

The Vital Center

A FEDERAL-STATE COMPACT TO RENEW
THE GREAT LAKES REGION



THE BROOKINGS INSTITUTION METROPOLITAN POLICY PROGRAM

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the Great Lakes Region

Executive Summary

The Great Lakes region of the United States is a unique economic, social, and cultural area made up of all or part of 12 states, including the western portions of New York, Pennsylvania, and West Virginia; northern Kentucky; all of Ohio, Indiana, Michigan, Illinois, and Wisconsin; and eastern Minnesota, Iowa, and Missouri. Home to 97 million people, this region is defined by a shared geography and natural resources, a dynamic political and economic history, and strong principles of social organization that together have shaped its growth and development. One of the largest industrial production centers and consumer marketplaces in the world, this highly urbanized “mega-region” is a vital global hub of economic activity and growth.

Yet, for all this, the Great Lakes region stands today in a precarious position. During the past generation, globalization, and the intense competition it has engendered, has diminished the region’s economic primacy, leaving its states and communities struggling to find their competitive niche. With one foot planted in a waning industrial era, the other in the emerging global economy, the region is teetering between a future marked by growth and innovation, and one that conforms to the “Rust Belt” label applied to the region due to the decline of its factory-based economy.

The time is now for Great Lakes leaders to articulate a meaningful agenda for what the states of the region and the federal government can do together to ensure that this economic giant steps in the right direction.

Having decided the past two presidential elections, national leaders understand the political importance of the swing states of the region. But they must also recognize these states’ tremendous economic value and support their efforts to transition from the industrial era, which they dominated, to the knowledge age. State leaders, for their part, need to fully appreciate the regional nature of their economy, and develop and advocate for federal policies and investments that would redound to the benefit of the region as a whole.

Certainly, the Great Lakes region faces several major challenges. Still heavily reliant on mature industries and products, its aging workforce lacks the

education and skills needed to fill and create new economy jobs. Its entrepreneurial spirit is lagging, hampering its ability to spur new firms and jobs in high-wage industries. Its metropolitan areas are economically stagnant, old and beat up, and plagued by severe racial divisions. And its legacy of employee benefit, job, and income security programs—many of which the region helped pioneer—has become an unsustainable burden, putting its firms at a severe competitive disadvantage in the global economy.

But the region is also endowed with several major assets that, if fully leveraged, could vault the region forward. Among them are a strong research, innovation, and talent cultivation infrastructure; critical mass and expertise in emerging industries from advanced manufacturing to health care; global firms and universities that are significant players in the worldwide exchange of ideas, people, products, and services; and the tremendous amenity and resource of the lakes and their waterways.

As 2008 approaches, the moment is ripe for regional leaders to forge a compact with the federal government around a series of policy innovations that will put the region on sure ground in the new economy. These innovations, if implemented, will help the 12 Great Lakes states to surmount their common challenges, leverage their common assets and opportunities, and together reassert their economic leadership in the nation, and the world. They fall broadly into educational, economic, social, and infrastructure initiatives:

To cultivate the region's human capital, the Great Lakes states and the federal government should:

- Forge a Great Lakes compact focused on producing highly skilled graduates of K-16+ school systems with rigorous curriculums in science, technology, engineering and design, and math (STEM) disciplines
- Build a Great Lakes "common marketplace" for education and employment, enabled by portable credit, credentialing, and pension systems that facilitate mobility between all states of the region
- Create a "Passport to Higher Education Program" that improves financial access to college and skills training through state and federal matching grants

To fuel the economic engines of the region, the Great Lakes states and the federal government should:

- Develop a Great Lakes emerging economy initiative designed to take advantage of the region's research and development infrastructure by substantially increasing funding for basic and applied research and development
- Forge a Great Lakes energy independence compact that commits significant new investments for research in clean energy sources and sustainable transportation
- Create a Great Lakes venture fund whereby state governors and other public and private sector leaders agree to dedicate a portion of state and private pension funds, university endowments, and foundations to growing new companies in the region
- Build out the North Coast by leveraging a national multi-billion dollar investment in lake restoration with strategic water-based economic development projects, cross-state branding and promotion initiatives, and improved public access to the lakes and their waterways

To remake the region's social compact, the Great Lakes states and the federal government should:

- Create new defined contribution pension systems whereby traditional benefits are converted to more flexible plans that are portable across state borders nationwide
- Remake the nation's re-employment system by allowing a portion of unemployment benefits to be used for retraining, and by subsidizing more generous benefits for workers who do get retrained
- Support health care reform by encouraging states in the region to join together to create low-cost, portable health insurance plans funded by employers and workers

To strengthen the economies of the region's metropolitan areas, the Great Lakes states and the federal government should:

- Design and embrace a new competitive vision for transportation policy that includes high speed rail, greater access to ports and freight hubs, and better maintenance and preservation of existing highway and transit systems
- Rebuild the region's crumbling water and sewer infrastructure based on a thorough assessment of regional needs and a "fix-it-first" funding strategy that prioritizes existing systems in established communities
- Reinvest in cities and older communities by targeting infrastructure and economic development funding toward catalytic urban projects and revamping federal policies that concentrate the poor in decaying urban neighborhoods

Time was when the nation and the Great Lakes states joined together to develop the land, the higher education institutions, and the economic infrastructure that helped put the region, and the country, at the forefront of the 20th century economy. And so they can again. A new 21st century federal-state compact focused on revitalizing the Great Lakes will help reanimate the attributes that inspired its past and ultimately reinvigorate and renew its contribution to the nation's future. ❁

I. Introduction

The Great Lakes region—the states and communities that rim the lakes’ shores and line the Ohio and Mississippi watersheds—is an important economic and cultural center of gravity. This Midwestern region of North America was created by a shared geography, unique economic history, and common cultural experiences that, for both better and worse, have continued to shape its growth and development. Today, it is a region that aspires to regain global economic leadership in an era transformed by globalization and rapid technological change.

During the 19th and most of the 20th centuries, the farmers, business, labor, civic, and political leaders who built the Great Lakes region seeded and reaped the American Dream, and pioneered social and economic innovations that reverberated across the nation and globe. In fact, many of the attributes that define our understanding of America were forged in the states cradled by the great heartland waters:

- here the promise of the American “frontier” was first realized: bountiful land, timber, water, and raw materials;
- here the creative genius of American knowledge and know-how was “applied” to real world tasks: the birth of the auto and assembly line, the erection of world’s first skyscrapers out of Chicago’s sandy soil; and
- here the *values* of America were animated: free labor, free education, the family farm, and workers rights.

These values defined the character and development of the region, which in turn influenced the country and the world:

- great industries were born—in timber and meat-packing, oil and steel, electronics, autos, and aviation—while Sears, Armour, Heinz, Rockefeller, Carnegie, Mellon, and Ford became household names;
- the region’s land grant universities opened the door of learning to all, and led the agricultural revolution in the U.S. and abroad;
- the assembly line spurred the global mass production revolution;
- the arsenal of democracy churned out the tools to win two world wars; and

- the universities in Michigan, Minnesota, and Illinois helped pioneer the Internet and its widespread use.

The economic primacy of the Great Lakes has diminished during the past generation, however. The opening of the global economy and the intense competition engendered in the latter part of the 20th century shook its economic foundations, and revealed that a once highly entrepreneurial economy had in many ways become complacent.

Today, the Great Lakes region is at a critical economic juncture. This once economic giant is standing precariously—with one foot still planted in a waning industrial era, and the other striding the emerging global knowledge economy. The giant could step either way:

- forward to a future of economic and population growth, as a hub of research and innovation, a corporate R&D and decision center, a university-led global research hothouse, and a talent magnet and immigrant gateway; or,
- backward to a future of distressed cities, depopulated rural communities, out-migration, and closing plant doors—increasingly a backwater in the world economy.

The Great Lakes region faces many challenges transitioning from the industrial era, which it dominated, to the knowledge age. It is still heavily reliant on mature industries and products, with a workforce ill-prepared to obtain or create jobs in the new economy. Its landscape is dotted with hollowing city centers, emptying manufacturing towns, and isolated farm, mining, and timber communities, which continue to bleed mobile, educated workers.

And, perhaps most importantly, within much of the region the culture of innovation that helped make it an economic leader has been lost.

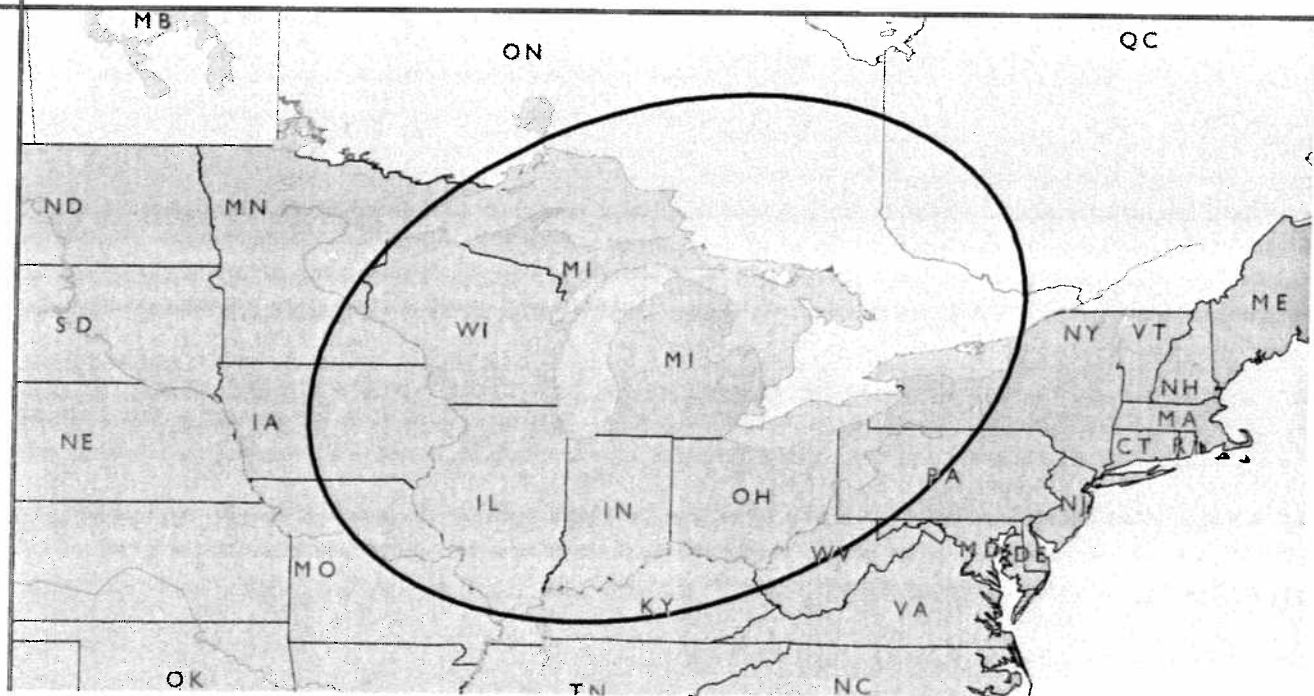
But the Great Lakes region also has strong and powerful assets needed to compete in today's economy, assets that, if built upon, could accelerate its transformation. The region remains the advanced manufacturing cockpit of the world, with the sector becoming more competitive, productive, and of better quality even as it employs far fewer people. At the same time, it is a globally significant center of new knowledge creation, talent, and innovation, with an unrivaled network of private and public research and higher education institutions; globally engaged businesses, cities, and civic institutions; a huge, strategically located marketplace; and unique water and natural resource attributes. Finally, as the pioneer in the creation of today's social welfare system, the Great Lakes states are an ideal laboratory for remaking public policy to more effectively and efficiently support economic success and security, helping workers adapt to a more unpredictable economic environment than that of the past.

The states of the Great Lakes region assert strong national political influence. Having decided the last

two Presidential elections, they enter the 2008 election season as the catered-to swing states in the nation's first wide-open presidential contest in many years.¹ Yet the region has never leveraged its political position by articulating a meaningful agenda for what its state and national leaders can do together to support a successful transition from "Rust Belt" to "knowledge belt" in today's economy.

The goal of this paper is to inform and catalyze a needed discussion among the region's Governors; the business, civic, and political stakeholders that influence state policy; the region's Congressional delegation and federal leadership; and aspirants for President in 2008 around a winning economic vision for the Great Lakes region. It describes why the region developed as it did, and how it is positioned today to be a global economic player. It provides a candid assessment of what assets it can build on, and what challenges it must overcome. And it begins to identify ways states in the region can strengthen their economies through collective action, joining together with federal partners in pursuit of an integrated state, multi-state, and national policy agenda that can contribute meaningfully to economic prosperity in whole Great Lakes region. ■

The Great Lakes region extends from western New York and Pennsylvania in the east to eastern Minnesota, Iowa, and Missouri in the west



II. What Is the Great Lakes region?

Geography and history have made the Great Lakes region a unique economic, social, and cultural area extending from Syracuse and Pittsburgh in the East, to St. Louis, the Quad-Cities, and Minneapolis/St. Paul in the west. The region described in this paper includes all or part of 12 states, including western New York, Pennsylvania, and West Virginia, northern Kentucky, all of Ohio, Indiana, Michigan, Illinois, and Wisconsin, and eastern Minnesota, Iowa, and Missouri. While, from an economic standpoint, the Great Lakes region also incorporates the major metropolitan communities of Ontario, Canada, data and illustrations presented in this paper focus only on the American states and the major metropolitan areas that comprise the region.

History and Influence

New England conjures up a certain identity—the flinty farms, the village ethos, the banking and trading centers of the early Americas, and the first industrial development on the continent in textiles, shoes, and other goods.

The South grew based on its unique crop mix and the peculiar institution of slavery, which fostered a separate culture from that of the North. A landed elite reaped the economic benefits without building the region's civic and economic infrastructure—leaving a long legacy of a poorly educated populace and underdeveloped economy that lingered until recent decades.



The West has its own mythology—the rugged prairie and dramatic mountains, the cowboy, and a living eked out of meager land through force of will. During the 20th century, California and the West Coast became the new promised land, the crucible of progressive social trends and a more diverse society.

While less articulated and popularized, the Midwest, too, shares a unique regional culture and identity that is very much felt by those who reside there. The geography and natural resources, the political and economic history, and the values and principles of social organization brought to life by those who settled this landscape interacted to create a pattern of economic and community development that continues to define the region.

Unique resources, culture, and political organization shape the region

In the 17th and 18th centuries, traders and trappers opened the Great Lakes and waterways of the interior United States. It was, and remains, a region rich in natural resources—from pelts to timber, coal to iron ore, and some of the most fertile farmland on the planet. This abundance served as the initial magnet for people and commerce during the economic era in which natural resources drove the location of settlement and economic activity.

After the American Revolution, the new nation turned to this rich hinterland to expand. Jefferson and the nation's founders looked West in the hopes of making a healthier country, providing room to grow, and creating the opportunity for democracy to flourish, peopled (as it was to become) by "yeomen" farmers. This vision was made real in the form of the Northwest Ordinance and Louisiana Purchase.

The Northwest Ordinance (1787) codified a political, social, and development pattern for a large part of the region that shapes it to this day, and that reflects a clear set of values: free labor, free public education (there was land set aside in every township for schools), religious freedom, local government close to the people (the townships), and cheap or free land to support the new citizen-farmers.² The Homestead Act and Morrill Act land grant university system (1862) represent unprecedented and purposeful investments in public goods with the intent of fueling economic growth. The former gave anyone willing to settle the land 160 acres at a nominal fee; the latter gave the new "Western" states land to sell in order to create higher learning institutions specifically designed to support agricultural and industrial development, and allow millions to reap the benefits of public higher education who otherwise could not afford to do so.³

A world-leading agricultural and industrial powerhouse emerges

Throughout the 19th century, great private and public resources were invested in the construction of canals and railroads in the region, adding to the natural network of rivers and lakes, and opening the rich resources of the region to development. The conversion of agricultural goods, timber, and minerals to processed and manufactured goods fueled a dynamic process of "agricultural industrialization."⁴ The large number of family farmers that populated the region provided a critical mass of producers and consumers of the goods generated in the heartland, putting it at the center of national and international trade.

Skilled labor and new migrants, growing capital, and the newly opened transportation corridors stoked industrial development. Flour milling, brewing, distilling, and logging, begat farm equipment manufacturing, and boiler and steam engine production. They, in turn, nurtured metalworking and machine-making,

The large number of family farmers that populated the region provided a critical mass of producers and consumers of the goods generated in the heartland, putting it at the center of national and international trade.

which led to machine tool, carriage, and tractor manufacturing, furniture making, and the world-changing development of the automobile and assembly line. And the world economy came to be lubricated by the discovery, extraction, and refinement of crude oil in Northwest Pennsylvania.

