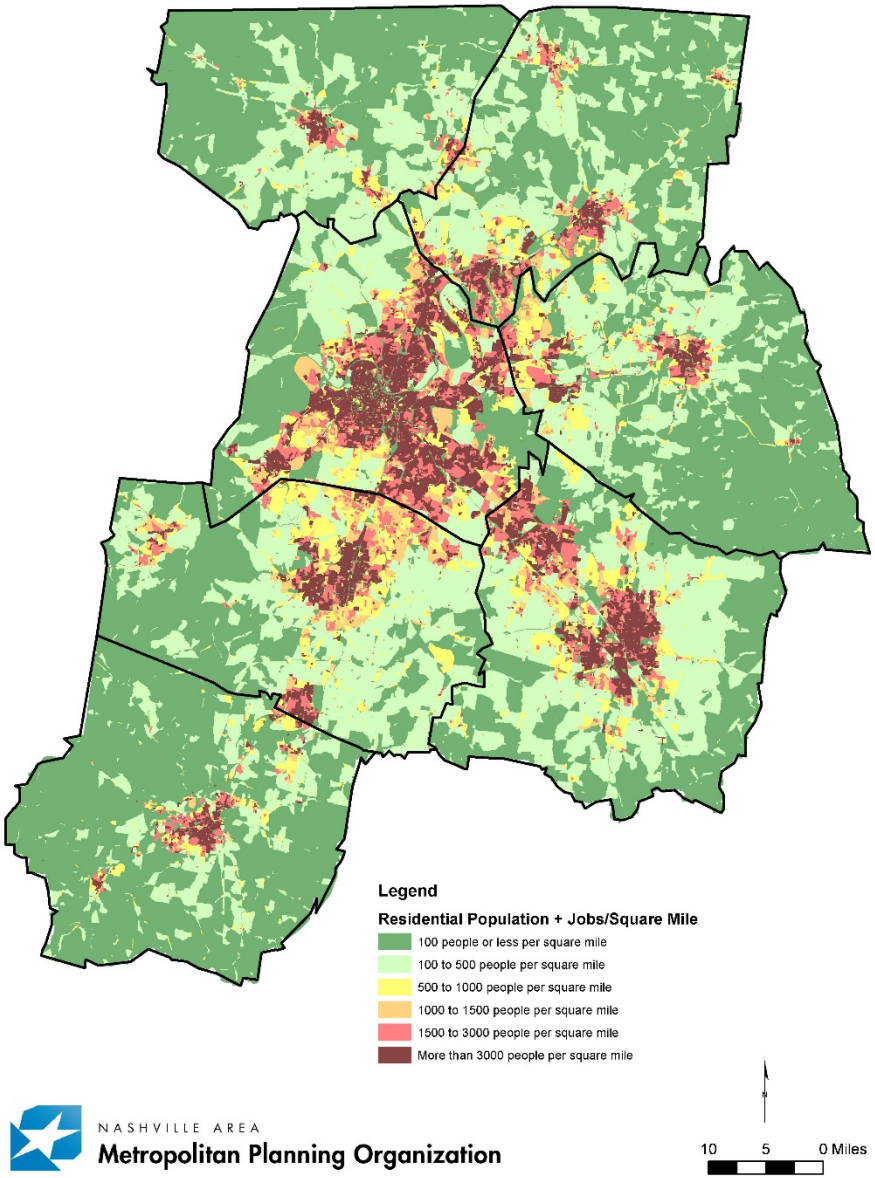
2020 Total Density by Census Block

Residential Population and Jobs



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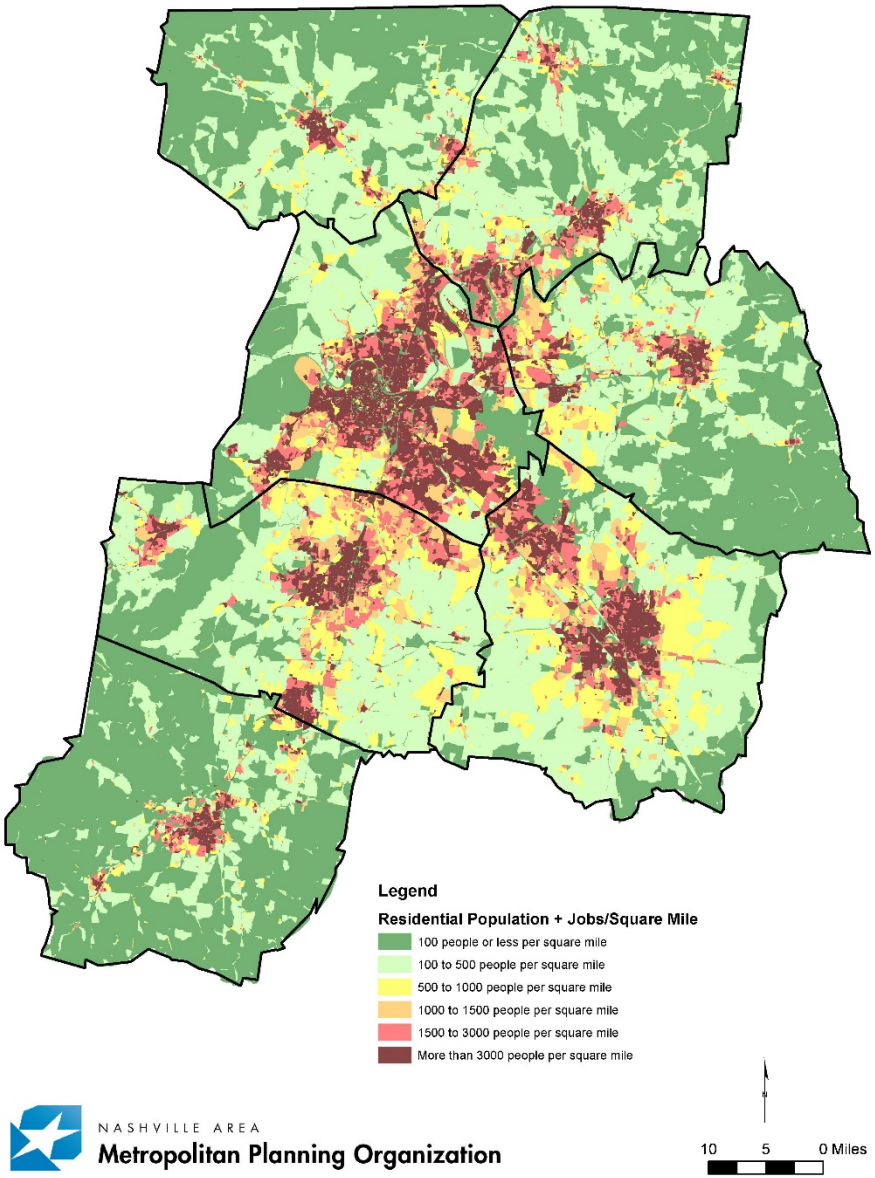
2030 Total Density by Census Block

Residential Population and Jobs



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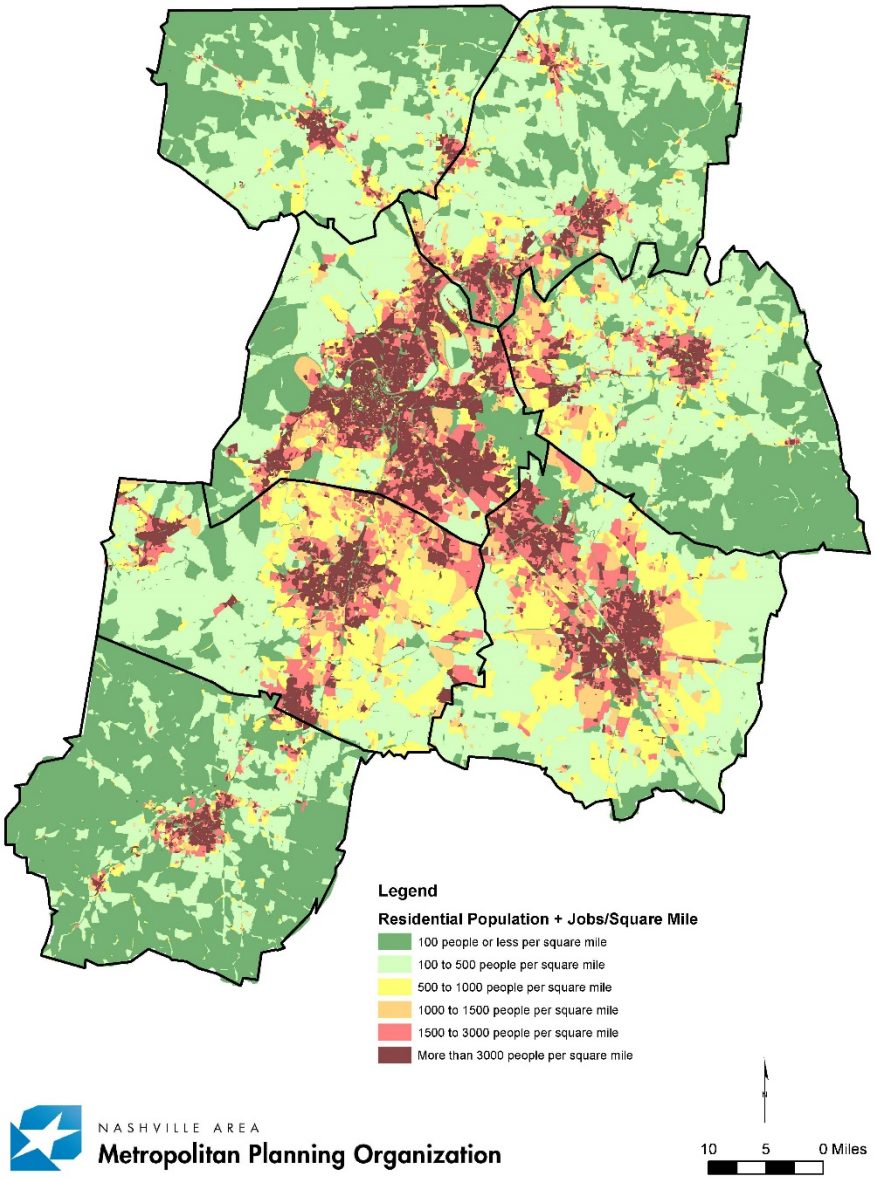
2040 Total Density by Census Block

Residential Population and Jobs



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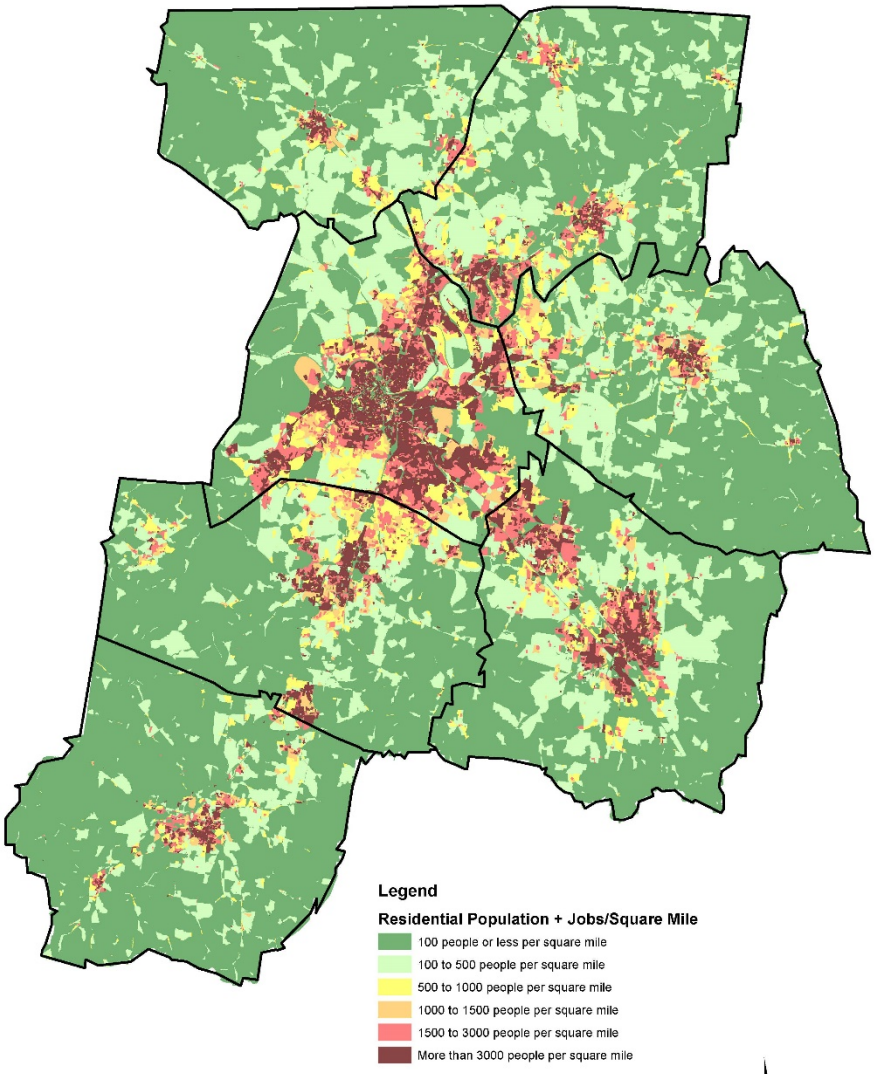
2010 Total Density by Census Block

Residential Population and Jobs



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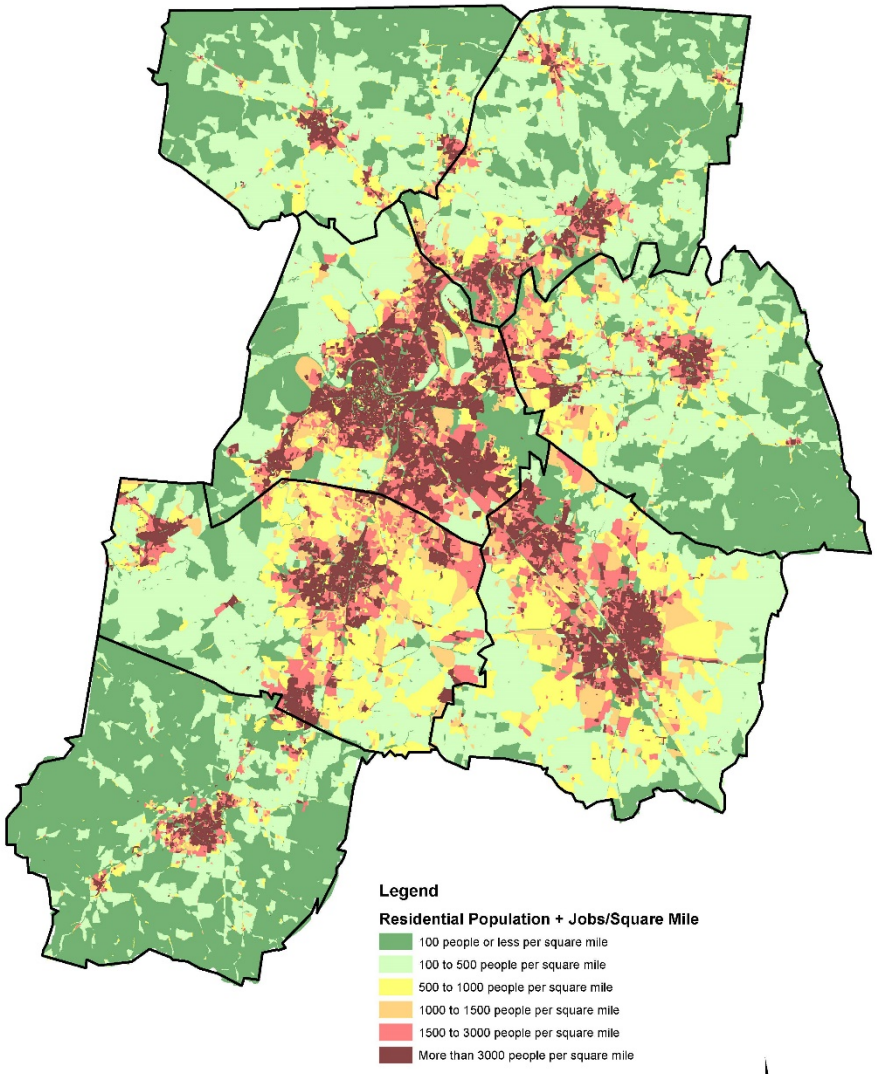
2040 Total Density by Census Block

