Reinventing Megalopolis:

THE NORTHEAST MEGAREGION

UNIVERSITY OF PENNSYLVANIA
SCHOOL OF DESIGN

SPRING 2005

Introduction

This document summarizes the work of *Reinventing Megalopolis,* a 2005 University of Pennsylvania City and Regional Planning Studio. This studio builds on the findings of last spring's Penn Plan for America Studio, which concluded that most of America's growth in the first half of the 21st century would occur in eight emerging "SuperCity" or "Mega" regions. This year's studio focuses on one of these eight – the connected urban region stretching from the northern fringe of metropolitan Boston to the southernmost suburbs of Washington DC – first identified by Jean Gottmann in 1961 as "Megalopolis." This report summarizes the global context of networked cities, the current identity of the region including existing strengths and weaknesses, and concludes with a strategic vision for the MegaRegion.

A team of students and faculty at the Georgia Institute of Technology are conducting parallel research in a second emerging region in the Southeast U.S. The Tech team is focused on the Piedmont Atlantic Macropolitan (PAM) region, centered on Atlanta and stretching from North Carolina to Alabama.

Both studios had the opportunity to share findings and ideas at a mid-semester charrette on SuperCities held at the Fundación Metrópoli in Madrid, Spain from March 7th to 11th, 2005. The goal of the workshop was to strengthen the Penn and Tech teams' understanding of the innovative planning occurring in similar large regions in the European Union. The studios also looked to the charette's distinguished European faculty to aid in translating this international experience to the Northeast and Southeast mega-regions. Following Madrid, the *Reinventing Megalopolis* studio incorporated the outcomes of the charrette into policy recommendations and a set of proposed strategic actions for the region.

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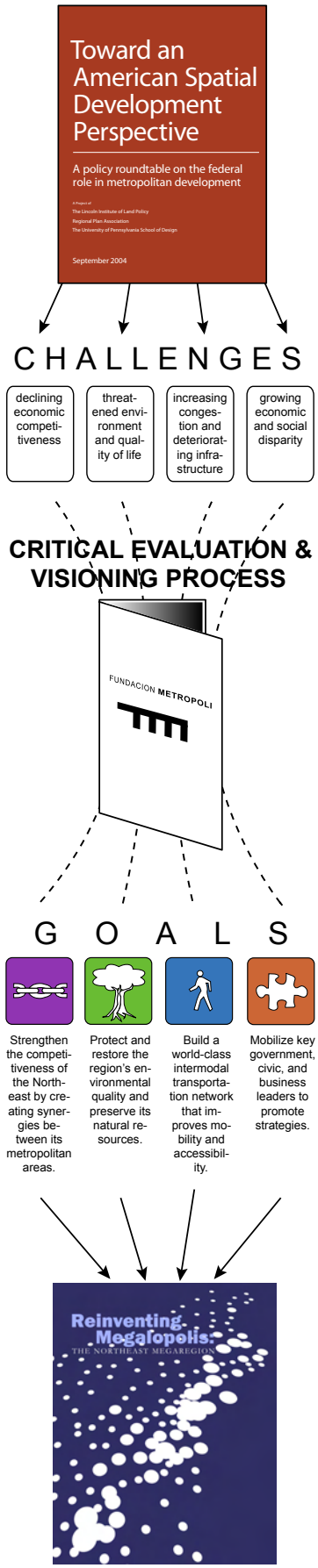


Executive Summary

The Northeast MegaRegion contains a diverse and unique network of dynamic cities, region-defining natural amenities, and superior mobility systems. Its world-class educational and cultural institutions make it a global center for research and the arts. The Northeast is also home to leading financial industries and continues to be America's gateway to global markets.

Its continued success, however, cannot be taken for granted. Inadequate and congested infrastructure, as well as fragmented governance, threatens the region's future economic preeminence. Land-consuming sprawl erodes open space at an alarming rate. The growing racial and social isolation of many of the region's cities and older suburbs undercuts the productivity of the whole Northeast.

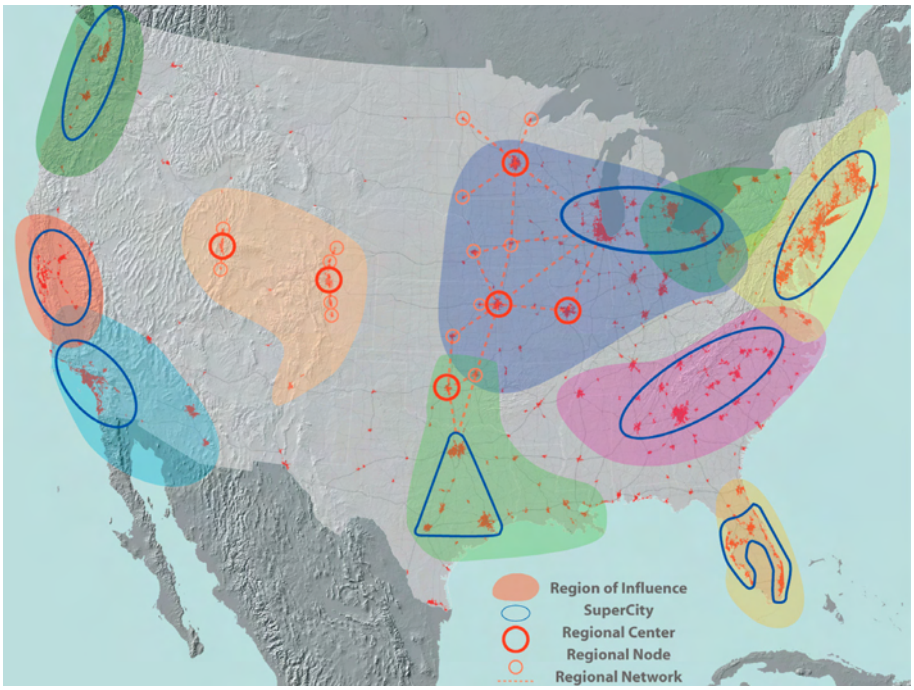
To meet these challenges and to improve the future livability of the MegaRegion, the Northeast must mobilize to a new level of collaboration and action. Working cooperatively, we can address common threats and capitalize on the assets that make the Northeast an attractive place in which to live and work. It will then create synergies between successful and underperforming areas and advocate for a strengthening of the Northeast's competitiveness. In order to ensure sustainable growth, our environmental resources must be restored and protected. A world-class, multi-modal transportation network would improve global links, as well as mobility within the region. Last, in order to make this a reality, all key stakeholders at all levels will need to come together and advocate the promotion of the Northeast MegaRegion.

This report outlines seven strategies that can be employed as tools to realize these region-wide goals. Each strategy addresses many of the region's challenges and can be used collectively or individually to affect change. Strategies vary in scope and scale, ranging from region-wide initiatives to those designed to coordinate local programs. Case studies illustrate best practices and exemplify how implementation might take place. These strategies require cooperation on a number of different levels but have the ability to achieve region-wide success.

This report enhances the efforts to encourage regional thinking and action. Success requires the commitment and investment of stakeholders at all levels, who will continue to shape the future vision of the Northeast MegaRegion.

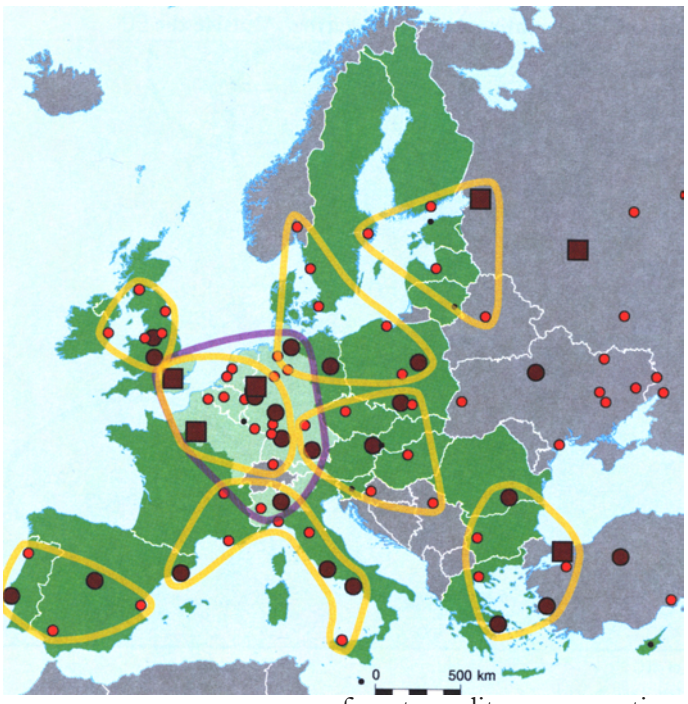
Precedents

Efforts to plan at the mega-regional scale in Europe and Asia have inspired and informed this project. Recent European efforts to develop policies and investments for the entire continent and for regions that cross national boundaries are now being organized under the umbrella of the *European Spatial Development Perspective*, a set of policy directives and strategies adopted by the European Union in 1999. China and Japan are also planning for this new, unit of global competition, emphasizing infrastructure enhancement and coordinated economic development.



ASDP emerging supercities

Over the past generation, the EU has initiated a large-scale approach to planning for metropolitan growth, mobility, environmental protection, and economic development. European "spatial planning" involves planning across regional and national borders and encompasses new "networked cities" dispersed over hundreds of kilometers. The EU is also mobilizing public and private resources at the continental scale, with bold plans and investments designed to integrate the economies of, and reduce the economic disparities between, member states and regions. These efforts increase the global competitiveness of regions and, by extension, the continent.



new european zones of metropolitan cooperation

Despite a long history of regional and even national planning, the United States currently has no initiatives aimed at a comparable scale to its international counterparts. National development and conservation strategies initiated by President Thomas Jefferson in 1807 and by President Theodore Roosevelt 1907 stimulated the major infrastructure, conservation, and regional economic development strategies that powered America's economic growth in its first two centuries. Now one hundred years later, the United States must renew its large-scale planning efforts in order to sustain its global competitiveness and maintain its quality of life.

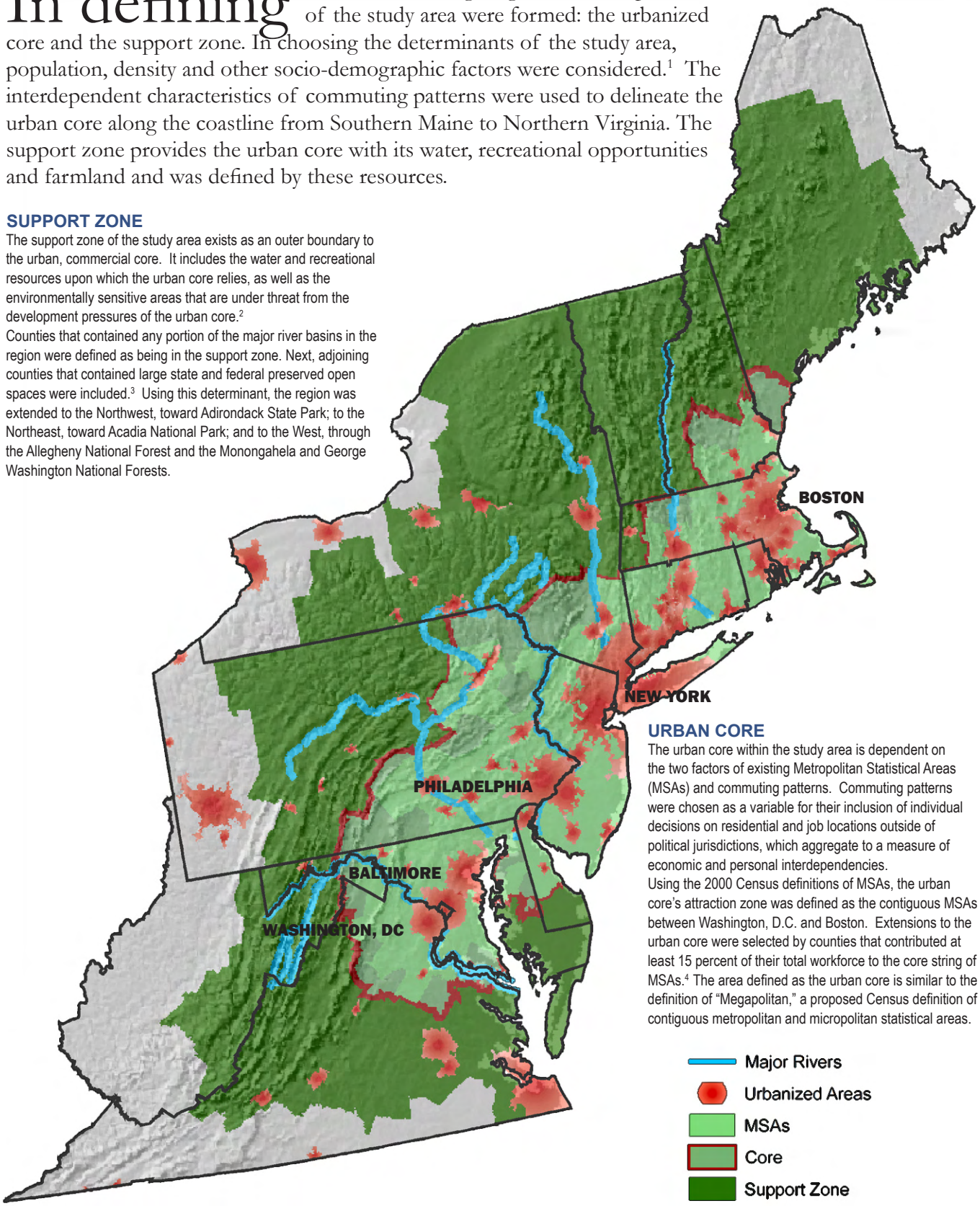
Of late, the United States has delegated most economic development and planning powers to the municipality, the smallest of political units. Meanwhile, Japan is planning at the regional scale along its 1,400-mile long Shinkansen transportation corridor. China is implementing mega-regional planning efforts in the Pearl River Delta, an area that represents 46 million people and 1/3 of China's exports. At an even larger scale, the European Union is engaging in continent-wide planning, directing funding to countries most in need. Thus, the United States must look to its global competitors, as well as its own history, to plan at the appropriate scale for directing infrastructure investment, coordinating economic development, and planning for the future of this great nation.

In defining the Northeast MegaRegion, two components of the study area were formed: the urbanized core and the support zone. In choosing the determinants of the study area, population, density and other socio-demographic factors were considered.[1] The interdependent characteristics of commuting patterns were used to delineate the urban core along the coastline from Southern Maine to Northern Virginia. The support zone provides the urban core with its water, recreational opportunities and farmland and was defined by these resources.

SUPPORT ZONE

The support zone of the study area exists as an outer boundary to the urban, commercial core. It includes the water and recreational resources upon which the urban core relies, as well as the environmentally sensitive areas that are under threat from the development pressures of the urban core.[2]

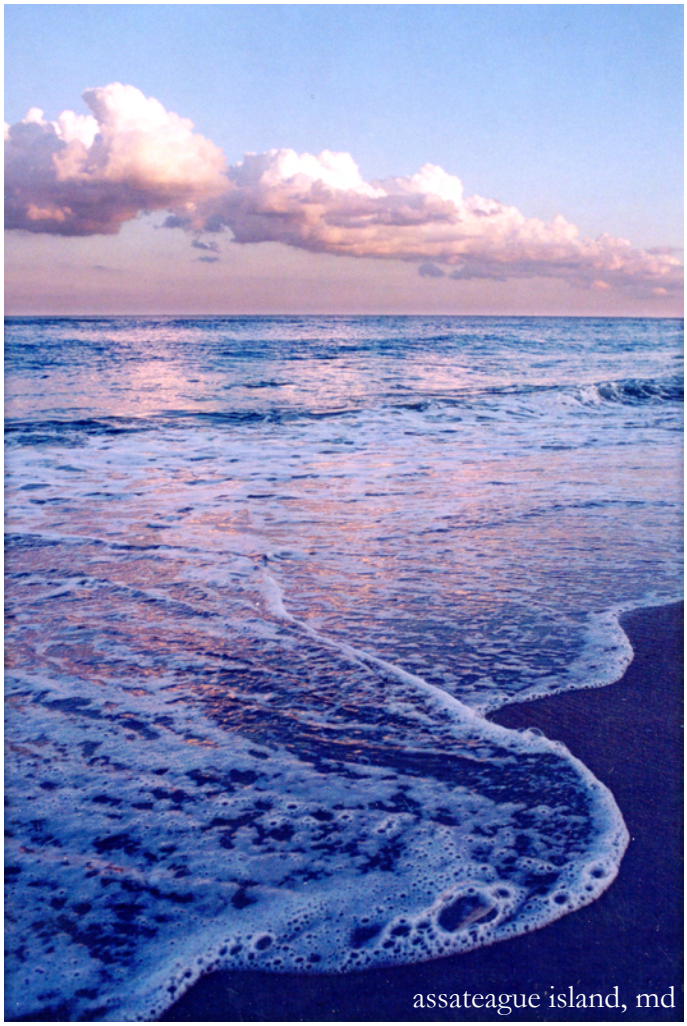
Counties that contained any portion of the major river basins in the region were defined as being in the support zone. Next, adjoining counties that contained large state and federal preserved open spaces were included.[3] Using this determinant, the region was extended to the Northwest, toward Adirondack State Park; to the Northeast, toward Acadia National Park; and to the West, through the Allegheny National Forest and the Monongahela and George Washington National Forests.



URBAN CORE

The urban core within the study area is dependent on the two factors of existing Metropolitan Statistical Areas (MSAs) and commuting patterns. Commuting patterns were chosen as a variable for their inclusion of individual decisions on residential and job locations outside of political jurisdictions, which aggregate to a measure of economic and personal interdependencies.