This trade, the wealth it created, and the application of new ideas and innovation built new industrial models. The meatpacking fortunes financed the construction innovations of Chicago, while the timber barons invested in the new contraptions of Henry Ford and Billy Durant. New consumer goods companies like Cincinnati's Procter and Gamble arose from the conversion of animals to soaps and other products. And the region created, and then fine-tuned, the modern industrial mass production paradigm. Borrowing from the Chicago stockyards assembly line, Henry Ford applied the approach to manufacturing. "Fordism" was born, quickly becoming the model for industrial organization the world over.

The shared values of the predominantly northern European settlers—including free labor, work, education, and civic institution building—shaped the culture of the region.

Highly integrated economic development leads to a dense network of farm, commercial, and manufacturing communities

A large and interdependent network of production, industrial, and commercial centers developed across the region, converting the bounty of the land into goods, which were then transported by lake, river, and rail to the rest of the world. The region's geography and transportation routes determined the locations of the region's industrializing cities and population centers. Goods traveled from Pittsburgh west down the Ohio more easily than east over the mountains. The Great Lakes ports shipped materials and provided outlets to the world. Collection and conversion sites grew to reach the West—Minneapolis/St Paul, Davenport, and St. Louis—where the fruits of the Great Plains could begin their trek down the Mississippi, and east over the rails. The region came to be uniquely celebrated as the "the empire of the independent farmer, merchant capitalist and small industrialist," and a dense network of bigger cities grew amidst the farmlands and small towns.⁵

Given the size of commerce in the region and global reach of its exports, by the early decades of the 20th century major global decision-making, research, and trading centers emerged—in Chicago, St. Louis,

Detroit, and, across Lake Ontario, Toronto. Cleveland was the Silicon Valley of its day, where the nation's aviation industry initially grew, and the first corporate research and development campus, GE's Nela Park in East Cleveland, was built.

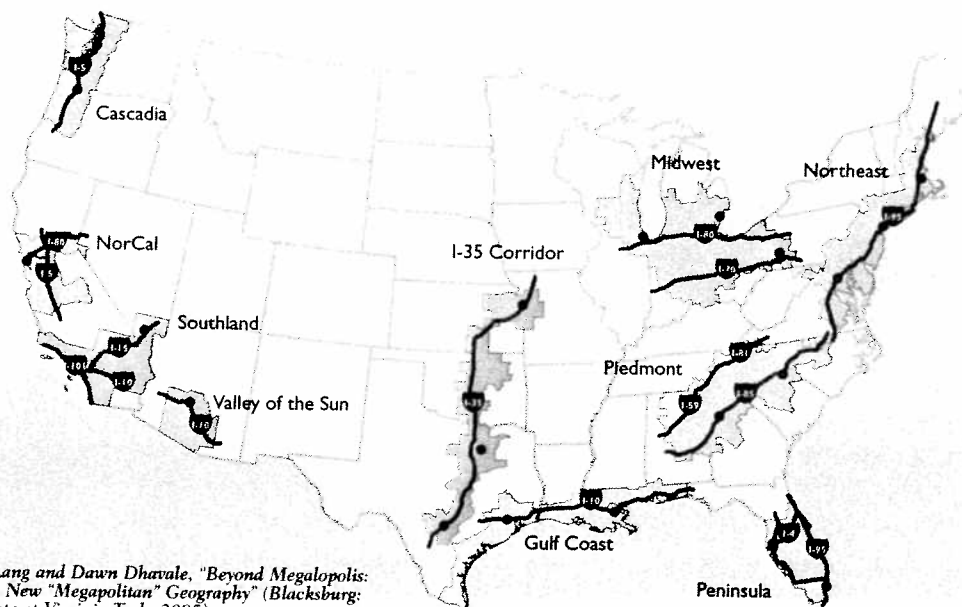
Waves of newcomers from America and the world redefine the region

The available land for family farms, followed by the abundance of agro-industrial jobs, brought waves of immigrants from Europe and around the globe. Among them were numerous skilled labor and artisans, including the many "inspired tinkerers"—Ford and the Wright brothers among them—who helped fuel the innovation and productivity gains in the region.⁶

The rise of the industrial north during the early 20th century also opened opportunities to individuals from the South and Appalachia who were trapped in a dead economy. The Great Migration brought flocks of African-Americans to the Great Lakes. In 1910, before the migration, 89 percent of the nation's blacks lived in the predominantly rural South; by 1960, 40 percent of blacks lived outside the South and 75 percent resided in the nation's cities. From 1910 to 1930 alone, Chicago's black population jumped from 44,000 to 235,000; Detroit's from 6,000 to 120,000.⁷

While truly a "melting pot" of people from different backgrounds, races, and religions, the growing populace of the Great Lakes states did not always coexist harmoniously. White and black, immigrant and native, were thrust together in the region's burgeoning industrial cities, and anti-immigrant, anti-Catholic, and racial conflicts proliferated. Tensions culminated in numerous (and even recent) riots, including the 1916 Alderman's Riot and the 1919 Race Riot in Chicago, the 12th Street (now known as Rosa Parks Boulevard) Riot in Detroit in 1967, and riots in other cities dating from 1908 in Springfield, Illinois to 2005 in Toledo, Ohio. Racial tensions accelerated the rise of some of the nation's most segregated metropolitan communities.

The Great Lakes region is one of 10 U.S. mega-regions



Source: Robert E. Lang and Dawn Dhavale, "Beyond Megalopolis: Exploring America's New "Megapolitan" Geography" (Blacksburg: Metropolitan Institute at Virginia Tech, 2005).

A unique social and economic culture is forged

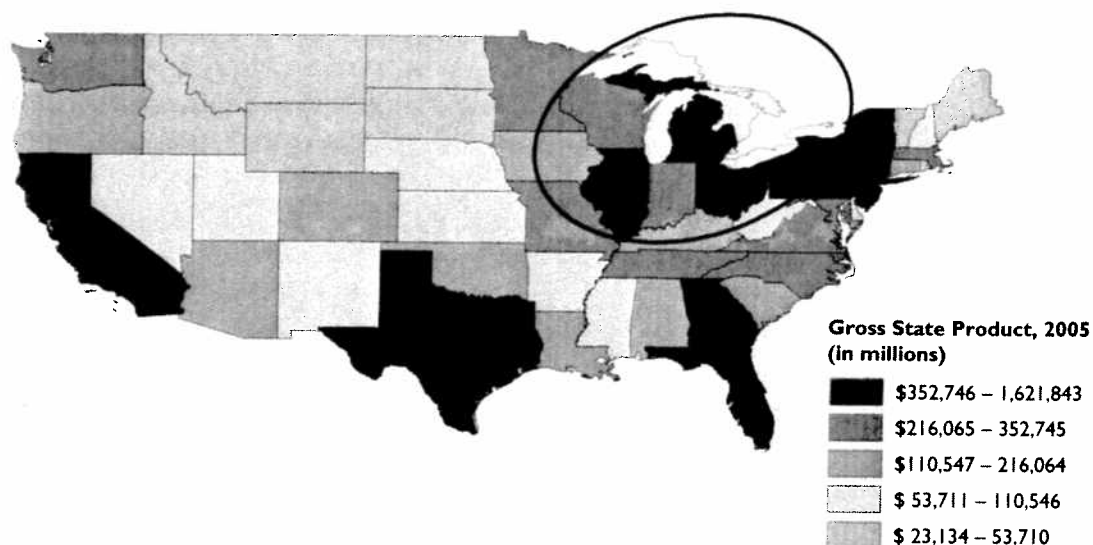
The wealth, greed, and back-breaking intensity of big-scale industry and the assembly line, along with the socialist values of many of the region's immigrants, spurred a corollary labor movement, which reached its zenith in the successful fight for better wages and working conditions, time-off, and generous health, education, and retirement benefits in the big industry sectors. Midwesterners take credit for building the American middle class, displaying their achievement as a model for a more equitable income distribution that characterized the American Dream.

The labor movement also served to unite black and white workers with large numbers of ethnic minorities in an interracial movement, spearheading important struggles for civil rights.⁵ While the Great Lakes region came to be home of the country's most segregated cities, it also created an increasingly integrated industrial workplace. Through organized effort over several generations, the factories of the Midwest led in gender and racial integration that far advanced the rest of society. As one labor leader noted recently, "The most integrated institution in America is the shop floor."⁶

The escalating wealth of the region also led to civic institution building, including a globally unrivalled network of public higher education institutions. These schools were purposefully built to afford the benefits of higher learning to all citizens, not just the privileged. This commitment was early enshrined in the language of the Northwest Ordinance, later inscribed on the parapet of Angell Hall at the University of Michigan: "Religion, morality, and knowledge, being necessary to good government and the happiness of mankind, schools and the means of education shall forever be encouraged."

The shared values of the predominantly northern European settlers—including free labor, work, education, and civic institution building—shaped the culture of the region. Settlers of the Midwest carried a self-conscious rejection of the "elite" that was seen to characterize old colonies, just as it characterized the old world to the first Americans who came from Europe. This social culture has morphed and evolved with new populations and relative prosperity built by the region's success in the industrial era, resulting in attitudes that still inform a Midwest culture and social identity: plainspoken, hardworking, egalitarian, problem-solving (to the good); oft-times anti-intellectual, nativist, and insular (to the bad).

The states of the Great Lakes region produce over 32.5 percent of U.S. Gross State Product



Source: U.S. Bureau of Labor Statistics, 2005

The Great Lakes Today: A Vital Economic Region Still Stands

Today, the Great Lakes region is in transition, struggling to retain the best of its social, cultural, and economic tradition while at the same time trying to reinvent itself for success in a very different economic milieu.

Change has not come easy. Given that several generations of workers and families made their living in factory towns with one or more dominant employers, many in the Great Lakes region are nostalgic for the region's hey-day of industrial hegemony. In many communities a culture of expectation and entitlement grew around the economic success of its companies, and the prosperous middle-class life they afforded.

Unfortunately, the sense that this relative prosperity would always endure, that workers and firms could reap good wages without continuing education and innovation, has, over time, stifled the entrepreneurialism and economic churn that built the region. Indicators and anecdotal evidence suggest that in most parts of the region, what was once a dynamic

economy is now change-averse, weighed down by sticky attitudes of entitlement and hopes that "things would stay as they were."

Still, the core strengths that made the Great Lakes a social innovator and economic powerhouse remain. For two centuries, the Great Lakes region has occupied center stage in America's economic development, and—while its stature may have waned in recent decades—it remains a huge part of the U.S. and world economy.

The Great Lakes region has a significant and still growing population of 97 million people, and is one of the largest industrial production centers and consumer marketplaces in the world. The population of the major metropolitan areas clustered in the Great Lakes region alone approaches 40 million, making it second only to the U.S. Eastern seaboard as a highly integrated, urbanized economic "mega-region." Such mega-regions are increasingly the global hubs of economic activity and growth.¹⁰

Indeed, with over 32.5 percent of U.S. gross state product, the Great Lakes region is one of the largest wealth generators and marketplaces in the world.¹¹ Over 300 of the country's Fortune 1000 firms are headquartered here. And it is leading the nation's

The Great Lakes region is a huge player in global trade, responsible for more than 30 percent of U.S. exports

Region,* with states** and export rank	Exports (in dollars)	Share of U.S. Total
U.S.	\$904,379,818	
Great Lakes	\$267,975,911	30%
New York (3), Michigan (5), Illinois (6), Ohio (7), Pennsylvania (9), Indiana (11), Wisconsin (18), Kentucky (19), Minnesota (20), Missouri (25), Iowa (27), West Virginia (39)		
Northeast	\$138,464,560	15%
New York (3), Pennsylvania (9), Massachusetts (10), New Jersey (12), Connecticut (26), Vermont (33), New Hampshire (41), Delaware (43), Maine (44), Rhode Island (45)		
South	\$314,783,577	35%
Texas (1), Florida (8), Georgia (13), North Carolina (14), Louisiana (16), Tennessee (16), Kentucky (19), South Carolina (21), Virginia (23), Alabama (24), Maryland (28), Oklahoma (32), Mississippi (34), Alaska (36), West Virginia (39)		
West	\$116,818,585	13%
California (2), Washington (4), Arizona (17), Oregon (22), Colorado (29), Utah (31), Nevada (35), Arkansas (37), Idaho (38), New Mexico (42), Hawaii (47), Montana (49), Wyoming (50)		
Midwest	\$189,017,819	21%
Michigan (5), Illinois (6), Ohio (7), Indiana (11), Wisconsin (18), Minnesota (20), Missouri (25), Iowa (27), Kansas (30), Nebraska (40), North Dakota (46), South Dakota (48)		

*Comparison regions are those that are drawn and defined by the U.S. Census; Great Lakes states are therefore also included in these regions.

**State figures include states in their entirety

Source: TradeStats Express <http://tse.export.gov>

fast-growing global trade, generating 30 percent of all U.S. merchandise exports. The region's exports dwarf that of the West and the Northeast, and are exceeded only by exports from the South (which include Texas's gas and oil).¹²

To be sure, the Great Lakes region has been—and remains—a vital contributor to the nation's growth and prosperity, and its continued leadership is essential to the country's ability to compete in the generations ahead. To this end, the region's leaders, in partnership with the federal government, must work to leverage the assets that have defined its past, while overcoming the challenges that could undermine its future. ■

III. Challenges to Adaptation

In recent decades, the Great Lakes states have struggled to retain their economic and social viability in the face of globalization, technological advances, and the transformation from an industrial economy to a knowledge-based one. To remain competitive, the region faces several challenges, chief among them an underdeveloped human capital base, a weak culture of entrepreneurialism, largely uncompetitive metropolitan areas, and a legacy of employee benefit, job, and income security programs unsuited for today's economy.

Underdeveloped Human Capital

Despite the large numbers of graduates its universities produce each year, the Great Lakes region continues to be hampered by serious human capital deficits, reflected in a population that generally lacks the postsecondary degrees and credentials essential to succeed in today's economy. This is largely due to the region's significant brain-drain, its aging workforce, and the legacy of an industrial economy that once provided good jobs and wages without a college degree.

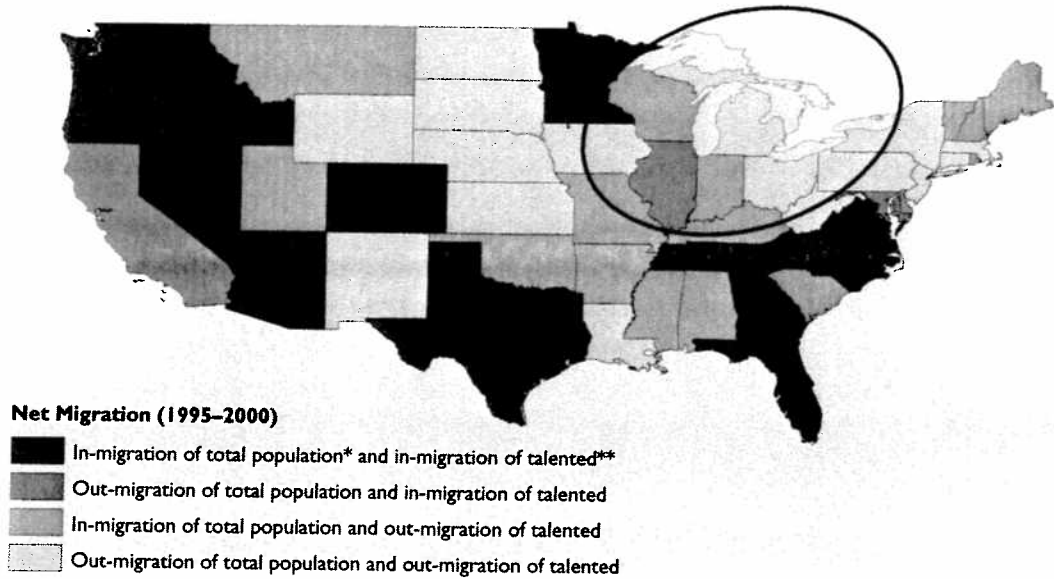
Nearly all of the Great Lakes states are experiencing a significant out-migration of residents, particularly of young, educated workers. From 1995 to 2000, only Minnesota enjoyed both in-migration of total domestic population, and young, single, well-educated 25-39 year olds. Illinois attracted talent, while seeing a net out-migration of its domestic population. Iowa, Michigan, Ohio, West Virginia, New York, and Pennsylvania all lost both domestic residents and young, educated individuals to other regions. Michigan, for example, lost, on net, over 16,000 of its young, talented workers. Pennsylvania lost nearly 29,600.

While young people flee the Great Lakes region, its workforce, moreover, is growing older. The Great Lakes states, excluding the state metros that aren't

part of the region, are home to just 28.5 percent of the nation's 18- to 34-year olds, but have 30.4 percent of the country's 35- to 64-year-olds, and 31.5 percent of its seniors. These middle-aged and older workers make up the fastest growing share of the states' total population and available workforce, and constitute a larger share of Midwest state population than in the U.S. as a whole.¹³ Many of these adult workers do not possess higher degrees. In 2005, 33 percent of working-age adults (25 years and older) in the Great Lakes region had only a high school diploma, compared to 29.6 percent nationwide; only 26.2 percent had a bachelor's degree or higher, compared to 27.2 percent nationally, and well behind leading states.