Residential Population and Jobs



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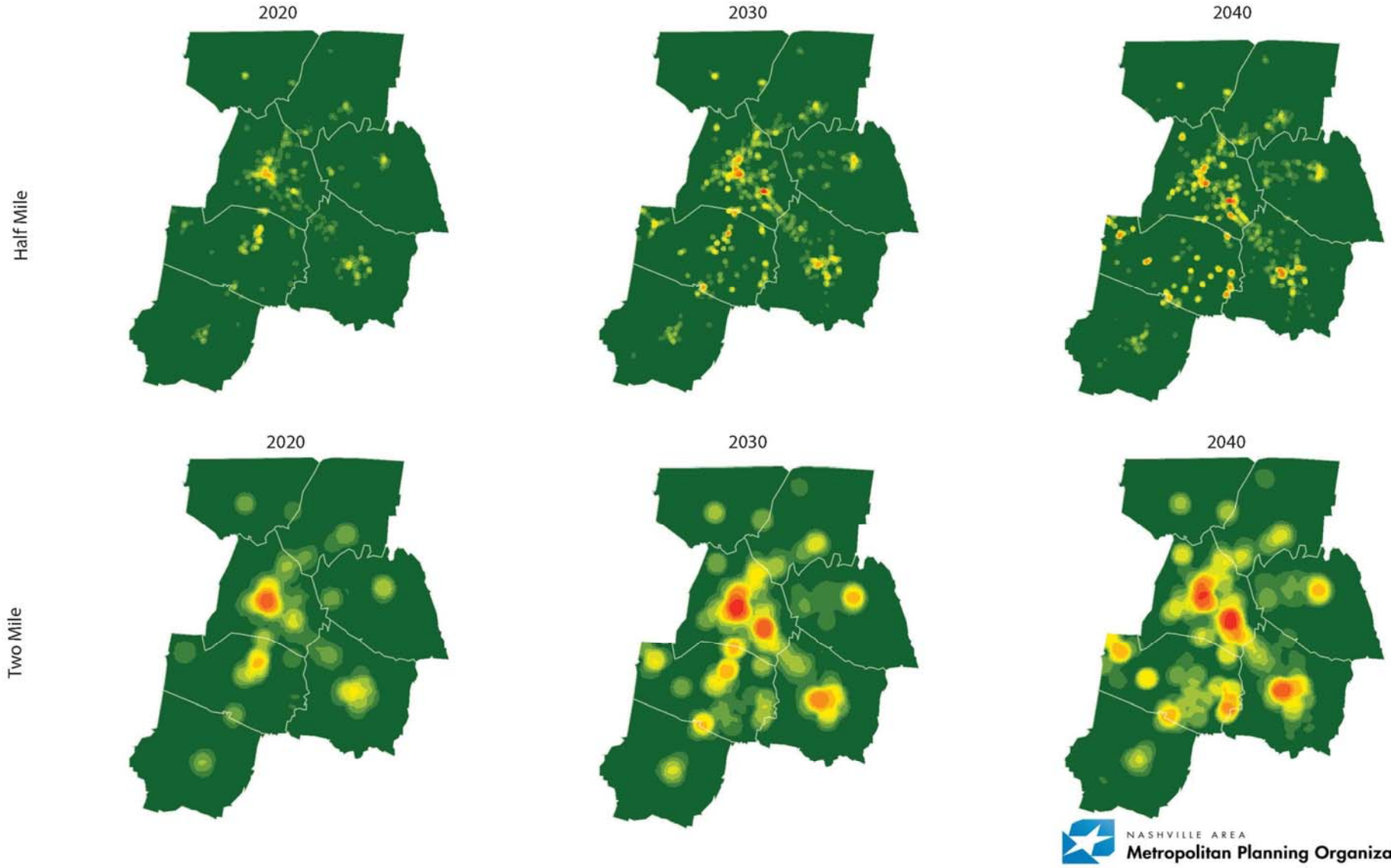
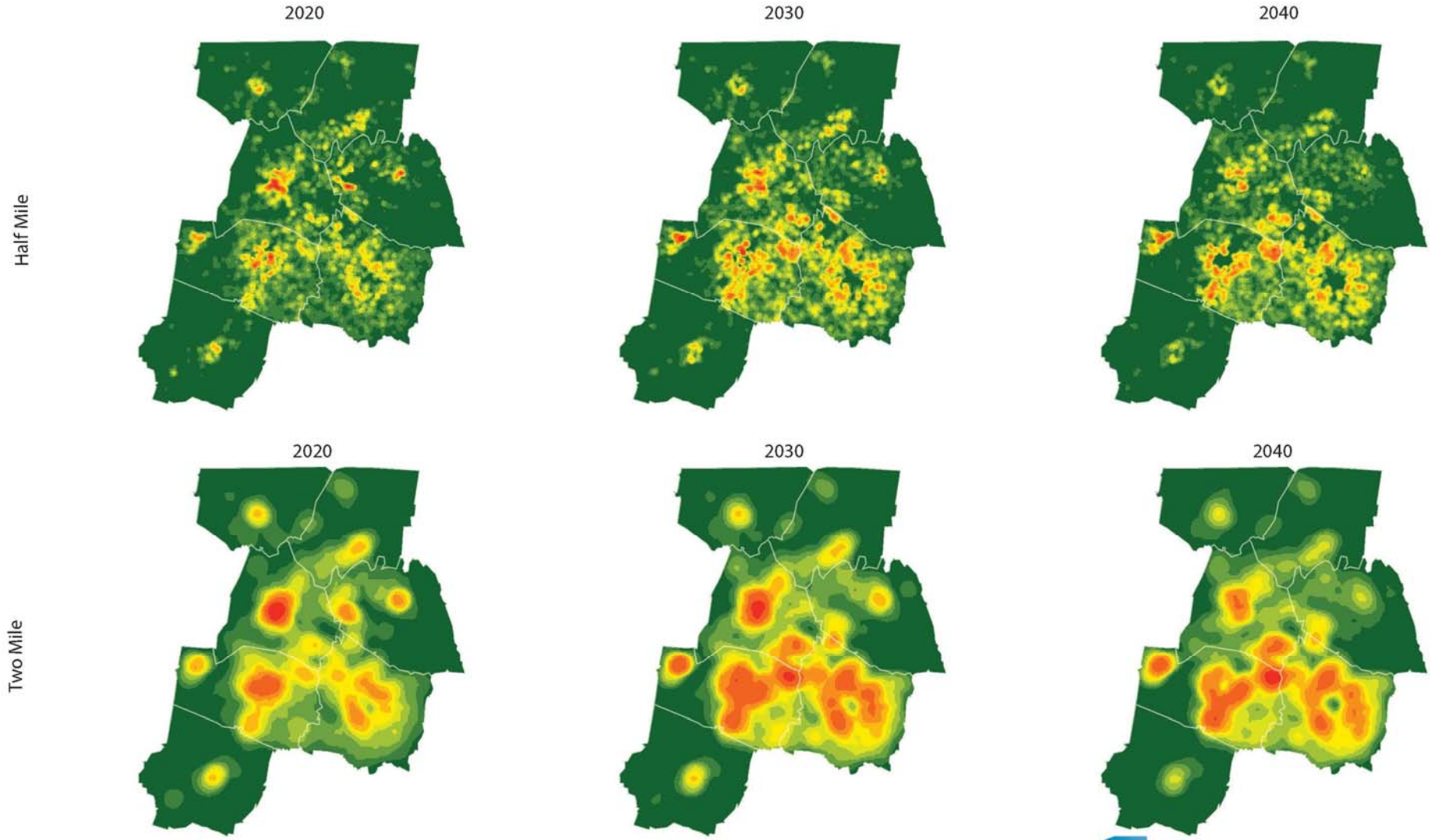
Net Employment Allocation by Horizon Year - Grid Cell Analysis



Net Household Allocation by Horizon Year - Grid Cell Analysis



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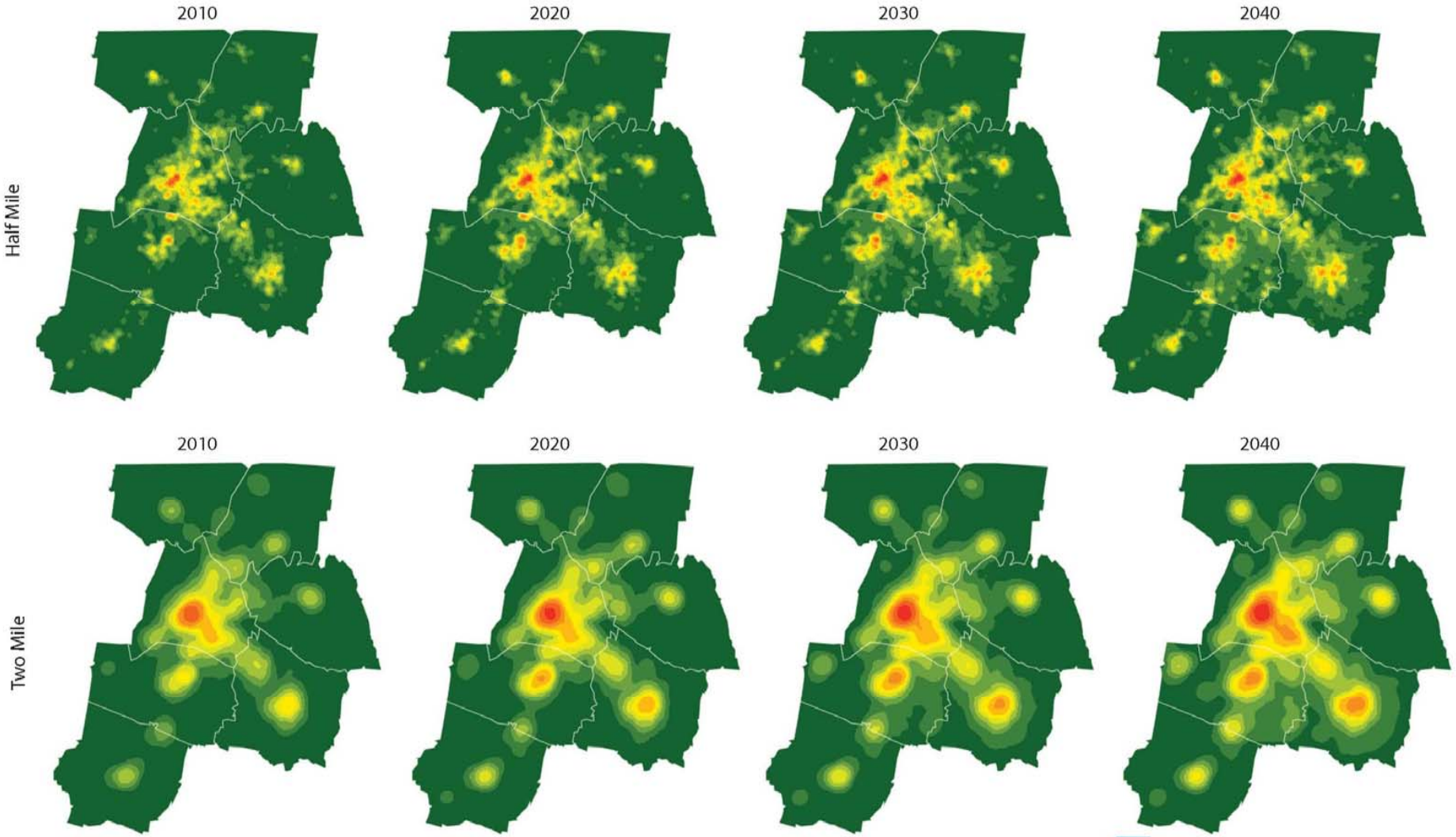
Cumulative Growth* by Horizon Year - Grid Cell Analysis



Growth*- Total Residental & Jobs

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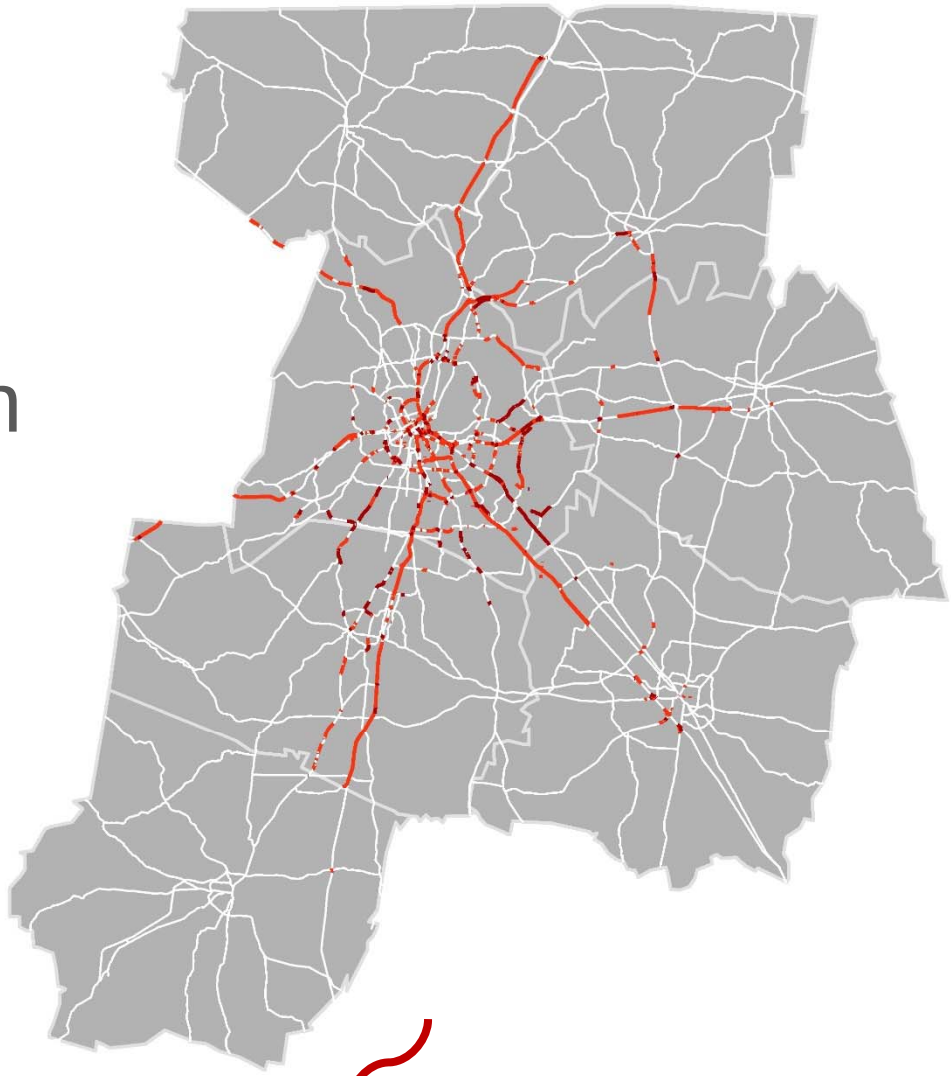
Traffic Congestion

2010
Congestion

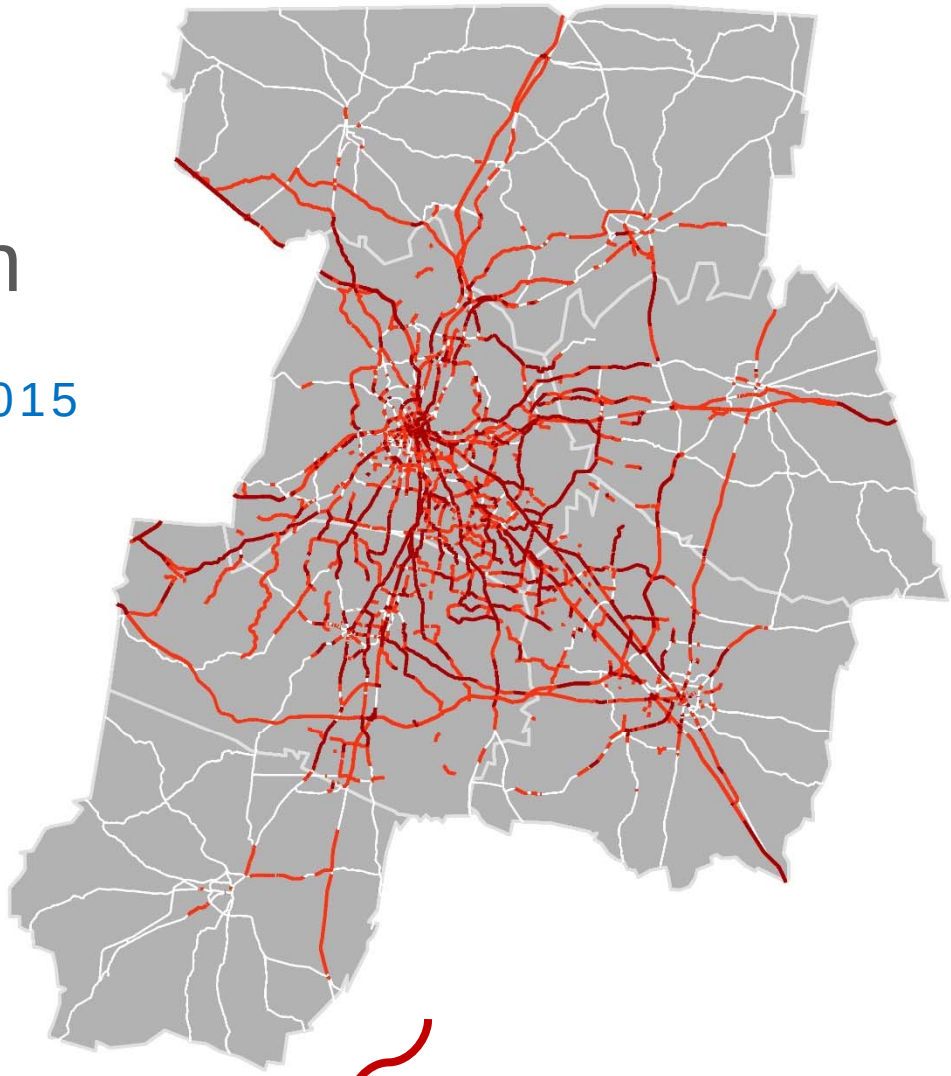


Routes operating **over capacity** during peak hours

Routes operating at **70% or less of free flow speed** during peak hours

2040 Congestion

After implementing projects through 2015



Routes operating **over capacity** during peak hours

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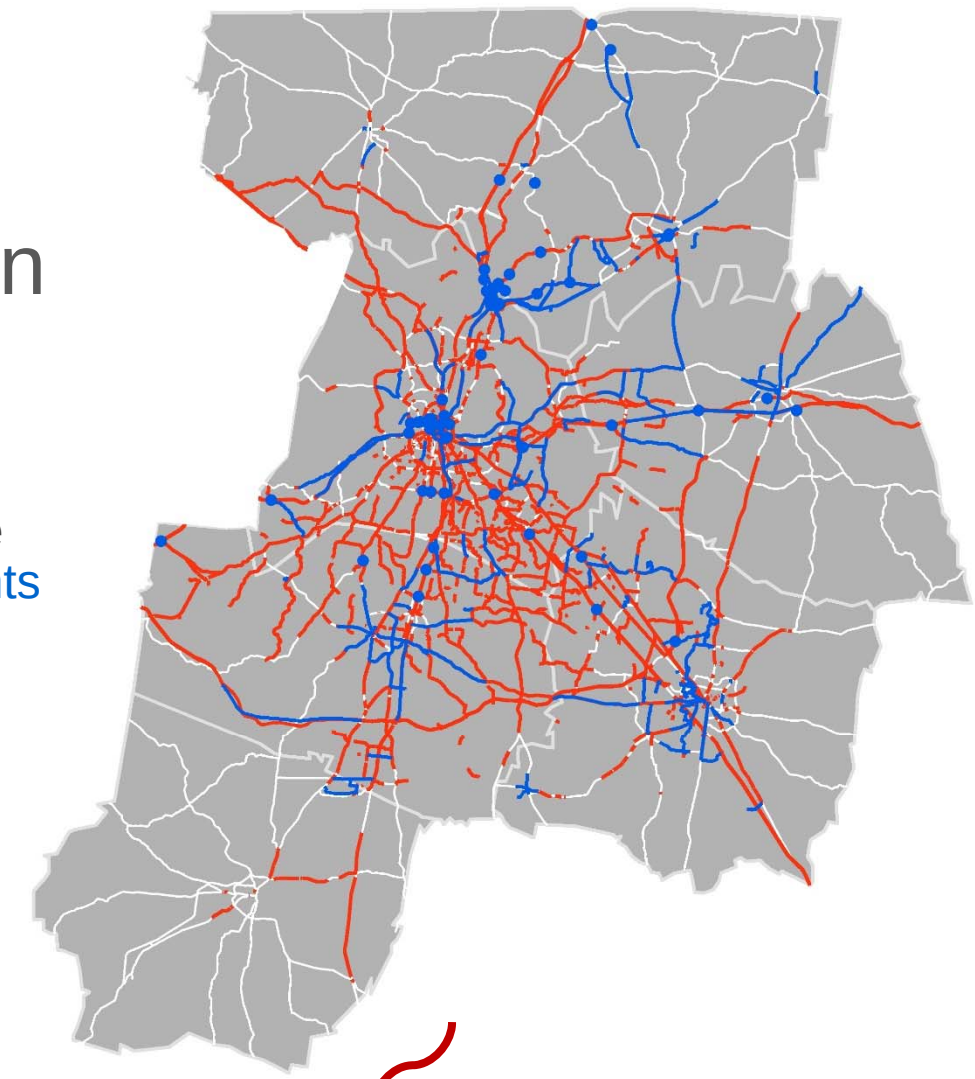
2040 Congestion