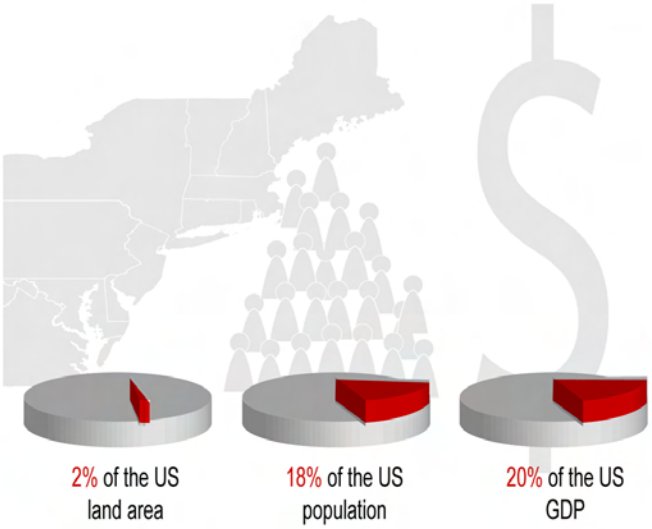
Using the 2000 Census definitions of MSAs, the urban core's attraction zone was defined as the contiguous MSAs between Washington, D.C. and Boston. Extensions to the urban core were selected by counties that contributed at least 15 percent of their total workforce to the core string of MSAs.[4] The area defined as the urban core is similar to the definition of "Megapolitan," a proposed Census definition of contiguous metropolitan and micropolitan statistical areas.


assateague island, md


pennsylvania

Vital Statistics (2000)

Population	**(Urban Core):**	**47.6 Million**
	(Entire MegaRegion):	**69.2 Million**
Land Area	**(Urban Core):**	**62,440 sq. mi.**
	(Entire MegaRegion):	**188,380 sq. mi.**
Gross Metropolitan Product (Urban Core):		**$1.9 Trillion**



The Northeast MegaRegion's sense of place, its environmental quality and its urban form have been shaped by the region's large land forms and natural resource systems, principally the Appalachian Mountains forming the western border and the Atlantic Ocean to the east. Five major rivers – the Connecticut, Hudson, Delaware, Susquehanna, and Potomac – provided a setting for the region's early settlement, and continue to shape the region's population centers. These centers establish the core of the Northeast MegaRegion, where 91 percent of the population lives in an urban area. Constituting one-third of the land area, the urban core is supported by the remaining two-thirds of largely rural areas These provide its water and food supplies and the places where Northeasterners seek refuge from the pressures of urban life.

The Northeast urban core makes up just 2 percent of the total United States land area, yet the population of the region is 52 million people, representing 18 percent of the total United States population. This disparity underscores the density of the Northeast. Further, this small piece of land not only is home to a large share of U.S. residents, but also produces 20 percent of the country's Gross Domestic Product (GDP). Taking land area into consideration, the Northeast urban core produces ten times more GDP per square mile than the United States' national average. The Northeast is not only a powerhouse within the United States, but also on the global stage, representing 6 percent of the world GDP.


adirondack mountains, ny


philadelphia


washington d.c.

Five great cities

drive the Northeast's economy – Boston, New York City, Philadelphia, Baltimore, and Washington, D.C. Altogether, these cities are home to more than 11 million of the region's citizens. **New York City** is the financial, commercial, and media capital of the United States, **Washington, D.C.** is the political capital of the country, and **Boston** is its intellectual capital. **Philadelphia** and **Baltimore** also contain world-class academic, cultural and commercial activities. These five cities form a corridor along the region's spine. A network of supporting cities and towns sustains them and plays an important role in shaping the region. This supporting network includes cities like Providence, Rhode Island; New Haven, Connecticut; Newark, New Jersey; and Wilmington, Delaware.


new york


baltimore


boston

The Northeast's strong regional identity emerges from its sense of place, dynamic economy, specialized infrastructure, and cultural amenities. Collectively, the Northeast MegaRegion accounts for $1.9 trillion of the United States' wealth, representing **20 percent of the national economy.** The region is noted for its dominance in the finance, government, healthcare, and education sectors. In fact, healthcare and social assistance constitute the largest regional employment share with 14.5 percent of the total employment, dubbing the region "The Medical Megalopolis." Additionally, 15 of the top 20 *global* pharmaceutical and biotechnology companies have headquarters in the Northeast.

Percent Share of Employment (Specialization)

	Industry	Share of Natl Empl.	Share of NE Empl.
1	Educational Services	29	3.8
2	Finance and Insurance	25	7.8
3	Prof., Sci., & Tech Services	25	8.5
4	Information	23	4.0
5	Mgmt of Co. & Enterprises	21	3.0
6	Healthcare & Social Assist.	20	15
7	Real Estate & leasing	20	1.9
8	Wholesale Trade	19	5.5
9	Other services	19	5.0
10	Arts, Ent. and Recreation	19	1.7

Source: U.S. Census, 2002 County Business Patterns

The Northeast also has many natural amenities that give the region its form. With over **500 miles of coastline,** the Northeast MegaRegion is the gateway to the Atlantic Ocean, and its seacoast areas contain some of the nation's most popular and exclusive resorts, from the Maine coast to Cape Cod to the Hamptons on Long Island to the Jersey and Maryland Shores. Eleven estuaries, including Narragansett Bay, Long Island Sound, and the Chesapeake Bay, provide the region with unique ecological habitats and additional recreational and scenic resources. The five major rivers connect the mountains to the ocean and provide drinking water for over 55 million people. Some of **the country's most fertile farmland** is situated within the Northeast, as well as **12 million acres of protected open space and parkland.**

The Northeast contains America's most extensive network of transportation infrastructure. These systems include urban and intercity rail, highways, and several of the world's busiest airports and seaports. In fact, **over 50 percent of all U.S. public transit riders live in the Northeast and 77 percent of commuter rail riders.** There are over 20 airports with at least 100,000 enplanements each year. Additionally, the region's network of tolled highways is connected by a single automated tolling system known as E-Z Pass.

The Northeast was the first area to be extensively settled. For more than 350 years the region has been the dominant economic force in the U.S. and for the past century has played a leading role in the global economy. Its historic centers and landscapes also contain multiple tourist attractions, unique and varied architecture, compact and picturesque neighborhoods, and a defining character. Further, the region is noted for its **diversity of thought, religion, race, and culture.** This is reflected in its rich array of arts and entertainment, including world-class museums, theaters, and symphonies.

All of these assets provide a solid foundation for the Region's future competitiveness and quality of life. To realize this potential, however, the Northeast needs to build on its assets, identify challenges, set forth a vision, and implement cohesive strategies. Fundamentally, the region's future success is threatened by a growing set of infrastructure, economic, and social concerns. The Northeast has outstripped the capacity of its infrastructure. Its economic potential and quality of life are threatened by growing congestion and escalating housing costs and taxes. Many of its cities and neighborhoods have been bypassed by the region's prosperity. Growing racial and social disparities between and within cities also threaten its overall well-being.

Four major challenges

need to be addressed with regional strategies if the region is to maintain its vitality and livability in the first decades of the 21st century.

- **First,** the Northeast is declining in its economic competitiveness both within the United States and the world.
- **Second,** the region's environment and quality of life are threatened.
- **Third,** the Northeast currently experiences increasing congestion and deteriorating infrastructure.
- **Fourth,** there is growing social and economic disparity both within and between the metropolitan areas of the Northeast MegaRegion.

Underlying these challenges is a fractious system of governance which exacerbates the barriers to continued prosperity.

Declining Economic Competitiveness

The Northeast MegaRegion has a set of exceptional economic assets that make it a global economic power; however, a chain of trends has recently emerged that may hinder the region's future economic competitiveness.

Declining GDP and Employment Share

First, for the past two decades the region has seen a decline in employment and GDP share. The MegaRegion's Urban Core had 18.39 percent of the nation's employment in 2002, down from 19.28 percent in 1992. This figure is comparable to the Core's 19.48 percent share of the nation's GDP in 2000, as well as its 18 percent share of the population. The loss of GDP share is occurring despite the gain in share of GDP by US metropolitan areas as a whole. This indicates that the Northeast is not only losing out to the rest of the nation, but to its competing metropolitan regions as well. The annual growth rate of employment in the Northeast between 1992 and 2002 was 1.37 percent compared to the national annual growth rate of 1.85 percent.

Second, certain industrial sectors in the Northeast saw losses greater than those that occurred nationwide. Manufacturing in the Northeast saw an employment loss at 2 percentage points faster than the national average annual rate. Between 1992 and 2002, all other sectors (SIC), including dominant Northeast industries such as FIRE (Finance, Insurance, and Real Estate) and service industries, suffered lagging rates of growth behind their respective national growth rates. In fact, construction was the only Northeast industry that outpaced the national growth rate.

In her "Global City Hypothesis," Saskia Sassen argues that the loss of GDP share and service sector employment such as FIRE indicate that the entire nation is weakening in global competitiveness as a result of the Northeast's lagging economy.[1]

Share of Total U.S. GDP (%)

	1990	2000	Rate of Change (%)
NE MegaRegion (Urban Core)	20.16	19.48	-3.36
All US Metro Areas	84.3	84.7	0.47

Source: U.S. Metro Economies, The Engines of America's Growth, U.S. Conference of Mayors, 2001

Nominal Gross Product, 2000 Rank ($ Billions, Current)

Rank		1990	2000	Annual Growth Rate (%)
1	United States	5,803	9,963	5.6
2	European Union 25	5,015	8,167	5.0
3	Japan	3,040	4,614	4.3
4	NE MegaRegion (Urban Core)	1,170	1,941	5.2
5	Germany	N/A	1,873	N/A
6	United Kingdom	827	1,410	5.5

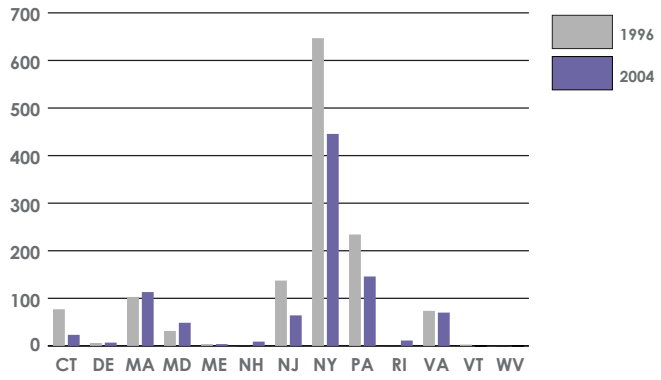
Source: U.S. Metro Economies, The Engines of America's Growth, U.S. Conference of Mayors, 2001; Economic History Services, www.eh.net; Japan Institute for Social and Economic Affairs, www.kkc-usa.org; United Nations Statistics Division, http://unstats.un.org

Gross Metro Product (GMP) Growth, US Metros (90-00)

National Rank	Metro Region	Annual Growth Rate
1	Las Vegas, NV-AZ	10.3
2	Austin-San Marcos, TX	9.8
229	Wichita Falls, TX	5.2
230	Burlington, VT	5.2
231	Milwaukee-Waukesha, WI	5.2
232	NE MegaRegion (Urban Core)	5.19
233	Huntsville, AL	5.1
234	Melbourne-Titusville-Palm Bay, FL	5.1

Source: U.S. Metro Economies, The Engines of America's Growth, U.S. Conference of Mayors, 2001

S & P 500 Employment Loss (Thousands)



Source: www.forbes.com

The hypothesis argues that competition on the global scale is primarily an urban phenomenon; that is, the strength of urban centers, such as New York, support the entire nation's global competitiveness. As a measure of global connectivity, these cities have concentrations of high-end export service industries such as FIRE. However, the Northeast has been losing out in these very industries, threatening the region's global connectivity. Between 1992 and 2002, the nation's FIRE employment grew at a 2.01 percent annual growth rate, while the Northeast lagged behind at a 1.25 percent annual growth rate, indicating a loss in global competitiveness for both the Northeast and the nation.

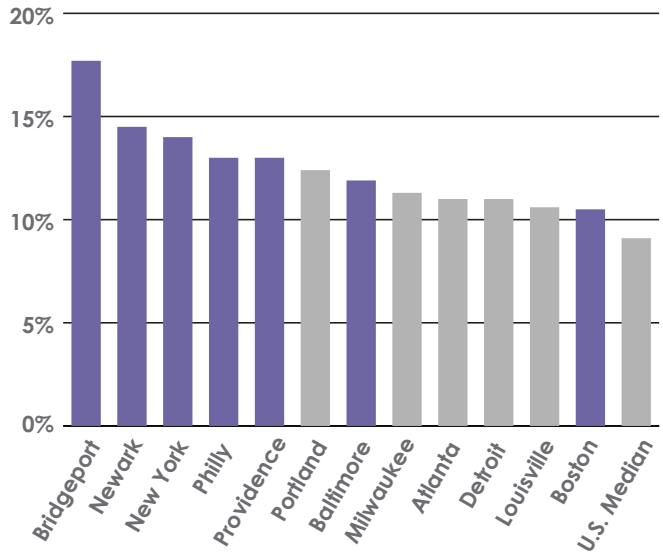
Third, the Northeast has seen a dramatic loss in Fortune 500 employment. In 1996, Fortune 500 companies employed 1.3 million people. In 2004, Fortune 500 companies employed only 941,000 people in the Northeast. This change over an eight-year period represents a 28.5 percent loss in the number of jobs. Connecticut, New York, New Jersey, and Pennsylvania suffered greatest in this employment loss.

High Tax Burdens

Last, the Northeast MegaRegion is plagued by high tax burdens for families in its major cities, as well as a low ratio of federal expenditures. The region's state and municipal tax burdens are far higher than national averages and the Northeast states pay tens of billions of dollars more in federal taxes than the region receives in federal spending.

For a family of four with an annual income of $75,000, 7 of the top 12 highest tax burdened cities in the U.S. are in the Northeast (Bridgeport, Newark, New York, Philadelphia, Providence, Baltimore, and Boston). For a family of four with an annual income of $150,000, 8 of the top 12 highest tax burdened cities are in this region (Bridgeport, New York, Newark, Providence, Philadelphia, Baltimore, Portland, ME and Washington, D.C.). Most important, the taxpayers in the Northeast MegaRegion subsidize most other states across the country. The state of New Jersey, for instance, has the lowest federal expenditure ratio in the country. The state receives 57 cents for every dollar paid to the federal government. Connecticut, Delaware, Massachusetts, New Hampshire, and New York are also big losers, receiving, on average, only 71 cents for every tax dollar paid. If the Northeast received a one-to-one ratio of federal expenditures to taxes paid, it would collect an additional $66.6 billion in federal funding.

Top 12 Tax Burdens ($75,000 Income, 2003)



Source: Distric of Columbia, "Tax Rates and Tax Burdens," 2004.

Federal Tax Expenditures per $1 (2004)

State	Return on $1 Tax
New Jersey	$0.57
New Hampshire	$0.64
Connecticut	$0.65
Massachusetts	$0.78
New York	$0.80
Delaware	$0.82
Rhode Island	$1.06
Pennsylvania	$1.08
Vermont	$1.14
Maryland	$1.34
Maine	$1.36
Virginia	$1.58
West Virgina	$1.82
District of Columbia	$6.59

Source: Federal Tax Burdens and Expenditures by State, 2004.

Threatened Environment and Quality of Life

off exit 12, new jersey turnpike

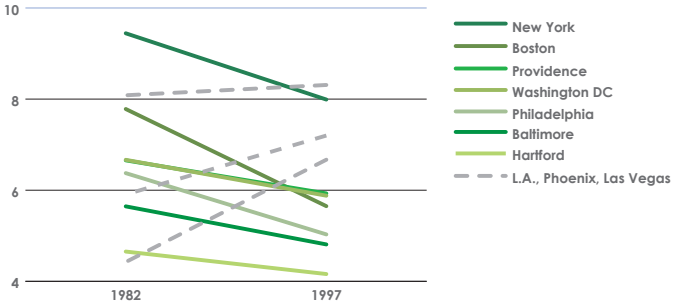
The Northeast MegaRegion benefits from abundant natural resources and environmental amenities. However, there are numerous challenges that must be addressed and overcome in order for the region to remain a sustainable, desirable, and competitive place in the future. Since green infrastructure takes centuries to regenerate, it is vital that the citizens and leaders of the Northeast MegaRegion plan for the maintenance of these resources.

Impacts of Sprawl

Sprawl, defined as a pattern of urban and metropolitan growth that is low-density, automobile-dependent, and located on the fringe of settled areas, is one of the most significant challenges facing the Northeast. Past trends and future projections show urbanization outpacing population growth. Between 1982 and 1997, the region's population increased by 7 percent, compared to a 39 percent expansion of urbanized land, resulting in a 23 percent decrease in overall density.[2] This trend shows that the common perception of a dense metropolitan Northeast and a sprawling, auto-dominated Southwest and West is no longer valid. Over the period from 1982 to 1997, all of the region's first- and second-tier urban areas became significantly less dense while many Western counterparts experienced the reverse trend. Nowhere is this contrast more pronounced than in Las Vegas and Phoenix, two cities commonly connected to sprawl, whose density surpassed all of the MegaRegion's metropolitan areas save New York. Even Los Angeles, the stereotypical auto-oriented city, had a density of 8.31 people per urbanized acre, 0.3 greater than New York.

These trends can also be projected into the future. If development patterns and the policies that guide them are left unchanged, between 2000 and 2050, the Northeast's population will increase by 40 percent while urbanized land will expand by 154 percent. These 40,339 additional square miles of developed land will account for 16 percent of the total land area of the MegaRegion, roughly the size of the state of Virginia.

Northeast Cities Sprawl While the West Densifies (Persons per Urbanized Acre)

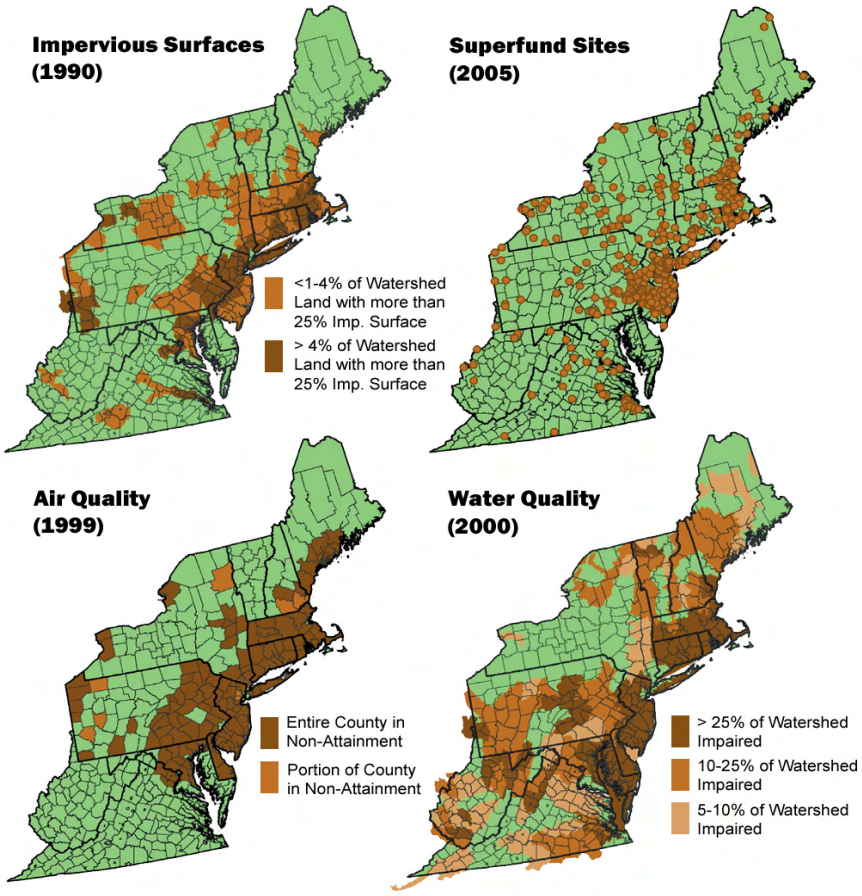


Source: Fulton, William, Rolf Pendal, Mai Nguyen, and Alicia Harrison. "Who Sprawls Most? How Growth Patterns Differ Across the U.S." The Brookings Institution: July 2001.