In fact, only a few states in the region—Minnesota, Illinois, and New York—rank in the top tier of states based on the share of their population holding a bachelor's degrees or higher. BA attainment levels are relatively low in the Great Lakes states that rely more heavily on manufacturing, including Michigan (24.5 percent of the population), Indiana (21 percent), Pennsylvania (25 percent), Ohio (23 percent), Missouri (24 percent), Wisconsin (24 percent), Iowa (24 percent), Kentucky (19 percent), and West Virginia (16 percent).¹⁴ Within these states, the major metropolitan areas and college towns are functioning as talent magnets, while many smaller and mid-size metros are struggling to keep and attract educated residents.

Most states in the region are experiencing out-migration of overall population and young, educated workers

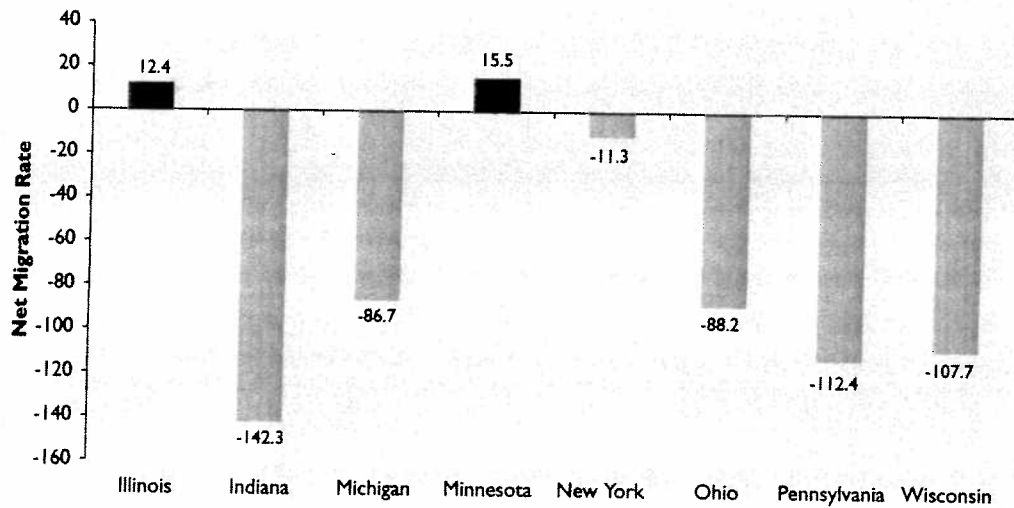


*Total population includes all individuals aged 5 or older, and excludes in-movers from abroad

**Talented population includes those who in 2000 were young (aged 25 to 39), single, and college-educated (BA or greater).

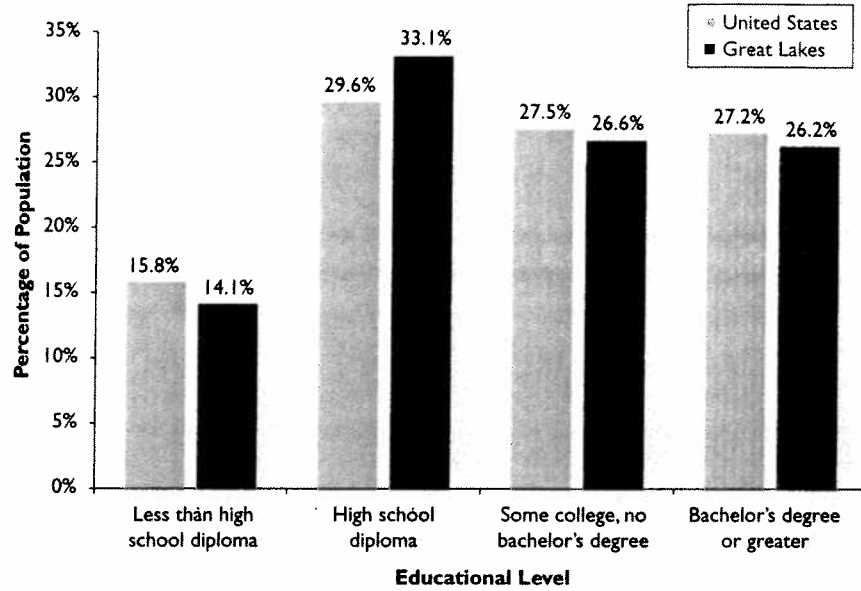
Source: Adaptation from U.S. Census Bureau Migration Report, 2005

Between 2000 and 2005, most Great Lakes states experienced large losses of young, single, college-educated residents



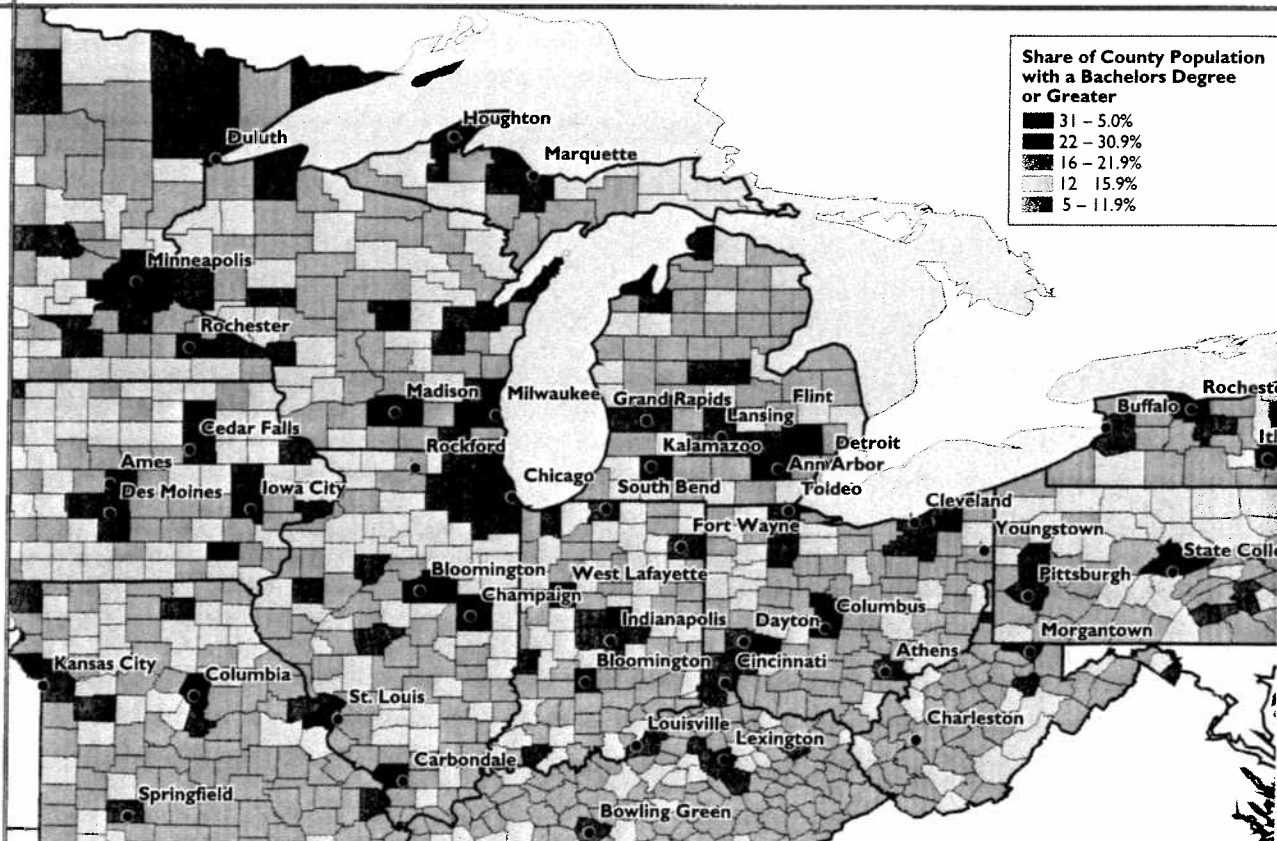
Source: U.S. Census Bureau, special tabulation

The Great Lakes region has a high share of working-age adults with only a high school diploma



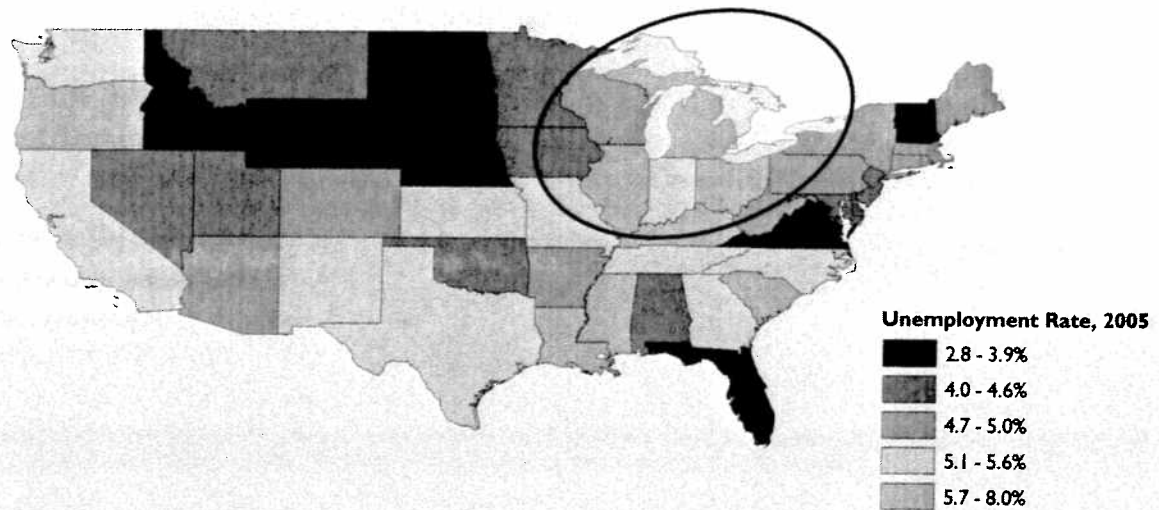
Source: U.S. Census Bureau, American Community Survey, 2006

BA attainment is comparatively high in many of region's large metros and college towns



Source: U.S. Census Bureau, 2000 Census

The Great Lakes states have comparatively high unemployment rates



Source: U.S. Department of Commerce, Bureau of Labor Statistics

The overall lack of an educated workforce represents a significant challenge for the Great Lakes economy. While a high school education was sufficient to enter the middle class in the industrial economy, an associate degree or above is now the entry ticket, with an estimated 80 percent of new jobs requiring some form of postsecondary education or training.¹⁵ A higher education degree goes a long way in improving graduates' employment opportunities and incomes, which in turn provide economic and fiscal benefits to states and localities.

To begin with, workers with a post-secondary education earn more over time than those without higher degrees. According to a recent report by the Institute for Higher Education Policy, in 2004 the national average total personal income of workers 25 and older with a bachelor's degree was \$48,417, over \$23,000 more than that of workers with only a high school diploma. In Michigan, for example, residents with a bachelor's degree earned \$47,558 compared to \$24,210 for those without a degree. Those residents with even some college had personal incomes over \$10,000 greater than those with no post-secondary education.¹⁶

Education is also increasingly essential to workers' ability to adapt to changing opportunities in the job market. Today, intense competition is forcing many of

the mature industries in the Great Lakes region to undergo significant restructuring, and large numbers of workers are being dislocated as a result. In 2005, one-third of the country's mass layoffs occurred in the Great Lakes region, with five Great Lakes states—New York, Illinois, Pennsylvania, Ohio, and Michigan—among the top ten in the nation in raw numbers of layoffs.¹⁷ Not surprisingly, then, unemployment rates are on balance higher in the Great Lakes states than elsewhere.

Layoffs and unemployment tend to hit those without a college education particularly hard. According to the Institute for Higher Education Policy report, in 2004 the national unemployment rate for residents with a bachelor's degree was 3.0 percent, compared to 5.9 percent for those with only a high school diploma. In Illinois, for example, the unemployment rate for college graduates without an advanced degree was 4.1 percent, versus 6.6 percent for high school graduates. The gap was even greater in Michigan (2.9 percent vs. 10.1 percent) and Pennsylvania (3.3 percent vs. 6.4 percent).¹⁸

Beyond its importance to family wealth and well-being, education also helps foster more prosperous state and local economies. Recent research by Glazer and Grimes shows that the most thriving states in the country are those with a high proportion of adults

Most states in the region are not enjoying the high incomes being generated in states that are the best educated. They have above the U.S. average share of high-paying knowledge industries.

State	Per Capita Income, 2005	Share of Gross State Product, High Education Industries, 2004	Population Aged 25 and Older with Bachelor Degree or Higher, 2004
United States	\$34,586	21.7%	27.0%
Above the U.S. Average in Per Capita Income, Above the U.S. Average in Share of GSP in High Education Industries			
New York	\$40,507	34.7%	30.5%
Minnesota	\$37,373	23.5%	29.7%
Illinois	\$36,120	24.7%	29.1%
Below the U.S. Average in Per Capita Income, Above the U.S. Average in Share of GSP in High Education Industries			
Above the U.S. Average in Per Capita Income, Below the U.S. Average in Share of GSP in High Education Industries			
Pennsylvania	\$34,897	19.9%	24.7%
Below the U.S. Average in Per Capita Income, Below the U.S. Average in Share of GSP in High Education Industries			
Wisconsin	\$33,565	16.7%	24.1%
Michigan	\$33,116	18.9%	24.6%
Ohio	\$32,478	18.5%	23.3%
Iowa	\$32,315	17.6%	23.9%
Missouri	\$31,899	20.3%	24.3%
Indiana	\$31,276	13.3%	21.5%
Kentucky	\$29,136	15.1%	21.9%
West Virginia	\$27,215	11.3%	16.3%

Source: Compiled by Michigan Future, Inc. using data from the Census Bureau, the U.S. Department of Labor, and the Bureau of Economic Analysis

with four-year degrees that are creating and working in high-pay, knowledge-based industries such as information, finance and insurance, professional and technical services, management of companies, education, health care, and government.¹⁹

In 2004 only three states in the region—New York, Minnesota, and Illinois—were among the top performing states in the nation based on their average per capita income and the share of their Gross State Product (GSP) derived from high-education, high-pay industries. These leading states also have higher than national average shares of adults with a bachelor's degree or higher. Pennsylvania boasts a high per capita income, but falls below the national average in its share of GSP from knowledge industries, and its share of adults with a bachelor's degree or higher. The

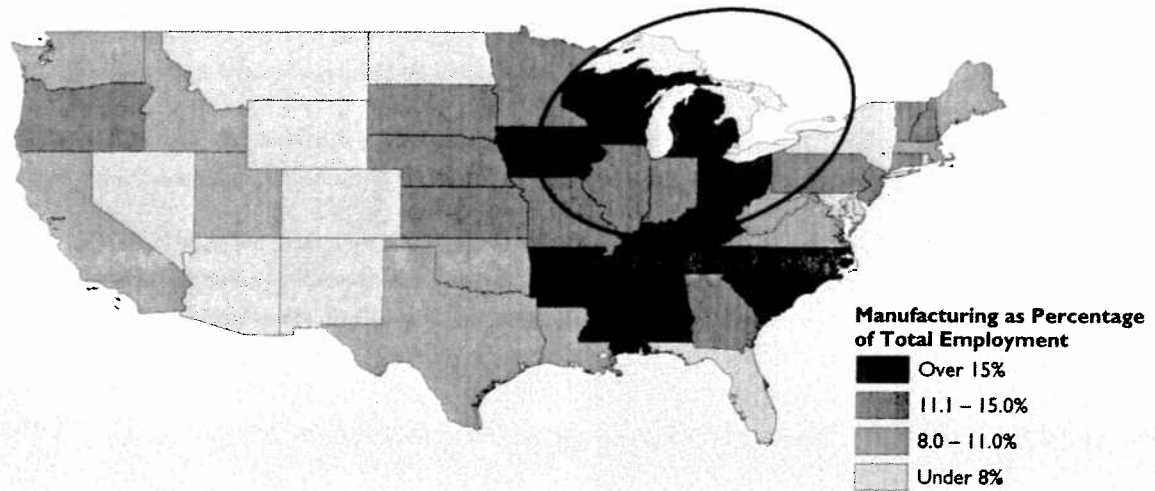
remaining eight Great Lakes states were among the states below the U.S. average on all three indicators.

Lagging Entrepreneurialism

Despite its strong network of higher education institutions, the Great Lakes region has not been terribly successful at spurring new firms, jobs, and industries. Overall, the region has not created enough jobs in high-wage advanced services industries to offset declines in factory jobs, and has struggled to commercialize and develop locally the fruits of its research products and innovations.

The products that shaped the region's development

The Great Lakes states remain highly concentrated in manufacturing



Adapted from William A. Testa, Thomas Klier, and Richard H. Mattoon, *Chicago Federal Reserve Letter Challenges and Prospects Report* (March, 2004).