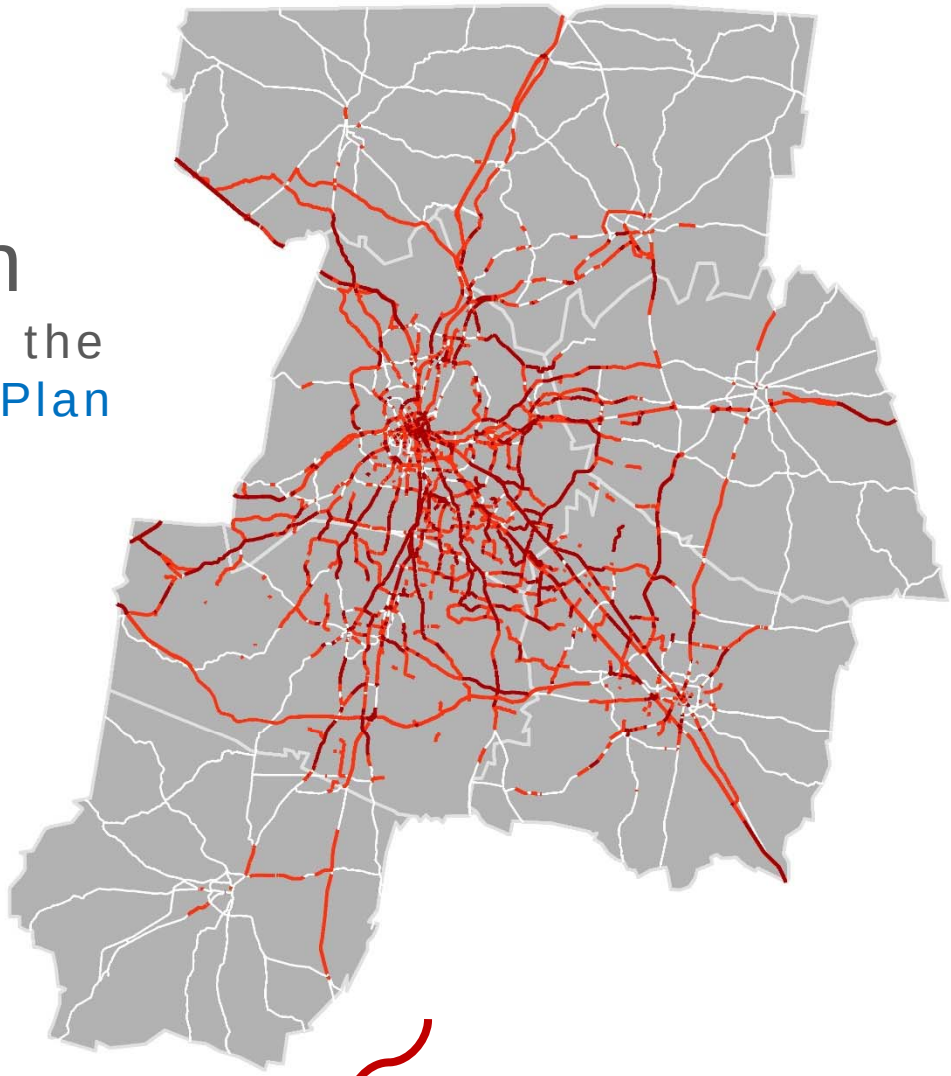
$6 Billion Cost-Feasible
2035 Plan Improvements



Routes operating at **70% or less of free flow speed** during peak hours

2040 Congestion

After implementing the cost-feasible 2035 Plan



Routes operating **over capacity** during peak hours

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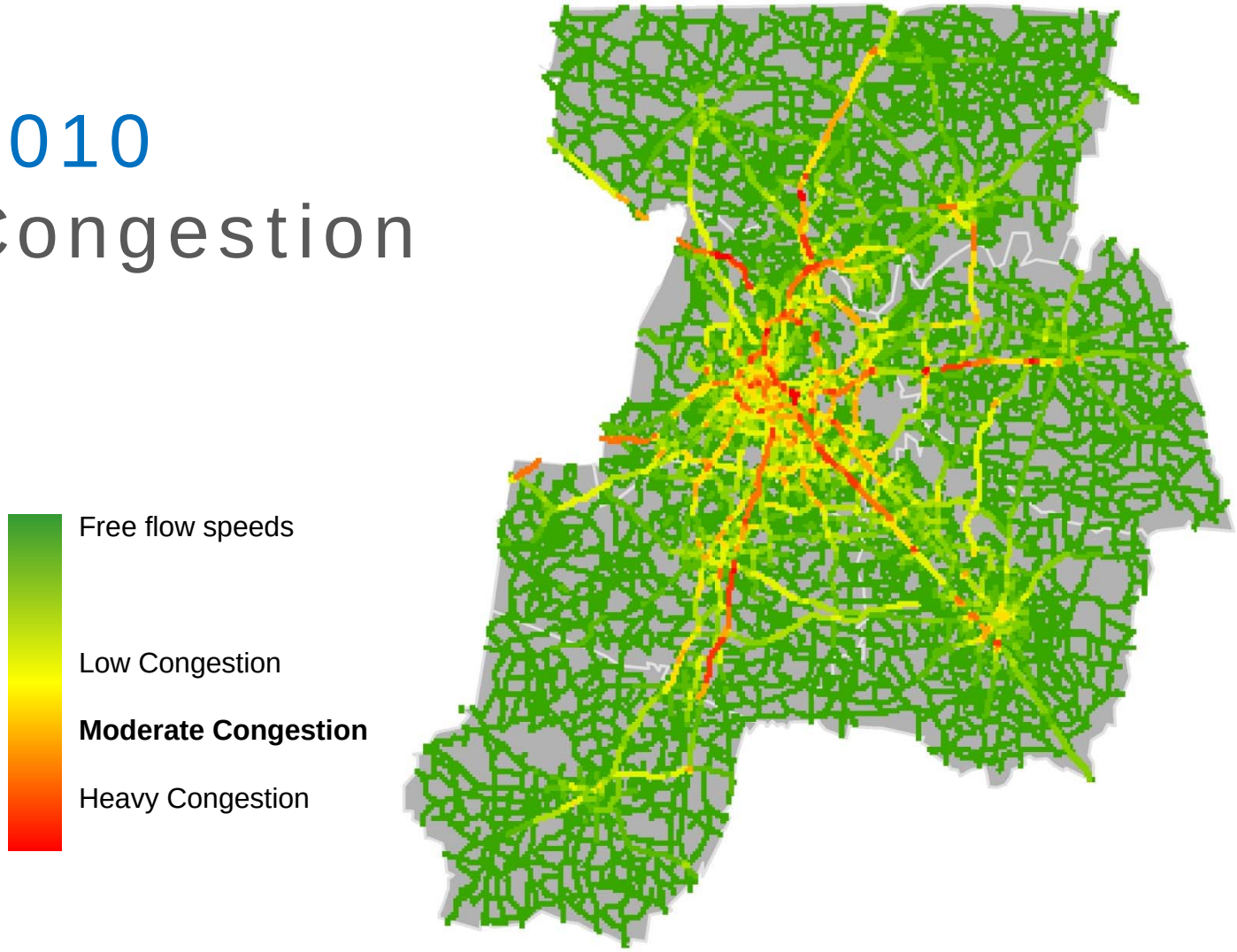
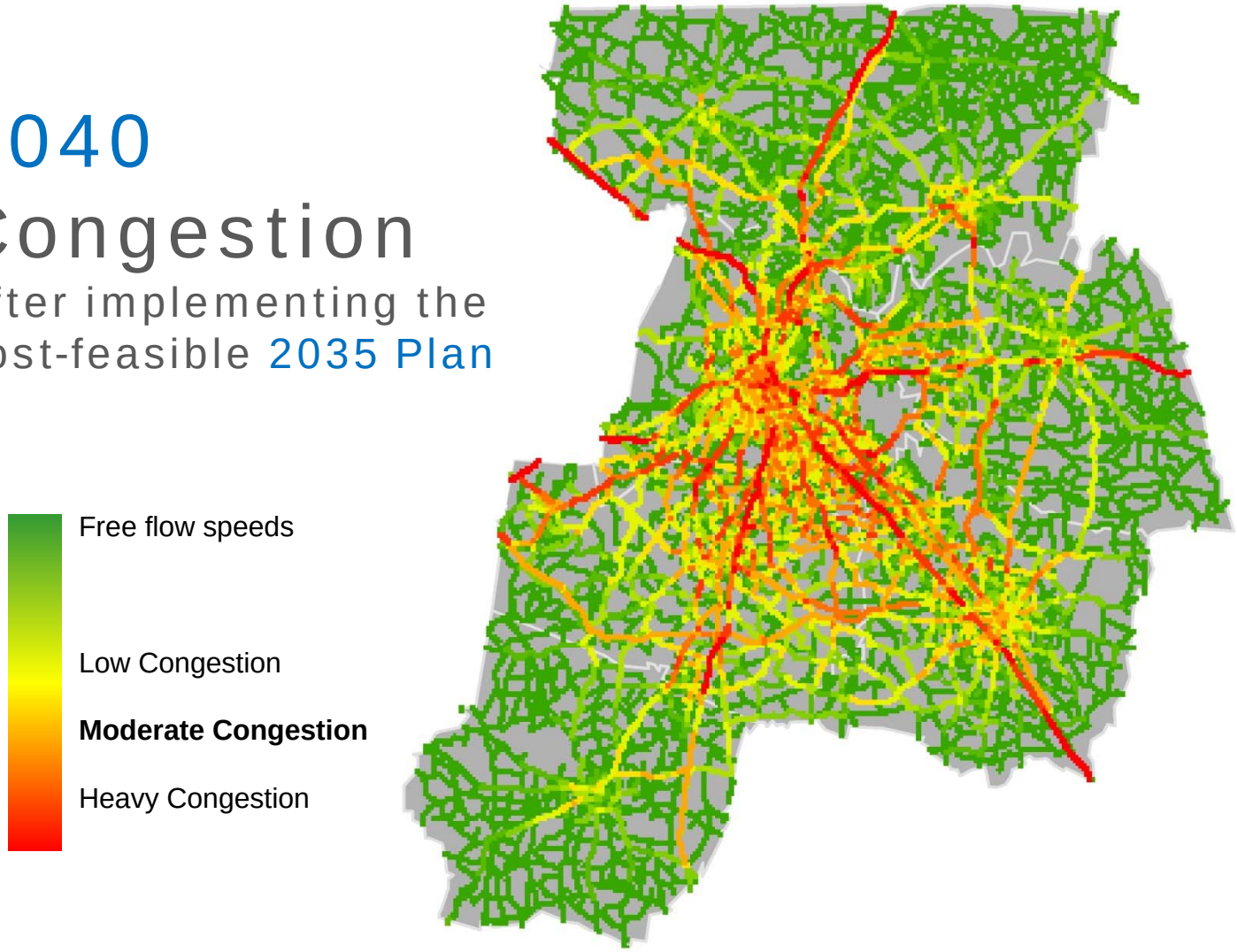
2010
Congestion



Moderate congestion identified when routes operate at **70% or less of free flow speed** during peak hours

2040 Congestion

After implementing the cost-feasible 2035 Plan



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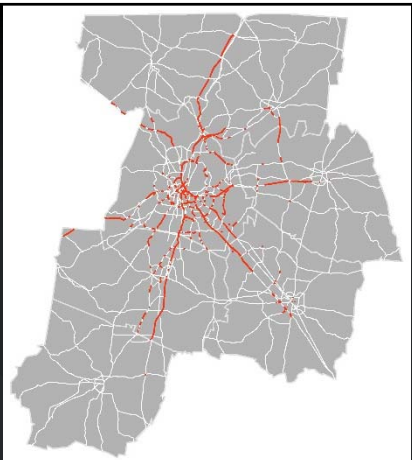
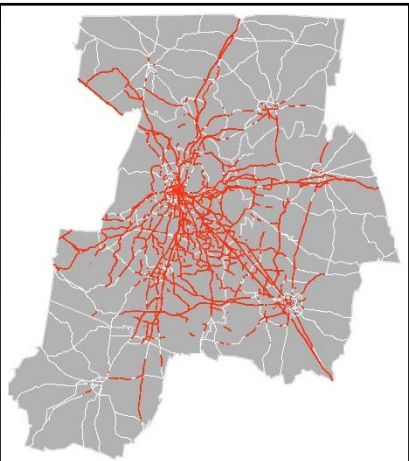


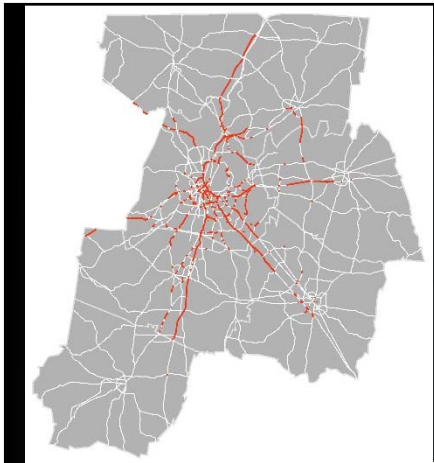
2010

System-Level Performance

2040



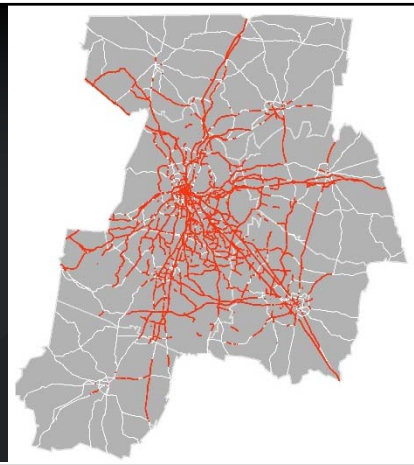
1,494,300	People	+ 76%
971,900	Jobs	+81%
5,950,000	Daily Trips	+ 78%
3.98	Trips per Person	+1%
49,650,000	Total VMT	+ 86%
33.2	VMT per Capita	- 6%
0.80	VHT per Capita	+113%
47	Average Speed	- 26%
15%	Congested VMT	+162%
23%	Congested VMT - Heavy Trucks	+141%
32,230	Transit Ridership	+33%
27,634	Lane Miles	+1%



2010

System-Level Performance

2040



			After Implementing Cost-Feasible 2035 Plan
1,494,300	People	+ 76%	IMPROVEMENT
971,900	Jobs	+81%	
5,950,000	Daily Trips	+ 78%	
3.98	Trips per Person	+1%	no change
49,650,000	Total VMT	+ 86%	no change
33.2	VMT per Capita	- 6%	no change
0.80	VHT per Capita	+113%	8%
47	Average Speed	- 26%	no change
15%	Congested VMT	+162%	5%
23%	Congested VMT - Heavy Trucks	+141%	1%
32,230	Transit Ridership	+33%	no change
27,634	Lane Miles	+1%	

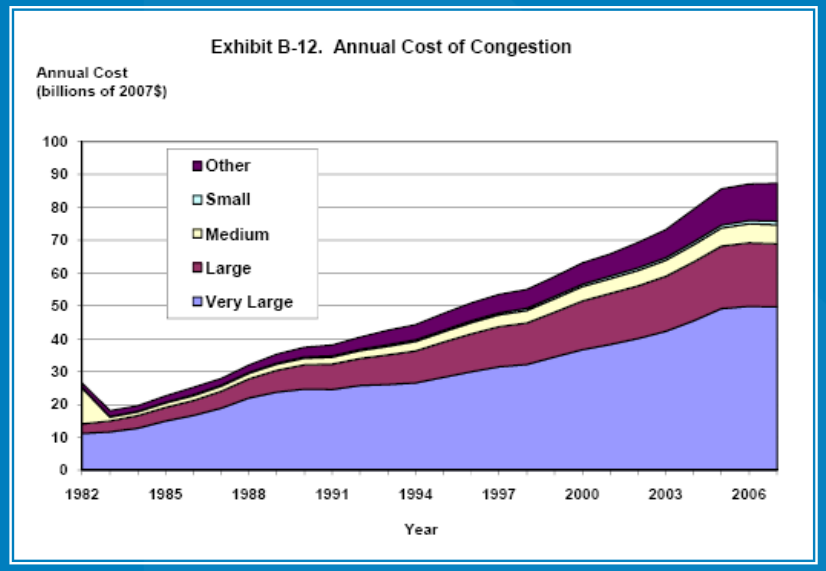
http://mobility.tamu.edu/ums/

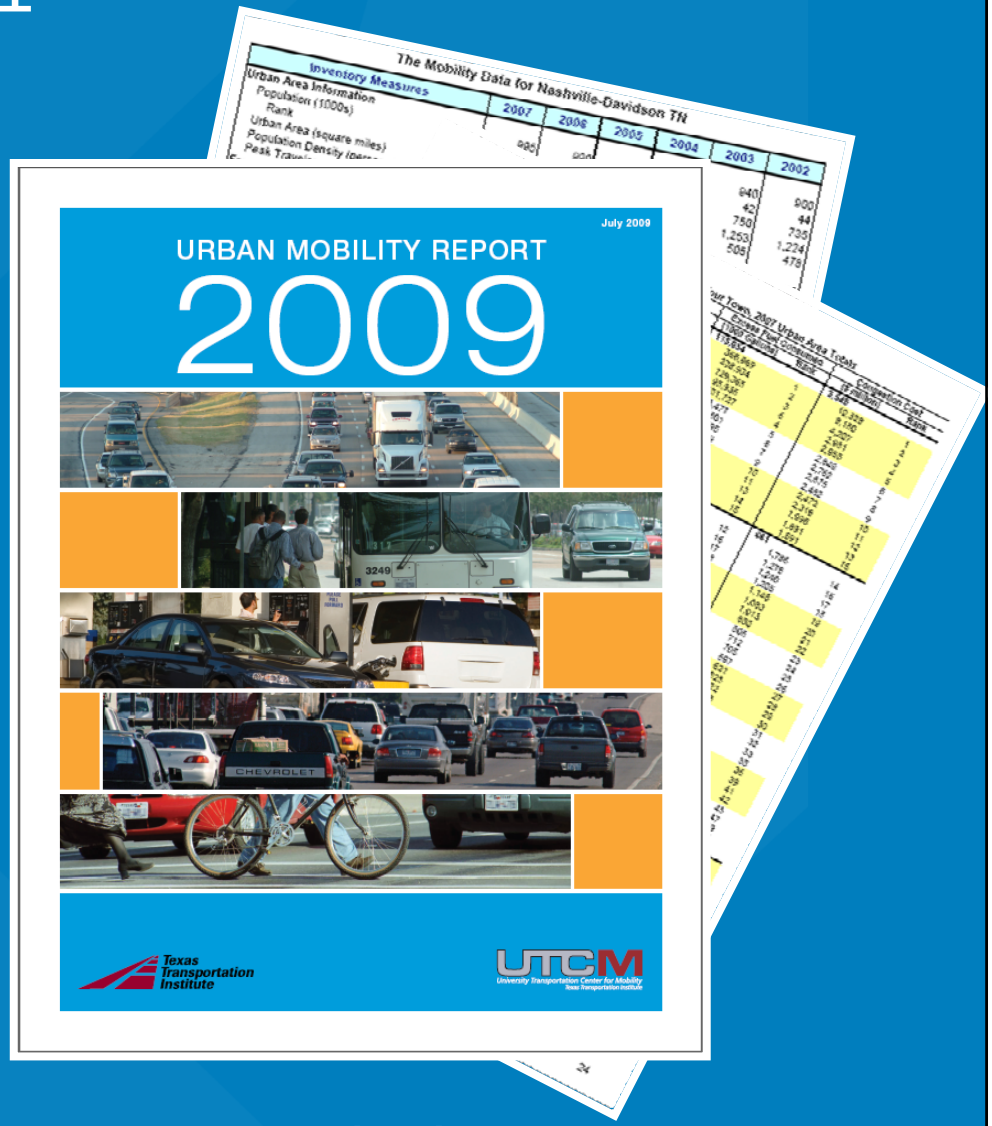
Texas Transportation Institute (TTI) Urban Mobility Report, 2011