Frequently, farmland is located in the path of sprawl. Within the MegaRegion, approximately 198,000 acres of prime farmland are lost each year.[3] This is an area comparable to the size of New York City.[4] Specifically, there are five critical farming areas under threat from development pressures: the Connecticut River Valley, spanning Connecticut, Massachusetts, New Hampshire, and Vermont; Southeastern Massachusetts; central Pennsylvania; western New York and the Finger Lakes region; and large portions of eastern New York and southern New England.[5] Cumulatively, the effects of sprawl threaten the intrinsic quality of life in the Northeast MegaRegion and create a fragmented ecological habitat.

The legacy of the industrial revolution and fifty years of sprawl have left their marks on the Northeast MegaRegion. Vacant land and brownfields, which are abandoned industrial or commercial lands, can be found in many of the region's urban areas. However, new development typically occurs on undeveloped 'greenfield' or agricultural sites, leaving brownfield sites underused. According to The Brookings Institution, the Northeast region has the lowest amount of vacant land in the country but the highest number of abandoned structures. On average, 10 percent of an urbanized area is vacant and there are 7.47 vacant structures per 1000 inhabitants.[6] For example, in 2002, Baltimore and Philadelphia, two of the largest cities within the MegaRegion, had a combined total of 40,000 vacant houses and, an additional 43,000 vacant lots.[7]

Concentrated Pollution in the Northeast MegaRegion



Sources: Imp. Surfaces: US EPA, Urban Runoff Potential, www.epa.gov/iwi/1999sept/iv11_usmap.html; Superfund: Environmental Defense. Scorecard: the pollution information site, superfund, www.scorecard.org/env-releases/land; Air: Environmental Defense. Scorecard: the pollution information site, Smog and Particulates, www.scorecard.org/env-releases/cap, a non-attainment area is defined by the EPA as a locality where air pollution levels peristently exceed National Air Quality Standards, or that contributes to ambient air quality in a nearby area that fails to meet standards; Water: US EPA, Atlas of Polluted Waters, www.epa.gov/owow/tmdl/atlas.

Pollution

The Northeast MegaRegion faces major water, land, and air pollution problems. It has approximately 480 Superfund Sites, which are those areas characterized by hazardous waste and pollution and considered to be the most contaminated land in the nation.[8] This number represents 37 percent of all Superfund sites in the United States within only two percent of U.S. land area. Eighty percenty of the core counties are in air quality non-attainment. A problem partially created by high concentrations of auto use and industry along the corridor but also from point sources upwind in the Midwest.

The quality of the MegaRegion's water is critical to its survival. All of the region's inhabitants use it and need it. With the help of federal legislation, such as the Clean Water Act and the National Pollutant Discharge Elimination System (NPDES), water quality has improved over the last several decades. However, the Northeast continues to suffer from water pollution. Its surface and ground waters are polluted, leaving water unsafe for drinking, fishing, and swimming, destroying aquatic and terrestrial habitats, and diminishing the aesthetic appeal of streams and landscapes.

Continued sprawling development could result in a 155 percent increase in impervious surfaces - an additional 18,000 square miles.[9] Nationwide, impervious surfaces, defined as 'constructed surfaces,' i.e., rooftops, sidewalks, roads, and parking lots that are covered by such impenetrable materials such as asphalt, concrete, or stone, cover 5,500 square miles more than all of the wetlands in the United States combined. Stormwater runs off of impervious surfaces or chemically treated agricultural land and picks up contaminants along its way. These contaminants, in turn, contribute to the region's poor water quality. Watersheds, river basins, and rivers flow across city and county lines and state borders. Unfortunately, contaminants also flow across these political boundaries. Because millions of people rely on the MegaRegion's water resources for their drinking water, it is critical that its quality is not jeopardized.

15 million people, approximately 5 percent of the United States' population, count on the Delaware River for their water, 7 million people of whom live in New York City and northern New Jersey.[10] The river flows through four states and supplies water to two major cities: New York City and Philadelphia. Yet the Delaware River Basin faces many water quality issues, including a high concentration of contaminants stemming from urbanized areas. Much of the land in the river basin continues to be under intense development pressure. The headwaters in the Catskill Mountains are protected. However, other sections of the river may be exposed to further degradation from pollution.[11]

The Housatonic River, flowing through western Massachusetts and Connecticut, near Bridgeport and New Haven, has some of the highest concentrations of PCBs (polychlorinated biphenyls) in the nation.[12] Furthermore, in the Delmarva Peninsula there are agricultural and urban runoff problems. While 50 percent of the land on the Peninsula is traditionally used for agriculture, large increases in population near Atlantic Coast resorts and around Wilmington, Delaware have led to a higher percentage of urbanized land area.[13]

One of the MegaRegion's most important natural resources, the Chesapeake Bay, is also at risk. Its northern portion is fed by the Susquehanna River, identified in 2005 as the nation's most threatened river.[14] From 1990 to 2000, impervious surface in the Chesapeake watershed increased by 250,000 acres. This is equivalent to covering an area five times the size of Washington, D.C., or more than twice the size of Shenandoah National Park with pavement.[15]

The Northeast MegaRegion faces daunting environmental challenges. However, there are also great opportunities for the region to protect and preserve its remaining natural resources. Sustainable, more compact growth patterns and transit-oriented development can help shape the form of development. Additionally, the potential exists to create a permanent greenbelt along the MegaRegion's Appalachian Highlands and Atlantic coastline to protect and preserve the region's natural resources. Vacant land, located in the region's urban centers, can provide space for infill development and help revitalize struggling inner cities.

Increasing Congestion and Deteriorating Infrastructure

I-76, philadelphia

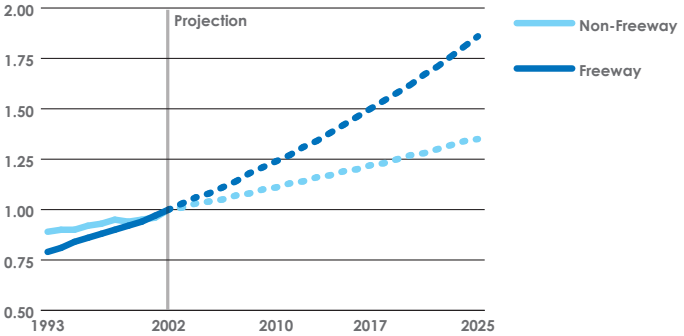
The Northeast MegaRegion has the nation's oldest infrastructure system. Many of these facilities are outmoded, overcrowded, and in need of repair, replacement, and expansion. As a result, most of the MegaRegion faces growing congestion and delays that undercut its quality of life and economic potential. The region can no longer provide for the capacity needed to move current and anticipated volumes of passengers and freight internally within the region. In addition, the Northeast must strengthen its external connections to the rest of the world.

Highway Congestion

While congestion represents a failure of the entire transportation network, nowhere is it more apparent than on the region's roadways. The MegaRegion loses $13.8 billion in congestion costs, 1.3 billion gallons of gas, and 772,000 hours in traffic annually on its roadways.

Forecasts of highway traffic, based on the trend between 1993 and 2002, indicate that the MegaRegion's highways and interstates will experience a steep increase in traffic.[16] Extrapolation of this trend shows that projected traffic volume on highways will escalate 86 percent between 2002 and 2025. If freeway capacity cannot accommodate this new volume, some of the traffic will be forced onto local arterials and collector roads, congesting these networks, increasing travel time, and leading to significant economic and environmental loss.

Growth of VMT in NE MegaRegion (Index, 2002 = 1.0)



Source: Estimated from Highway Stats, FHWA.

An analysis of the MegaRegion's largest cities, New York, Philadelphia, Washington, D.C., Boston, and Baltimore, demonstrates that congestion within urban areas is also expected to increase. The Texas Transportation Institute reports a Travel Time Index for all major urban centers in the United States. A score of 1.00 represents free-flowing traffic, while any increase above 1.00 represents that percentage increase in time. For example, a score of 1.20 corresponds to a 20 percent longer travel time. In 2002, New York, Washington, D.C., and Boston were above the national average of 1.37. While Philadelphia and Baltimore are slightly below the national average, these cities' freeway miles are projected to increase at a faster rate than the other three cities. This suggests a saturation point

Travel Time Index, Peak Periods (1982-2002)

Urban Area	1982	1992	2002
National Average	1.12	1.28	1.37
Washington DC-VA-MD	1.18	1.37	1.50
Boston MA-NH-RI	1.14	1.29	1.45
New York-Newark NY-NJ-CT	1.13	1.27	1.40
Philadelphia PA-NJ-DE-MD	1.13	1.22	1.35
Baltimore MD	1.07	1.19	1.36

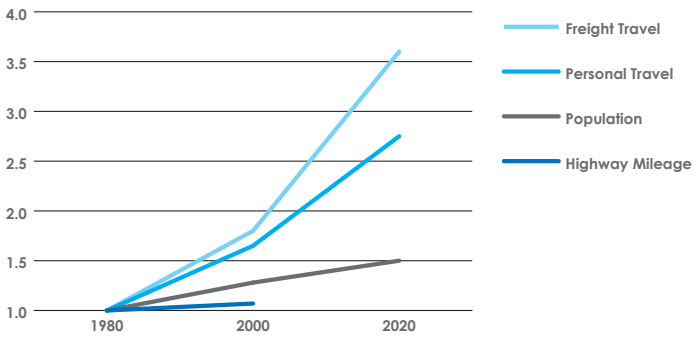
Source: Texas Transportation Institute

Ratio of Vehicle Miles in 2025 (2002 = 1.00)

Area	Freeway	Non Freeway
NE MegaRegion (Urban Core)	1.86	1.35
New York	1.63	1.44
Philadelphia	2.02	1.08
Washington	1.46	1.28
Boston	1.46	1.25
Baltimore	2.25	1.20

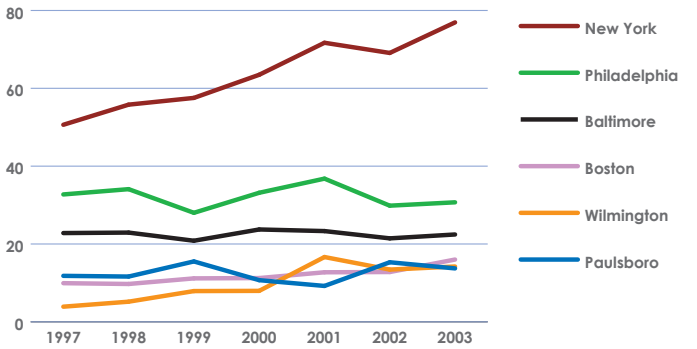
Source: Estimated from Highway Stats, FHWA.

Travel Projections, 1980-2020



Source: U.S. DOT.

U.S. Waterborne Foreign Trade (millions of metric tons)



Source: U.S. DOT.

elizabeth, nj

where the increased travel congestion will deter people from making trips. If other alternatives, such as public transportation, are provided as feasible options, these modes will satisfy the additional demand with lower environmental impacts.

Roadway congestion not only affects auto passengers but trucking freight as well. USDOT anticipates that truck traffic volume will increase faster than passenger traffic. Freight volume doubled between 1975 and 1995 and national projections predict it to double again by 2025.[17] This is of concern because a majority of freight is moved through the MegaRegion by trucks. Thus, increased congestion in freight movement will result in significant economic loss in the Northeast MegaRegion.

Maritime Freight

The study area includes six of the 25 largest ports in the nation: New York; Philadelphia; Baltimore; Boston; Wilmington; and Paulsboro. With the exception of New York, the largest port in the Northeast and second in the nation to Houston in metric tons of waterborne foreign trade, maritime freight at the MegaRegion's ports is stagnant. A primary reason for these ports' underperformance is that they cannot provide for the current trend of increasing vessel size, thereby making it difficult to improve efficiency. Additionally, the region's ports are not successfully connected to other delivery modes, causing freight containers to be stuck in-port and damaging the MegaRegion's economic competitiveness.

Inadequate Rail Network

The Northeast's rail network is failing due to a lack of investment in adequate infrastructure and low utilization, the product of chronic under-investment which consequently results in a low level of service. This applies to both inter-city rail (Amtrak) and urban rail systems. Although rail transit is one of the greatest assets to the MegaRegion, it is still inadequate when measured against the rest of the world. A comparison of the Northeast's urban rail systems (subway, regional, and light) to other world systems demonstrates this insufficiency. London's ridership per capita is more than double Philadelphia, Washington D.C., and Boston. Tokyo demonstrates a similar phenomenon. While Tokyo's population is only twice New York's, Tokyo's ridership is three times New York's. The superiority of international urban rail systems over those in the Northeast is the result of lower population densities and over-utilization of highways, producing low transit utilization and less urban rail miles traveled. These failures bring highway congestion, economic losses, and a diminished quality of life to the MegaRegion.

Amtrak faces similar challenges to the urban rail systems. Ridership has been increasing only at very low rates since 1980 as a result of chronic disinvestment in the rail corridor's basic systems and cross-subsidies out of the Northeast Corridor to Amtrak's long-distance services. The consequences of these actions have been a number of disincentives contributing to low ridership including overpriced fares, slow travel

Amtrak Annual Ridership: Top 20 Station Pairs in NE MegaRegion

Station Pair	Riders
New York - Philadelphia	1,642,587
New York - Washington D.C.	1,293,296
Philadelphia - Washington D.C.	667,515
New York - Albany	511,761
New York - Boston	469,023
New York - Baltimore	355,289
New York - Wilmington	332,640
Philadelphia - Newark	165,697
New York - Providence	163,534
Washington D.C. - Newark	149,475
Washington D.C. - Metropark	144,315
Washington D.C. - Wilmington	142,400
Philadelphia - Baltimore	137,853
Washington D.C. - Trenton	102,746
Philadelphia - Harrisburg	97,201
New York - New Haven	82,738
Philadelphia - Boston	75,340
Washington D.C. - Boston	71,794
Metropark - Philadelphia	67,902
New York - Hartford	62,264

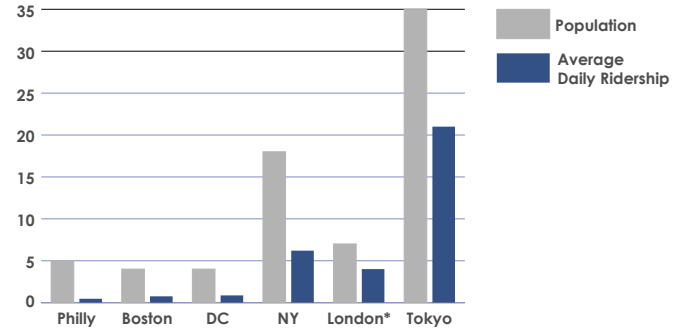
Source: RPA

union station, d.c.

times, and inefficient scheduling. Additionally, slow speeds and aging infrastructure and technology have kept Amtrak behind foreign high-speed systems such as France's TGV or Japan's Shinkansen systems.

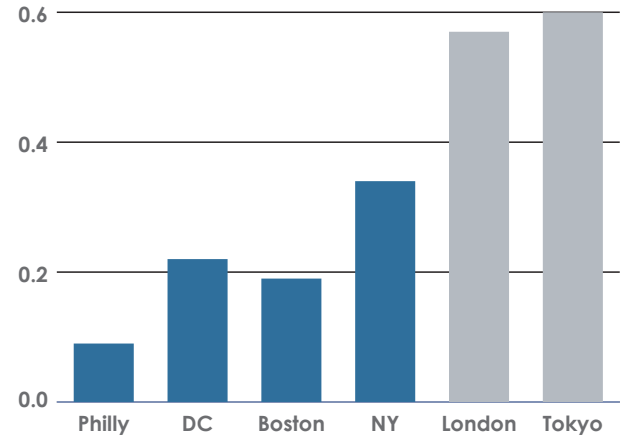
Acela, classified as the higher speed rail in the Northeast, currently runs from Boston to Washington, D.C. at an average speed of 71 miles per hour. However, slower speeds during specific portions of the route affect the overall travel time and speed for the entire system. For example, Acela travels at an average speed of 81 mph from New York to D.C. but only 69 mph from New York to Boston. Fewer available tracks and archaic and unreliable power systems between New Haven and New York cause significant delays which cause the train to run only at 54 mph. These

Population in Relation to Avg. Daily Ridership (mil.)



Source: American Public Transportation Authority transit ridership report; Metropolitan Transportation Authority; Transport for London; Washington Metropolitan Area Transit Authority; Massachusetts Bay Transportation Authority; City Mayors, www.citymayors.com/features/urban_areas1.html; United Nations Information Service. *London's population may be underestimated.

Weekday Rail Trips per Capita (Daily)



Source: American Public Transportation Authority transit ridership report; Metropolitan Transportation Authority; Transport for London; Washington Metropolitan Area Transit Authority; Massachusetts Bay Transportation Authority; City Mayors, www.citymayors.com/features/urban_areas1.html; United Nations Information Service

figures pale in comparison to the Shinkansen or TGV. The Shinkansen averages 152 mph between Tokyo and Fukuoka and the TGV averages 162 mph between Paris and Marseille, nearly double that of the Acela.

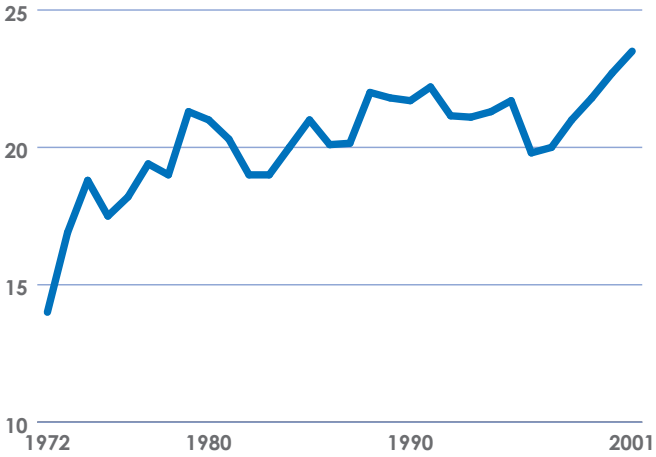
A significant reason for the Acela's low ridership is that the train is not fast enough to attract travelers for medium distances between 100 to 500 miles. The slow speeds and high-priced fares have given people little choice but to use highway modes for shorter trips and air for longer distances, ultimately reducing demand for Amtrak and leaving both highways and airports congested.

An analysis of originations and destinations shows that Amtrak does not effectively match offered capacity with ridership demand. For the top 20 ridership station pairs, New York, Washington, D.C., and Philadelphia carry the highest number. Unfortunately, Amtrak does not offer sufficient capacity for these cities in the peak hours. Instead, many trips are focused at very long distances or between station pairs that have low ridership demand.