Data Source: U.S. Department of Commerce, Bureau of Economic Analysis, and U.S. Department of Labor, Bureau of Labor Statistics

and identity—autos, machinery, durable goods, manufactured components—still dominate the region's economy. Jobs in the Great Lakes region remain highly concentrated in manufacturing, though the sector's contribution to gross state product far outstrips its share of state employment.²⁰ This mismatch is due to growing value gains in the sector, and concomitant employment declines: Nationwide, manufacturing industries experienced a 38 percent productivity increase from 1997 to 2004, compared to only 24.4 percent productivity growth in other non-farm employment.²¹

The decrease in manufacturing employment, while a national phenomenon, has hit the Great Lakes particularly hard: More than one-third of the country's loss of manufacturing jobs between 2000 and 2005 occurred in seven Great Lakes states: Illinois, Indiana, Michigan, New York, Ohio, Pennsylvania, and Wisconsin. Further, New York (-22.7 percent), Michigan (-24.3 percent), Ohio (-20.3 percent), Illinois (-20.8 percent), and Pennsylvania (-20.9 percent) each lost a larger share than the country as a whole (-17 percent) over the five year period.²²

Unfortunately, manufacturing losses in the region are not being replaced by new growth industries. Its number of high technology business establishments as a share of total business establishments, for exam-

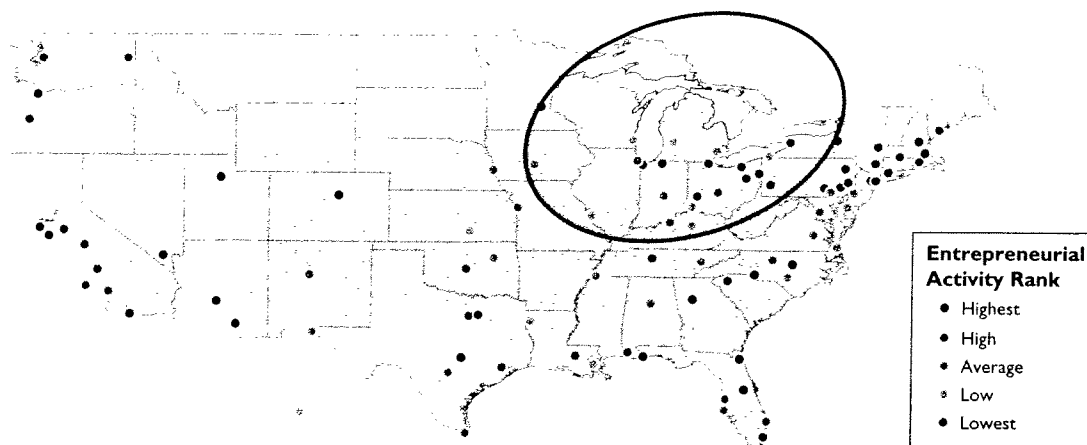
ple, is comparatively low among regions: only 5.7 percent of all businesses in the area are high-tech, less than any other part of the country.²³

To improve its overall economic position, the Great Lakes region must continue to make rapid productivity gains in manufacturing, while at the same time developing new products from its industrial base, and new knowledge-based products and services. But while once *the* hotbed of innovation, much of the region lacks the entrepreneurial, churning, change-oriented economic culture needed to translate ideas into jobs.

The majority of Great Lakes communities are behind their peers, for example, on a recent Small Business Administration ranking of entrepreneurial activity, new business development, and commercialization in the nation's metropolitan areas.²⁴ These rankings are based on a combined measure of new firms per 1000 workers, the growth rate of new firms, and the share of new businesses that are growing. Minneapolis-St. Paul is the only large Great Lakes metro that ranks among the top 20 percent of the nation's most entrepreneurial areas.²⁵ Most of the Great Lakes metros are at the other end of spectrum, not spawning, nor seeing growth among, new enterprises.

In addition, despite its large population and busi-

Only one of the region's major metros ranks among the top one-fifth of the nation's most entrepreneurial communities; most rank near the bottom



Source: Compiled from the 1990–2001 LEEM data file, U.S. Census Bureau by Advanced Research Technologies, LLC with elimination of "Small Regions"

ness base, the Great Lakes region lags in terms of its share of small business innovation and research, earning only 20 percent of the nation's competitive Small Business and Innovation Research (SBIR) grant dollars from 2001 to 2003.²⁶ The region's share of these awards is lower than that of the West (36 percent), the Northeast (29 percent), and even the South (23 percent).²⁷

The region's lagging entrepreneurialism is likely a product of several forces. First, small business creators and owners are better-educated and more likely to be longer-term community residents.²⁸ Low overall education levels in the region and the continued out-migration of young talent could thus be hindering the development of new enterprises.

Further, some of the failure to commercialize new knowledge locally may be due to failures in capital markets. Despite the ease of capital movement globally, not all regions benefit from it equally: As one Midwest VC manager put it, "capital *isn't* perfectly mobile; VC firms want to have their investments nearby."²⁹ Venture capital in the United States is concentrated on the coasts, leaving a void in the middle part of the country: In 2003, 51 percent of the nation's venture capital was dispersed in the West, and 27 percent in the Northeast, while Great Lakes states saw only 12 percent—a number well below the

32 percent share of the nation's patents for new intellectual property created in the region, and the region's 33 percent share of the national population

A third impediment to entrepreneurialism in the Great Lakes region may be the change-averse culture that has been nurtured through several generations of industrial employment. Anecdotes are legion in the region regarding individuals who a generation ago were advised, or themselves chose, what appeared at the time to be durable, steady career work in the region's manufacturing or other large-scale enterprises, forgoing the opportunity to start a new business. This anecdotal evidence is supported by research by Douglas E. Booth, who, based on analysis of industrial life-cycles in the Northeast and Midwest, determined that "[T]he principal barrier to new business formation in older regions is simply the existence of established industries that divert potential entrepreneurs and other resources from the new business formation process."³¹

Ultimately, it may simply be that the Great Lakes culture as it has evolved does not today promote or encourage entrepreneurial behavior. Openness, engagement, and comfort with new ideas and people are central features of innovative communities. To the degree that the relative isolation and success of many Great Lakes manufacturing communities cre-

ated a self-referential, insular, and paternal leadership class, prospects for adaptive change have likely been diminished.³²

Uncompetitive Metropolitan Communities

In today's globalizing world, economic activity and the people who drive it are congregating in diverse, globally interacting metropolitan areas. These communities are our centers of research and innovation, our ports of entry, and our immigration gateways.

The nation's metropolitan areas are home to 80 percent of the U.S. population, and are accommodating most of its growth: The majority of economic and population growth over the past 25 years has occurred in 30 large metropolitan regions. In 1999, 12 of the nation's 18 large consolidated metropolitan areas (CMSAs) were responsible for 66 percent of all patents and 43 percent of jobs related to technology development.³³ These communities are also magnets for young talent: In 2000, college-educated 25- to 34-year olds were 25 percent more likely to live in one of the 50 largest metro areas.³⁴

The Great Lakes states are no exception to these trends. Over 80 percent of the population of the 12 Great Lakes states—as well as 82 percent of all jobs and 85 percent of bachelor's degree holders—can be found within metropolitan areas, demonstrating their primacy in the regional economy.³⁵

For metropolitan areas to prosper, they must be able to adapt to the changes in the global economy and create communities that generate quality jobs, raise the welfare of all citizens, and provide a sustainable quality of life for businesses and families. Unfortunately, this isn't happening in most of the metros of the Great Lakes. Instead, these areas—and the cities within them—are plagued by numerous economic, physical, and social problems. Many of these communities are, and are perceived to be, economically stagnant, old and beat-up, and seriously fractured along racial lines.

In the first place, the metropolitan areas of the Great Lakes are not, on the whole, performing as well economically as those in other regions of the country. According to a forthcoming Brookings

47 percent of "weak market" metros are located in 11 of the 12 Great Lakes states*

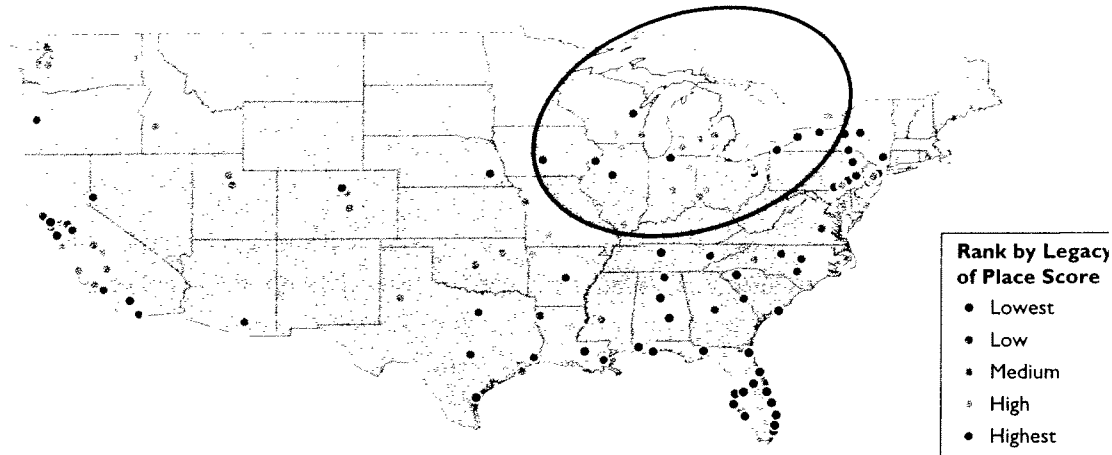
Ames, IA
Davenport-Moline-Rock Island, IA-IL
Dubuque, IA
Waterloo-Cedar Falls, IA
Decatur, IL
Anderson, IN
Fort Wayne, IN
Muncie, IN
South Bend-Mishawaka, IN-MI
Terre Haute, IN
Owensboro, KY
Battle Creek, MI
Flint, MI
Lansing-East Lansing, MI
Saginaw-Saginaw Township North, MI
St. Joseph, MO-KS
St. Louis, MO-IL
Albany-Schenectady-Troy, NY
Binghamton, NY
Buffalo-Niagara Falls, NY
Rochester, NY
Syracuse, NY
Utica-Rome, NY
Canton-Massillon, OH
Cleveland-Elyria-Mentor, OH
Dayton, OH
Mansfield, OH
Springfield, OH
Toledo, OH
Youngstown-Warren-Boardman, OH-PA
Altoona, PA
Erie, PA
Harrisburg-Carlisle, PA
Pittsburgh, PA
Reading, PA
Scranton-Wilkes-Barre, PA
Milwaukee-Waukesha-West Allis, WI
Racine, WI
Charleston, WV
Huntington-Ashland, WV-KY-OH

*Minnesota doesn't have any weak market metropolitan areas.

**List includes metropolitan areas that were ranked in the bottom one-third of 256 U.S. metropolitan areas based on their change in MSA-level employment, wages, and gross metropolitan product from 1990 to 2000, and their gross metropolitan product per job in 2000

Source: Forthcoming Brookings Institution report

The metros of the Great Lakes region suffer most from legacy of place costs, including older housing and infrastructure, greater demand for services, and higher tax rates



Source: Randall Eberts, George Erickcek, and Jack Kleinhenz, "Dashboard Indicators for the Northeast Ohio Economy." Working Paper 06-05 (Kalamazoo, MI: W.E. Upjohn Institute for Employment Research, 2006).

*Legacy of place takes into account the costs associated with a declining industrial base, an older infrastructure, high unemployment, low educational attainment, a disproportionate need for human services, and a tax base insufficient to support the demand for services.

Institution study, of 85 metropolitan areas considered economically "weak" based on their relative performance on a series of indicators—including change in MSA-level employment, wages, and gross metropolitan product from 1990 to 2000, and gross metropolitan product per job in 2000—47 percent (40 metropolitan areas) are in the 12 Great Lakes states. Metropolitan areas in these states, meanwhile, make up just 32 percent of the 256 metros included in the analysis.

The Buffalo, NY metropolitan area, for example, experienced a 1.3 percent decrease in employment from 1990 to 2000, while its earnings over the period grew only 42 percent. Flint, MI lost 3.6 percent of its jobs during the decade, while its earnings grew just 35.8 percent. This compares to an average 12.3 percent employment growth and 77 percent earnings growth for the all the metros in the study sample. The story is much the same in metros scattered from Dubuque, IA to Erie, PA.

Older metropolitan communities in the Midwest such as these are also suffering from a host of what the Upjohn Institute refers to as "legacy of place" costs—including a declining industrial base, aging infrastructure (roads, sewers, and housing), lower

educational attainment rates, greater demand for services accompanied by an insufficient tax base multiple and duplicative local government units—that are likely both a cause and an effect of their going economic performance.³⁶ This research shows that Great Lakes metropolitan areas suffer more these costs than any other region of the country. These communities have decaying roads, antiquated water-sewer systems, crumbling school buildings, costly brownfield cleanup challenges, all of which thwart their ability to attract, retain, and grow the families and firms they need to thrive.

The transportation systems in Great Lakes metropolitan areas, especially, are aging and outmoded have never been developed to serve a rapidly decentralizing population: Their transit systems are weak they are choking on congestion, and their roadways are in terrible shape. Chicago and Detroit, for example, rank 7th and 8th in the nation, respectively, travel delay time, and even smaller cities of the Great Lakes rank high, including Minneapolis (22nd), Louisville (24), Indianapolis (27th), and Cincinnati (39th).³⁷ And according to the American Society of Civil Engineers 2005 Report Card on America's Infrastructure, in states such as Michigan, Illinois

Many of the region's historic manufacturing cities continue to lose population

City	City population (1990)	City population (2000)	Percent Change 1990–2000	Rank Among Top 100 Most Populous Cities
Fort Wayne, IN	173,072	205,727	18.9%	26
Lexington-Fayette, KY	225,366	260,512	15.6%	34
Columbus, OH	632,910	711,470	12.4%	42
Madison, WI	191,262	208,054	8.8%	51
Indianapolis, IN	731,327	781,870	6.9%	62
St. Paul, MN	272,235	287,151	5.5%	66
Grand Rapids, MI	189,126	197,800	4.6%	68
Chicago, IL	2,783,726	2,896,016	4.0%	71
Minneapolis, MN	368,383	382,618	3.9%	73
Des Moines, IA	193,187	198,682	2.8%	75
Akron, OH	223,019	217,074	-2.7%	85
Louisville, KY	269,063	256,231	-4.8%	87
Milwaukee, WI	628,088	596,974	-5.0%	88
Rochester, NY	231,636	219,773	-5.1%	89
Cleveland, OH	505,616	478,403	-5.4%	90
Toledo, OH	332,943	313,619	-5.8%	92
Detroit, MI	1,027,974	951,270	-7.5%	93
Cincinnati, OH	364,040	331,285	-9.0%	95
Pittsburgh, PA	369,879	334,563	-9.6%	96
Buffalo, NY	328,123	292,648	-10.8%	98
St. Louis, MO	396,685	348,189	-12.2%	100

Source: Census 2000 and Census 1990

Missouri, Wisconsin, and Pennsylvania 30 percent to 50 percent of the major road network is in poor or mediocre condition.³⁸

At the same time, the transportation routes that connect these metros to one another remain underdeveloped, still designed for a previous economic era. To be sure, the Great Lakes region today has significant infrastructure elements in place, including road and rail transportation arteries, airports, and a large power production and distribution grid. However, compared to other “mega-regions” such as the Northeast Corridor and those in Europe, the intermodal air, rail, and road hubs between and within major metro areas of the Great Lakes region are much less fully developed. Europe, China, India, and other emerging competitors are deliberately accelerating their growth by expanding transportation and

other infrastructure links within and across regions. By contrast, the United States has only paper plans for high speed rail to link our global gateways.

Finally, the metropolitan areas of the Great Lakes suffer from serious social problems, including severe racial and economic segregation.

Economic change has hit the region's urban cores particularly hard. As a result, many of the Great Lakes traditional manufacturing cities have continued to experience a significant population drain, even at a time when U.S. cities as a group are again seeing gains. In the process, many of the region's neediest families have been left behind, creating a widespread pattern of racial and economic disparities within metros: In 2000, seven of the top ten most segregated large metropolitan areas for blacks were in the Great Lakes region—Milwaukee, Detroit, Cleveland,

The Great Lakes industrial cities are among the most racially segregated in the nation

Rank	Great Lakes Regional MSA/PMSA
------	-------------------------------

1	Milwaukee-Waukesha, WI PMSA
2	Detroit, MI PMSA
3	Cleveland-Lorain-Elyria, OH PMSA
4	St. Louis, MO-IL MSA
6	Cincinnati, OH-KY-IN PMSA
7	Buffalo-Niagara Falls, NY MSA
9	Chicago, IL PMSA
13	Indianapolis, IN MSA
16	Rochester, NY MSA
17	Pittsburgh, PA MSA
22	Columbus, OH MSA
24	Minneapolis-St. Paul, MN-WI MSA

**Residential segregation is measured across five dimensions: evenness, exposure, concentration, centralization, and clustering. The Census Bureau uses non-Hispanic whites as the reference group, and metropolitan areas as reasonable approximations of housing markets. There are 43 large metropolitan areas.*

Source: John Iceland, Daniel H. Weinberg, and Erika Steinmetz, U.S. Census Bureau, Series CENSR-3, Racial and Ethnic Residential Segregation in the United States: 1980-2000, U.S. Government Printing Office, Washington, DC, 2002.