Nashville-Davidson Urbanized Area
Cost of Congestion (wasted fuel & time):

$800 Million, Annually

$20 Billion, over 25 years





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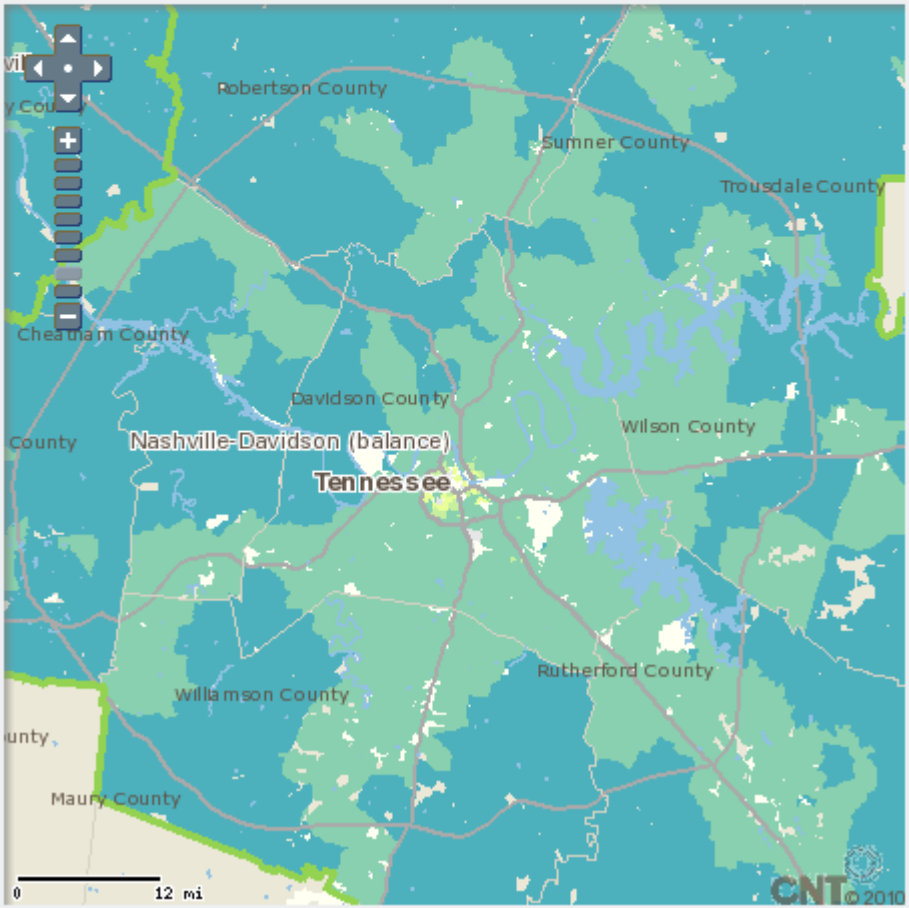
Transportation Costs, % Income

Change

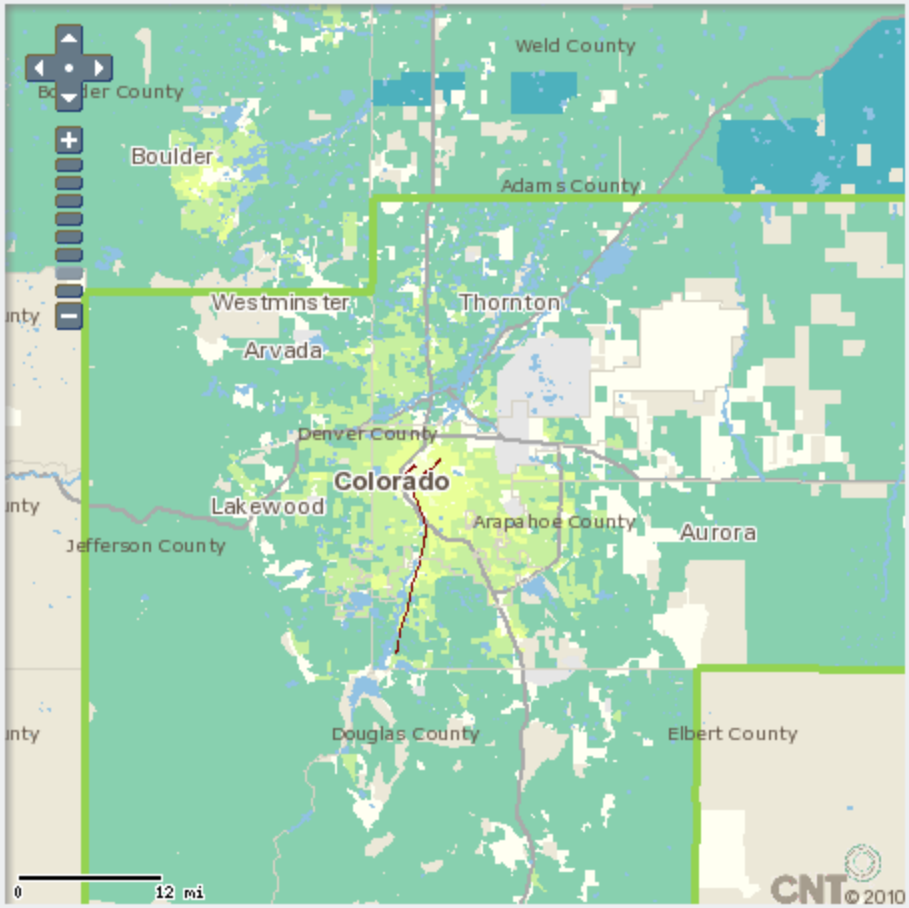
Transportation Costs, % Income		
Criteria	Households	Percent of Households
No Data Available	0	0%
Less than 15%		0%
15 to 18%	8,352	1.7%
18 to 20%	10,927	2.2%
20 to 28%	389,765	79.7%
28% and Greater	79,885	16.3%
Map Total	488,929	100%



Transportation Costs, % Income

Change

Transportation Costs, % Income		
Criteria	Households	Percent of Households
No Data Available	373	0%
Less than 15%	26,917	2.9%
15 to 18%	157,387	16.8%
18 to 20%	358,988	38.2%
20 to 28%	394,162	42%
28% and Greater	912	0.1%
Map Total	938,739	100%



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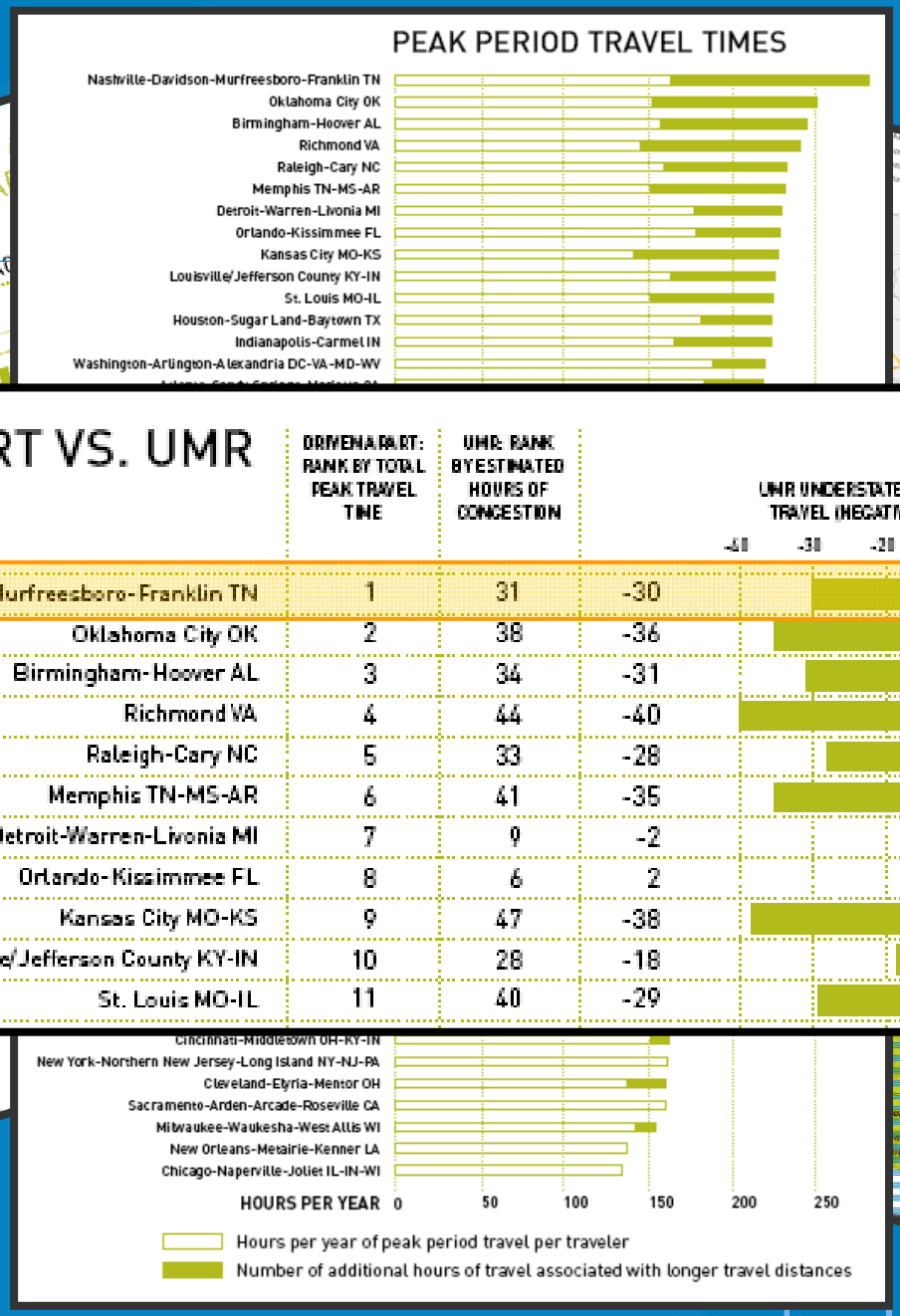
Source: Center for Neighborhood Technology Housing + Transportation Affordability Index (http://www.htaindex.org/)



DRIVEN APART VS. UMR

	DRIVEN APART: RANK BY TOTAL PEAK TRAVEL TIME	UMR: RANK BY ESTIMATED HOURS OF CONGESTION	DIFFERENCE IN RANKS (UMR UNDERSTATES HOURS OF TRAVEL (NEGATIVE VALUES); UMR OVERSTATES HOURS OF TRAVEL (POSITIVE VALUES))
Nashville-Davidson-Murfreesboro-Franklin TN	1	31	-30
Oklahoma City OK	2	38	-36
Birmingham-Hoover AL	3	34	-31
Richmond VA	4	44	-40
Raleigh-Cary NC	5	33	-28
Memphis TN-MS-AR	6	41	-35
Detroit-Warren-Livonia MI	7	9	-2
Orlando-Kissimmee FL	8	6	2
Kansas City MO-KS	9	47	-38
Louisville/Jefferson County KY-IN	10	28	-18
St. Louis MO-IL	11	40	-29

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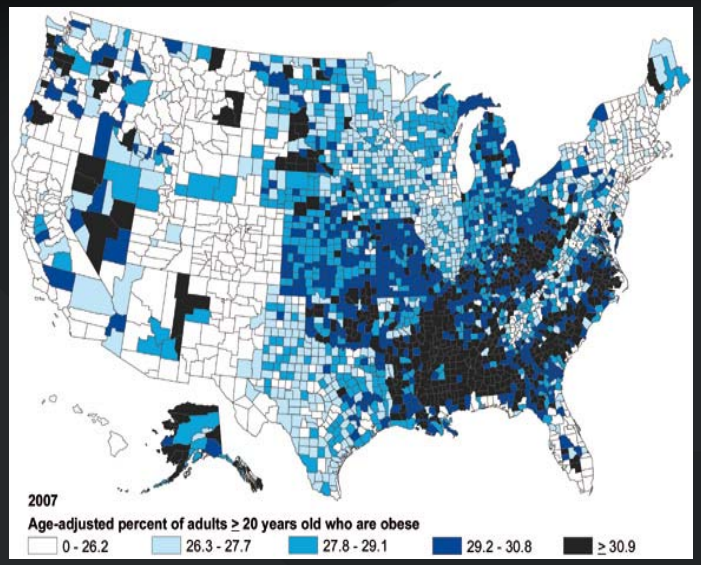
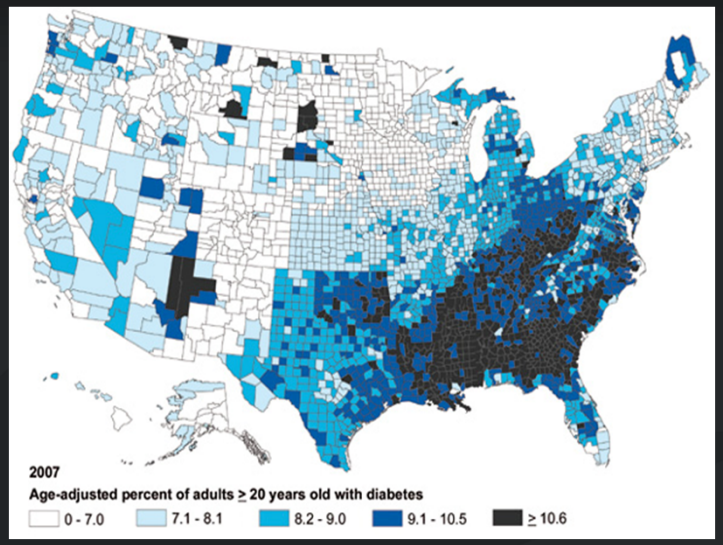
Source: Driven Apart (CEO for Cities) http://www.ceosforcities.org/research/driven-apart/