A final obstacle is a lack of funding and political support. If Amtrak could garner more political support, public officials would then have the capacity to push for improvements, a necessary process if the Northeast is to create a modern inter-city rail system. To do so, the federal government must look beyond the Northeast rail corridor's current diminished role as a transportation link and towards its potential contributions to the region's economy and quality of life. A world-class high-speed - or even more

south station, boston

Amtrak Annual Ridership in U.S. (millions)



Source: Amtrak Reform Council.

reliable, well-priced and scheduled higher-speed inter-city rail service - could provide a broad range of benefits to the economy, infrastructure and quality of life of the Northeast. It could:

- Create enormous new synergies between the urban centers of the Northeast, potentially adding tens of billions of dollars of economic value to the region's economy;
- Reduce congestion on I-95 and other highways, and reduce congestion at major airports;
- Promote redevelopment of center city areas in larger and second-tier cities, creating billions of dollars in new real estate values; and
- Reduce sprawl and air pollution throughout the Northeast.

Air Congestion

Air travel serves the MegaRegion by connecting it to other regions in the United States as well as to other countries. Unfortunately, the ability to compete domestically or internationally is threatened when airports are functioning over capacity. While there is no substitute for air travel for trips greater than 500 miles, trips under this optimal length, classified as "short-range", typically lead to airport congestion and overcapacity. At JFK Airport in New York, 60 percent of domestic departures are short-range.[18]

Even when accounting for currently scheduled improvements to major airports, the Federal Aviation Administration (FAA) projects that many will still be over capacity by 2020. Around the New York metro area these airports include LaGuardia, Islip, Newark, Providence, and Bradley. New airlines coming onto the market who offer low-cost, regional flights, are merely adding to the problem of airport congestion.

Regional air travel is both economically inefficient and environmentally wasteful. Intercity rail is 45 percent more energy-efficient than domestic commercial airline service and 76 percent more energy-efficient than general aviation.[19] While the FAA is concerned about this growing trend of regional and low-cost air carriers, their combined enplanements are up 40 percent from 2000 to 2003, increasing their share of the market from 30 to 43 percent. These shorter flights generally utilize smaller aircrafts, adding to congestion because they carry fewer passengers per flight and now represent 37 percent of all commercial traffic at the nation's airports.[20] Further compounding the problem, these smaller carriers' lower ticket prices result in less tax revenues to the Federal Aviation Trust Fund. The MegaRegion would be better served if it focuses the air industry solely on trips greater than 500 miles by offering competitive alternative modes for short-range trips. Transforming the Northeast rail corridor into a world-class high-speed rail system, or even a more reliable, better scheduled and more fairly priced higher-speed system would represent an important first step towards this goal.

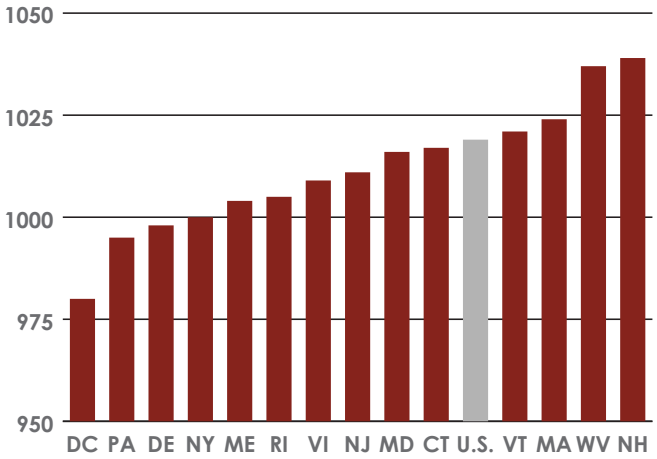
Growing Economic and Social Disparity


philadelphia

The Northeast MegaRegion is an economic powerhouse, employing tens of millions of its residents in a range of high-level professions. Its world-class universities provide residents with choice and proximity when seeking higher educational opportunities and attract large numbers of highly skilled people to the region. Despite these strengths, however, the region has growing racial and social disparities that limit economic opportunities for many of its communities and residents, undercutting the economic competitiveness and quality of life of the whole Northeast.

Meeting this challenge will require that growing economic and social segregation be addressed with a focus on the following: low educational attainment, high unemployment, lack of affordable housing, and high concentrations of poverty. These concerns are highly concentrated in inner-city neighborhoods, inner-ring suburbs, and a number of second-tier cities, and must be tackled.

State Average SAT Scores



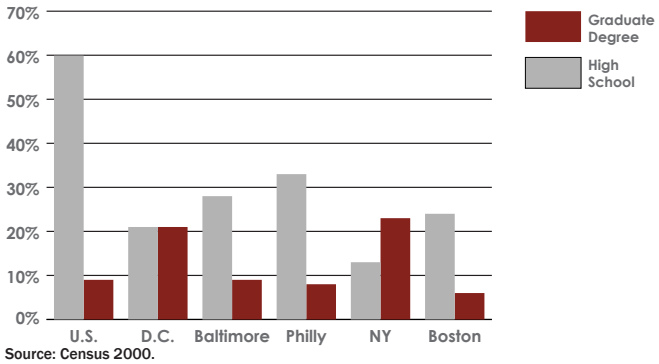
Source: National Center for Education Statistics.

Education

The Northeast MegaRegion is home to some of the country's most acclaimed educational institutions, including all eight Ivy League institutions, and an extensive network of elite private colleges and universities. In addition, its high schools produce some of the nation's top test scores. The Northeast does exceed the national average in some areas. For example, 81.56 percent of the region's population 25-years and over has a high school degree compared with 59.91 percent nationally. High school students in four out of the fourteen states in the region also rose above the national SAT average for 1999-2000.

Although a high concentration of highly educated people reside along the spine of the corridor in the major metro-regions, the core cities in the

Gaps in Educational Attainment in Core Cities



Source: Census 2000.

spine exhibit wide gaps in educational attainment. With the exception of Washington, D.C., there are large disparities in the percentage of people with graduate degrees and the percentage of people with high school degrees in the remaining four major cities – Boston, New York City, Philadelphia, and Baltimore. And, in comparison with the national average, the Northeast's five major cities have only half to one-third the amount of people with both high school and graduate levels of educational attainment. Even with the high concentration of major institutions of higher learning exhibited in the Northeast, when comparing attainment levels for the entire Northeast MegaRegion to U.S. attainment levels, the region's percentage of persons with college and graduate degrees falls below nationwide percentages. An education strategy pursued at the mega-regional scale could help coordinate resources to equalize attainment levels and provide a stronger future labor force for the region as a whole.

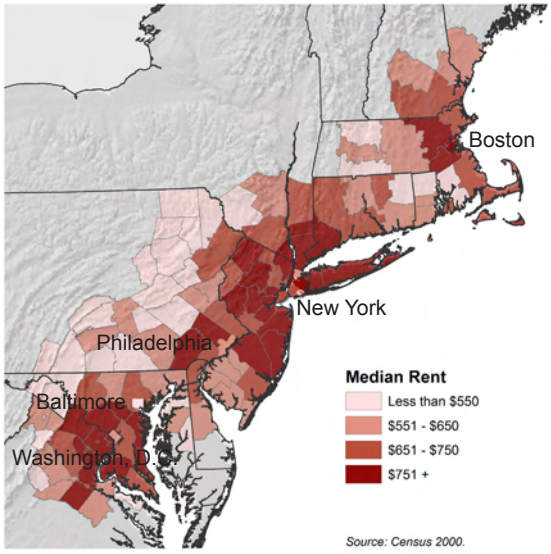
Unemployment

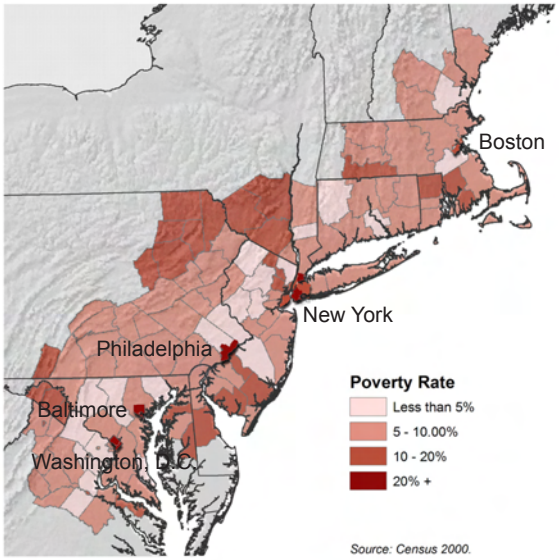
Unemployment within the region ranges from 2 percent to 14.3 percent, while the national unemployment rate in 2000 was 4 percent, evidence that many residents of the region face significant employment hurdles.[21] The core areas of major cities face a particularly difficult challenge to provide jobs for their residents, as evidenced when reviewing unemployment patterns in the region. However, unemployment persists throughout the region, reflecting a universal need for quality education and access to jobs.

Housing

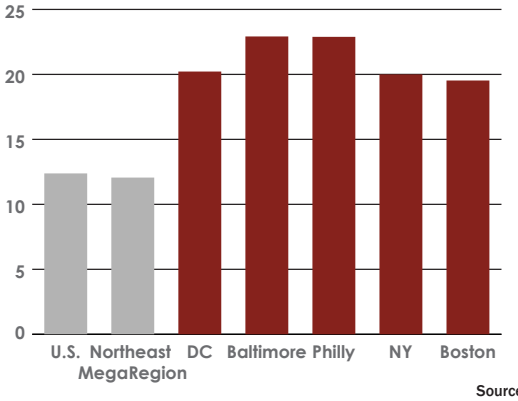
Growing out of urban centers, it is becoming increasingly difficult to find affordable housing. Increased housing demand in the more successful metropolitan areas of Washington, D.C., New York City, and Boston are outpacing their ability to provide affordable housing, resulting in an extraordinary run-up in housing prices in these metro areas. New housing is concentrated in the periphery of major cities while inner-city areas possess high rates of vacant land near existing infrastructure. Housing costs will rise with the costs of living and doing business in urban areas, but not all urban residents can afford decent housing or care for older homes. If these patterns of affordability persist, particularly patterns of high rents in the major cities, these areas will become less attractive to young professionals and the region will find it more difficult to attract a skilled labor force. These trends also encourage sprawl, particularly the willingness of companies to follow their workforce to outlying areas at the fringe.

There is also a disadvantaged portion of the population that is concentrated in the urban cores of major cities, inner-ring suburbs, and in second-tier cities. High concentrations of low-income minorities and immigrants exist where educational attainment is low, unemployment high, and where a shortage of affordable housing exists. Many of these residents are facing these issues in isolation from the rest of the region. An overall strategy must also include ways to integrate the population and provide access to opportunities for segregated communities.





Pockets of High Poverty Rates in Northeast MegaRegion



Source: Census 2000.

Poverty

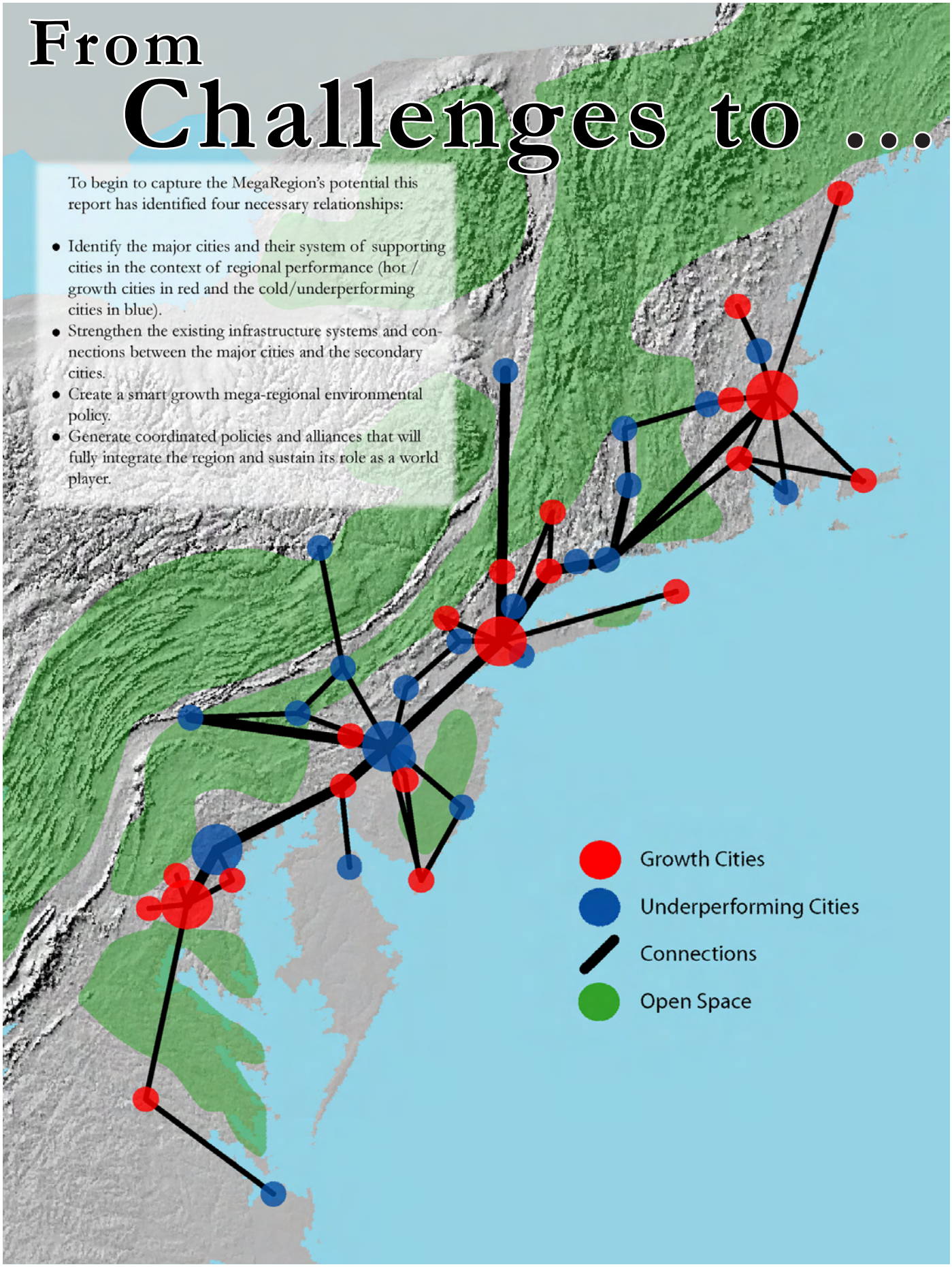
The Northeast MegaRegion's urban communities possess rates of poverty more than double the U.S. average. As a result, the region houses some of the country's worst examples of uneven distribution of wealth. For example, Camden, New Jersey, a city with a median income of $23,421 in 2000 is just a twelve minute drive from Cherry Hill, a Camden suburb whose reported median income in the same census was $69,421. In the 2000 census, 10.9 percent of the Northeast MegaRegion's population reported an income below the poverty level. This group represents 2.7 percent of the 2000 U.S. population. From the region's five major cities to its smaller cities poverty exists in pockets. However, more uneven distribution of poverty exists for children throughout the region. The existence of children living below the poverty level in outer-lying areas within metro-regions raises concerns about local tax capacity. Myron Orfield has analyzed the tax structure of many of the region's metropolitan areas and the percentage of students eligible for free lunch programs.[22] His research concludes that the Northeast's existing decentralized tax system, in which municipal services and schools are financed largely by local property taxes, puts poor urban and inner-ring suburban communities at an untenable disadvantage compared with wealthy outer suburban communities

The growing concentrations of poverty and growing racial and social isolation of many urban and inner-ring suburban communities and their residents requires that the states take action to reform tax systems and take steps to bring these communities back into the Northeast's economic and social mainstream. By developing a larger regional strategy to combat these patterns, the region could improve the economic potential and quality of life of the entire MegaRegion.

From Challenges to ...

To begin to capture the MegaRegion's potential this report has identified four necessary relationships:

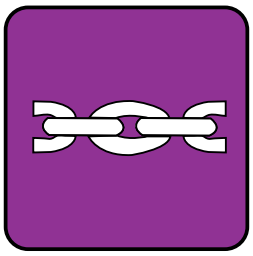
- Identify the major cities and their system of supporting cities in the context of regional performance (hot / growth cities in red and the cold/underperforming cities in blue).
- Strengthen the existing infrastructure systems and connections between the major cities and the secondary cities.
- Create a smart growth mega-regional environmental policy.
- Generate coordinated policies and alliances that will fully integrate the region and sustain its role as a world player.



VISION

If overlooked, these challenges **jeopardize** the economic prospects and future livability of the Northeast MegaRegion. While changing the trends behind these challenges will be difficult, it can be done if the Northeast mobilizes to a new level of **collaboration and action.** Through new forms of cooperation between the Northeast's states and metropolitan areas, the MegaRegion can address common threats and capitalize on mutual assets. The goals outlined below set forth a strategy to improve the **quality of life** and economic potential of the whole region while preserving local identity. Along with their corresponding strategies, these goals improve mobility and accessibility, strengthen economic networks, and protect natural resources to **maximize** the region's ability to compete in national and global markets.

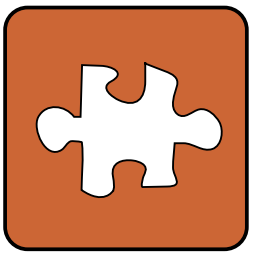
GOALS



Strengthen the competitiveness of the Northeast by creating synergies between its metropolitan areas.

Protect and restore the region's environmental quality and preserve its natural resources.