St. Louis, Cincinnati, Buffalo, and Chicago³⁹—while six of its metropolitan areas—Syracuse (36 percent), Buffalo (33.5 percent), Milwaukee (32.6 percent), Toledo (32 percent), Youngstown-Warren (31.4 percent), and Pittsburgh (30.6 percent)—are in the top 10 of the 100 largest metros in terms of percentages of blacks living in poverty.

The impact of these stark racial and economic divisions is twofold. First and foremost, they have a terrible effect on those families left behind in neighborhoods with increasingly limited access to employment opportunities, quality schools, and basic goods and services. Educational attainment levels among blacks in the region are just one manifestation of this schism. Among the 100 largest U.S. metropolitan areas, in 1999 only five Great Lakes metros—Ann Arbor (83 percent), Minneapolis (80 percent), Pittsburgh, Columbus, and Dayton (78 percent)—were in the top half based on their share of black residents with a high school degree. Only Ann Arbor (24 percent), Minneapolis (20 percent), Chicago, Dayton, and Columbus (15 percent) were among the top 50 for black BA attainment.

These divisions, moreover, undermine the economic prosperity of the entire region. As the region's aging workforce moves into retirement, moving low-income minorities out of poverty will be key to meeting the economy's growing need for skilled workers. Unfortunately, if current economic and education patterns persist, young minorities will be ill-prepared for high level jobs—the very type of jobs the region needs to grow.

Outdated Social Compact

Today's employee benefit, job, and income security systems—like so many of the nation's economic and social practices—were forged in the Midwest. The wealth generated by the industries of the region allowed the American dream to be codified in a social compact that placed increasingly generous health, pension, retirement, working condition, unemployment, and income protections first in negotiated agreements, and ultimately in public policy.

Over the years, industrial unions, who at the zenith of their membership and influence were clearly concentrated in the Great Lakes, accomplished much in bringing basic workplace rights, decent working conditions, and other benefits to its members and the broader society. But the opening of the American marketplace to global competition has exposed American industry to rival countries' very different treatment of social welfare costs. While these countries' generalize health and retirement costs across society, the burden of these costs in the Great Lakes region is borne by older manufacturing firms with large workforces and unions. This has put these companies at a big cost disadvantage compared to their foreign, and even many domestic, counterparts.⁴⁰

To alleviate much of this cost burden, today's employers are dramatically curtailing employee benefits. For example, in the past four years alone, workers covered by employer-based health insurance dropped from 64 percent to 59 percent. Drops are steepest among those with less than a college education, and within the blue collar occupations that characterize much of the Great Lakes workforce.⁴¹ In fact, over the past five years eight of the 12 states of the Great Lakes region experienced drops in private sector health coverage greater than the national rate

of decline of 3.8 percent. This shift is contributing to the skyrocketing Medicaid costs that are cramping states' ability to invest in education, re-training, or job creation.⁴²

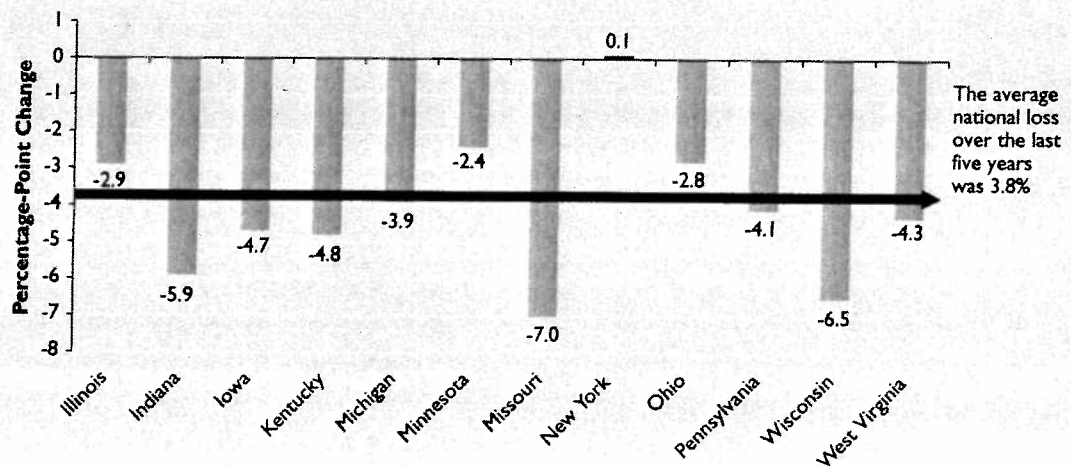
Generous defined benefit pension plans are also fast becoming a relic of the past. Only 20 percent of private sector workers today participate in such plans.⁴³ Those that still exist, moreover, are on increasingly shaky ground, underfunded as they are by a total of \$450 billion.⁴⁴ These deficits are hitting the Midwest particularly hard: Eight of the top ten pension plans underfunded by at least 25 percent of their market capitalization are with firms headquartered in the Great Lakes states.⁴⁵ A number of these large employers are resorting to strategic bankruptcy to escape their pension and other obligations, resulting in large layoffs, and a heightened sense of insecurity among current and former employees.

The legacy—and challenge—of robust employee benefits permeates the public sector as well. In fact, up to 90 percent of state and local government employees are still members of defined benefit plans, which have unfunded liabilities that are even higher than those of private firms.⁴⁶ These liabilities, combined with five years of sluggish market returns, have brought fiscal crises to communities around the



country. These problems are only exacerbated in the Great Lakes. With its numerous local units of governments, tradition of generous compensation packages, and an older, and aging, population, the Great Lakes region faces particularly significant strains on state and local pensions, as well as on its Medicare, Medicaid, and social security systems.⁴⁷

Over the past five years eight of the 12 Great Lakes states have experienced declines in private health insurance coverage greater than the U.S. average



*Employer-provided health insurance coverage refers to individuals having coverage through their current or previous employer or as a spouse or dependent on someone else's plan. The employer's contribution to the coverage premium could be as high as 100% or as low as 0%.

Source: Gould's (2006) analysis of the March Current Population Survey, 2000–2005

IV. Assets on Which to Build

For the Great Lakes to secure leadership in the knowledge economy, its citizens and leaders must overcome its challenges, and harness the forces of globalization and change. Just as the region once served as a “laboratory of democracy”—inventing whole new paradigms for industry, education, social, and workplace organization—it can again become a source of innovation, progress and prosperity.

The region has several major assets upon which to build, including a strong infrastructure for research, innovation, and talent cultivation; critical mass and expertise in important emerging industries; global connectivity; and the tremendous resource and distinctive amenity provided by the Great Lakes and its waterways.

Innovation Infrastructure

The Council on Competitiveness 2005 Report “*Innovate America*” names innovation as the chief economic challenge of 21st Century America and identifies several elements central to cultivating it:⁴⁸

- Investment in the research and development that fuels innovation
- Talent cultivation
- An innovation infrastructure that supports it

With its sizable and technologically-rich private sector research and industry base and extensive public university system, the Great Lakes region has the potential to excel in innovation.

To begin with, the region’s private sector research and development engines work together with its leading research universities to create what is, by several measures, one of the world centers of innovation and new technology development.

The accompanying map shows state shares of total public and private R&D funding, demonstrating that the Great Lakes region as a whole conducts a large portion of the nation’s total basic and applied

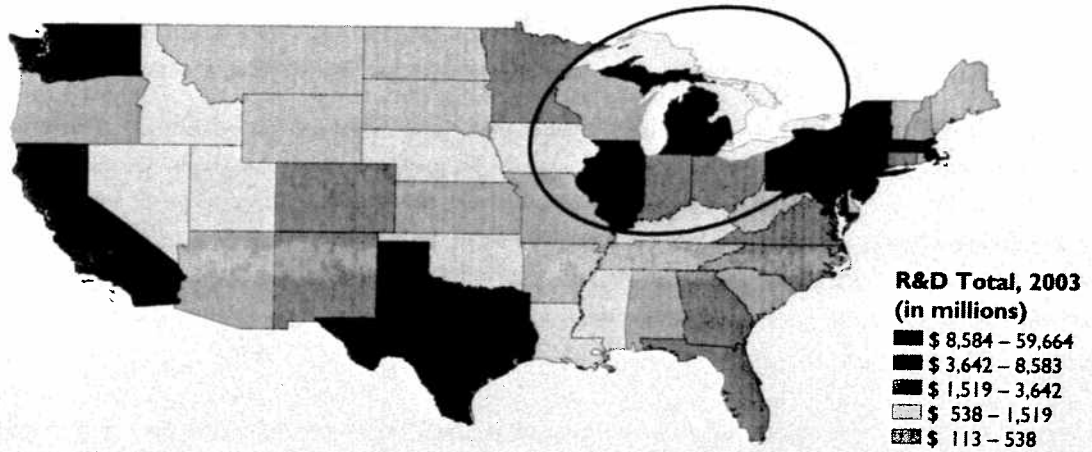
research and development. Taken together, the Great Lakes states perform 29 percent of the nation’s total public and private research and development.⁴⁹

These research dollars are contributing to the development of new products and processes: The Great Lakes states generated 32 percent of the new patents in the nation in 2003, lagging only the West (35 percent), and outpacing the Northeast (23 percent).

While the private sector—the numerous corporate headquarters and research centers located in the region—contributes the bulk of R&D spending and creates the lion’s share of new intellectual property (as measured by patents), it is powerfully aided by the region’s public and private research universities.

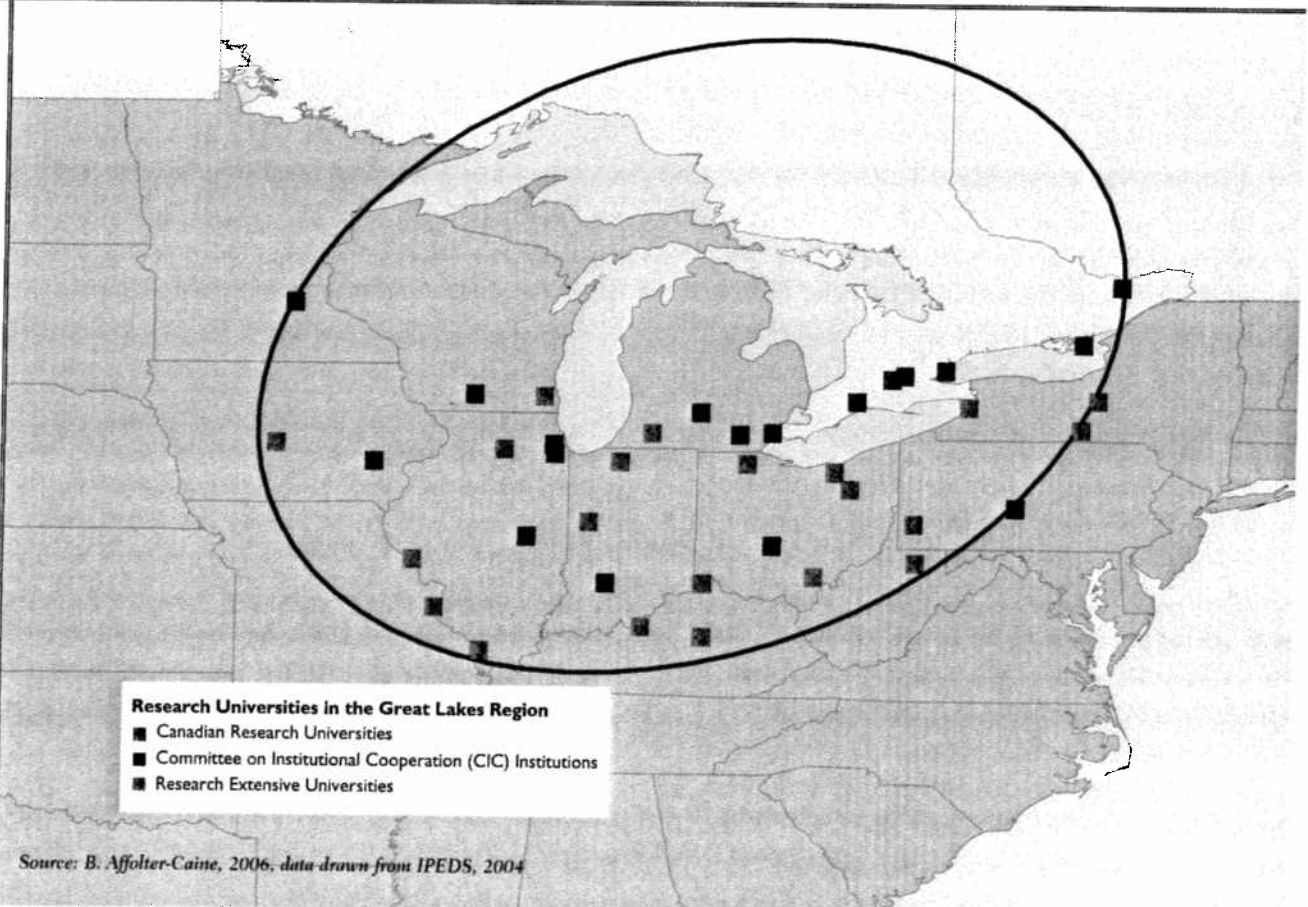
With their commitment to “uncommon learning for the common man,” and the creation of the land-grant university to further industry and commerce, the founders of the Great Lakes region built what is arguably the greatest network of universities in the world. According to Institute of Higher Education at Shanghai Jiao Tong University, 19 of the top-ranked 100 universities in the world are Great Lakes institutions—compared with only 15 in the Northeast/Mid-Atlantic, and 13 on the West Coast.⁵⁰ (The number rises to 21 if the University of Toronto and McMaster University (Hamilton, Ontario) are included in the Great Lakes tally). The region’s universities alone (excluding Canada) include one-quarter of the top 100 colleges and universities in total R&D spending, 7 of which are in the top 20 nationally in total research dollars earned.⁵¹

The Great Lakes region performs 29 percent of total U.S. public and private research and development



Source: Science Foundation, Division of Science Resources Statistics, Survey of Industrial Research and Development, Survey of Research and Development Expenditures at Universities and Colleges; Survey of Federal Funds for Research and Development; and U.S. Department of Commerce, Bureau of Economic Analysis, www.bea.gov/bea/newsrel/gspnewsrelease.htm

The Great Lakes region is home to one of the largest concentrations of research universities in the world



Source: B. Affolter-Caine, 2006, data drawn from IPEDS, 2004

19 of the top-ranked 100 universities in the world are located in the Great Lakes region

Institution	Location	R
University of Chicago	Chicago, Illinois	
Cornell University	Ithaca, New York	
University of Wisconsin - Madison	Madison, Wisconsin	
University of Michigan	Ann Arbor, Michigan	
University of Toronto	Toronto, Ontario	
University of Illinois - Urbana Champaign	Urbana-Champaign, Illinois	
Washington University	St. Louis, Missouri	
Northwestern University	Evanston, Illinois	
University of Minnesota	Minneapolis-St. Paul, Minnesota	
Pennsylvania State University	University Park, Pennsylvania	
University of Pittsburgh	Pittsburgh, Pennsylvania	
Carnegie Mellon University	Pittsburgh, Pennsylvania	
Ohio State University	Columbus, Ohio	
University of Rochester	Rochester, New York	
Case Western Reserve University	Cleveland, Ohio	
Purdue University	West Lafayette, Indiana	
Michigan State University	Lansing, Michigan	
Indiana University	Bloomington, Indiana	
McMaster University	Hamilton, Ontario	

**These rankings are heavily weighted towards those institutions with an emphasis/expertise in the sciences.*

Source: Institute of Higher Education, Shanghai Jiao Tong University, 2005

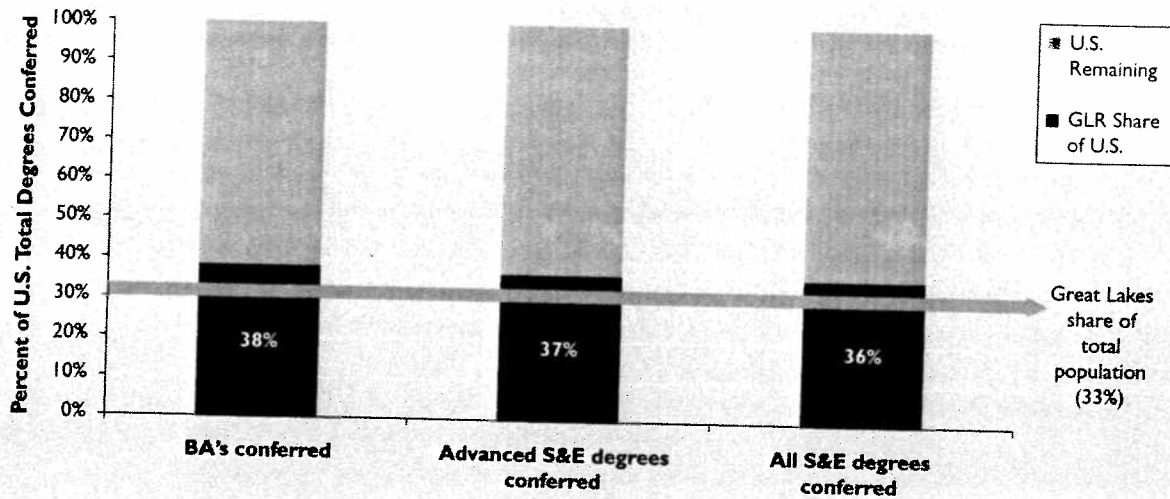
Great Lakes universities are also the nation's leading creators and exporters of talent. With 33 percent of the U.S. population, the Great Lakes states produced 38 percent of the country's bachelor degree holders, 36 percent of all science and engineering degrees, and 37 percent of all advanced science and engineering degrees in 2003—far outstripping any other region of the country.⁵²

Beyond their role as talent magnets and producers, these universities function as truly global institutions, advancing intellectual discourse, new discovery, and cross-national exchange of ideas (and commerce) while being anchored firmly in the Midwest. Today these institutions are engaged in very substantial efforts on every continent. The University of Michigan alone, for example, has partnerships with Peking University and Shanghai Jiao Tong, business school campuses in Seoul, Hong Kong, Sao Paulo, Paris, and London, and runs an Institute for Emerging Economies in Eastern Europe. These and

other international linkages will help keep the U the forefront of new technologies and innovation on a global basis, while expanding multi-cultural knowledge and connections among the world's leaders.