Making the Case for Health Integration

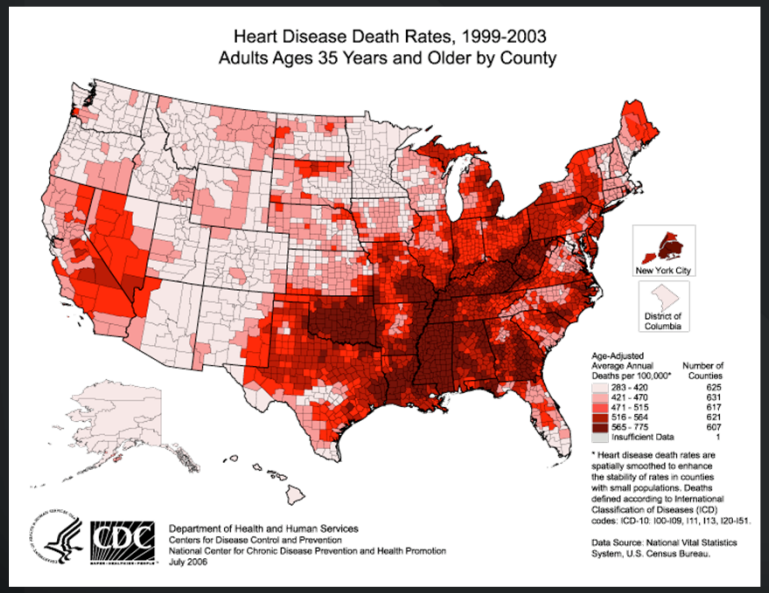
Obesity



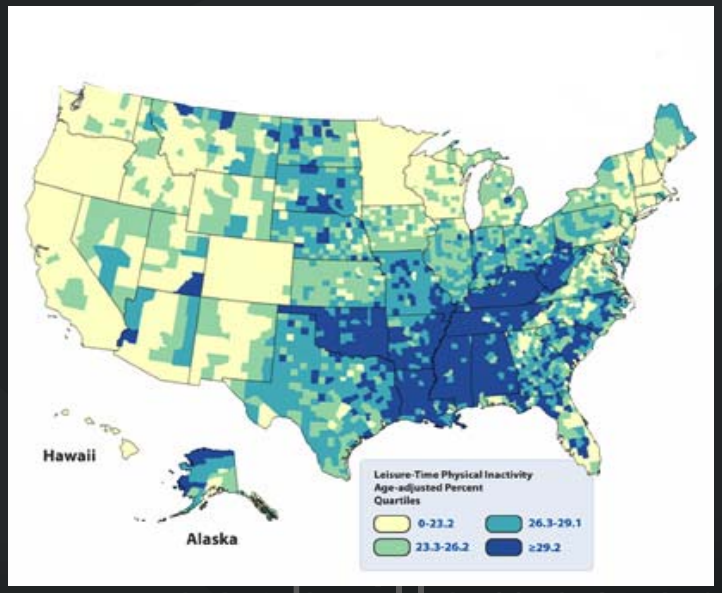
Diabetes



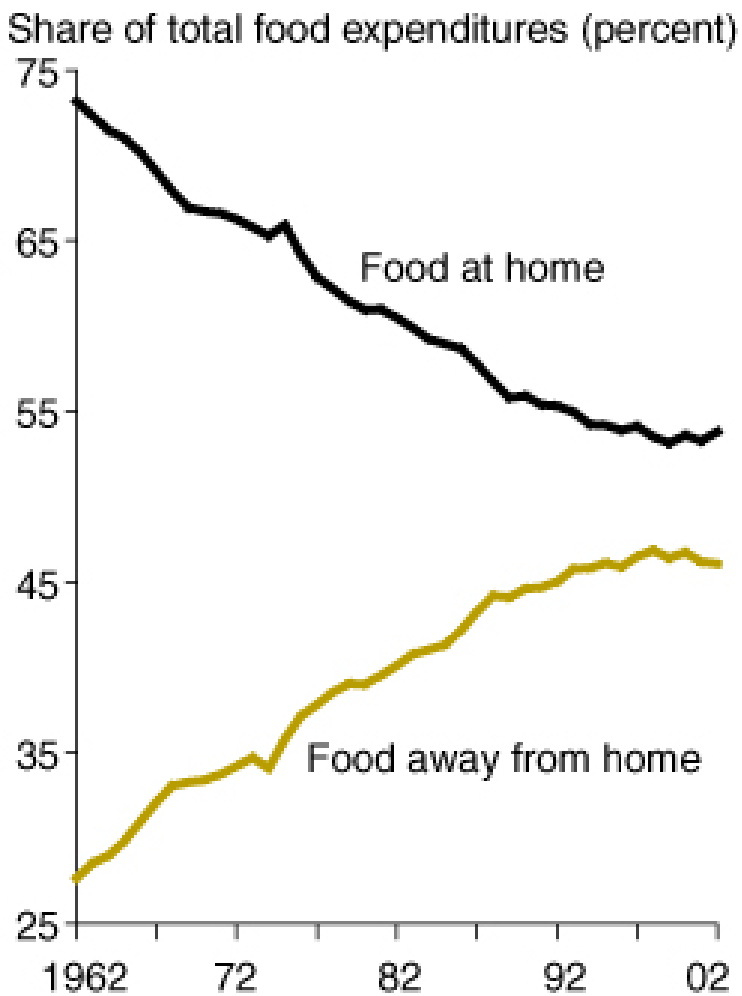
Heart Disease

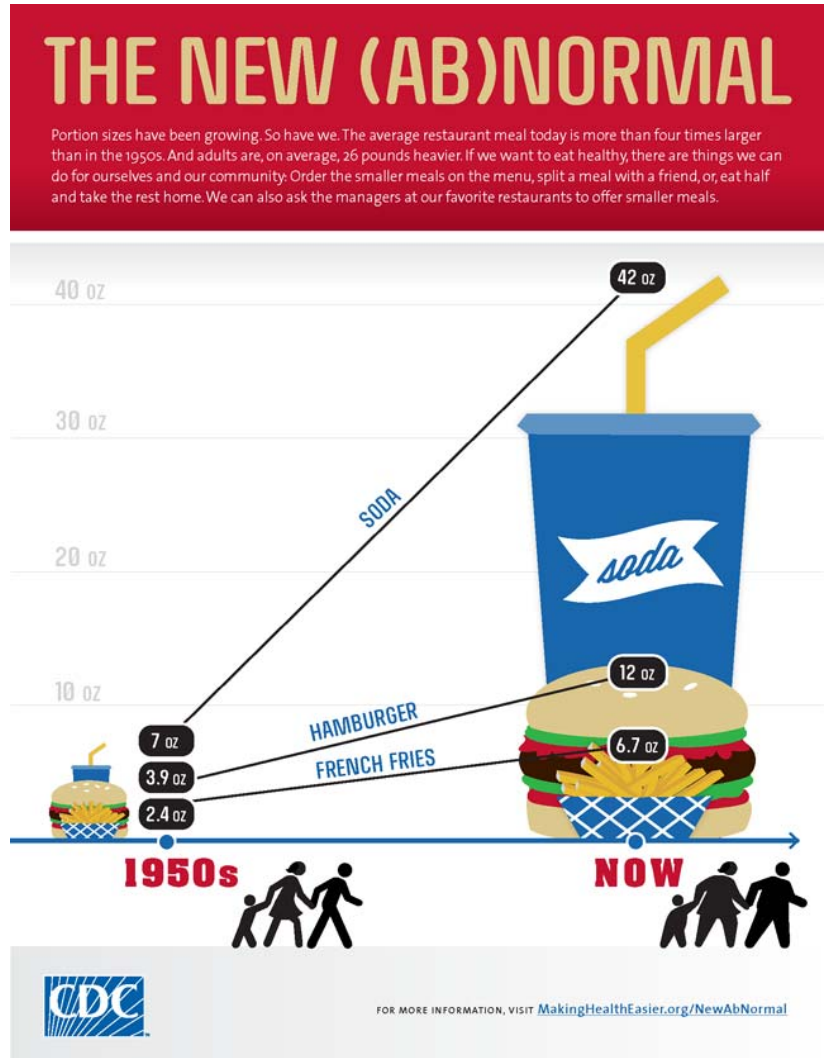


Physical Inactivity



Obesity in America



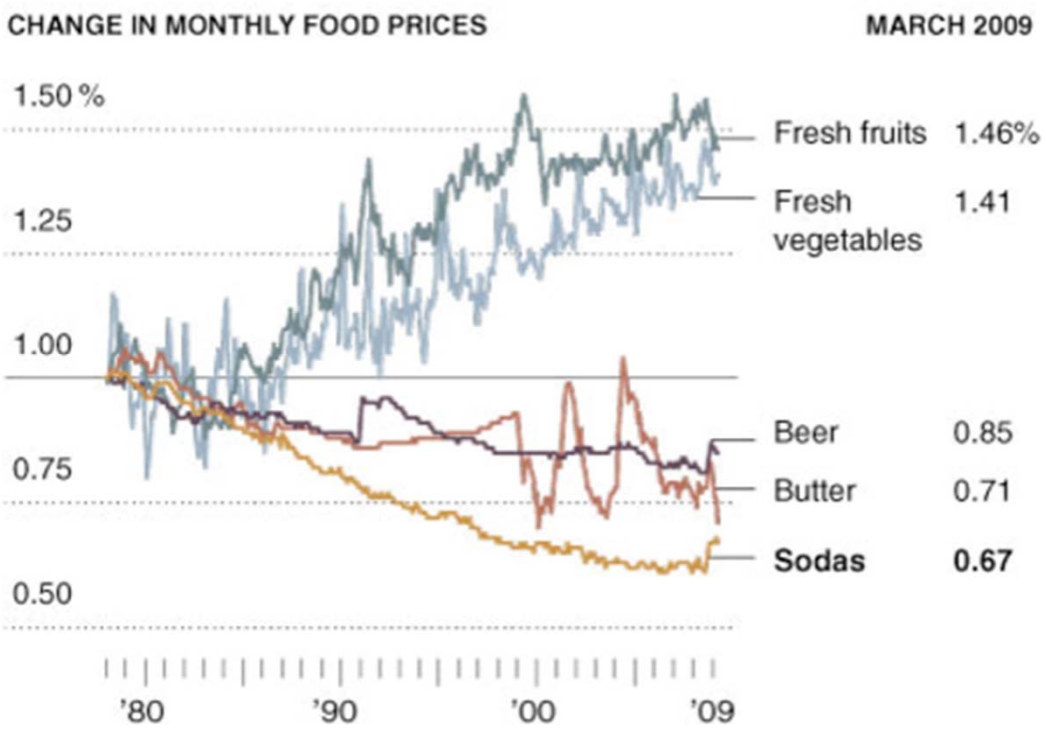


Sources: Food Consumption Data System, USDA, Economic Research Service
Centers for Disease Control – National Health and Nutrition Examination Survey/

Obesity in America

The Cost of Healthy Eating

The cost of many unhealthful foods, like soda, butter and beer, has fallen in the last three decades, while the cost of fruits and vegetables has risen substantially.

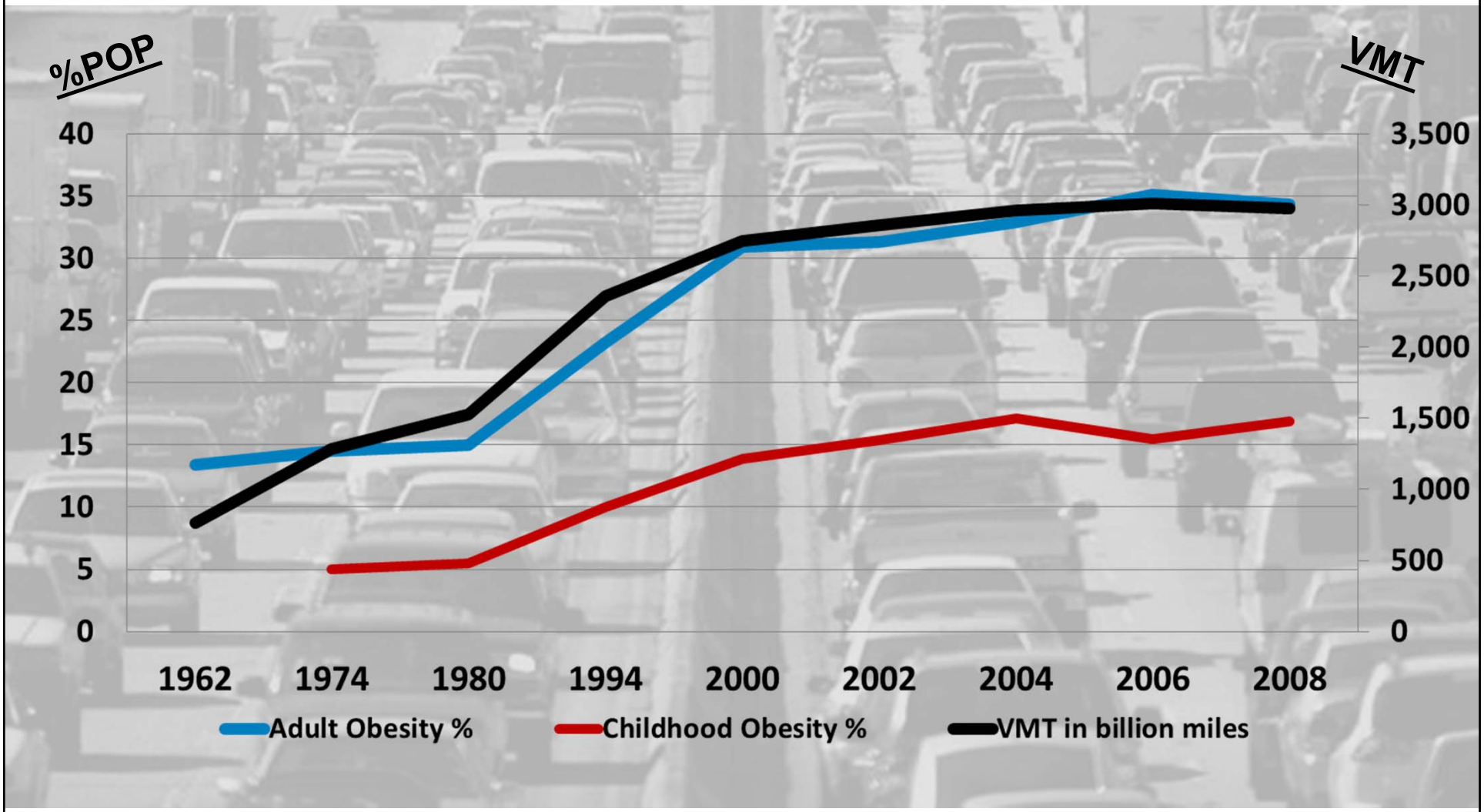


Lines show change in price of items since 1978, relative to overall inflation as measured by the Consumer Price Index. The price of vegetables, for example, has risen 40 percent faster than the overall index.

Source: Bureau of Labor Statistics, via Haver

Courtesy: The New York Times 5.20.09

Vehicle Miles Traveled and Obesity



Sources: Centers for Disease Control – National Health and Nutrition Examination Survey/
U.S. DOT – Federal Highway Administration, Annual Vehicle Distance Traveled in Miles and Related Data

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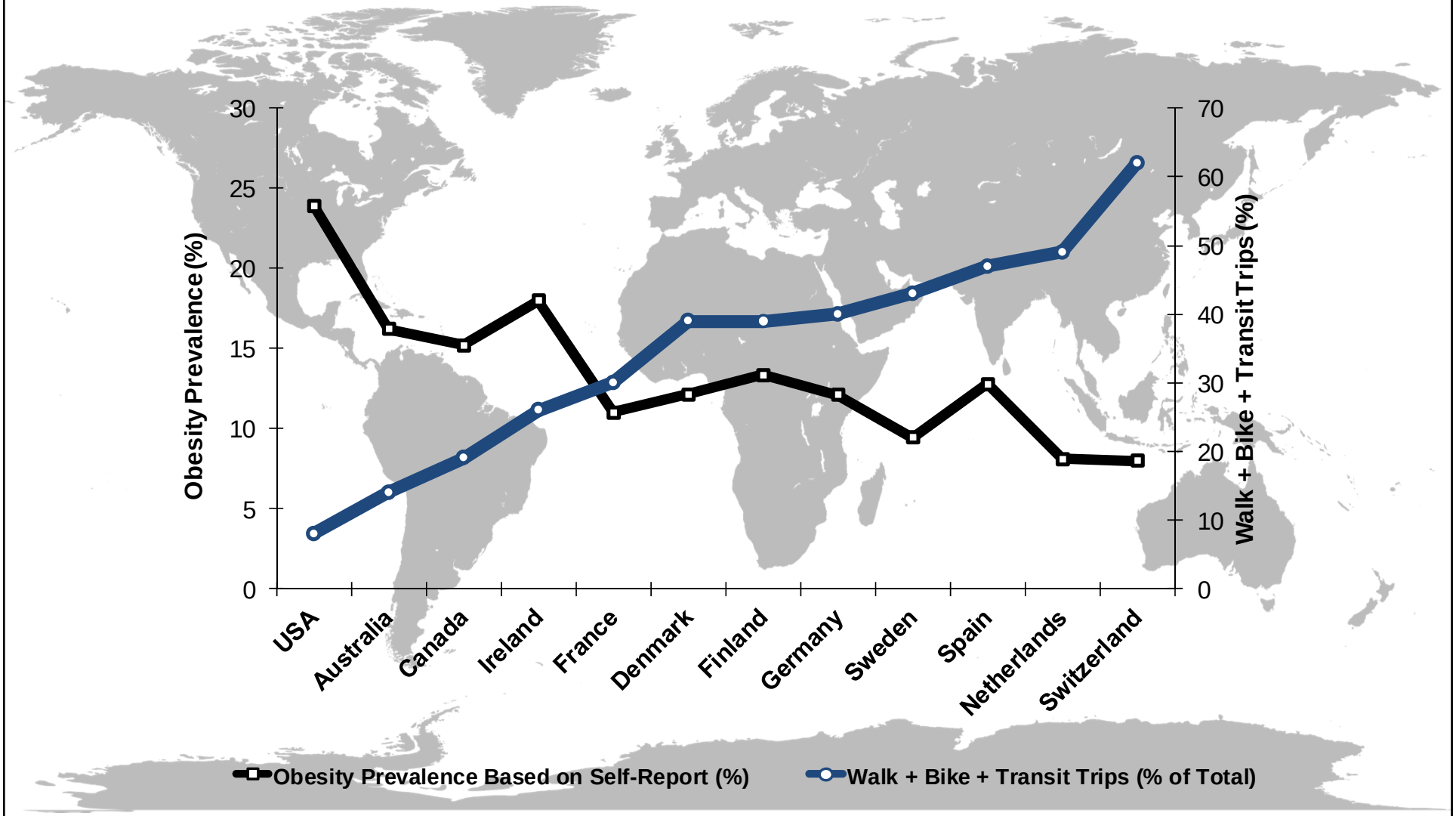
Active Transportation & Obesity Rates