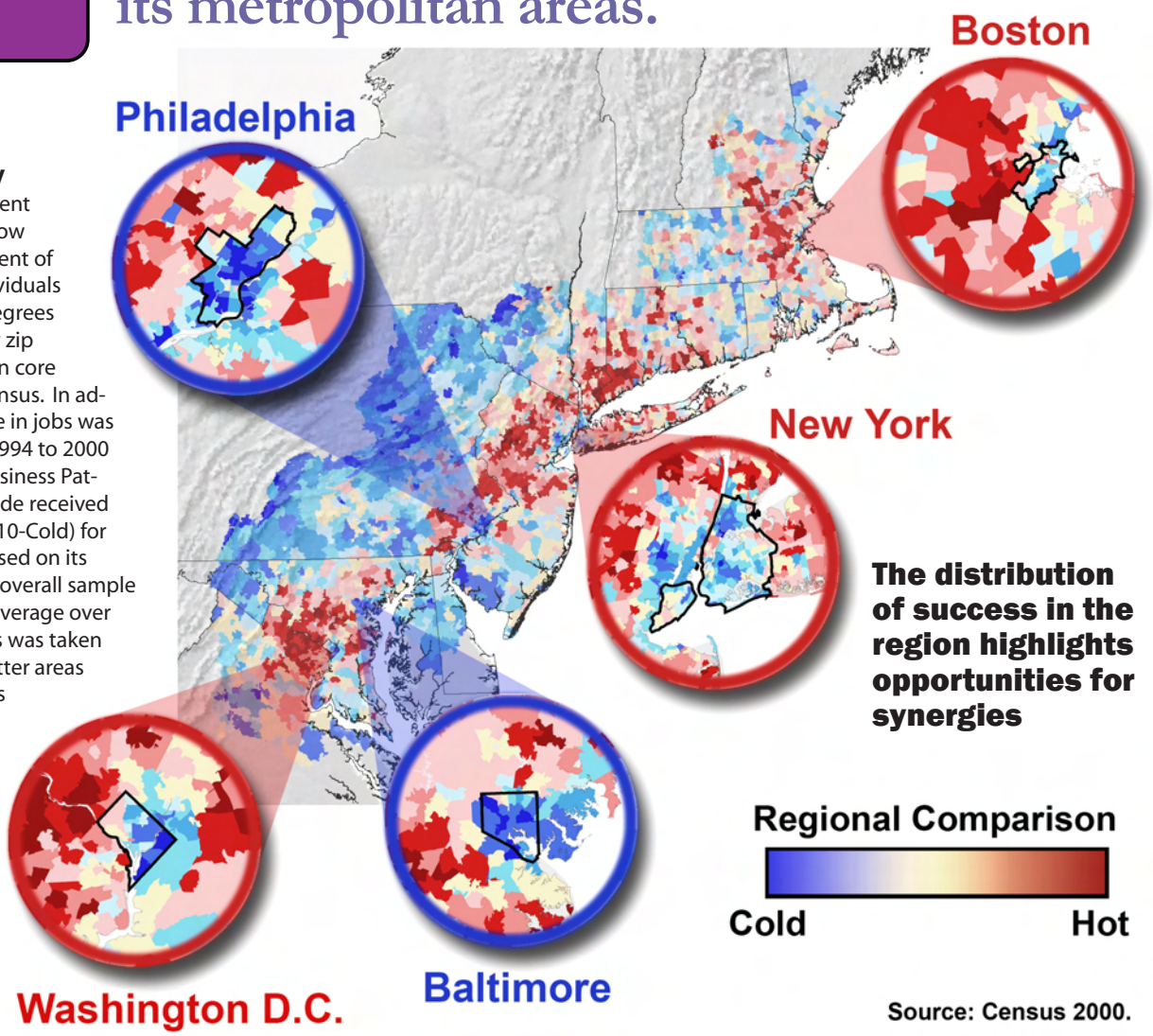
Build a world-class intermodal transportation network that improves mobility and accessibility



Mobilize key government, civic, and business leaders to promote strategies.

Strengthen the competitiveness of the Northeast by creating synergies between its metropolitan areas.

Methodology
Median rent, percent of individuals below poverty, and percent of 25 and older individuals with advanced degrees were collected by zip code for the urban core from the 2000 Census. In addition, the change in jobs was calculated from 1994 to 2000 from Zip Code Business Patterns. Each zip code received a ranking (1-Hot, 10-Cold) for each indicator based on its placement in the overall sample distribution. An average over all four categories was taken indicating the hotter areas with low numbers and cold with larger numbers.



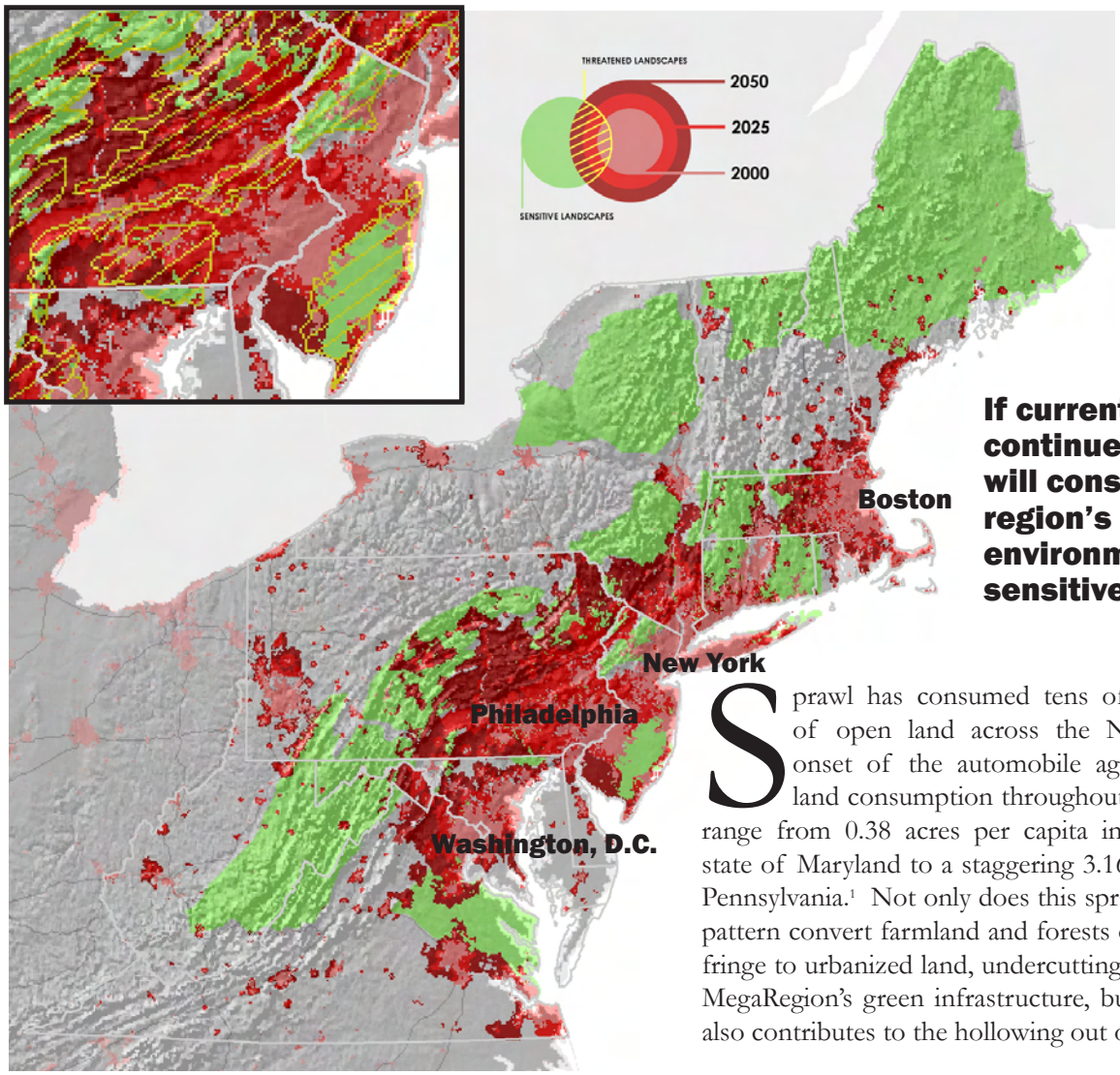
The distribution of success in the region highlights opportunities for synergies

Source: Census 2000.

Recent economic trends in the Northeast MegaRegion have resulted in "hot" and "cold" places – areas that have experienced considerable growth and development, contrasted with other areas defined by decline or stagnation. Several indicators can distinguish the economic "temperature" of these places; for example, poverty rates, educational attainment of residents, employment growth over time, and median rent.

A number of the Northeast's "hottest" areas, including the Boston, New York and Washington, D.C. metropolitan areas, are now suffering from congestion and rising residential and commercial prices. At the same time, "cold" areas, including the Philadelphia and Baltimore regions and a number of smaller cities and towns, have lost residents and jobs, but have both the capacity and political will to accommodate additional growth. This creates the opportunity to attract a larger share of the Northeast's growth to "cold" areas through improved transportation links between "hot" and "cold" places and targeted investments in quality of life, housing, education, and other activities. This new investment will provide underperforming areas with an opportunity to develop underutilized land, improve access to jobs, and offer affordable housing. Not only will these improvements turn "colder" areas warm, but they will also relieve the pressure on "hotter" areas of the region where growth may compromise future attractiveness and livability.

Protect and restore the region's environmental quality and preserve its natural resources.



If current trends continue, sprawl will consume the region's most environmentally sensitive land.

Sprawl has consumed tens of millions of acres of open land across the Northeast since the onset of the automobile age. Trend rates of land consumption throughout the fourteen states range from 0.38 acres per capita in the smart growth state of Maryland to a staggering 3.16 acres per capita in Pennsylvania.[1] Not only does this sprawling development pattern convert farmland and forests on the metropolitan fringe to urbanized land, undercutting the integrity of the MegaRegion's green infrastructure, but this development also contributes to the hollowing out of existing centers.

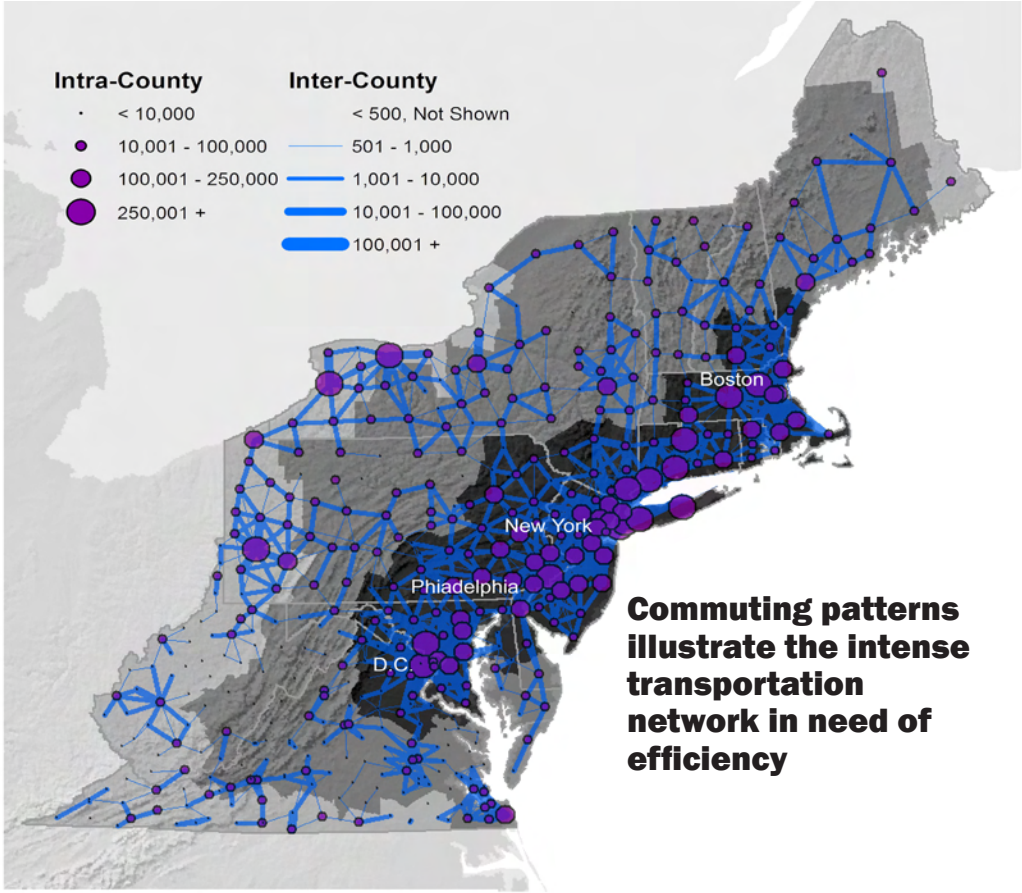
The region's most sensitive landscapes have been identified and mapped based on a series of environmental and quality of life criteria. Large swaths of these ecological and recreational zones lie in the direct path of projected development to 2025 and 2050. Regional, state, and local policies should be developed that reflect the finite nature of these resources with the goal of preserving the character and environmental quality of the natural zones of the MegaRegion. In doing so, growth can be directed away from greenfields and towards the underutilized and bypassed urban and suburban areas. This process will strengthen the identity and sense of place of the whole Northeast.

Methodology

The growth projections were based on Woods and Poole population forecasts to 2025, projected out to 2050, and land consumption rates per capita for each state based on 1982 to 1997 trends. A raster cost field was created composed of 100 acre cells, each assigned a value of impedance depending on presence of existing urbanization, water, federally or state protected land, and proximity to existing centers and transportation infrastructure. The closest possible amount of cells corresponding to the acres of consumption for each county for 2025 and 2050 were chosen and exported as the growth projection shapefile. Where a county was built out in either projection period, spatial growth was shifted to adjacent counties to accommodate for the actual total growth. State lines were always respected so as to not affect land consumption rates particular to each state.

Build a world-class intermodal transportation network that improves mobility and accessibility

The Northeast has America's oldest transportation infrastructure. The capacity of these systems has been largely expended, while decades of disinvestment have transformed this former regional asset into a liability. Congestion plagues the region's highways, airports, and seaports. Strategic investments in the transportation network will expand capacity for growth in the 21st century, strengthen the Northeast's economic prospects, provide important environmental benefits, and improve the region's quality of life. The transformation of the Northeast's transportation system into a truly multi-modal network will alleviate congestion, increase transit ridership, accelerate the movement of goods, and improve the efficiency of transportation operations throughout the region.

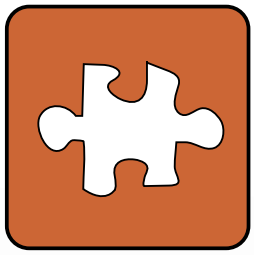


Commuting patterns illustrate the intense transportation network in need of efficiency

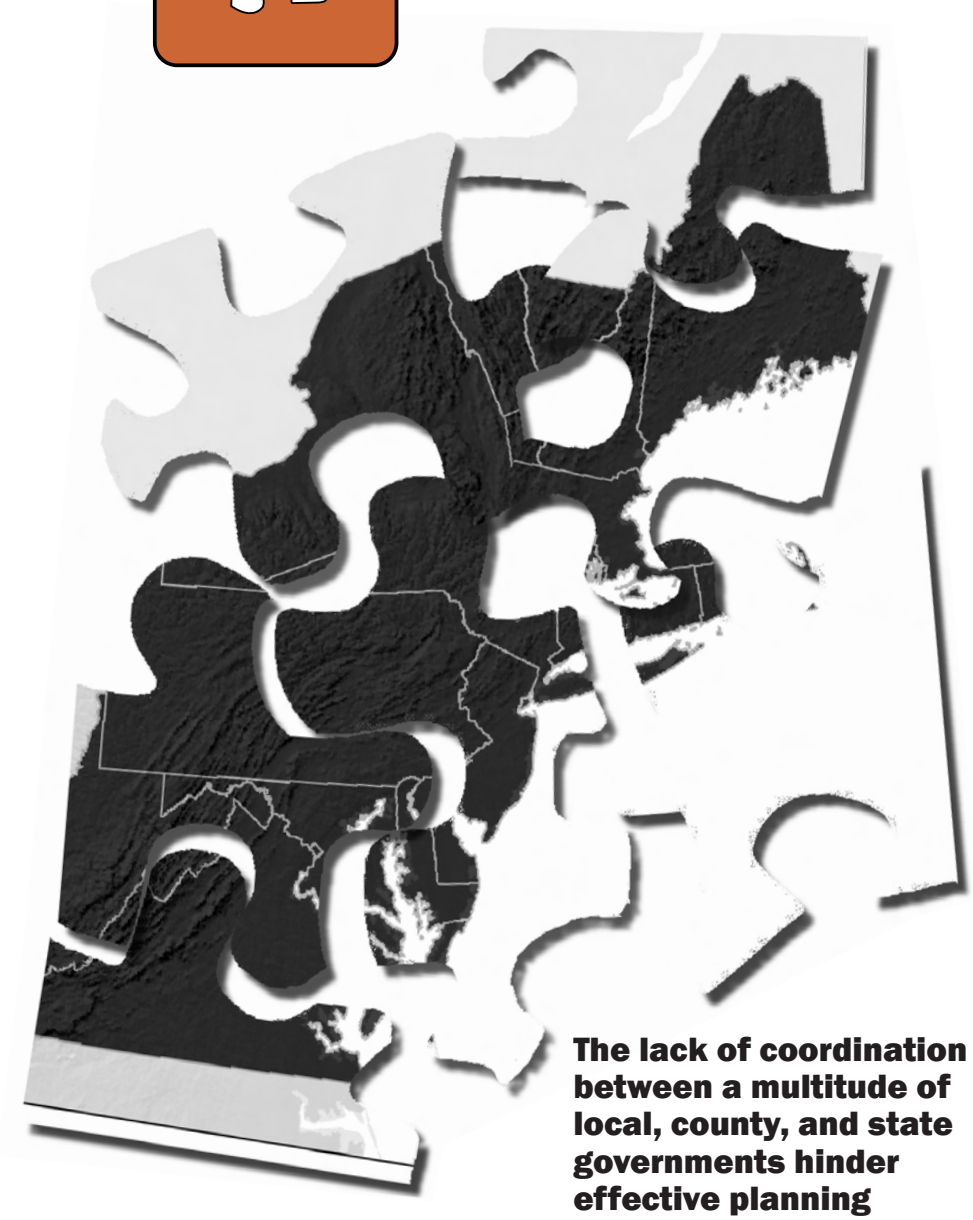
Source: U.S. Census County-to-County Work Flows, 2000.

Economic competitors in European and Asian MegaRegions are investing in similar, new multi-modal transportation systems. At the heart of these systems are new high-speed rail networks which provide fast inter-city connections for trips between 100 and 400 miles. High-speed rail can integrate formerly isolated metropolitan economies and promote new development in formerly "cold" places. Additionally, high-speed rail can reduce commuter congestion on highways and at airports, providing a broad range of economic and mobility benefits. The key to the success of these systems, however, is their integration with both other modes of transportation, including airports, urban rail and highways, and with urban development patterns, such as the clustering of major employment centers around high speed rail stations.

An interim step towards creating a world-class high-speed rail system in the Northeast will be to improve its existing inter-city rail system. By increasing the level of service, performance, and management, rail systems can reduce fares and attract new riders that would not usually travel by rail. This would alleviate congestion by taking many cars off of highways. Finally, Intelligent Transportation Systems (ITS) and Transit Demand Management (TDM) will improve the conditions on roadways in the Northeast. Comprehensive strategies and competitive policy alternatives will not only create a balanced and integrated transportation network, but will also improve the quality of life within both the cities themselves and the region as a whole.



Mobilize key government, civic, and business leaders to promote strategies.



The lack of coordination between a multitude of local, county, and state governments hinder effective planning

The Northeast MegaRegion has an exceptionally fragmented governance system, encompassing fourteen states, 405 counties, several thousand cities and towns, and an even larger number of special service and tax districts. To achieve regional goals, an improved governance framework is needed in which political, civic, and business leaders can work together. This framework could take shape in several ways: a mandate from the federal government that the region works together; a bottom-up initiative led by civic or business leaders; or a middle ground where partnerships are formed between states and regions, encouraged by federal incentives.