Great Lakes universities are also the nation's leading creators and exporters of talent.

Great Lakes universities produce a large share of the nation's educated professionals



Source: Authors' analysis of data from the Science and Engineering Indicators, 2006

Leadership in Emerging Global Industries

The Great Lakes region has the infrastructure and critical mass in key industry sectors to afford current and future economic leadership on a global basis. These industry clusters are regional in scope, extending beyond metropolitan and state borders, and even across national lines into Canada.

For example, even as the auto industry undergoes dramatic restructuring that continues to shrink factory employment, the region is consolidating as a global auto design and research center. While some new foreign transplant manufacturing facilities are choosing the Deep South, Honda, Toyota, and other highly competitive firms are locating new facilities in Indiana and Ohio. Perhaps even more importantly, they are opening new major R&D centers in Southeast Michigan that will employ thousands of highly educated professionals.

Other areas of economic leadership include:

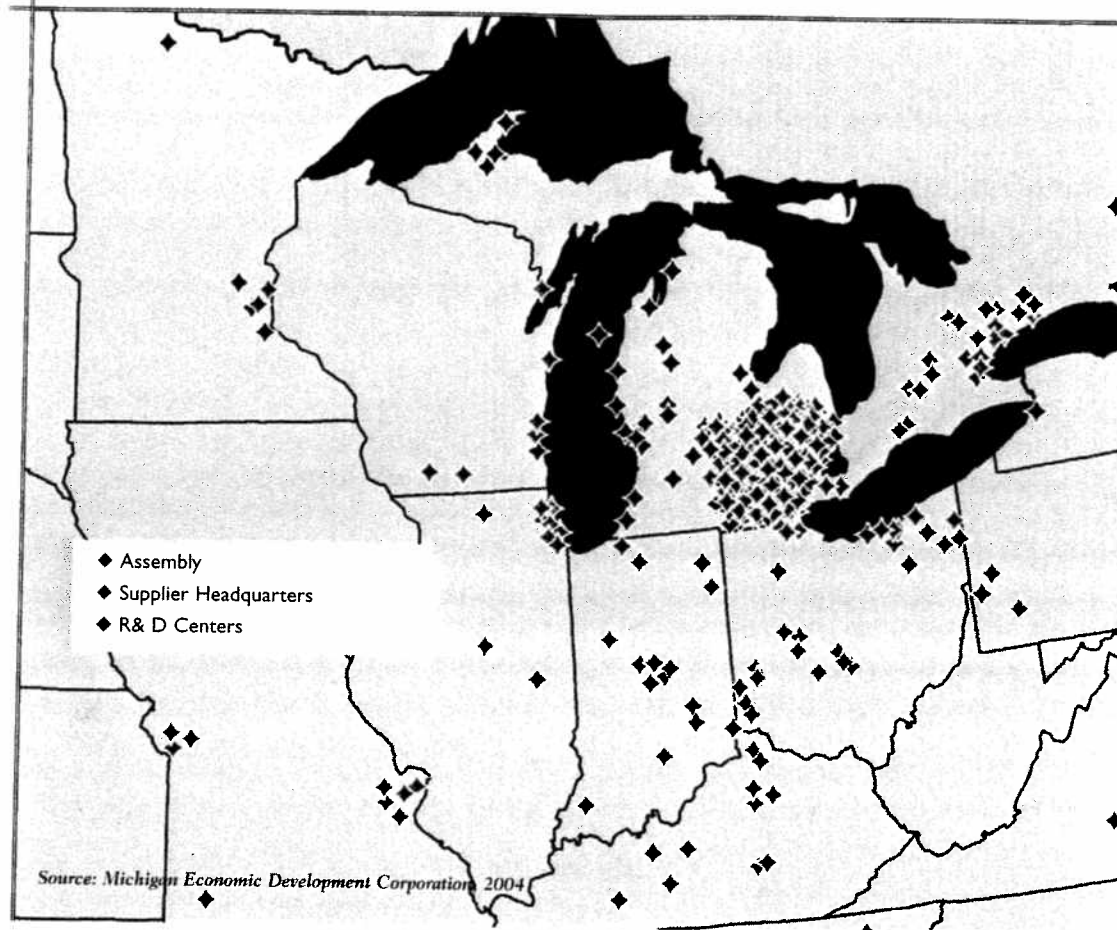
Energy/Environment/Next Generation Transportation

The Great Lakes has a huge base in energy and power generation and consumption, producing 34 percent of the country's electrical energy, and consuming 33 percent of the country's energy output. The region's industrial and research infrastructure offer a strong platform for growth in improved and alternative energy sources.

As the center of coal-based energy generation, for example, the region can lead the way in the development of clean-coal and pollution abatement technologies for the nation and the world. At the same time, the region can be in front of the push for basic and applied research for non-polluting, safe, and secure nuclear power, as well as hydrogen-based power. The Great Lakes region in 2005 generated over 37 percent of the nation's nuclear energy.⁵³ Experience with nuclear technology, and very high temperatures available in advanced nuclear plants, make the region an ideal location for hydrogen production (whether through electrolysis or chemical processing).

The rich confluence of companies and research institutions engaged in energy and transportation

The region is home to significant global industry clusters, including automobile design and develop



innovations, including automobile/transportation research, and the development of hydrogen fuel cell technology and grain-based and synthetic fuels, also position the region as a world leader in new transport technologies. With its huge concentration of agribusiness and public/private research in agri-science, and as the center of the nation's production of biomass (from corn and other fuels), it has particular potential for leadership in biomass production and new bio-based fuel technologies.

Bio-Science

The Great Lakes area has developing strengths in two areas of bio-science, a field that has spurred intense competition around the world in recent years.

First, the Great Lakes region is an important center in areas of biotechnology applied to agriculture—including FARMaceuticals (genetically-engineered drugs and antibodies from livestock), biofuels, indus-

trial processes (green engineering), and “green chemicals” such as biodegradable plastics that build on the region's base of pharmaceutical industries.

The region is also the location of significant biotechnology applied to medical products. Great Lakes communities are among the nation's major centers of medical research and treatment, with a number of hospitals ranked nationally in multiple disciplines. Five metros in the region are among the top 100 research centers in the country: Detroit, Chicago, and St. Louis.⁵⁵ The hospitals and research institutions in these communities are vibrant, both attracting students and patients, and developing new products and services.

Several of the nation's top medical research and teaching hospitals are located in the Great Lakes region

Specialty	Hospitals in the Top Ten Nationally
Cancer	Mayo Clinic, Rochester, MN University of Chicago Hospitals
Digestion	Mayo Clinic, Rochester, MN Cleveland Clinic University of Chicago Hospitals Clarian Health Partners, Indianapolis
ENT	University of Iowa Hospitals and Clinics, Iowa City University of Pittsburgh Medical Center University of Michigan Hospitals and Health System, Ann Arbor Barnes-Jewish Hospital/Washington University, St. Louis Cleveland Clinic
Endocrinology	Mayo Clinic, Rochester, MN Mayo Clinic, Rochester, MN Barnes-Jewish Hospital/Washington University, St. Louis Cleveland Clinic
Gynecology	Mayo Clinic, Rochester, MN Cleveland Clinic
Heart	Cleveland Clinic Mayo Clinic, Rochester, MN Barnes-Jewish Hospital/Washington University, St. Louis
Kidney Disease	Mayo Clinic, Rochester, MN Cleveland Clinic Barnes-Jewish Hospital/Washington University, St. Louis
Neurology	Mayo Clinic, Rochester, MN Cleveland Clinic Barnes-Jewish Hospital/Washington University, St. Louis
Ophthalmology	University of Iowa Hospitals and Clinics, Iowa City
Orthopedics	Mayo Clinic, Rochester, MN Cleveland Clinic Rush University Medical Center, Chicago University of Iowa Hospitals and Clinics, Iowa City
Pediatrics	Rainbow Babies and Children's Hospital, Cleveland; Cincinnati Children's Hospital Medical Center; Children's Memorial Hospital Chicago
Rehabilitation	Rehabilitation Institute of Chicago Mayo Clinic, Rochester, MN Ohio State University Hospital, Columbus, OH
Respiratory	Mayo Clinic, Rochester, MN Cleveland Clinic Barnes-Jewish/Washington University, St. Louis
Rheumatology	Mayo Clinic, Rochester, MN Cleveland Clinic
Urology	Cleveland Clinic; Mayo Clinic, Rochester, MN Barnes-Jewish Hospital/Washington University, St. Louis

Source: 2006 Hospital Rankings by U.S. News and World Report

The Great Lakes region is the nation's second largest energy producer and consumer

Region	Net Generation, 2004		Consumption (MWh)
	(MWh)	Regional Share of U.S. Total	
U.S.	3,970,518,778		3,536,802,678
Great Lakes	1,367,154,311	34%	1,153,471,436
Northeast	549,879,552	14%	503,186,475
South	1,703,443,847	43%	1,517,959,100
West	770,706,184	19%	683,475,923
Midwest	946,489,195	24%	832,181,180

Source: EIA State Energy Data, 2004 Report

*Comparison regions are those that are drawn and defined by the U.S. Census; Great Lakes states are therefore also included in these

Advanced Manufacturing

While manufacturing is often thought of as an "old technology" industry, traditional industries are in fact highly sophisticated in developing and using new technologies in their operations and products. Indeed, the Great Lake region's high concentration of manufacturing-reliant jobs include significant numbers of high-technology occupations and activities.

The region has a critical mass of expertise in designing and making products that require significant technical know-how. This includes 34 percent of the country's workers employed in high-tech firms (versus 19 percent in the Northeast, and 25 percent in the West),⁵⁶ and a large share (30 percent) of the nation's scientists and engineers.⁵⁷ This experience base gives it a leg up on growing advanced manufacturing in emerging product lines, including robotics, electronics, health and medical devices and products (including ones that incorporate nanotechnology), energy producing and conserving materials and products, new sensing devices, and graphic and computer design and engineering applied to manufacturing processes. These examples don't even consider the power of new transformative technologies that may create products and services not seen today; such technologies could offer the region comparative advantage that extends its high-value manufacturing in new directions.

Infrastructure for Global Connectivity and Knowledge Exchange

The region is also the nation's pioneer in developing the cyberinfrastructure needed for global connectivity. Global knowledge work, including software and software, IT scientists and the organizations and policies that support them. Great Lakes states have led the development of technology for the nation, e.g., University of Minnesota developing the supercomputer, the University of Illinois introducing the web browser, the University of Michigan building the Internet, and the University of Indiana leading the development of Internet2. For Great Lakes companies have developed a significant strength in global sourcing economies. The use of sophisticated IT networks for cyberinfrastructure development, implementation, and utilization, if nurtured, can be a significant asset of the region.

Global Connectivity

The most successful communities today have global reach. They are home to global firms and universities that are players and connectors in the world exchange of ideas, people, culture, fashion, products, and services. Several of the leading communities in Great Lakes region have these attributes.

Analysis by the Globalization and World Cities project categorizes cities as "Alpha", "Beta," "Emerging," and "Reemerging" based on a number of indicators, including the nature and number of firms in a region that were at the center of global services provision, as well as international business travel activity. Based on this analysis, Chicago and Toronto are "Alpha" world cities and Minneapolis-St. Paul is "Emerging." And, while still facing significant economic challenges, Detroit/Southeast Michigan, and Cleveland are reemerging as global entrepôts, sharing several of characteristics of global leaders, including well-developed air transportation infrastructure.⁵⁸

In a 2005 paper that rates cities based on connections among advanced producer service firms, Taylor and Lang found that Chicago ranked second in the country behind New York, with nine other Great Lakes cities—Minneapolis (14), St. Louis (15), Detroit (16), Cleveland (20), Indianapolis (21), Pittsburgh (22), Cincinnati (26), Columbus (28), Rochester (30), and Buffalo (34)—among the top 40 most globally connected U.S. communities.⁵⁹

The major metropolitan areas in the Great Lakes are also the gateways for the Great Lakes lion's share (30 percent) of the nation's fast-growing global trade. Trade now constitutes close to 30 percent of U.S. GDP, up from 10 percent as recently as 20 years ago,⁶⁰ and the major metros of the region are the export intensity hubs.⁶¹ They play a particularly important role in the country's bi-national trading relationship with Canada. At \$1.8 billion dollars per day, it is the largest bilateral economic relationship in the world, the bulk of which flows to and through the Great Lakes region and its major metropolitan areas.⁶²

Finally, major metros of the region are becoming truly world cities in the sense of hosting diverse multi-national populations and in serving as entryways for immigration. Most Great Lakes states and metropolitan regions have benefited from immigrant

Most Great Lakes states and metropolitan regions have benefited from immigrant in-migration, and several states and metropolitan communities are among the continuous or reemerging immigrant magnets.

in-migration, and several states and metropolitan communities are among the continuous or reemerging immigrant magnets.⁶³ Survey data from 2005 shows Great Lakes states' significant gains in immigrant population from 2000 to 2005, with Kentucky (32.2 percent), Indiana (29.9 percent), Missouri (29.2 percent), Minnesota (25.8 percent), Pennsylvania (22 percent), Wisconsin (21.8 percent), Michigan (18.5 percent), and Iowa (18.3 percent) all exceeding the national average of 16 percent.⁶⁴

These immigrants, moreover, are relatively well-educated compared to immigrants nationwide. On average, 36 percent or more of the foreign born population in Michigan, Ohio, Pennsylvania, West Virginia, and Missouri hold at least a bachelor's degree (compared to a national average of 27 percent).⁶⁵

With slow population growth, and as a net loser in domestic migration, the region has been aided by the nation's relatively open borders. In a number of states and communities in the region, immigrants were the main reason they experienced *any* workforce and population growth, with domestic out-migration slightly compensated for by increased rates of immigrant in-migration.

Immigrant inflows have partially compensated for domestic outflows of population in Great Lakes metros

Metro Area	1995–2000	
	Immigration from Abroad*	Net Domestic Mi
CMSAs		
Chicago-Gary-Kenosha, IL-IN-WI	38.1%	
Cincinnati-Hamilton, OH-KY-IN	11.9%	
Cleveland-Akron, OH	13.2%	
Detroit-Ann Arbor-Flint, MI	21.5%	
Milwaukee-Racine, WI	17.5%	
MSAs		
Buffalo-Niagara Falls, NY	14.1%	
Charleston, WV	5.0%	
Columbus, OH	22%	
Davenport-Moline-Rock Island, IA-IL	12.2%	
Dayton-Springfield, OH	10.5%	
Des Moines, IA	23%	
Elkhart-Goshen, IN	29.9%	
Erie, PA	12.2%	
Fort Wayne, IN	11.0%	
Grand Rapids-Muskegon-Holland, MI	17.9%	
Indianapolis, IN	15.9%	
Jamestown, NY	6.5%	
Janesville-Beloit, WI	11.0%	
Johnstown, PA	7.5%	
Kalamazoo-Battle Creek, MI	12.8%	
Lansing-East Lansing, MI	21.6%	
Lexington, KY	23.3%	
Louisville, KY	14.0%	
Madison, WI	29.3%	
Minneapolis-St. Paul, MN-WI	24.0%	
Pittsburgh, PA	9.8%	
Rochester, MN	31.4%	
Rochester, NY	17.0%	
Rockford, IL	18.6%	
Saginaw-Bay City-Midland, MI	7.5%	
St. Louis, MO-IL	14.5%	
South Bend, IN	17.2%	
Springfield, IL	7.0%	
Syracuse, NY	13.3%	
Toledo, OH	11.0%	
Waterloo-Cedar Falls, IA	26.7%	
Wheeling, WV-OH	3.8%	
Youngstown-Warren, OH	5.6%	

*Rates of immigration from abroad and net domestic migration 1995-2000; rates per 1,000 for all U.S. metropolitan areas

Source: William H. Frey, *Immigration and Domestic Migration in U.S. Metro Areas: 2000 and 1990 Census Findings by Education and Race* (Research Report No. 05-572) (Ann Arbor: Population Studies Center at the University of Michigan, 2005).