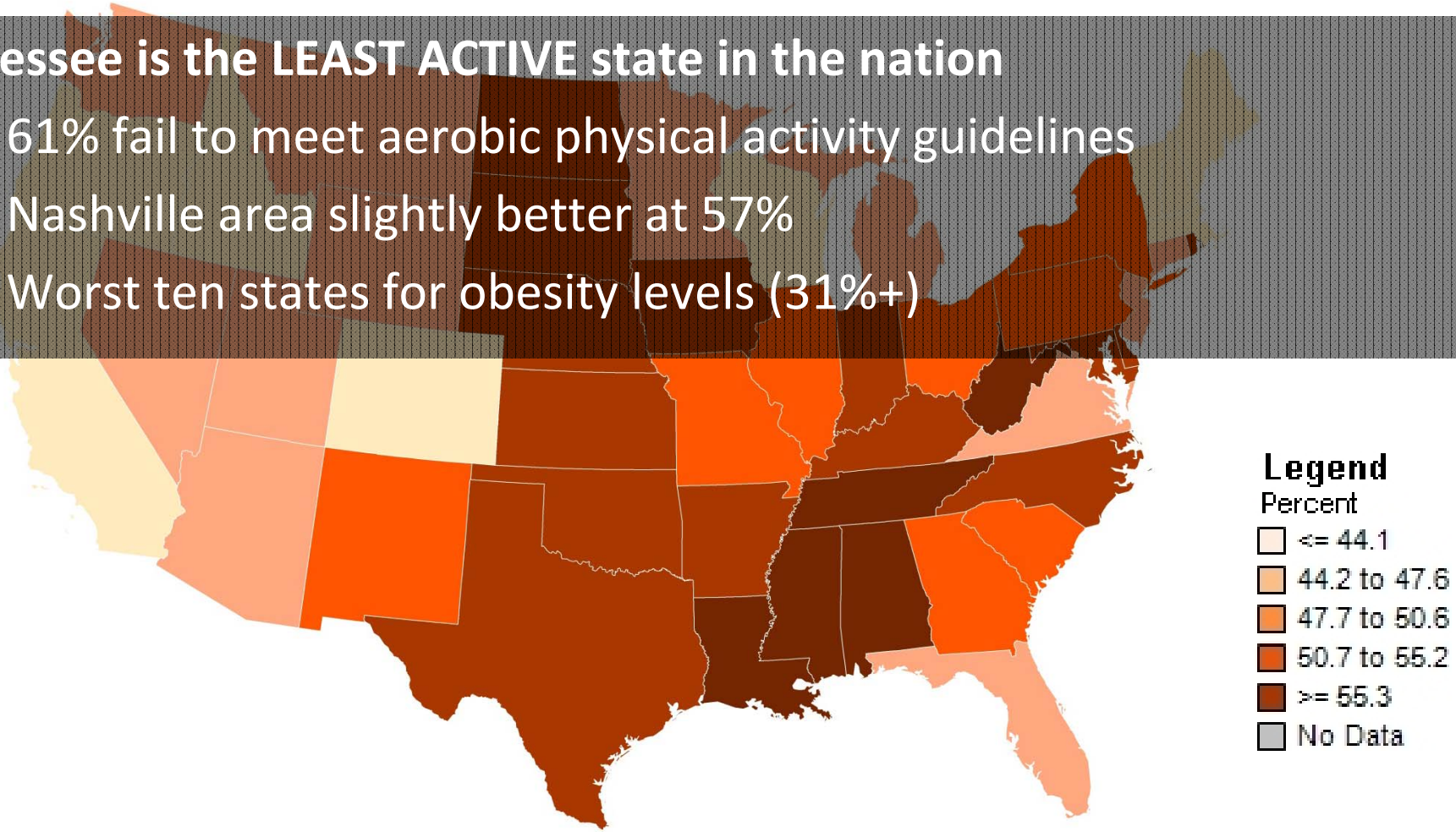


Bassett, et al. J Phys Act Health, 2010

Physical Inactivity in Tennessee

Tennessee is the LEAST ACTIVE state in the nation

- 61% fail to meet aerobic physical activity guidelines
- Nashville area slightly better at 57%
- Worst ten states for obesity levels (31%+)



Physical inactivity: 2011 BRFSS;
obesity: 2012 BRFSS

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Home
Eat Well Play More TENNESSEE
Plan Overview
State Initiatives
Resources & Tools
About Us
Eat Well Play More
TENNESSEE
Eat Well, Play More Tennessee is Tennessee's statewide nutrition and physical activity plan to reduce obesity and chronic disease in Tennessee by 2015. It is our vision to create an environment in which every Tennesseean has the ability to make healthy lifestyle choices regarding nutrition and physical activity.
About The Tennessee Plan
Eat Well, Play More Tennessee is Tennessee's statewide nutrition and physical activity plan to reduce obesity and chronic disease in Tennessee by 2015.
GO
Action Teams
Each Action Team works closely with statewide partners to drive the efforts toward formulating and implementing annual action plans.
GO
Resources & Tools
Get a jumpstart in achieving objectives with recommendations of resources & tools.
GO
Data & Evidence
This section provides information on the risks, consequences, and economic costs of obesity as well as discusses the disparities in select populations affected by obesity.
GO
Workgroup Web Site
Resources for implementation and evaluation of state plan.
GO
Consumer Panel
An online consumer panel to gather data on a monthly basis. Learn how you can participate.
GO
How to Become Involved
For interested individuals or groups that want to help reduce the burden of obesity in Tennessee.
GO

MPO Public Health Initiatives

- **New Policy Development**
  - Dedicated staffing to build partnerships across silos
  - Identified active transport as a major initiative
- **Reprioritizing of Funding**
  - Updated project scoring criteria to include health in evaluation of transportation projects
  - Restructured existing funding sources so more money is spent on active transportation
- **Research & Modeling**
  - Regional data collection effort to provide baseline evidence for policy benchmarking
  - Implementation of health outcome model

Recent Public Health Products

- Regional School Siting Symposium
- HIA on Proposed School Siting within a Transit Oriented Development
- HIA on Proposed Transit Ready Development
- Middle Tennessee Transportation & Health Study
- Nashville Region's Vital Signs – Annual Indicators Report
- Shaping Healthy Communities Publication

Shifting Policy

U.S. DOT Responding to Public Demand

"I have traveled all over this country…and everywhere I go, people want **better options**. Options that offer reduced greenhouse-gas emissions. Options that offer reduced fuel-consumption. Options that offer **better health**. Options that bring communities together. Now, let me make this absolutely clear: I never said we would stop repairing, maintaining, and –yes– even expanding roadways. I said only that it's time to **stop assuming that putting more cars on more roads is the best way to move people around more effectively**."

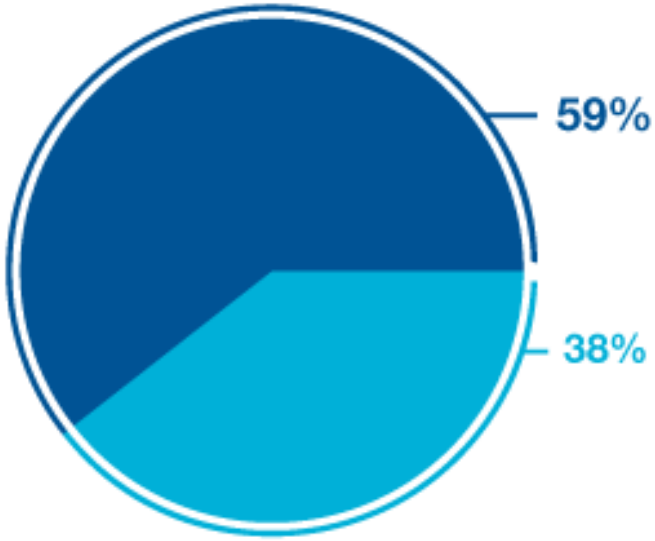
– U.S. DOT Secretary Ray LaHood

Transit a Preferred Solution

Transportation for America

Preference to Reduce Traffic Congestion

Future of Transportation National Survey



59% We need to improve public transportation, including trains and buses, to make it easier to walk and bike to reduce traffic congestion

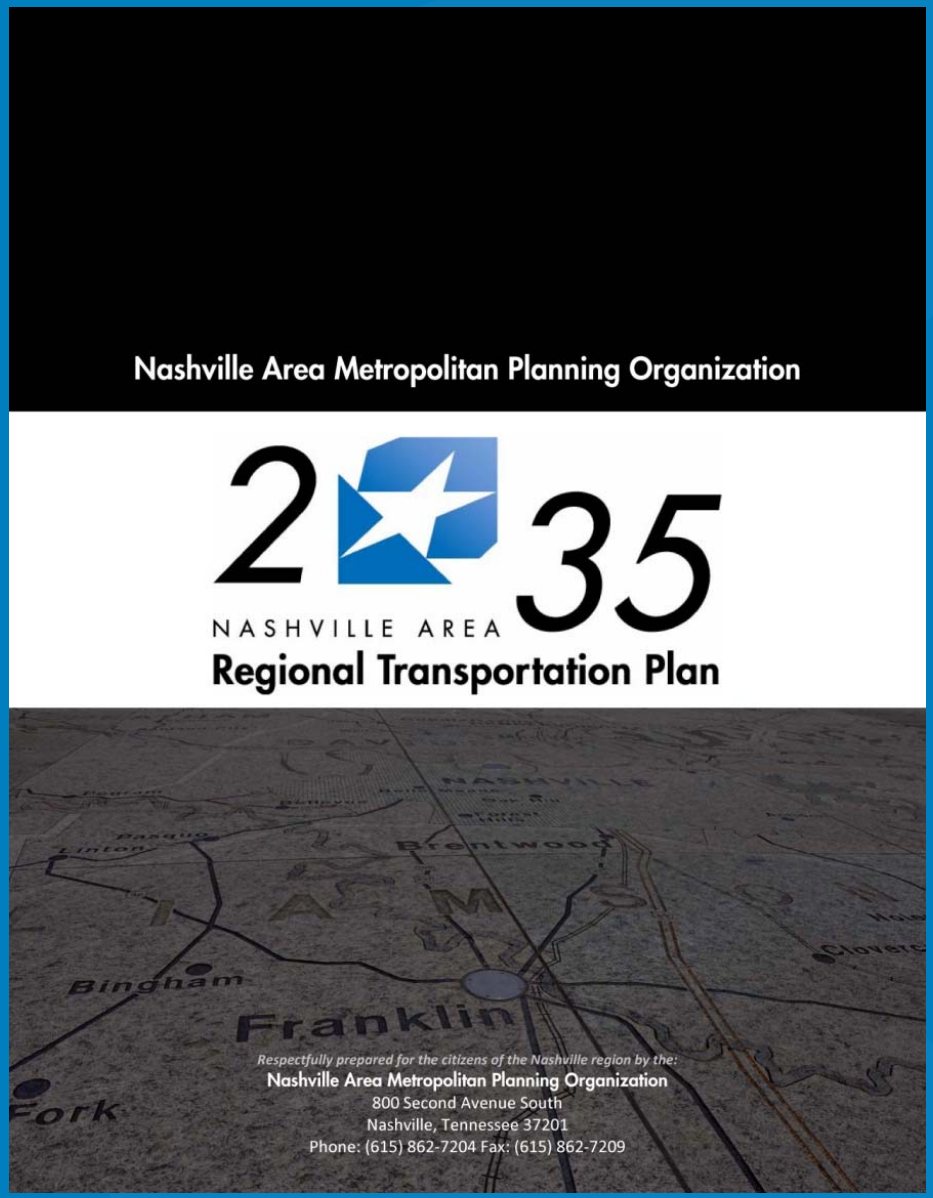
38% We need to build more roads and expand existing roads to help reduce traffic congestion

(*National telephone survey of 800 registered voters: 700 landline interviews & 100 cell phone interviews.*)

MPO Area Public Opinion

- Three strategies provided for improving transportation in Middle Tennessee; respondents then asked to prioritize–
  - **1st choice**: improve and expand mass transit options
  - **2nd choice**: make communities more walkable & bike-friendly
  - **3rd choice**: build new or widen existing roadways