Regional leaders must convene government, business, and civic stakeholders to discuss and debate a vision for the Northeast. They must initiate a public education campaign to foster an understanding of the threats and opportunities facing the region. A regional capital investment budget can be created, incorporating both existing and proposed public and private investments. The fourteen state governors should be marshaled to work together to advance the region's vision. Lastly, the Northeast Congressional delegation, which represents nearly one quarter of Congress, should work to secure legislation and funding to advance the strategies of the region.

From goals to strategies...

Strategy:

Preserve Open Space and Green Infrastructure

Although the northeastern United States is characterized by its urban amenities and large centers, it also boasts a wide variety of open spaces. The region's green infrastructure is composed of all undeveloped land that has not been substantially altered by human activity, consisting of agricultural land, forests, shorelands, and water bodies.[2] This finite resource supports our environmental attributes and quality of life. From the farm fields of Lancaster, Pennsylvania to the forests of Maine; from the Appalachian Highlands in New York to the coasts of Cape Cod and the Chesapeake Bay; the Northeast MegaRegion depends on its extraordinary network of environmental resources for its livability, water, and food supplies.

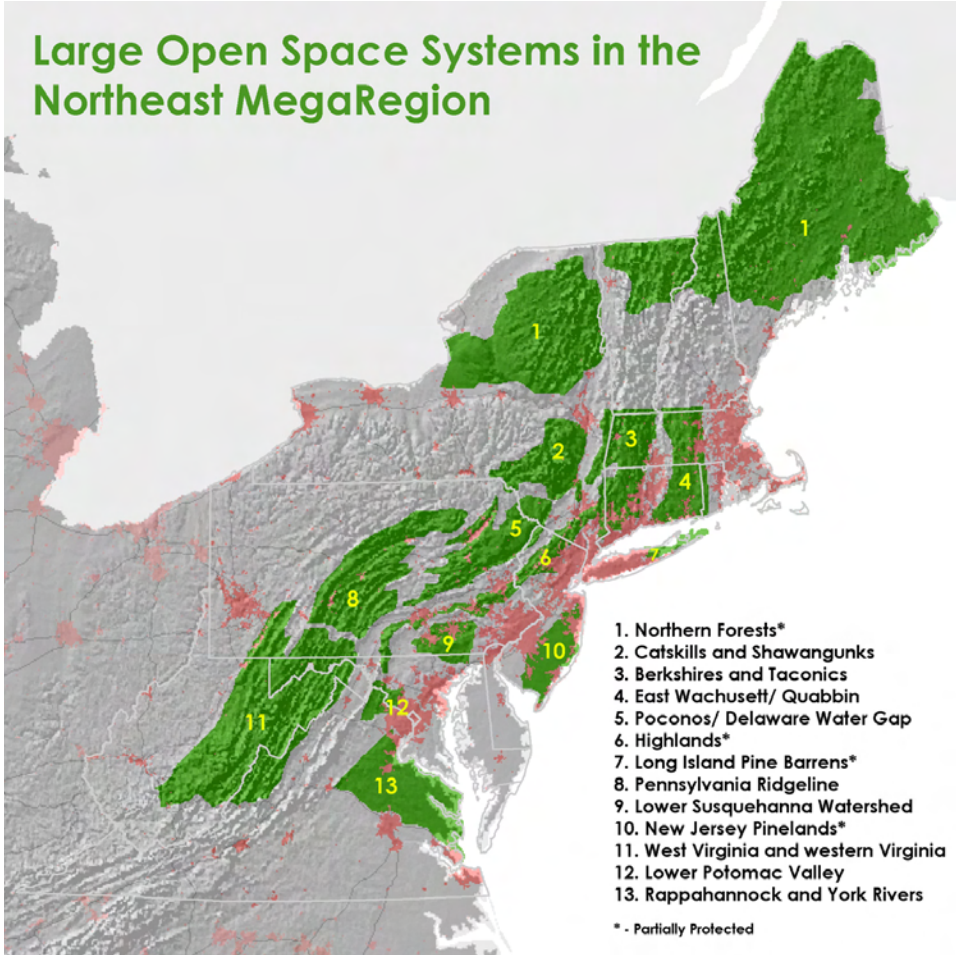
For two centuries, transportation infrastructure has determined the Northeast MegaRegion's shape and form. Development has occurred around canals, railroads, and highways. Similarly, green infrastructure can influence spatial patterns by providing levees to the flow of urbanization. By identifying the green space that should be preserved and reclaimed, the region determines its zones for both preservation and development.[3] It is widely accepted that water, sewer, and transportation infrastructure needs to be carefully planned and built. It follows that the region's green infrastructure also needs to be strategically planned for and invested in. Unlike aspects of the built environment, however, it is virtually impossible to replace or rebuild our natural support systems once they are destroyed. While it takes only days to pave a parking lot and only months to build a house, it takes centuries to rebuild a thriving ecosystem. Thus, a regional open space plan must take a long-range approach to investment and preservation.

Investments in open space protection will inevitably have a positive impact on the physical health and economic prosperity of the region and its citizens. A healthy environment fosters a healthy economy and healthy people. Open space has a positive effect on the environmental quality of the region. If managed properly, the natural systems act as an ecological filter for the region, improving air and water quality. If open space is maintained and development is managed, the region can spend less money on installing new, built infrastructure. The Conservation Fund and the U.S. Forest Service believe investing in green infrastructure can often be more cost effective than conventional public works projects. For example, in the 1990s, New York City avoided the need to spend $6–$8 billion on new water filtration and treatment plants by instead purchasing and protecting watershed land in the Catskill Mountains for about $1.5 billion.[4] Moreover, the attractiveness of the region is enhanced by its open space, making it more economically competitive. Superior quality of life, both inside and outside of cities, lures and retains top businesses to the MegaRegion.

Case Study: NJ Pinelands and Long Island Pine Barrens

New Jersey's Pinelands and the Long Island Pine Barrens planning areas provide excellent examples of how open space may be planned and protected on a regional scale. Each of these regions has a detailed, codified regional plan for growth and open space protection and utilize a number of regulatory and incentive-based tools to implement the plans.[7] Both areas are being managed to protect their finite ground water resources and their unique ecosystems. A similar regional land use planning and regulatory system is being established in the New Jersey Highlands under recently enacted state legislation.

One of the most ambitious tools is the transfer of development rights (TDR) program. The TDR program establishes a system where there are sending and receiving zones. Sending zones are located in ecologically sensitive areas. Receiving zones are located in areas where growth is encouraged. Development rights are transferred from landowners in the sending zones, where development is restricted, to developers in the receiving zones, where more development is acceptable. A land bank has been established in both cases to handle the transactions. While the primary purpose of TDR programs is to provide fair compensation to landowners for their assets, redevelopment in centers adjacent to the preservation zones has shown their potential to encourage urban revitalization.[8]



Source: Appalachian Mountain Club

There are a number of factors to consider when determining where to protect open space: 1) Where are the most ecologically sensitive lands? 2) How can the open space be made accessible to the public? 3) How can the open space provide a framework for growth in the region? 4) Which lands are needed to protect the region's public water supplies at a time when population growth and climate change may require larger protected supplies to meet future needs? Protecting critical ecological areas helps guard our natural life support system. Protecting areas for recreational use provides the region with an amenity. Strategically protecting open space around urbanized areas influences our pattern of growth. Finally, linking and connecting the open spaces enhances the entire system.

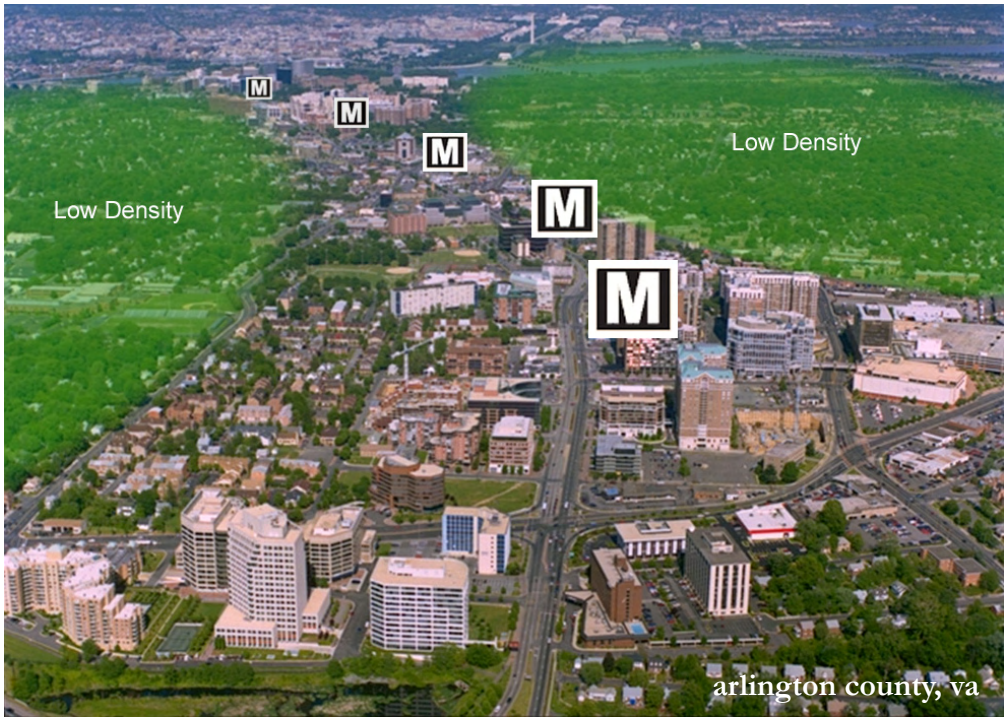
Protecting open space requires strategic planning rather than haphazard, last minute responses. There are a number of tools available for protecting open space. These tools fall into one of either two categories: incentive-based tools or regulatory-based tools. Often a combination of tools is used.

Regulatory tools include zoning, establishing protected areas, changing development guidelines, or creating urban growth boundaries, which encourage compact development.[5] In addition to local regulatory measures, a growing number of places in the Northeast have established regional land use regulatory commissions. These include the Adirondack Park, the New Jersey Pinelands, Cape Cod, Martha's Vineyard, the Long Island Pine Barrens, and, most recently, the New Jersey Highlands. Incentive-based tools include tax breaks, providing direct sources of funding for land purchases or easements, providing location efficient mortgages, or establishing transfer of development rights programs (TDR).[6] While TDR programs have proven effective in many places at preserving sensitive landscapes, they can also serve to revitalize urban areas. When applied at a large enough scale in conjunction with a TDR bank, the development credits can encourage the reuse of underutilized land in centers tens of miles away from the preservation zones.

Strategy:

Redirect Growth Towards Urban Centers

Although it varies among the region's metropolitan areas, cities and suburbs throughout the Northeast are burdened with underutilized parcels, ranging from urban "gap" sites to former industrial areas to underutilized suburban strips and "dead" malls. Across the MegaRegion, suburban greenfield sites are being consumed for development at the expense of these abundant infill and redevelopment opportunities, requiring new investments in infrastructure and further weakening urban and suburban centers. In fact, land areas of cities in the Northeast are, on average, 10 percent vacant, representing almost 2,000 square miles.[9] At an average density of 6 dwelling units per acre, offering a variety of community options from high urban density to single family dwellings, infill development could accommodate over 7 million households, or 77 percent of the region's projected growth to 2050. Promoting infill development makes better use of existing infrastructure and offers an important opportunity to both boost the growth of "cooler" metropolitan areas and ease the high cost of living and doing business in nearby "hot" ones.



The Region boasts significant transit infrastructure that could be utilized to its full potential through a coordinated strategy of infill and transit-oriented development (TOD). Almost half of the infill potential can be accommodated within a ½ mile radius of existing or planned fixed-route transit. The MegaRegion contains ten cities with transit systems that range from the extensive metropolitan New York system consisting of 962 stations to Lancaster, Pennsylvania's new system with its planned three stations.[10] Policies to encourage development within walking distance of transit and the creation of a network of origins and destinations along the transit system will help to revitalize existing communities and increase the utilization of transit systems while creating a framework for compact, walkable, mixed-use development throughout the region. This form of development will be particularly suitable for the region's expected demographic shift towards larger concentrations of the elderly, immigrants, and younger singles, all of whom prefer these kinds of housing and communities.

One of the greatest challenges to development within urban and older suburban areas of the Northeast is the presence of contaminated, or brownfield, sites. Inner-city brownfields, in particular, typically present a package of benefits and a package of costs. Parcels are almost always connected to existing infrastructure and transportation networks, and are sited relatively

Case Study: The Economic Impact of Rail on Arlington County, Virginia

In the 1960s, Arlington County, Virginia began to plan for the construction of a new metro line extending from the District of Columbia. The initial proposed route was to be constructed in the median of a new highway, what is now I-66. Neighboring Fairfax County chose to approve this plan and program, while Arlington lobbied for an alternative underground option along the old commercial corridor.

The County had already debated the impacts of development and the benefits of growth. In doing this, the County realized that in order to preserve the current sense of place, concentrated development needed to happen within one mile of the proposed transit corridor. To implement this growth strategy, the County adopted a corridor-wide General Land-Use Plan (GLUP) with "urban villages" around each metro station. These "urban villages" have individual visions, specific public improvements, and infrastructure, density bonuses, and urban design standards. Accordingly, 11 percent of the County was re-zoned to encourage high-density and mixed-use development. To move forward with this plan, Arlington put up $300 million in local money for the preferred route and additional stations.

The goal of balancing development, land uses (50/50 commercial/residential), and transit ridership has transformed Arlington County into a national model of transit-oriented development. Today, Arlington has more office space than either downtown Dallas, Pittsburg, or Denver. Since 1980, the local tax base has increased from $5.3 billion to $27.2 billion, with an annual change of 16.7 percent. Additionally, while 47 percent of the $27 billion in assessed land value in the County is in the county's transit corridor, this represents only 11 percent of its total land area.

Orange Line Ridership

Metro Stop	*1991*	*2004*
Roslyn	13,637	30,663
Court House	5,561	14,191
Clarendon	2,964	6,848
Ballston	9,482	22,957

Source: Arlington CPHD

Roslyn-Ballston Development Corridor Growth

Type	*1970*	*2002*
Office (million sq. ft.)	5.6	23.6
Residential (units)	7,000	24,500
Ratio Residential/Office	56/44	51/49

Source: Arlington CPHD

closer to existing business districts than their suburban greenfield counterparts. These parcels typically also have titles that may be subject to liens or foreclosure proceedings, require environmental remediation, offer obsolete structures or parcel sizes, or their owners may have long since abandoned them. Land banks such as Atlanta's Fulton County Land Bank Authority (LBA) can undertake the inventory, organization, and preparation of these parcels for transfer to private developers. The Fulton County LBA is a municipally authorized agency with the power to clear property titles pending review of development plans. Other authorities, such as the Louisville Metro Land Bank, are empowered to not only clear titles, but also acquire and remediate brownfield properties, further lowering the cost to the private market and spurring redevelopment. These authorities are then capable of marketing the newly prepared parcels and promoting well-coordinated development through comprehensive plans and tax policies. Land banks can facilitate this in a number of ways, using readily available municipal legal controls over land use and tax reform.

Ideally, a functional infill development program would begin at the metropolitan level while maintaining a regional perspective. The United Kingdom's Previously Developed Land targets illustrate how local and regional plans can be integrated and guided by a comprehensive national policy. Beginning with the construction of a national land use database in 1998, the UK has employed the government's powers of development permitting it to implement a national land use policy that promotes infill redevelopment and sustainable development in general. While the Northeast MegaRegion does not share the UK's centralized planning authority, a consortium of state and metropolitan planning agencies or municipal planning commissions – in coordination with a broader MegaRegion strategy – could create incentives or regulatory reforms to promote infill, perhaps coupled with a broader transfer-of-development rights (TDR) program designed to move development out of designated conservation areas.

Strategy:

Create Affordable Housing Options

Providing a mix of housing types, prices, and densities affordable to residents' needs is a necessary component of healthy, thriving communities. The Northeast can boast some of the country's greatest housing options in some of the world's most prominent cities and metropolitan areas; however, some of the region's "hottest" cities also represent some of its least affordable places to live. In 2000, the percent of households spending 35 percent or more of their income on housing exceeded the national percentage in four out of five of the Northeast's major metropolitan areas. The same was true for the percent of households paying 50 percent or more of their income on housing.[11] Planners and developers have noted that the most successful communities are those that are diverse in all areas, including socioeconomic class; but in the Northeast, income and class are increasingly stratified in a growing number of residential areas. In order for the Northeast to continue to create successful communities and attract residents, affordable housing needs must be addressed.


kentlands, md.

greenbelt, md.


forest hills gardens, nyc


trenton, nj


roosevelt island, nyc

While the Northeast's affordable housing shortage is a region-wide problem and will require a unified regional strategy, it may be best implemented at the metropolitan or sub-regional scale. Solutions should be both people-based, providing affordable housing options to encourage diverse socioeconomic communities in inner-cities and suburbs, as well as place-based, encouraging urban infill development. Good examples of people-based, regional strategies already exist within the Northeast MegaRegion. New Jersey's Fair Housing Act and New Hampshire's Regional Housing Needs Assessments Program have achieved some success in promoting accountability on the part of local governments, as well as developing and retaining affordable units throughout both states.[12] Northeast Cities could also learn from Greater London where the new London Plan sets a target of 50 percent of all new housing being reserved for below market rents and sales prices.

A regionally coordinated approach to provide affordable housing, building on metropolitan-scale strategies, will help combat the Northeast's affordable housing challenge. Coordination on this scale acknowledges the responsibility of states within a region to provide for residents who may live in one place and work in another. Also, affordable housing strategies must not only focus on residents, but also be place-based by focusing strategies to invigorate "colder" areas by attracting residents. Efforts to expand housing production across the Northeast, particularly in bypassed urban and suburban communities, on brownfield sites, and in "colder" areas, could also reduce the run-up in housing prices that has made metropolitan Boston, New York and Washington increasingly unaffordable to many of their residents.

Case Study: Hartford, Connecticut

Hartford, Connecticut has developed a place-based strategy to bring middle class residents to downtown in order to enhance quality of life. Looking to its metropolitan region, Hartford plans to lure middle-aged, middle-income residents from its surrounding suburbs by offering subsidies on downtown housing and improved amenities, safety, and services. While Hartford has one of the largest pools of affordable housing for a city its size, it also has one of the lowest homeownership rates. Hartford's middle-income subsidy strategy hinges on increasing its tax base by importing wealthier residents, thereby increasing the level of services available to residents in its poorer neighborhoods and encouraging homeownership and entrepreneurship.[13]

Strategy:

Modernize Rail Systems

south station, boston

The Northeast MegaRegion should adopt the long-term goal of establishing a high-speed rail network linking all of its major urban centers. Most of the Northeast's European and Asian competitors already have or are building high-speed rail networks, providing important mobility, economic development, environmental, and quality of life benefits to their regions. Building such a system will take a decade or longer to design and construct and will require a substantial investment. In the interim, the current Amtrak Northeast Corridor system should be upgraded to provide a "higher-speed rail system." This system would provide more reliable, frequent, faster, and more fairly priced service than that currently provided by Amtrak. Even this improvement will require the investment of several billion dollars into the Northeast Corridor rail system, and that the current debate over the future of Amtrak be successfully resolved. An effective rail system has the ability to spur economic growth, create job access, protect the environment, and improve citizens' quality of life.