The North Coast

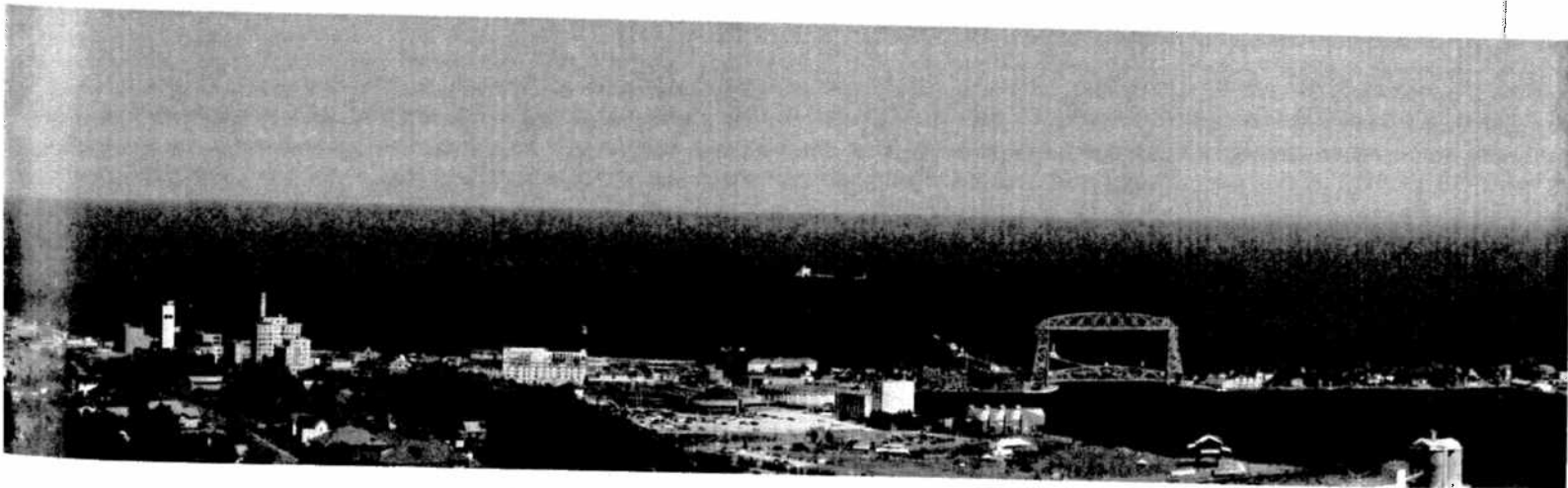
The Great Lakes are one of the most distinctive features on the earth's surface. The watershed includes one-fifth of the world's freshwater and 10,900 miles of Great Lakes coastline, along with rivers, forests, and scenic and recreation areas that rival any of America's other coasts. With fast-growing coastal areas of the U.S. prone to natural disaster (the "North Coast" of the Great Lakes is decidedly *not*)—and many fast-growing sunbelt regions facing serious water scarcity issues—the Great Lakes are a tremendous asset for the region, and a vital resource for the entire country.

The Great Lakes' many lakes, waterways, resort communities, and outdoor recreation areas—and the public access to them—are a significant contributor to quality of life in the region, and provide a large source of recreation/environment-based economic activity (tourism, boating, fishing, outdoor sports, eco-tourism, etc.). And with a dynamic history dating back to the 16th century that includes a unique role in the economic and cultural development of the continent, the North Coast is rich in historical and heritage tourism opportunities as well.

But while long enjoyed by Midwesterners, the Great Lakes watershed is still largely undiscovered by those outside the area, and many new opportunities for water-based development and enhanced public access—much, until recently, taken by industrial development—remain untapped. If fully leveraged, the watershed holds great potential to attract greater numbers of outdoor enthusiasts, history buffs, and those seeking healthy lifestyles to visit and spend, or even to live and work, in the region.

The major metropolitan areas in the Great Lakes are also the gateways for the Great Lakes' lion's share (30 percent) of the nation's fast-growing global trade.

With its unique water assets and existing industrial and research base in energy, chemicals, transportation, and new materials, the Great Lakes region can also be the nation's leader in new technologies, processes, and business opportunities in "clean" technologies. These include water pollution abatement technologies, as well as those dependent on fresh water (e.g., bio-tech, aqua-culture, water conservation, and pollution prevention technologies). These developments would both serve the national interest and accelerate the region's economic transformation. ❁



V. Bright Lines for Economic Growth: Forging a New Federal State Compact for the Great Lakes

Faced with economic restructuring and increasing global competition—as well as new opportunities for economic advancement—public and private leaders within the Great Lakes states have been making valiant efforts to build on their assets in order to better adapt and compete:

- States in the Great Lakes are making serious efforts to upgrade their education systems by increasing access to and success in postsecondary education for more citizens, and leveraging the knowledge-creation engines of their universities to support economic growth;
- States are funding and fueling development and commercialization of new products in next energy, life sciences, material technologies, and green chemicals;
- States are pooling their health care and prescription drug programs to leverage greater buying power;
- The Big-10 universities are laying down a new networking communications backbone to allow large amounts of information to travel quickly, and are maintaining leadership in Internet2 and related IT technologies;
- States have created venture capital pools to offset the dearth of funds for commercialization.

These are game and well-intentioned efforts. But the nature of the region's challenges dwarfs what

states and communities can do individually. In these areas the region's potential must be harnessed through joint action.

Great Lakes' leaders need to appreciate the nature of the real economy, and understand that



new auto/transportation R&D centers, energy technology firms, IT breakthroughs, or new drugs or cancer treatments are developed and grow in Indiana, Michigan or Ohio, or Pittsburgh, Chicago, or St. Louis, it can compound the benefit to the entire Great Lakes economy. Rather than just compete with and undercut each other in a perceived zero-sum game, the region's leaders can develop and advocate for the fundamental infrastructure, investments, and co-ventures that would contribute to the prosperity of the region as a whole.

At the same time, the federal government needs to recognize the economic value of the Great Lakes region. National leaders need to pay more regular attention to the region—beyond primary season—and make good on their promises to strengthen its economy by targeting investments in areas such as applied research, cyberinfrastructure, and human capital. Federal policy has both a special obligation, and terrific opportunity to fuel the engines of growth in the Great Lakes region, ameliorate dislocations, and support transition to a more prosperous economy.

The following recommendations begin to describe areas of policy focus for Great Lakes states, as well as for federal leadership. Several of the policies the states can advance alone. Others will require them to work together to advance region-wide goals, and/or to leverage their political muscle to advocate for federal support.

Several recommendations are intended as illustrative national policy “big bets” that if developed would constitute the kind of large-scale thinking and action that would well-serve the Great Lakes’ economic future, as well as that of the country. These are the kind of ideas regional leaders and aspirants for state and national leadership should offer and debate this year, and in the years ahead.

Given the economic opportunities and challenges facing the Great Lakes region and the nation, there are four major areas within which a new Great Lakes regional/federal compact needs be forged. They include:

- *Cultivate the Region's Human Capital*
- *Fuel the Economic Engines of the Region*
- *Remake the Social Compact; and*
- *Strengthen the Region's Metropolitan Areas*

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Cultivate the Region's Human Capital

State and regional policies should aggressively build the region's human capital by increasing preparation of talent in key disciplines; affording better access to postsecondary education and new skills training; and fostering a more flexible, and adaptive, labor marketplace.

Forge a Great Lakes Compact for Skill and Talent

Governors, legislatures, and education leaders in the Great Lakes should form a regional compact to produce highly skilled graduates of K-16+ systems in disciplines of national importance, particularly science, technology, engineering and design, and math (often referred to as the “STEM” disciplines).

State Policy Responsibility: The Great Lakes states together should develop region-wide standards, as well as align curriculum among K-12 and postsecondary institutions, in STEM disciplines. They should also create incentives for early college

credit and dual enrollment in these disciplines, provide additional incentives for STEM educators, and provide secondary and postsecondary support programs (e.g., counseling/career guidance, mentoring).

Federal Policy Responsibility: The Federal government should embrace and articulate a national strategy to support STEM education. It should also organize federal K-12 and higher education funding incentives that award priority to states/regions that implement the kind of comprehensive state strategy described above.

Build a Great Lakes "Common Market" for Human Capital

State leaders, together with the federal government, should work to build a dynamic and flexible marketplace for education and labor market mobility in the Great Lakes region.

State Policy Responsibility: States in the region should enhance their national and global attractiveness as a place to attend school, live, and work through creation of a seamless and portable human capital marketplace in the region. This would include:

- An "in-region" tuition compact so any resident of the region could attend any institution of higher education in the region and pay in-state tuition

- Portable/transferable postsecondary credits and standards, and use based student/customer informed of credits, between Great Lake institutions
- Portable professional credentials (nursing) within the region and
- Portable public pension and re-credits transportable across sta

Create a "Passport to Higher Program"

In partnership with the federal government the Great Lakes region can lead in providing high access for all residents and in helping the workforce to achieve new credentials and upgrade skills.

State Policy Responsibility: States should make higher education a budget priority and match federal federal unrestricted grant amount that equate two years of postsecondary education cost public community college or foundation (approximately \$4,000). The states' matching amount would be learner in their state, the country, or that enrolls in the region's network private universities and community

Federal Policy Responsibility: In partnership program, the federal would add to the current support available through grants and other restricted postsecondary fee that would match state commitments with a dollar equal to the state amounting would support an additional years of postsecondary education would be available at an learner's lifetime.



Fuel the Economic Engines of the Region

The region needs to rekindle a culture and practice of entrepreneurship and new business incubation, as well as support the basic and applied research to create globally competitive products and services. Many state leaders, wrestling with state budget deficits, have been gutting higher education, R&D, and commercialization. Federal support of R&D (which can benefit the region disproportionately) has shrunk as well, dropping from 2 percent of GDP to less than 0.8 percent over the past three decades. It's vital that state and local resources be raised back to—or even exceed—prior levels.

Develop a Great Lakes Emerging Economy Initiative

National and state resources should be organized to spur basic and applied research and technological innovation in global industries, and to take advantage of the Great Lakes region's research, development, and technology infrastructure.

State Policy Responsibility: States in the region should deliver “bang for the buck” in basic and applied research and development in many fields of national and regional interest by agreeing to match federal research dollars from NSF, NIH, and others on a (for example) 5 to 1 basis. This could be accomplished by tapping bonding authority and pension funds, partnering with university endowments, and (as some states are doing) securitizing tobacco entitlement monies. Such funding would serve to underwrite applied research, development, and commercialization of new technologies at scale. In addition, states of the region should collaborate on economic development strategies to support productivity gains, supply chain networking, and regional sourcing in advanced manufacturing and other industries with regional concentrations.

Federal Policy Responsibility: Consistent in direction with national competitiveness proposals emerging from Congress, the Administration, NSF, and the nation's policy think tanks, the federal government should significantly increase its basic, applied (and non-defense) research funding—doubling it from roughly \$100 to \$200 billion. The

It's vital that state and local resources be raised back to—or even exceed—prior levels.

government should also keep and enhance the federal R&D tax credit. Given the ability of the Great Lakes states to serve as the nation's platform for innovations in new products and processes, there should be a national commitment to give the Great Lakes states (historic donor states) more than their fair share of this increase in federal basic and applied research and commercialization funding from all federal sources.

Forge a Great Lakes Energy Independence Compact

The Great Lakes region can lead the nation's move towards new clean energy sources (clean coal, hydrogen, renewables, bio-mass) and sustainable transportation and energy use. Yet federal investments in the Department of Defense and the Energy Department are concentrated in federal labs and cold war installations, not capitalizing on the energy/transportation research and development nexus in the Midwest. A national commitment in energy policy and funding could support this effort.

State Policy Responsibility: States should prioritize funding for basic and applied research in clean energy sources, including upgrading university research capabilities. The Great Lakes states can also support new energy use by passing state legislation requiring all state-licensed gas and fueling stations to dispense a target ratio of grain-based/new fuels by 2015.

Federal Policy Responsibility: Federal investment in new energy technology should be centered in the region through a new Regional Energy Lab, building on Chicago's Argonne National Lab, and extending to the network of powerful public-private

energy technology research institutions and efforts in the region. The federal government should also provide funding for upgrading and expanding university laboratories, equipment, information technologies, and infrastructure needs in the region, such that the national capacity to conduct world-class research in energy and other key strategic disciplines is sufficient to address national priorities.

Create a Great Lakes Venture Fund

Intellectual property creation in the Great Lakes region often escapes to fuel new jobs and business elsewhere. A region-wide commitment to provide venture capital would send a strong message and ultimately help nurture new business growth in the region.

State Policy Responsibility: Governors of the region should collaborate on a Great Lakes Regional Venture Capital Fund to correct market failure in venture capital access, and to catalyze the fertile stew of inventors, researchers, entrepreneurs, seed, early stage and mid-late stage venture capital managers, and new firms. A prudent strategy to invest up to 2.5 percent of annual investments from state pension funds in growing new companies in the region—co-investing with the money managers of the region's university endowments, private pension funds, and foundations—would create a huge pool for development.

Build Out the "North Coast"

The Great Lakes states and the federal government should capitalize on the Great Lakes and the natural assets of its watersheds as an economic driver for the region.

State Policy Responsibility: The Great Lakes states should create a partnership to focus on key policy areas:

- Cross-state branding of the "North Coast" to promote the Great Lakes, regional waterways, forests, parks, and natural scenic assets as major tourist attractions
- A cross-state compact to expand public access to the shoreline and to enhance preservation of natural/recreational areas as key components of regional economic development
- State public-private and philanthropic extension of water-based economic development,

The Great Lakes states and the federal government should capitalize on the Great Lakes and the natural assets of its watersheds as an economic driver for the region.

natural and scenic environmental amenity development, and eco-tourism, as well as water-based technologies and industries

- Further development of state/regional/federal agreements on standards for CO₂, NO₂, mercury, and chemical pollutants that would seek to reduce national pollution emanating from the region, enhance natural resource/environment based-business, and promote the creation of new green and sustainable technologies products.

Federal Policy Responsibility: The federal government should deliver on its commitment to fund the \$20 billion dollar joint federal-state Great Lakes restoration effort that has been agreed to by the region's Governors and the current Administration.



Remake the Social Compact

The nation has a huge stake in remaking the employee benefit and security policies that—while building and supporting the country's great middle class—are today undermining the region's ability to compete on a global scale. The reliance on privately financed health care and retirement benefits are driving U.S. manufacturers and other long-established enterprises into the ground. Public and private pensions are too costly and not portable. And reemployment and income support policies—often designed to support return to the same or similar job—do little to foster new skills and enhance mobility in the labor market.

A federal-state partnership is clearly needed to reengineer these systems. Such change is predicated on the assumption the nation will rally to stabilize Social Security, and Medicare/Medicaid, however. National action around these pillars of the social compact will ensure the region's older population is secure in retirement, and reverse the fiscal drain on state and national budgets that are eroding the ability to invest in education, research, and infrastructure. Public policies must also support flexibility and adaptation of the region's people to fast-changing economic conditions, while providing a portable safety net for economic security.

Create Portable Defined Contribution Pension Systems

The state and federal governments should work together to promote movement and adaptation in the labor market through cross-state and nationally portable pensions.

State Policy Responsibility: The Great Lakes states should come together to create defined contribution savings plans similar to that offered federal employees. These portable 401K plans could be managed by states, or the consortia of states. They should be open to all employers and employees, public as well as private, and offer a set of investment options that assure sound, diversified investment throughout each participant's life cycle.

Federal Policy Responsibility: The federal government needs to assure appropriate and even-handed treatment of such state and region-wide sponsored defined contribution retirement plans under the federal tax code. The nation should also work on transition plans with large public and pri-

vate employers, workers, and unions with current defined benefit contribution plans. Federal responsibility includes ensuring workers do not lose their entire pension stake, either through sufficient public pension safeguards, and/or protection of pension obligations under bankruptcy law; in return, employees and unions must be willing to transition to defined contribution plans with much lower employer and employee contributions going forward. Such a transition will save many defined benefit plans now at risk of falling to the minimum levels guaranteed by the Pension Benefit Guaranty Corporation and will reduce the legacy costs of public and private employers, allowing them to better compete for skilled workers and offer more competitive goods and services.