2010 MPO Telephone Survey of 1100 Respondents across Middle Tennessee.



#1

A Bold, New Vision for Mass Transit

#2

Support for Active Transportation & Walkable Communities

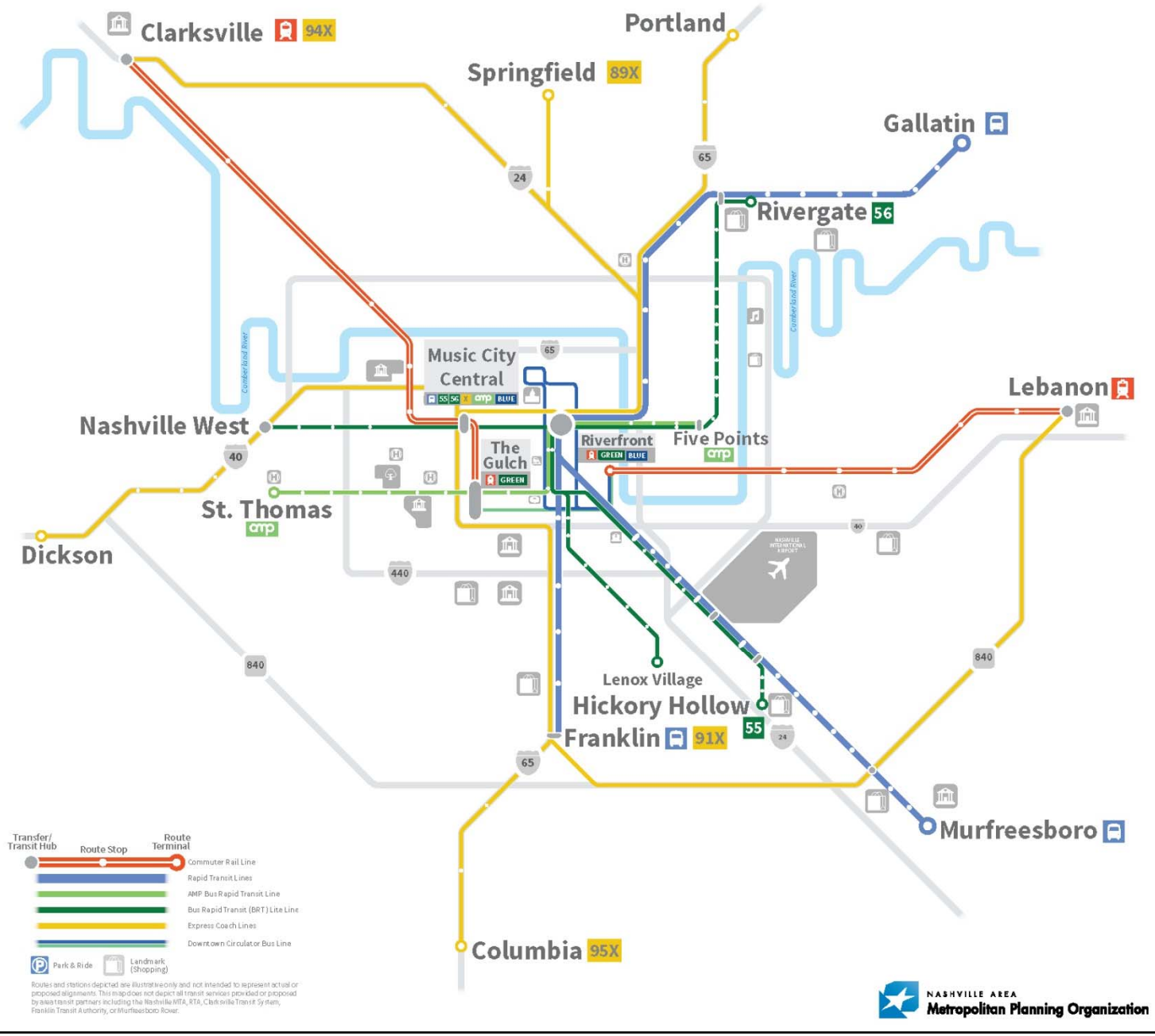
#3

Preservation & Enhancement of Strategic Roadways

nashvillempo.org

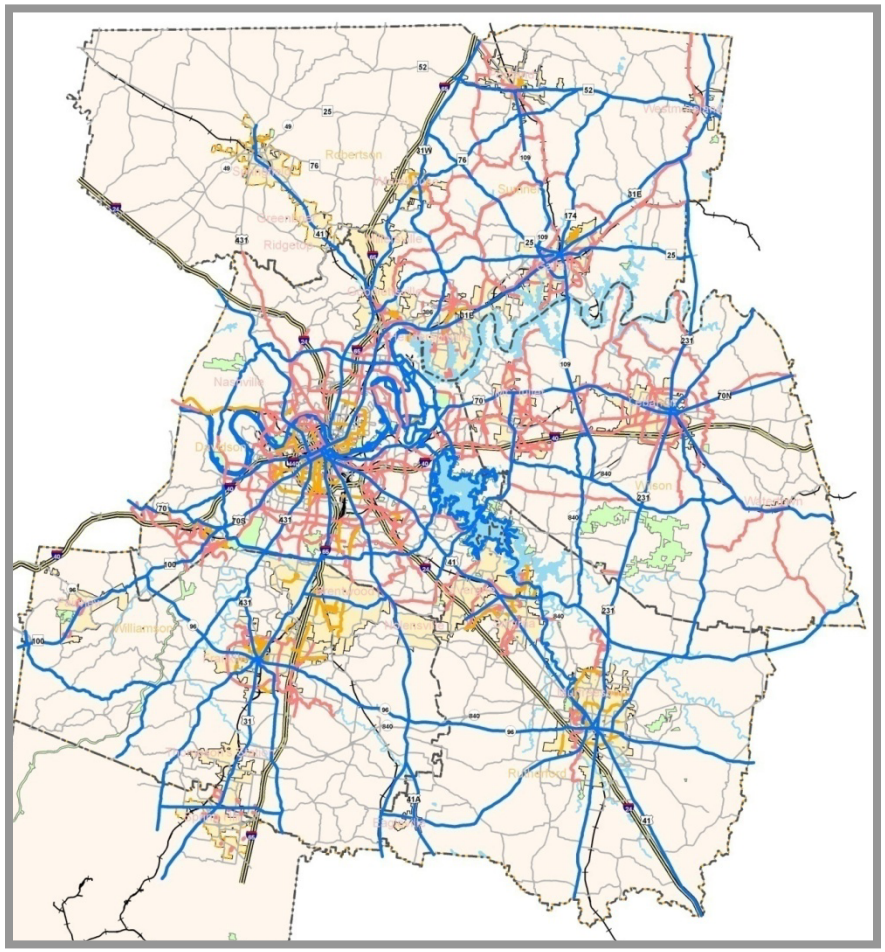
Middle Tennessee *Transit* Vision

middleTNtransit.org

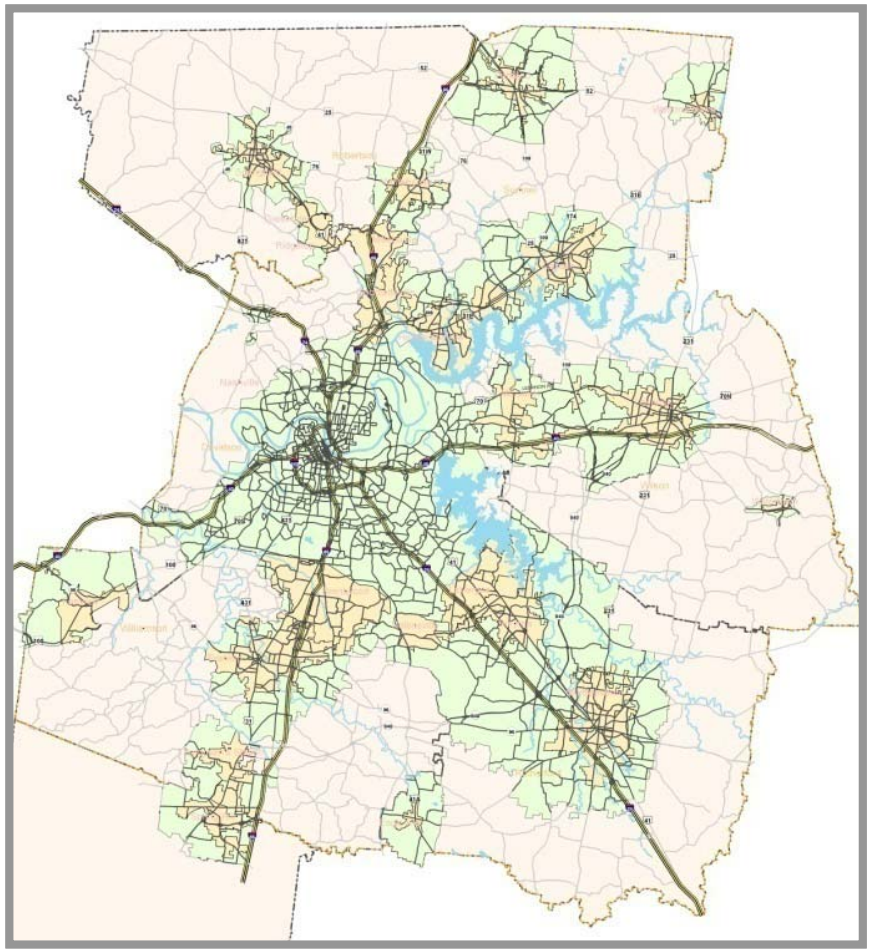


A Regional Vision for Non-Motorized Modes

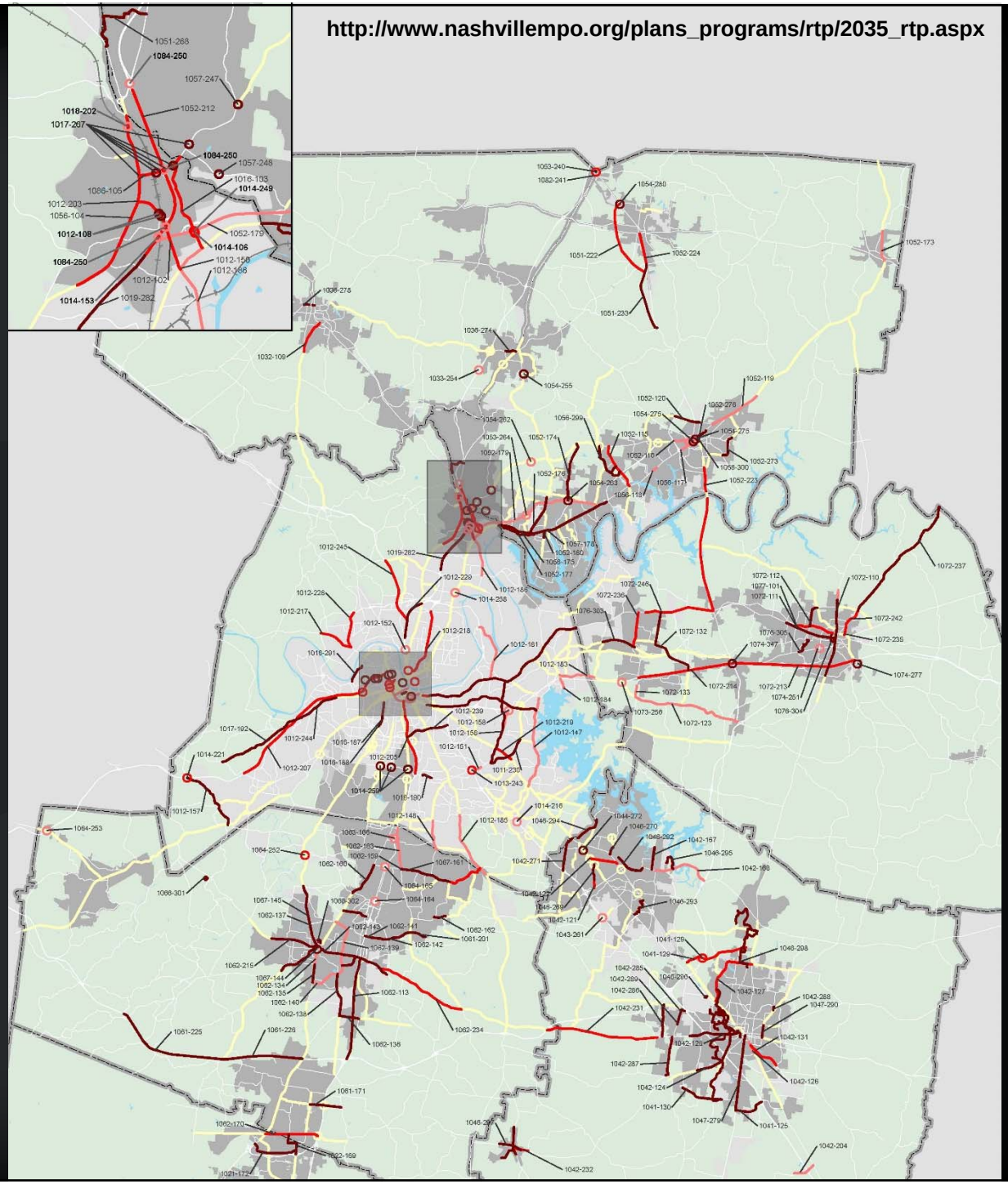
Bikeways



Sidewalks



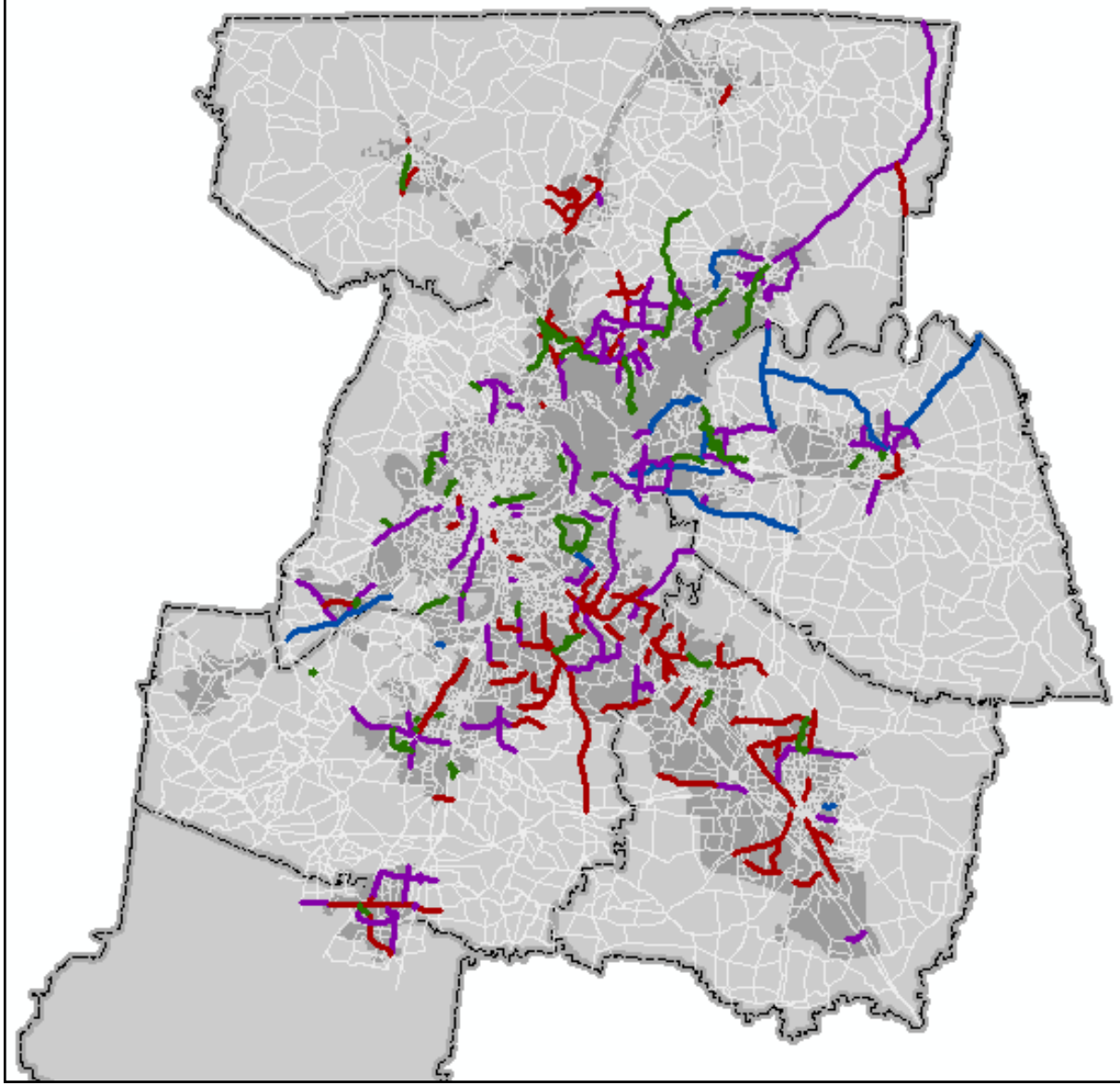
Cost-Feasible Roadway Projects 2010-2035



Legend

- 2011-2015 RTP Projects
- 2016-2025 RTP Projects
- 2026-2035 RTP Projects
- Unfunded Projects

More Complete Streets

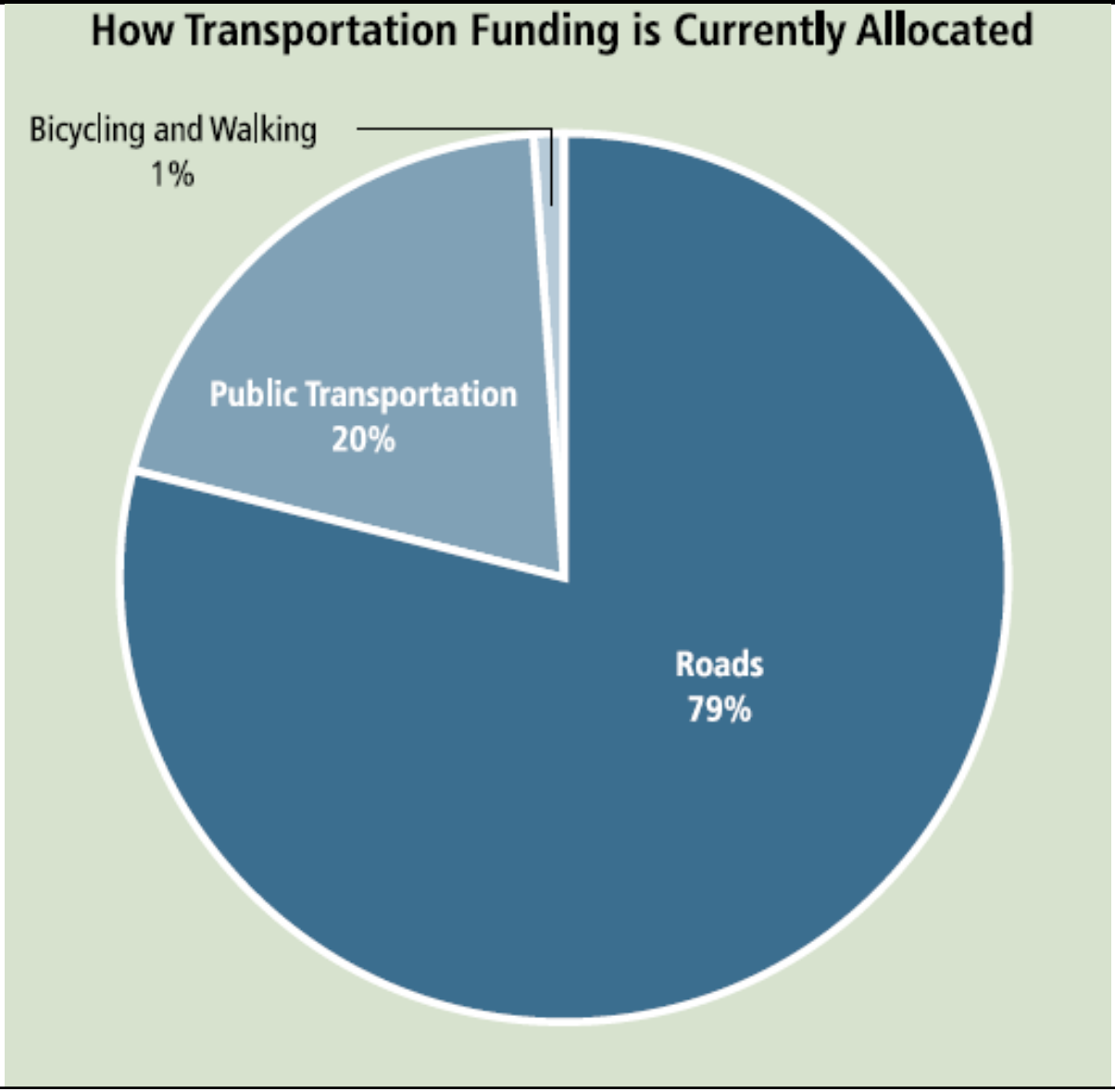


70% of adopted roadway projects include sidewalks, bicycle lanes, or shared-use lanes

(up from 2%)

Reprioritizing Funds

Federal Distribution of Funds



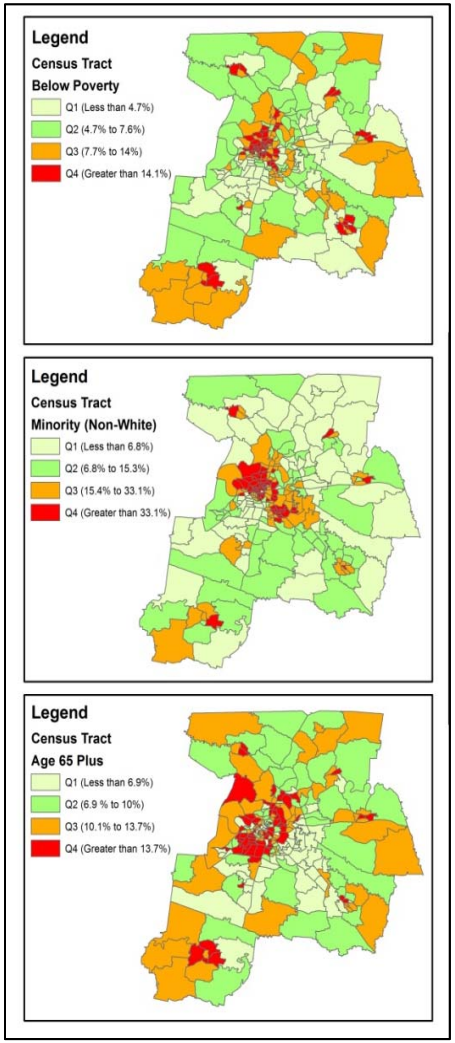
MPO's Urban STP Investment Strategy

- 70% Multi-Modal Roadway Safety and Capacity
- 15% Minimum investment in Active Transportation & Walkable Communities
  - Sidewalks, bicycle lanes, greenways, transit stops, and education
- 10% Minimum flexed to Transit
  - Combined with Federal Transit Administration funds to help implement regional vision for mass transit
- 5% ITS and Traffic Operations
  - Using technology to manage traffic

MPO's Urban STP Investment Strategy

- 70% Multi-Modal Roadway Safety & Capacity
- Projects Scored on Criteria – 100 points
  - **Quality Growth and Sustainable Development – 15pts**
  - **Multi-Modal Options – 15pts**
  - **Health & Environment – 10pts**
  - **Safety & Security – 10pts**
  - **Congestion Management – 10pts**
  - System Preservation & Enhancement – 15pts
  - State & Local Support/ Investment – 15pts
  - Freight & Goods Movement – 10pts

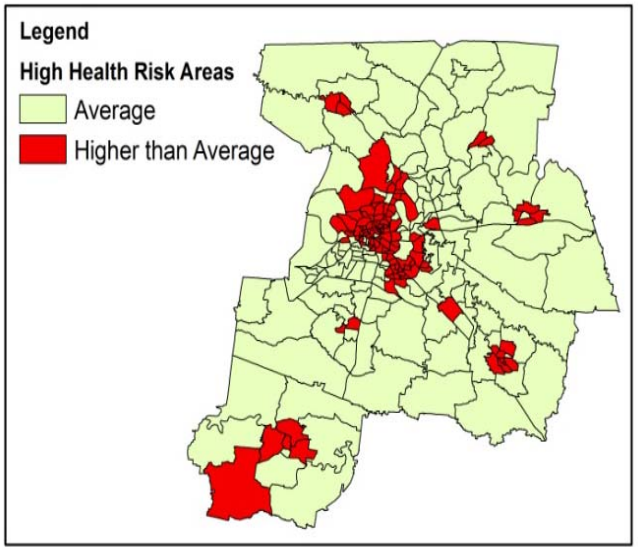
Prioritizing for Health – Data Gap



There is a strong link between the lack of physical activity and health (e.g. heart disease, obesity, and other chronic conditions).