I. Higher-speed Rail

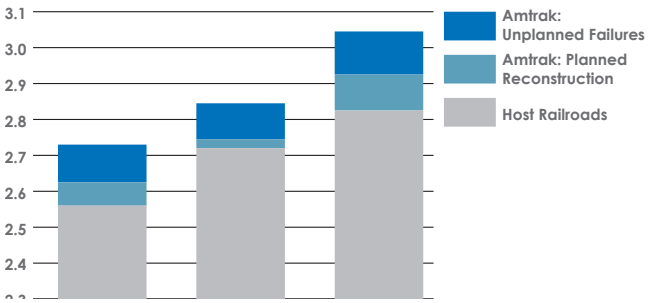
Due to the concentration of large cities in the MegaRegion, improved rail service and reduced inter-city travel times will create synergies between the economies of the Northeast's metropolitan areas. These synergies will also increase the efficiency of the entire MegaRegion by reducing travel times for commuters and by expediting the movement of goods.

Currently, the Northeast MegaRegion is served by Amtrak's higher-speed rail system, Acela. This is referred to as "higher-speed" because its average operating speed of 86 mph does not reach the velocity of a true high-speed rail system. In fact, the current speed along the Northeast Corridor does not even approach the system's current capability. Decades of neglect for the Northeast's transportation network have transformed a regional asset into a liability. Rail rights-of-way (ROW) are antiquated and, too often, freight and passenger rails are forced to share lines, decreasing the efficiency of both modes.

Amtrak's current services in the region have been hampered for decades by the underfunding of both its capital and operating needs. Due to underinvestment, Amtrak is too reliant on farebox returns for revenue and must therefore follow a business model that favors maximum financial return through high fares rather than through better service for the MegaRegion's citizens. Consequently, the Northeast Corridor rail service has been unreliable, expensive and slow, reducing ridership and the system's overall utility to the region. Instead of requiring Amtrak to create a profit with too little capital, it should receive further investment so that it can provide valuable service to the region. Inter-city rail must be valued for its overall positive impact on the MegaRegion, not simply its revenue generation.

True reform of Amtrak should create the setting for a major expansion of urban and inter-city rail throughout the Northeast. By reusing, upgrading, and expanding existing rail infrastructure, the region can improve its current inter-city rail network to its full potential before investing in a high-speed rail system. Short-term improvements to the current rail network, such as more frequent and reliable schedules and improved amenity, would increase ridership. This increase in ridership would subsequently decrease operating costs per rider and permit both fare reductions and further capital investment, catalyzing a cycle of revenue generation. Subsidizing these types of improvements would not only improve the function and efficiency of the system but also access to it, thereby building a stronger customer base.

Minutes of Delay on Amtrak Lines (millions)



Source: Amtrak Strategic Plan 2005-2009

Outside of the Northeast rail corridor, Amtrak's operations are further hampered by a dependence on freight operators for rail usage. These "host" railroads accounted for over 2.8 million of Amtrak's 3 million delay minutes in 2003. This delay is only increasing and will continue to worsen

without a new strategy. Better coordination between Amtrak and the host railroads, as well as construction of new rights-of-way, would reduce congestion at the critical choke points, thereby increasing efficiency along the entire line.

Exclusive rights-of-way specifically tailored for future high-speed rail would significantly improve existing service; Japan has implemented such phased construction and can be used as a model. Current vehicles can achieve higher speeds by using already-completed line segments of new tracks until an entire high-speed line, comparable to Japan's Shinkansen bullet-train service, is completed. By creating dedicated passenger rail lines, freight line capacity could be effectively increased, subsequently relieving truck traffic on the region's congested highways.

II. High-speed rail system (HSR)

A high-speed rail (HSR) network could require an estimated minimum of $14 billion to create, but would produce positive impacts on the entire regional transportation network. An HSR network would not only allow for increased access throughout the region but also alleviate congestion on modes that are currently near or over capacity, such as highways and airports. This improved regional mobility would also stimulate economic growth, allow for greater access to jobs, and provide for an improved quality of life throughout the Northeast.

Rail Comparison

Station Pair	Distance (miles)	Acela Time (minutes)	HSR Time (minutes)	Time Savings
Boston -Washington D.C.	457	387	196	191
Boston - New Haven	156	120	67	53
New Haven - New York	75	85	32	53
New York - Philadelphia	91	72	39	33
Philadelphia - Baltimore	94	60	40	20
Baltimore - Washington D.C.	41	42	18	24

Source: Calculated from Amtrak schedule.

The primary advantage of a new HSR would be significant reduction in travel time for inter-city trips. Already, the majority of trips on Amtrak's Northeast Corridor services are same-day trips, making them, in effect, long-distance commutes. Further reductions in travel times and improvements in reliability and amenity could significantly expand ridership. Although Acela has already decreased travel time from Boston to Washington, D.C. by one hour and twenty-eight minutes, a new high-speed rail system, based on an average speed of 145 mph speed, would save travelers a total of three hours and eleven minutes. These time savings would provide regional economic benefits and enhance quality of life and convenience for passengers. For example, increasing Amtrak's current average operating speed of 71 mph from Boston to Washington, D.C. to the 145 mph of France's TGV would create annual system time savings of $226 million.[14]

Although the financial savings in upgrading to HSR would be significant, construction estimates for creating such a network prove to be costly. Because no such systems currently exist within the Northeast region, the most appropriate approach for obtaining a rough cost approximation is through a weighted average of comparable HSR projects. Based on an average cost of $31 million per mile, a system between Boston and Washington, D.C., approximately 450 miles, would require $14 billion.[15] This figure is less than one percent of the Mega Region's GMP of $1.9 trillion and 21 percent of all the money the Northeast loses each year in federal tax expenditures. If this investment were to be financed through tax exempt bonds over a 30 year period, the annual debt service would represent an infinitesimal share of the Northeast's GMP and its annual "balance of payments" deficit with the federal government. These benefits indicate that a high-speed rail network would be both a smart and necessary investment.

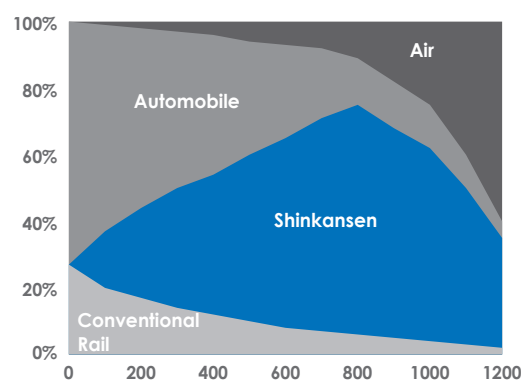
By identifying emerging markets for the proposed HSR, the challenge of uneven rail performance throughout the Northeast could be addressed through increased regional accessibility. The region's major "cold" cities – Philadelphia, Baltimore, Hartford, New Haven, and Bridgeport – are all within 150 miles of its "hottest" cities. A high-speed rail line capable of traveling 145 miles per hour would drastically improve access throughout the MegaRegion. An HSR system based on this speed would allow travel times of under an hour from Boston to New Haven and Philadelphia to New York. Back-office functions and service businesses, such as computer

Case Study: Shinkansen

Japan, comparable in size the Northeast MegaRegion, has a world-renowned high-speed rail network, Shinkansen, which connects most major cities, including Tokyo, Osaka, Nagoya, and Fukuoka, at the maximum speed of 300 kph (186 mph). Shinkansen currently has an extensive six-line network (2,250km (1,398mi), which transports 774,096 daily passengers.[17] Shinkansen has contributed to the integration of the nation as 43,477 monthly-pass holders account for 13.2 percent of the total annual transit ridership.[18]

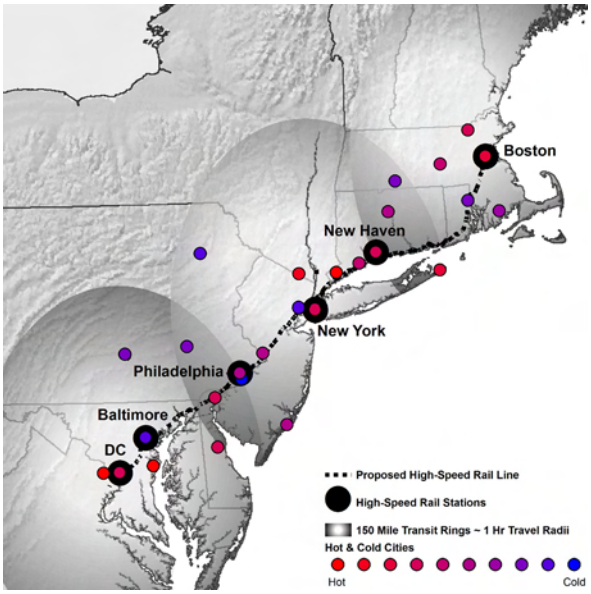
The high-speed rail network has positively affected the Japanese economy. The newest rail lines are estimated to improve national GDP by 1.0 percent, private investment by 1.4 percent, and housing investment by 0.6 percent.[19] Further, Shinkansen has created significant private investment around the new station, Sakudaira, in only two years.

Shinkansen also has significant impacts on regional development. For example, Nagano Shinkansen, which began operation in 1997, brought a faster population growth to the areas along the line than in areas not on the Shinkansen line. This has led to compact, transit-oriented development.

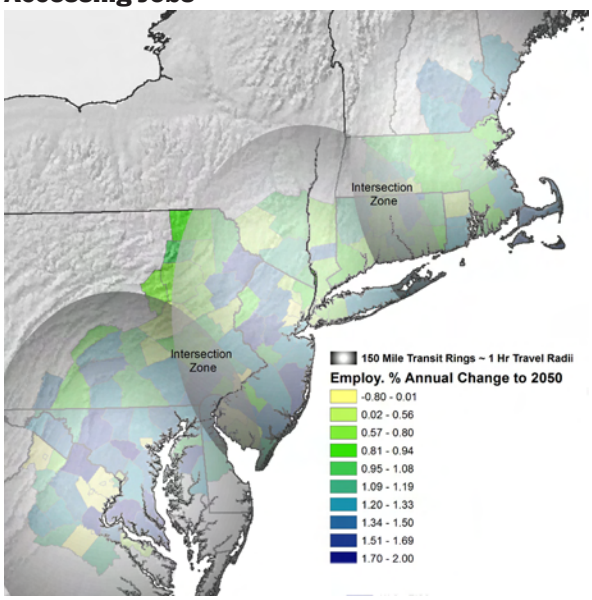


Source: Japan Railway Construction, Transport and Technology Agency

High-Speed Rail Linking Hot and Cold Cities



Accessing Jobs



Weighted Average of High-Speed Rail Costs

Project	*Mileage*	*Estimated Cost (billions $)*	*Cost per mile (milions $)*
California Corridor	700	25	36
Florida Corridor	356	6	17
LGV EST	279	6	31
LGV Aquitane	224	4	18
LGV Mediterrean*	155	5	32
Average Cost*			$31

* Completed project received double the weight.
Source: Cerreno, Allison, *High-Speed Rail Projects in the US: Identifying the Elements for Success* (NYU, 2004); http://www.railfaneurope.net/tgv/map.html

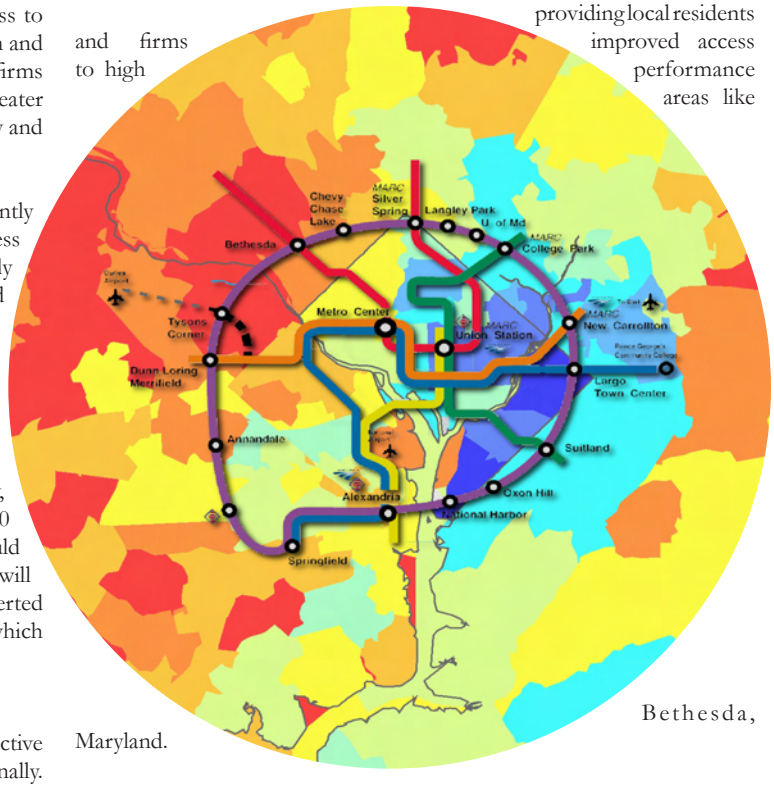
services, that require contact with but do not need immediate access to their clients, could locate in the intersection zones of the New Haven and Philadelphia regions. This system therefore has the power to allow firms in the MegaRegion more flexibility in their choice of location, greater access to markets of all sizes, and the ability to work more effectively and efficiently.

Commuters seeking the lower housing prices that these currently inaccessible communities would provide could also trade off less expensive housing for increased travel distances, as many drivers already do in the Northeast. But rather than promoting sprawl, as auto-based commutes do, longer distance commuters by rail would tend to locate near urban rail stations, resulting in more efficient land use and urban revitalization. With HSR, travel times could remain reasonable. Another significant benefit from this investment would be freeing up capacity on other modes. High-speed rail is more effective than air travel for trips under 400 miles because it is faster, safer, and more environmentally responsible than flights of this length. Currently, 26,000 daily air trips made within the MegaRegion are less than 400 miles.[16] By redirecting half of these passengers, an HSR network could attract nearly 5 million additional riders annually. Roadway capacity will also benefit from high-speed rail as long distance road trips are converted to rail, freeing up capacity for freight and the shorter road trips for which the automobile is best suited.

III. Local Regional Rail

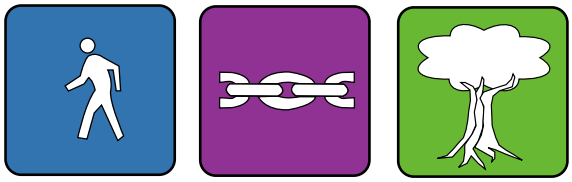
The MegaRegion should also focus on local rail in urban areas. An effective rail network will reliably move passengers locally as well as regionally. Investment in urban transit rail benefits the entire region through positive land use impacts, environmental benefits, and economic opportunity.

Within individual urban and metropolitan areas of the Northeast improved urban rail systems can create new capacity and provide important economic benefits. Both Germany and Greater London's regional plans have identified ways to link underperforming "cold" areas to "hot" centers. In the Northeast MegaRegion, cities like Washington, D.C. could improve existing transportation systems to increase local connectivity. In particular, the WMATA's proposed Purple Line could open up the markets in underperforming southeast Washington, D.C., providing local residents and firms improved access to high performance areas like Bethesda, Maryland.



Strategy:

Utilize Technology to Manage the Transportation Network



Technology can be used to not only improve the Northeast MegaRegion's transportation network through visible improvements such as a high-speed rail system, but also enhance the efficiency of existing modes through intelligent transportation systems (ITS) and road pricing. Emerging and already deployed ITS technologies provide a number of powerful tools for road and transit operations, such as variable message signs, electronic toll collection, real-time information systems, automatic vehicle location, and automatic fare media. ITS measures have proven useful to transit agencies, metropolitan areas, and state departments of transportation; and the first step of utilization in the Northeast would be an assessment of these tools at the mega-regional scale. One example of a region-wide strategy is a "smartcard," which could pay for transit fares, parking, inter-city rail, and road tolls. This multimodal and multi-area payment system would allow for easier transfers and would expedite travel within the MegaRegion. On the metropolitan scale, transit agency fare cards – like the MTA's Metrocard and WMATA's SmarTrip – have proven effective in increasing ridership and customer satisfaction. The feasibility of this strategy and others should be assessed on the mega-regional scale to identify investment-worthy ITS benefits.

EZ-Pass facilities are extensive in the Northeast

Case Study: Orlando Multimodal Payment System

Under "TEA-21," the current federal transportation legislation, the Federal Transit Administration began to fund operational tests of multi-modal electronic payment systems. The Orlando Regional Alliance for the Next Generation Electronic payment Systems (ORANGES) is one such pilot program partnered by the Orlando-Orange County Expressway Authority (OOCEA), LYNX (Central Florida Regional Transportation Authority), and the City of Orlando Parking Bureau. The program requires participants to register for one hand-held smart card which can be read on contact at participating parking garages and buses, and which can also be inserted into a transponder when traversing participating roadway tolls. Cardholders benefit from the convenience of a universal payment method, retain access to discounts for student and senior status, and receive new discounts available only through ORANGES. This project is increasing the sustainability of the county's current development patterns by providing a balance between modes. Incorporation of payments is crucial for decreasing one obstacle of transferring between modes to entice more drivers onto public transportation.[20]

Expanding capacity alone, however, cannot be a strategy for reducing congestion; it is also important to manage current travel demand. Tolls are one such effective travel demand management (TDM) technique. The electronic toll collection (ETC) system, E-Z Pass, has already been installed on toll roads from Maine to Virginia, speeding travel and making possible a mega-regional pricing policy. One possible pricing strategy could be flat fees across more road locations, limiting the growing congestion on highways such as I-295 in New Jersey, and providing new revenues to sustain and improve highways and other transportation services. A second pricing technique uses variable rates, determined by factors such as time or volume. Possible locations for this would be highly-congested stretches of I-95 such as the approach to Washington, D.C. and the Stamford-Bridgeport-New Haven spine in Connecticut. Prices could be increased, for example, during peak congestion periods and decreased during off-peak periods, to reduce volumes during rush hours. The MegaRegion's large scale could make it an ideal place for implementing just such a bold policy. At the same time that traffic congestion and air pollution would be reduced, revenues could be used for highway maintenance and also for improved public transportation alternatives to create a more balanced multimodal network for the whole Northeast.