Research has also shown certain population groups have a higher disparity. These groups include:

- Low Income
- Minority
- Older Adults (over 65)



Research & Modeling

Transportation & Health Study

www.middletnstudy.com

Research Objectives

- Baseline Data & Initial Exploration of Links between Built Environment, Transport, & Health
  - Socio-economics, travel behaviors, area type, physical activity, eating behaviors, health outcomes
- Inform Policy and Funding of MPO 2040 Regional Plan
- Behavioral Data for Regional Travel Demand Modeling
  - Traditional 4-Step Model Update
  - Activity Based Modeling Transition

Study Design

Traditional Diary Study – 6000 Households

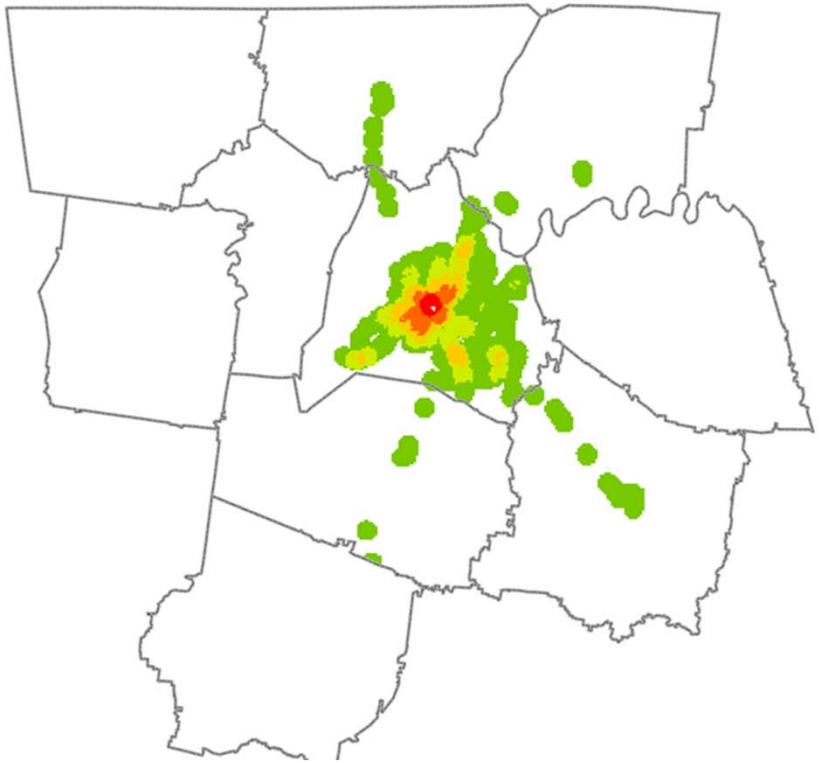
- Collect detailed personal and household level demographics
- Collect one day travel data (diary) – all persons age 5 and older
- Collect basic health information (six questions)

Health / Physical Activity Study – 600 Household Subsample

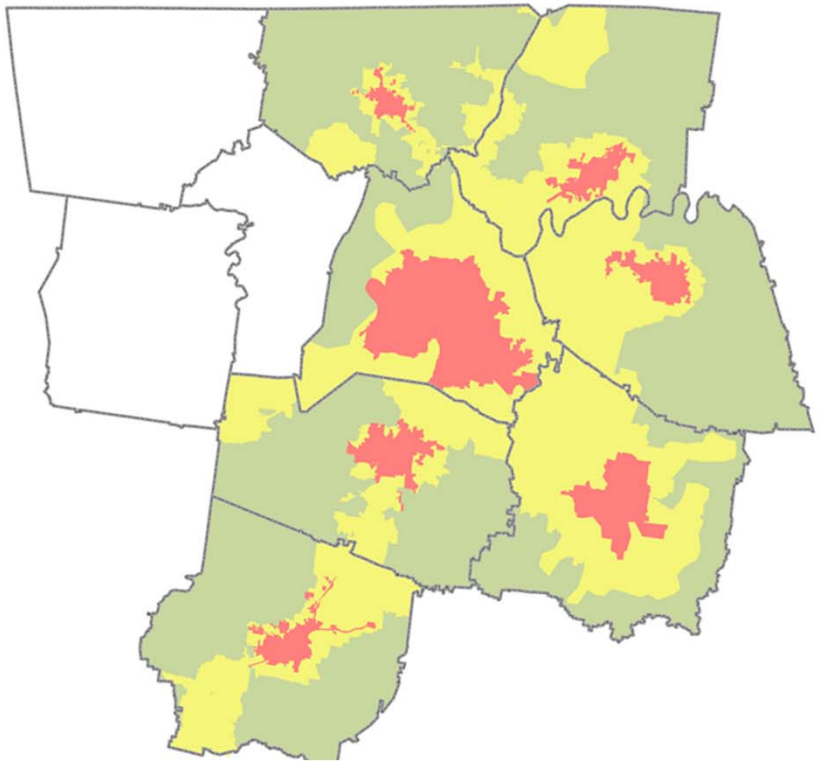
- Stratified by Urbanicity (rural, suburban, urban)
- Collect one day travel data (diary) – all persons age 5 and older
- Collect four days of travel data (GPS) – all adults (16-75)
- Collect four days of PA data (accelerometer) – HPA member only
- Complete Health Survey – HPA member only (18-75)

Sampling Plan

Addressed-based, random sampling with oversamples & stratification



Transit Oversampling
(All Households)



Area Type Stratification
(HPA households only)

Health Questions – All Persons / All Households

Q1 During the last 7 days, how much time did you usually spend ***sitting*** on a **weekday?** (Please report in hours; for example: 8.5 hours)

Q2 Which of the following statements best describes how physically active you are in a typical week.

1. I rarely or never do any physical activity.
2. I do some light or moderate physical activities.
3. I do some vigorous physical activities.

Q3 In general, how healthy is your overall diet?

1. excellent
2. very good
3. good
4. fair
5. poor

Q4 Would you say that, in general, your health is:

1. excellent
2. very good
3. good
4. fair
5. poor

Q5 About how much do you weigh without shoes?

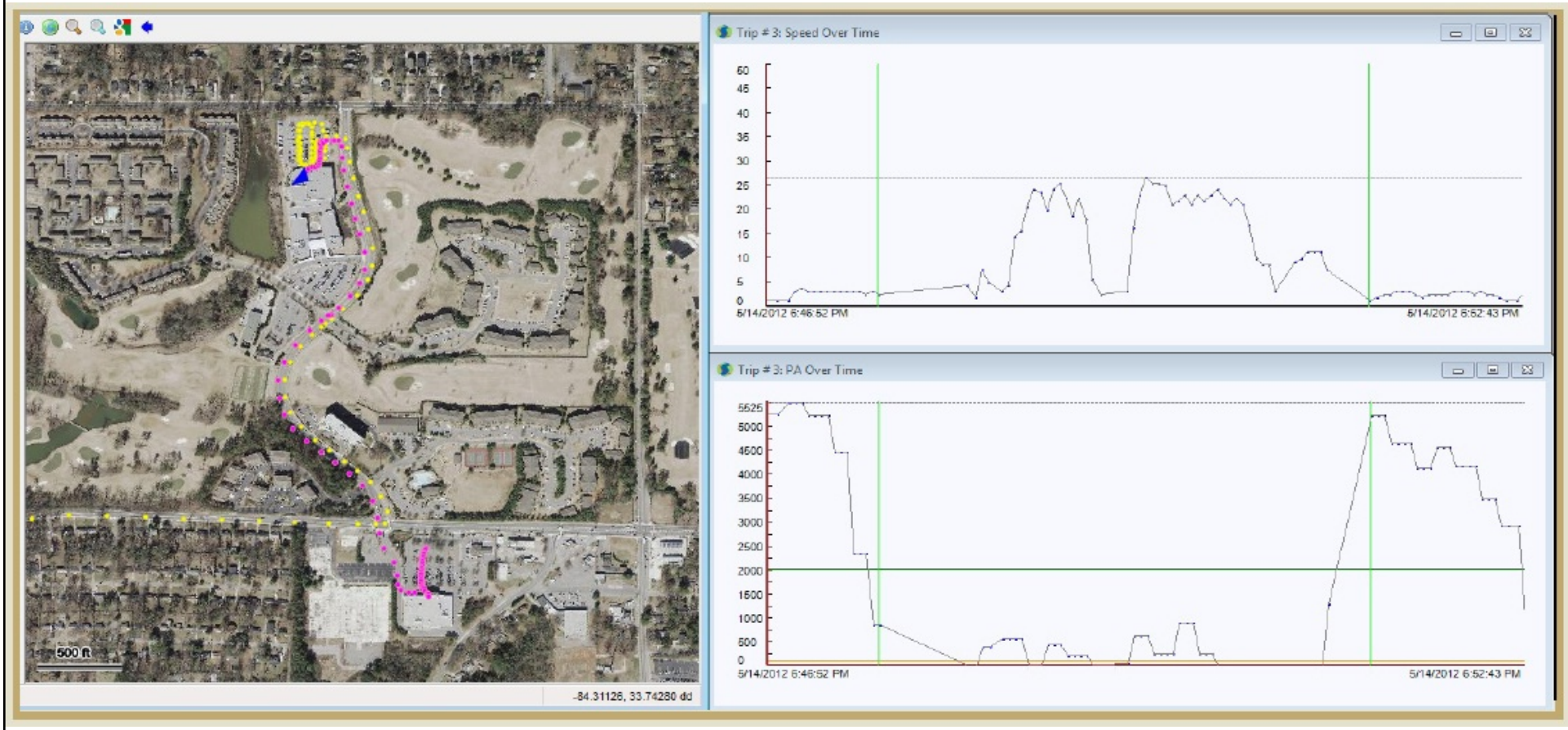
Q6 About how tall are you without shoes?

Health Study Questions

- Food Access (Respondent Only)
  - Food Access & Quality
  - Food Intake (4 days)
- Physical Activity (Respondent Only)
  - Average daily time spent in physical activity during the last 7 days
  - Average daily time sitting/inactive during the last 7 days
  - Average daily time spent traveling during the last 7 days
  - Average daily time spent walking and bicycling
- Health Outcomes (Household Members)
  - Number of days in past month in bad physical health, mental health
  - Number of days where bad health impacted activities
  - Medical conditions – high blood pressure, heart attack, coronary disease, stroke, asthma & other respiratory diseases, diabetes, depression

Package for three-person household

Accelerometer and GPS Data



General Findings

- Basic hypothesis is true:
  - Health is influenced by BMI
  - BMI is influenced by diet and physical activity
  - Physical activity is influenced by travel behaviors
  - Travel behaviors are influenced by built environment and household characteristics
- People are walking and bicycling for transportation reasons much more than most realize
- Resulting health measures largely mirror that of other health studies

Comparability with BRFSS

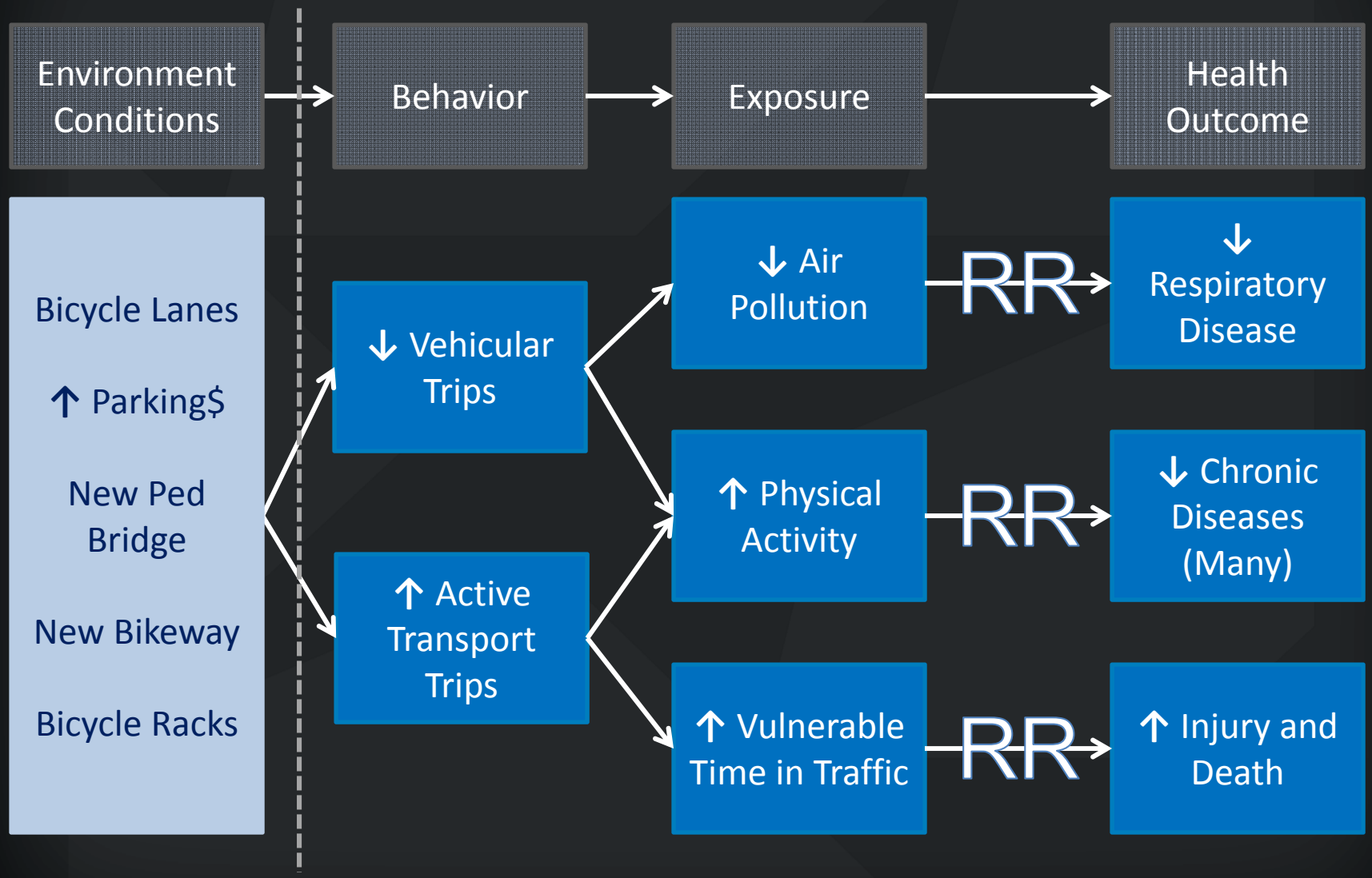
General Health Status	Weighted n	Weighted	BRFSS MSA	BRFSS TN
Excellent	108,276	16%	18%	18%
Very Good	232,981	34%	32%	31%
Good	237,119	35%	33%	30%
Fair	76,869	11%	12%	13%
Poor	21,888	3%	5%	8%

Integrated Transportation and Health Impact Model

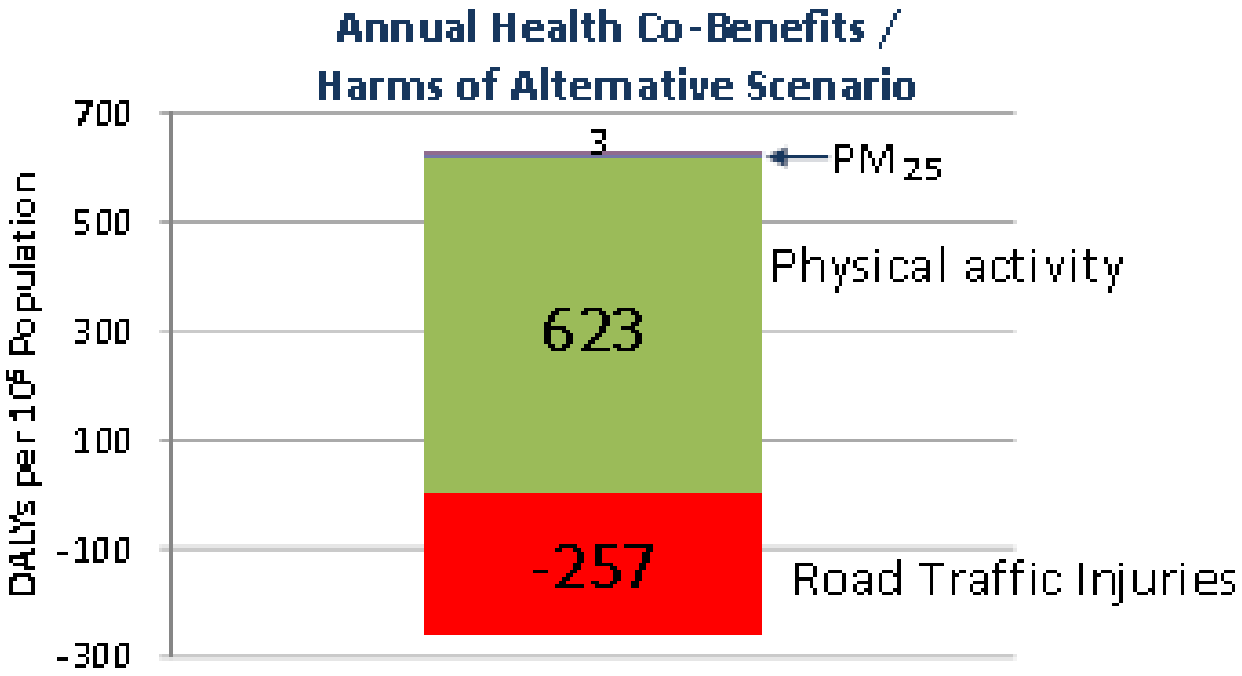
ITHIM provides integrated health impact assessment of transport through changes in physical activity, road traffic injury risk, and urban air pollution.

See more at: http://www.cedar.iph.cam.ac.uk/research/modelling/ithim

ITHIM Model Schematic



Example ITHIM Results



- **Increased activity = 623 DALYs averted per 100,000 people**
- **Increased injuries = 257 DALYs incurred per 100,000 people**

Sourced from Neil Maizlish, California Department of Public Health, ITHIM Developer

Data presented do not represent Nashville health impacts

Next Steps

- Analyze Basic Research Questions (examples)
  - Do travel behaviors affect health outcomes
  - How does area type influence activity and health
- Integrated Transport and Health Impact Model
  - Transportation investment strategy – increase p.a.
  - Input physical activity, air quality and injury data
  - Health outcomes: cancer, injury, asthma, etc. rates
- 2040 Regional Transportation Plan
  - Increase policy and funding for health outcomes
  - Use ITHIM outputs in decision-making
  - Develop health performance measures

http://www.nashvillempo.org/regional_plan/hea

Nashville Area MPO: Health...

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Metropolitan Planning Organization

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Regional Planning

- Planning Overview
- Roadways
- Mass Transit
- Walking & Bicycling
- Freight Movement
- Land Use & Urban Design
- Environment
- Health & Well Being

Health & Well Being

The Nashville Area MPO is committed to forming policy, funding and research that support the improvement of health outcomes through active transportation - transportation that requires physical activity - such as transit, walking and bicycling. One-third of Americans do not drive or own cars, and 12 percent of all U.S. trips are made by walking or bicycling, yet these modes account for 14 percent of traffic fatalities and only 1.6 percent of federal transportation funding. Of the trips taken in U.S. metros, 50 percent are three miles or less; nearly 30 percent are one mile or less. And despite the fact that 55 percent of Americans want to bike more, drive less and walk more than they do now, 65 percent of trips under one mile are still taken by automobile due to inadequate facilities for active transportation. With Tennessee ranked fourth in the nation for obesity rates, the MPO is pursuing infrastructure policies that reflect a desire for healthier options to get around communities - including safer, more convenient means to walk or cycle for routine trips.

RELATED RESOURCES

Health & Well Being:

Nashville Public Television

- NPT Children's Health Crisis Obesity

CDC

- CDC Health Community Design
- Obesity Epidemic Video
- Healthy Community Design 101
- Healthy Community Design Checklist
- Transportation Recommendations and

http://www.nashvillempo.org/regional_plan/health/#main-content

More about MPOs

- Association of MPOs (AMPO)
  - AMPO.org
- U.S. DOT Transportation Planning Capacity Building
  - Planning.DOT.gov
- Transportation Research Board
  - gtcmpo.org/TRBADA20_3
- Nashville Area MPO
  - NashvilleMPO.org
  - Facebook/NashvilleMPO
  - @NashvilleMPO

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