Case Study: Southern California Highway Congestion Pricing

The first fully automated highway congestion model was implemented in 1995 on a privately financed, 10-mile strip of four "express lanes" within the median of California State Route 91 in Orange County. Instead of manual tollbooths, the lanes are completely reliant on technology. FasTrak transponders, a windshield mounted device, similar to E-Z Pass, which can also be used on other tolls throughout the state, automatically debit a driver's prepaid account based on the time of day traveled. Most innovatively, the tolls correlate directly to traffic flows: the more congestion, the higher the tolls. There is a typical schedule showing varied charges at different hours for each day of the week (ranging from $1.05 for late-night travel to $7.00 for Friday evening rush), but since the tolls can change without notice to optimize traffic flow, motorists still have to check the electronic message signs for a final price before driving onto the lanes. These lanes have recorded 64 million vehicle trips and have saved customers over 32 million hours of commuting time and $480 million in productivity and quality-of-life benefits.[21] Public acceptance was slow in coming, but has risen after seeing the productive results on congestion: polls showed acceptance of Highway 91 express lanes rising from 40 percent before implementation to 70 percent after.[22]

Strategy:

Enhance Intermodal Connections


jfk airport, nyc

Transit systems must be improved and integrated to attract riders who would otherwise choose automobile-based trips. However, many existing transit services in the Northeast are not sufficiently attractive or convenient to achieve this goal. Many people use automobiles because one-seat transit rides are rare and many modes are not well connected. For these reasons, in many places transit has not provided shorter or comparable travel times to private vehicles. Transit agencies must create a connected and accessible network by constructing new lines, linking rail with highway modes, and providing easy transfers from Amtrak to regional rail and metro to regional rail. Only then will the Northeast transportation network provide attractive and convenient transit alternatives.

Public transportation provides accessibility to jobs, shapes communities through land use impacts, and significantly contributes to the economy. For example, a recent study estimates that the gradual shutdown of the Philadelphia transit system over 10 years would cause 85,000 additional cars in the central area during peak periods with severe slowdowns; $56 billion less in business sales; 144,000 fewer jobs; and $37.6 billion in reduced personal income.[23]

Many major airports within the Northeast MegaRegion also suffer from significant traffic congestion, on both the landside and the airside. Improved intermodal connections could reduce this congestion and make airport trips shorter and more convenient. Most world-class airports in Europe and Asia, and a growing number of US airports, have established direct rail links to major destinations. These links provide reliable airport connections at times when highways are congested and unreliable. They also promote center-city business and residential locations for businesses and individuals who utilize airports. A few airports in the Northeast have implemented direct regional rail access to terminals or automated guided transit between terminals and transit stations. Regional rail or Amtrak currently connects Philadelphia, Baltimore-Washington International, and Reagan-National airports to nearby city centers. This is most appropriate for airports where the majority of passengers are traveling to or from the central cities. New automated guided transit links connect New York's JFK Airport and Newark Airport terminals to major hubs. From here, riders have the choice to travel to either nearby cities or suburbs.

The new JFK AirTrain automated guided transit system, opened in 2001, connects all of the terminals to commuter rail and subway services in Queens, which provide access to both Manhattan and to urban and suburban destinations. The total trip time from the airport to the transit connections is only eight minutes and the trains run every four minutes during peak hours. While this is a substantial improvement to the car-only option that previously existed, it still does not provide a direct, one-seat ride to Manhattan. Proposals have been made to provide one-seat links to JFK from Lower Manhattan and Midtown.

Despite this and other new airport transit links, many major airports in the Northeast do not provide any public transit besides the occasional bus. These airports include New York's LaGuardia, Providence's T.F. Green Airport, Hartford's Bradley, Islip's Macarthur and many other smaller airports. Where appropriate, efforts should be made to create transit links to these airports.

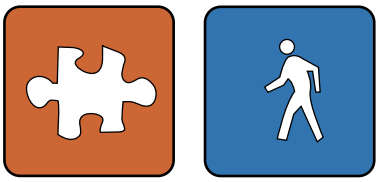
Air travel patterns have changed since September 11th, as many travelers have chosen to use other modes or not travel at all. Before 9/11, 56 percent of all flights were less than 500 miles. By April 2002, this had dropped to 47 percent because systems are not well connected and people are choosing to drive instead. An improved and integrated intermodal system will increase both air and rail travel. This will not only help the airline industry, but also will give people the choice to use rail or air instead of highways.

Distances of 100-400 miles have proven to be the most effective market for intercity rail and bus services. As airport access has become increasingly difficult in recent years, and as airline security and transfer times have increased, short- and mid-range trips by air have become less attractive. On the other hand, if rail routes are not efficient and well linked, people will continue to choose air travel over rail travel. This is the case for travelers from Philadelphia to Hartford, for example, where transfer time in New Haven by rail is at least one hour. The only other option is to travel farther north to subsequently travel south. For these reasons, most travelers between these places choose to drive to the Philadelphia airport, fly to Hartford, and then drive again to their destination.

Improved rail-air links could provide a broad range of transportation, economic and environmental advantages to the Northeast, including shortened travel times, reduced highway and airport congestion, increased transit use, improved air quality and increased incentives for businesses and individuals to choose central locations. The Northeast should expand investments in these links.

Strategy:

Coordinate Mega-regional Transportation Planning

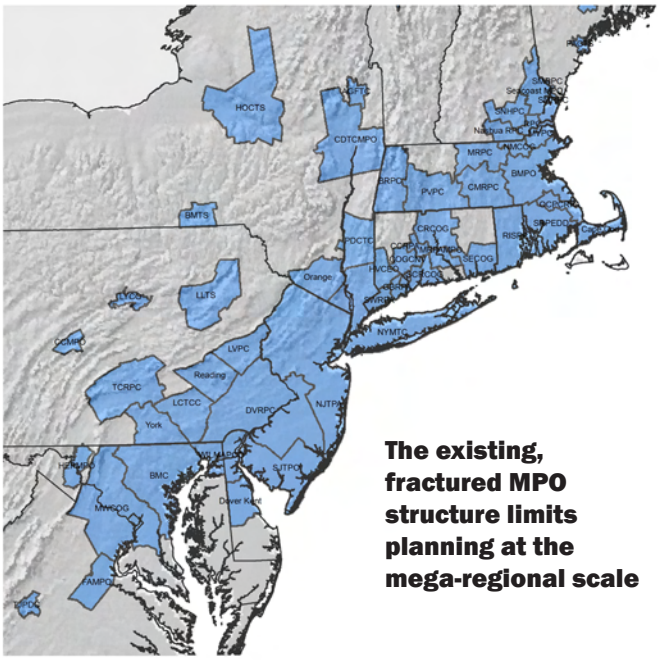


Planning and coordination for the Northeast's transportation system could be advanced in a number of ways, ranging from ad hoc collaboration around issues to the creation of a new planning authority for the whole MegaRegion. Already several coalitions and alliances exist that assume some of this additional responsibility. These range from the I-95 Corridor Coalition, an alliance of transportation providers from Maine to Florida, to Trips 123, a new partnership between state transportation agencies in New Jersey, New York and Connecticut to provide travel information to the public. The states could also create new single-purpose entities to coordinate policy, for example, around reform of Amtrak's Northeast Corridor service or implementation of ITS or congestion pricing policies. The Northeast's congressional delegation could also coordinate its activities around Amtrak reform, transit funding, or other shared concerns.

To advance these goals, the Northeast could also consider creating a new transportation coordinating council, which could operate like a "super MPO" (Metropolitan Planning Organization) for the whole MegaRegion. As noted above, Congress is now considering legislation to transform Amtrak's Northeast Corridor rail service into some form of public private partnership. Also pending in Congress is legislation that would permit additional tolling on the Interstate Highway system, and that would permit public-private partnerships to invest in, build, operate, or maintain highway and other transportation systems.

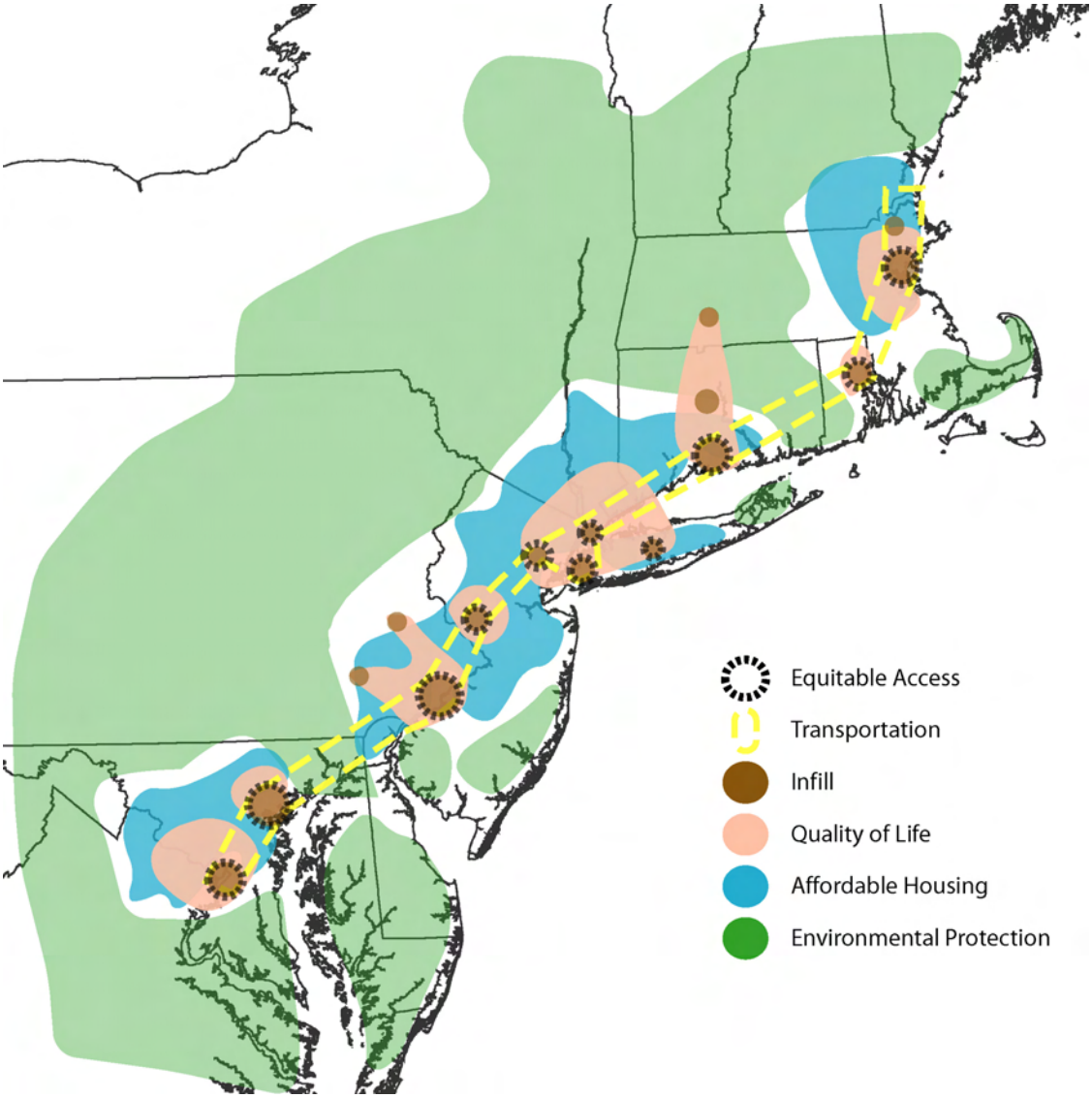
Public-private partnerships are being used all over the world to carry out these activities. Partnerships have proven successful in Japan, for example, with both positive returns and response from the public. There, authorities developed an institutional scheme for construction and operation of the country's high-speed rail, or Shinkansen services. Under this model, the government builds and owns the Shinkansen infrastructure and then leases it to a private railroad for operation. The advantage of this scheme is to avoid the excessive private risk and inefficient public operation. If innovative financing structures such as these were adapted by the Northeast they could result in a successful coordination of private business interests and public benefit.

The Northeast MegaRegion could also adapt the European Union's model for funding transportation improvements. Within the EU, each nation contributes 1 percent of their entire GDP to the EU for transportation purposes. Using this approach, the MegaRegion could raise funds for either improving the current system, for new high-speed rail construction and maintenance, or for congestion relief. The federal government could also contribute to this effort by directing Federal Highway Trust Funds to priority needs in the Northeast and other emerging MegaRegions. The next federal transportation authorizing legislation after TEA-21 should incorporate this reform to support the Northeast's effort to create the infrastructure it needs to grow in the 21st century.



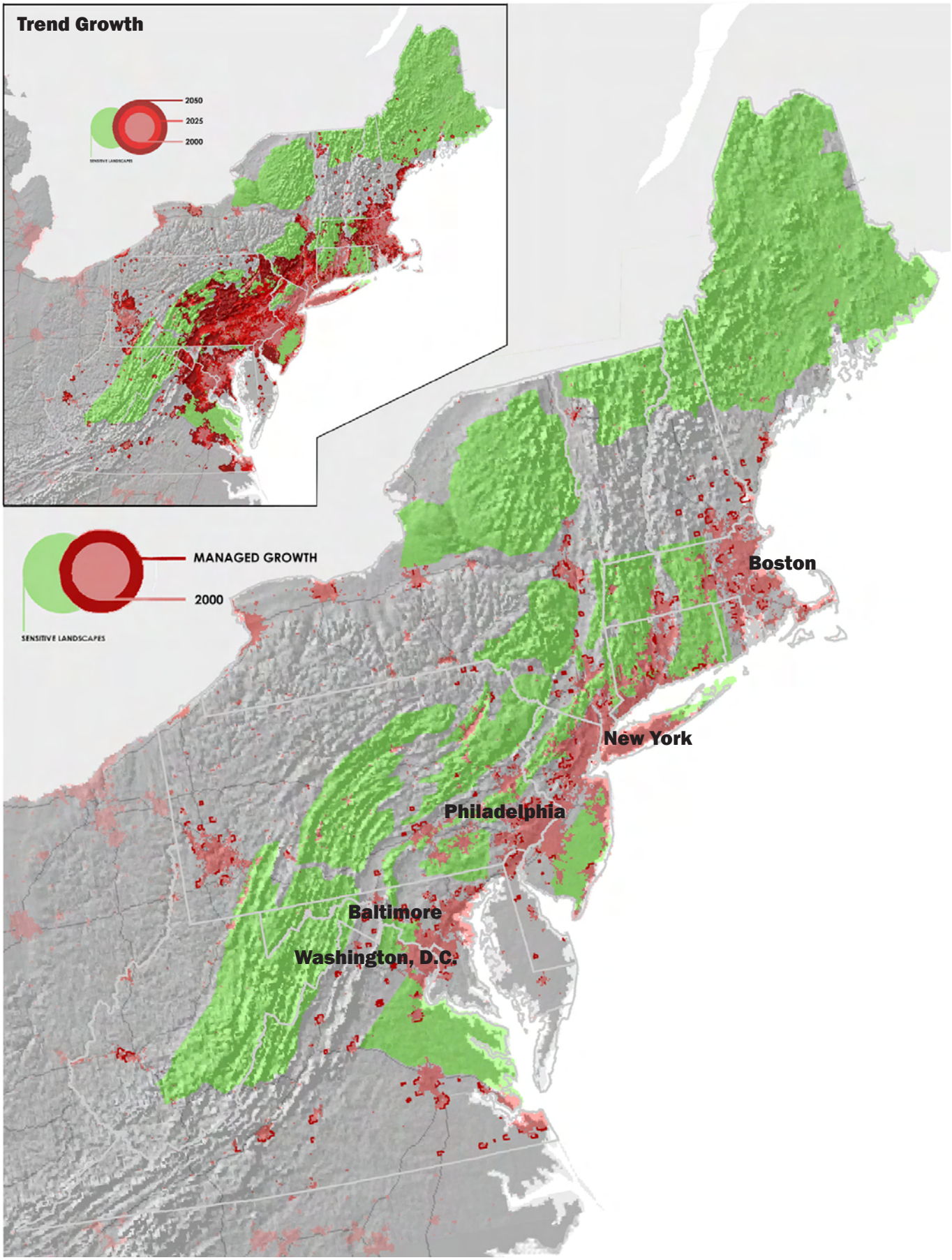
The existing, fractured MPO structure limits planning at the mega-regional scale

A Strategic Future



The actions presented in these seven strategies work together to achieve the four goals of creating regional synergies, enhancing the region's environmental quality, modernizing the intermodal transportation network, and mobilizing key government, civic, and business leaders. These strategies can be best addressed by directing resources to priority areas most affected by the MegaRegion's challenges. The EU achieves this goal through regional funding initiatives, which focus on primary objectives in targeted areas. From 2000-2006, the EU will grant its member states Structural and Cohesion Fund grants totaling $187 billion to undertake projects in a variety of sectors, including transportation and other infrastructure, research, education, and urban amenities, many of them organized around MegaRegions similar in size and complexity to the Northeast MegaRegion. Intended to boost the economic development of underdeveloped regions throughout EU member states, these projects are carried out by the private sector in partnership with public authorities.[24] Within the Northeast, political, business, and civic leaders can direct resources to all levels in order to implement the key strategies.

The Northeast MegaRegion has traditionally represented the model of efficiency, modernity, and productivity in the nation. This role, however, is in jeopardy. This report has outlined a series of investments that, although substantial, would set the framework for continued excellence and provide amplified benefits to the region's economy and quality of life. Current difficulties in implementing planning policies at the national, or even supra-municipal level, should not be taken as preemptive defeat. The institutional infrastructure for implementation can be created for each specific strategy and policy goal. Covering the spectrum from regional compact to cooperation between civic groups, there are many partnerships within the region that can be formed to achieve common goals. Government representatives, business leaders, and civic organizations can use this document to set the framework for debate about the future of the Northeast MegaRegion and the means to achieve a common vision.


Trend Growth
2050
2025
2000
SENSITIVE LANDSCAPES
MANAGED GROWTH
2000
SENSITIVE LANDSCAPES
Boston
New York
Philadelphia
Baltimore
Washington, D.C.

Notes

Definition of Study Area

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[14] This number only includes savings for current Amtrak passengers even though a HSR is certain to attract additional riders and therefore generate more savings.
[15] It should be noted that an accurate cost estimate of a HSR system is a complex task and beyond the scope of this report. However, without existing cost estimates for the Northeast MegaRegion, the most appropriate approach to a rough estimate is through a weighted average of comparable construction projects. The average cost per mile can be calculated from four proposed projects (two in the U.S. and two in France) and a completed project in France. Trans-national comparisons are difficult due to currency conversion and labor costs among other things. France is chosen as a comparable because topography is similar to the Northeast's. Based on the calculated average cost of $31 million per mile, the system between Boston and Washington D.C. (approx. 450 mi) would require a total construction cost of $14 billion.
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Studio Participants:

Tony Cho
Martine Combal
Mary DiCarlantonio
Geraldine Gooding
Doug Giuliano
Masaru Iwakawa
David Kooris
Mara Marino
Heather McCall
Nash Mewborn
Emily Moos
Taylor Pankonien
Tyler Patrick
Amy Pettine
Megan Ritchie
Jessica Tump

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