Remake the Re-Employment System

New state and federal resources under the proposed Passport to Higher Education Program would afford dislocated workers, adult learners, and job changers the ability to obtain needed new skills and credentials to navigate today's economy. In addition, other current program and resources (such as those provided by Unemployment Insurance and job training funds) developed for an economy in which workers were laid off during recessions and then recalled to their old jobs, can be repurposed. The federal government can work with states to modernize the unemployment insurance program by allowing a portion of unemployment benefits to be used for retraining and subsidizing more generous benefits for unemployed workers who get retrained.

Support Health Care Reform

The Great Lakes region has the most to gain from a successful transition to a health care regime that makes firms more competitive and that allows workers to move from job to job without having to worry that their health coverage will be reduced or eliminated. Given the seeming political impossibility of a meaningful national health insurance system, states in the region should be encouraged and afforded flexibility by the federal government to join together to generate lower-cost, portable health insurance plans, with contributions from employers and workers. This includes having broad latitude to organize existing health care resources from Medicaid, CHIP, and other resources to finance these plans.

Strengthen the Region's Metropolitan Areas

Over the centuries, the Great Lakes spawned great industrial centers linked together by investments in path-breaking infrastructure, from the canals linking the East to the Midwest, and Chicago to the Mississippi River system, the railroads, and the first limited access auto highway (the Pennsylvania Turnpike). These urban areas became great commercial hubs whose copious employment opportunities drew a large and diverse populace from throughout—and beyond—the region.

Yet decades of metropolitan decentralization and urban disinvestment have left many Great Lakes cities and older suburbs struggling to find their economic niche. This struggle is manifested and reinforced by concentrated poverty and racial segregation, and a ratepayer base that cannot pay for infrastructure improvements essential to these communities' economic growth.

Strengthening the competitive posture of the region's metropolitan communities must be a shared local, state, and federal agenda that includes adopting a 21st century approach to infrastructure policy—including modernizing transportation and sewer and water systems—and reinvesting in the region's cities and older communities.

Define, design, and embrace a new, unified, competitive vision for transportation policy

The Great Lakes region needs to lead the nation in developing a new paradigm for transportation—its purpose and overarching rationale should be rooted in the reality of the changing region and a globalizing economy. Such a paradigm should be informed by what other nations are doing, particularly those in the industrialized West.

State Policy Responsibility: As a mega-economic region, the Great Lakes states should come together to create a new vision for transportation policy that meets the pressing need of industries and workers to generate optimal economic growth. Within states, this means that leaders should build broad-based, majoritarian metropolitan coalitions that can advance this new transportation vision, building from the ground up networks of govern-

ment, business, civic, political, university, and community-based leaders. Across the Great Lakes region, the states should develop and articulate a unified policy position regarding federal transportation policy that embraces a truly multi-modal approach (e.g., road, transit, high-speed rail, pedestrian access) that is integrated with the environmental, land use, and economic goals of the region.

Federal Policy Responsibility: Rather than squabbling over allocations of federal funds for transportation or bickering over “bridges to nowhere,” Congress should be focusing on transportation policy as a vehicle to support and resilient metropolitan economies in regions like the Great Lakes that position the nation to compete globally for high-quality jobs. Yet transportation policy cannot replicate the success of the 1950s—we are not, simply put, going to build our way out of congestion. The federal government must shift to a series of other priorities including: connecting Great Lakes metropolitan areas with high speed rail; providing greater access to ports and freight hubs, particularly in metropolitan areas like Chicago and Detroit; and maintaining and preserving the existing system which serve the needs and ponderance of the population in the Great Lakes region and where substantial investments have already been made.

Rebuild the region's crumbling water and sewer infrastructure

The revitalization of Great Lakes metropolitan areas demands that the states and federal government plan for and invest in major upgrades to existing water and sewer infrastructure to ensure that older cities remain a competitive location for business and industry.



families. Many of the systems are a century old and reaching the end of their life span. The cost of bringing wastewater systems alone up to where they need to be is estimated at \$3.3 billion in Wisconsin, \$4.09 billion in Michigan, and \$11.89 billion in Illinois.⁶⁶

State Policy Responsibility: Great Lakes states should use discretion over existing federal and state funds to create incentives and financial benefits for metropolitan areas to engage in regional infrastructure planning. The states should help new communities identify how capital costs, operation costs, maintenance costs, and replacement costs will be paid, before expansion occurs, and help existing communities by “fixing-it-first”—targeting funds to improve outdated or crumbling water and sewer facilities. The states should assist both established and growing areas of the region to identify opportunities for reducing costs through efficient, cooperative delivery of service.

Federal Policy Responsibility: The federal government should at once create a national commission to assess the nation’s water and sewer infrastructure needs, with a special emphasis on the Great lakes region. Such a commission should also identify options for funding and resources (beyond existing limited loans) to finance these important upgrades.

Reinvest in cities and older areas

The Great Lakes states and the federal government need to reinvigorate the region’s older areas with the ultimate goal of stimulating economic growth, improving fiscal vitality, and advancing social equity.

State Policy Responsibility: The Great Lakes states need to leverage the assets of their cities, towns, and older suburbs by targeting their infrastructure and economic resources to these areas. States should undertake a full assessment of how current program dollars are dispersed, and design allocation processes that give funding priority to catalytic redevelopment projects in established communities. These can include waterfront revitalization initiatives, brownfield redevelopment projects, the construction of greenways and parks, the development of mixed income communities, and other projects with the potential to dramatically improve neighborhoods and the physical landscape. States should also review and overhaul outmoded

The region needs to rekindle a culture and practice of entrepreneurship and new business incubation, as well as support the basic and applied research to create globally competitive products and services.

building codes, tax foreclosure laws, and other policies that can thwart redevelopment in older areas.

Federal Policy Responsibility: Federal housing policy plays a significant role in helping to shape urban neighborhoods. Yet federal housing programs are largely designed for “strong market” cities and metros with affordable housing pressures, and are generally inappropriate to the needs of older Rust Belt communities. In fact, the glut of affordable housing in low-income neighborhoods reinforces the “weak market” nature of these areas when more middle class homes and families are needed. In order to help Great Lakes states and localities to create and maintain healthy urban communities, the federal government needs to revamp housing policies that have helped concentrate poor families, and replace them with programs that allow them greater housing choice and flexibility. At the same time, federal policy makers need to expand the resources available for moderate- and middle-income housing in distressed urban areas, and encourage the creation of mixed-income communities. Such policies would help keep and attract residents with diverse economic means, helping to stabilize neighborhoods and grow local tax bases. ■

VI. Conclusion

In recent years, the Great Lakes region has been plagued by negative perceptions of its economic malaise and industrial legacy. Even the common reference to the region as the “Rust Belt” further forces that the region may be stuck in time while the rest of the country surges ahead. No doubt, some of these perceptions are true, and clear social and economic challenges continue to hold the region back. But the Great Lakes region remains a vital part of the U.S. economy and possesses many assets that, if leveraged, can help it be a major contributor to the knowledge economy. While most of the growth and public attention in the past decade has focused on the east and west coasts, this “North Coast” has the potential to be a major source of growth and innovation.

The economic and political moment to make a commitment to the economic vitality of the Great Lakes region is now. It's time to break the regional “beggar-thy-neighbor” economic development approach and capitalize on the Great Lakes region's unique assets in the global economy. And it's time to enlist the people and applied work tradition of the region to help solve the economic and social challenges facing the nation.

The history and values that informed the region's economic ascendancy can be an aid, if marshaled anew, to support this transition. The region can lead again by reanimating the attitudes and practices that made it great:

- by creatively applying ideas to develop new products, processes, and technologies;
- by empowering and educating people to their highest potential;
- by building strong civic institutions and infrastructure;
- by reinventing the social compact for today's economic era;
- by welcoming and celebrating new people and new ideas.

The region can lead again by reanimating the attitudes and practices that made it great.

The nation can support this vital region, and should be called to the task by the citizens and leaders of Great Lakes states. The Great Lakes region is ready and equipped to help lead America's social and economic renewal. The nation and the region joined together in the past to develop the land, the learning institutions, and the economic infrastructure that helped America lead the world in the 20th century. New 21st century federal/state Great Lakes partnership will today help the U.S. remain at the creative fore of the economy, afford its global obligations, and realize its opportunities for building a more democratic, vibrant, and interdependent world economy.

Endnotes

1. In 2000, seven of the 15 states with the narrowest margins of victory were in the Great Lakes region; these seven states had by far the largest share of electoral votes among the 15. This pattern was repeated in 2004, with eight of the nation's most narrowly decided contests in Great Lakes states. These included Iowa and Wisconsin, where victory margins were less than 1 percent, and big electoral vote states like Ohio and Pennsylvania, where margins were less than 2 percent.
2. "The Northwest Ordinance, 1787," available at usinfo.state.gov/usa/infousa/facts/democrac/5.htm (June 2005).
3. Backgrounder on the Morrill Act, available at usinfo.gov (June 2005).
4. Brian Page and Richard Walker, "From Settlement to Fordisms: The Agro-Industrial Revolution in the American Midwest." *Economic Geography*, 67(4) (1991): 281-315, p. 291.
5. *Ibid.* (p. 309).
6. Other innovators included lesser known furniture makers in Grand Rapids, Michigan who pioneered machine production techniques in woodworking; carriage and wagon manufacturers who combined developments in metal-working and woodworking as they established strong centers in Cincinnati, South Bend and Detroit; German craftsmen who set up the shoe trade throughout the Midwest; farm equipment makers who created new metal-bending technologies; and many others. Edward P. Duggan, "Machines, Markets, and Labor," *Business History Review*, 51 (1977).
7. "Important Cities in Black History," David Johnson, Pearson Education, available at www.Factmonster.com/spot/bhmcities.1 (June 2006).
8. Michael Goldfield, "The Decline of Organized Labor in the United States and the Impact of Globalization" (Detroit: Wayne State University, 2005).
9. Owen Beiber. Personal Communication with John Austin, 2004.
10. Based on analysis of contiguous urbanized areas with populations of 10 million or more in 2003. The Northeast is the most populous mega-region, with over 50 million people. The Midwest mega-region has a total of over 40 million residents, well ahead of the next most populous regions, including the "Southland" region of Southern California (22 million people) and the Piedmont (19 million). Robert E. Lang and Dawn Dhavale, *Beyond Megalopolis: Exploring America's New "Megapolitan" Geography* (Blacksburg: Metropolitan Institute at Virginia Tech, 2005).
11. 2005 *World Business Chicago* analysis of the Great Lakes economy (which adds Ontario, Canada to the region described in this paper, and leaves out Missouri and Iowa) shows a gross product of \$3,753 billion dollars. This ranks the Great Lakes economy third when compared to country gross product, behind the U.S. as a whole (\$11,668 billion) and Japan (\$4,623 billion); it is larger than the economies of Germany, the U.K., and China.
12. Analysis of the Great Lakes Economic Region as a trading block conducted by authors utilizing data from TradeStats Express, available at <http://tse.export.gov> (June 2006).
13. Workforce Associates, Inc., Richard Judy, *Looking Ahead in the Midwest: A Survey of Major Trends*, presentation to the Midwestern Education to Workforce Policy Initiative Summit, October, 2005.
14. *Ibid.*
15. Bureau of Labor Statistics, Robert T. Jones, presentation to the Midwest Higher Education Council, October, 2005.
16. Institute for Higher Education Policy, "The Investment Payoff: A 50-State Analysis of the Public and Private Benefits of Higher Education," 2005. Those with a Bachelor's degree does not include those who have attained an advanced degree as well.

17. Analysis conducted by authors utilizing unemployment and mass layoff data from the U.S. Bureau of Labor Statistics, available at www.bls.gov (July 2006).
18. Institute for Higher Education Policy, "The Investment Payoff: A 50-State Analysis of the Public and Private Benefits of Higher Education." Statistic cited is based on number of residents in the labor force over 25 years old who were unemployed in 2004. Those with a Bachelor's degree do not include those who have attained an advanced degree as well.
19. Lou Glazer and Don Grimes, "A New Agenda for Michigan," A Report by Michigan Future, Inc. (Ann Arbor: 2006).
20. Howard Wial and Alec Friedhoff, *Bearing the Brunt: Manufacturing Job Loss in the Great Lakes Region, 1995-2005* (Washington: Brookings Institution, 2006).
21. *Ibid.*
22. *Ibid.*
23. Analysis conducted by the authors utilizing data from the *Science and Engineering Indicators*, 2006.
24. S. Michael Camp, *The Innovation-entrepreneurship NEXUS: A National Assessment of Entrepreneurship and Regional Economic Growth and Development* (Research Summary No. 256) (Powell, Ohio: Advanced Research Technologies, LLC, 2004).
25. Compiled from the 1990-2001 LEEM-data file, U.S. Census Bureau by Advanced Research Technologies, LLC with elimination of "Small Regions".
26. SBIR is a federal program to encourage small business to explore their technological potential and provide incentives to commercialize new products. It involves 11 federal agencies that reserve portions of their R&D funding for firms under 500 employees.
27. Analysis conducted by authors utilizing data from the *Science and Engineering Indicators*, 2006. Percentages do not total 100 percent due to the way in which regions have been divided: The Northeast, South, and West regions here are those defined by the Census Bureau, and include some states (i.e., Pennsylvania, New York, West Virginia and Kentucky) that are also included in the Great Lakes Region as defined by the authors.
28. George Erickcek, *The Role of Small Business: A Tale of Two Cities* (Kalamazoo, Michigan: W.E. Upjohn Institute for Employment Research, 1997).
29. Tim Petersen, Personal Communication with John Austin, 2006.
30. Analysis of the Great Lakes Economic Region conducted by authors utilizing data from the *Science and Engineering Indicators*, 2006.
31. Douglas E. Booth, "Long Waves and Uneven Regional Growth," *Southern Economic Journal* 53 (2) (1986): 448-458.
32. Sean Safford, "Why the Garden Club Couldn't Save Youngstown: Civic Infrastructure and Mobilization in Economic Crises." (Working Paper Series No. MIT-IPC-04-002, Boston: Massachusetts Institute of Technology Industrial Performance Center, 2004).
33. Andrew Reamer, Larry Icerman, and Jan Youtie, *Technology Transfer and Commercialization: Their Role in Economic Development* (No. 99-06-07435). (Washington: Economic Development Administration, U.S. Department of Commerce, 2003).
34. Joseph Cortright, *The Young and Restless in a Knowledge Economy* (Chicago: CEOs for Cities, 2005).
35. Authors' analysis of 2004 Bureau of Economic Analysis, REIS data.
36. Randall Eberts, George Erickcek, and Jack Kleinhenz, "Dashboard Indicators for the Northeast Ohio Economy." Working Paper 06-05 (Kalamazoo, MI: W.E. Upjohn Institute for Employment Research, 2006).
37. *Ibid.*

38. Urban Mobility Study, Texas Transit Institute, 2005 available at mobility.tamu.edu/ums/congestion_data/national_congestion_tables.stm
39. John Iceland, Daniel H. Weinberg, and Erika Steinmetz, U.S. Census Bureau, Series CENSR-3, "Racial and Ethnic Residential Segregation in the United States: 1980-2000" (Washington: U.S. Government Printing Office, 2002). Residential segregation is measured across five dimensions: evenness—differential distribution of population; exposure—potential contact; concentration—relative amount of physical space occupied; centralization—degree to which a group is located near the center of an urban area; and clustering—degree to which minority group members live disproportionately in contiguous areas. The Census Bureau uses non-Hispanic whites as the reference group, and metropolitan areas as reasonable approximations of housing markets. For the purposes of this study, the authors chose to highlight the average rankings of all five segregation dimensions in 2000 for blacks compared to whites because this population has a significant historical and long-term presence in the region compared to other minority populations.
40. "Now for the Reckoning—Corporate America's Legacy Costs" *The Economist*, October 15, 2005.
41. Elise Gould, "Prognosis Worsens for Workers' Health Care: Fourth Consecutive Year of Decline in Employer-Provided Insurance Coverage," Briefing Paper No. 169 (Washington: Economic Policy Institute, 2005).
42. *Ibid.*
43. Charles R. Morris, *Whatever Happened to Private Pensions?* (February, 2006), available at www.tcf.org/list.asp?type=NC&pubid=1210
44. "Now for the Reckoning—Corporate America's Legacy Costs"
45. Morris, *Whatever Happened to Private Pensions?*
46. Nanette Byrnes and Christopher Palmeri, "Sinkhole! How Public Pension Promises are Draining State and City Budgets." *BusinessWeek, Special Report*, June 13, 2005.
47. Stephen D'Arcy (University of Illinois) suggests that if these costs aren't brought under control, rising taxes could prove unavoidable, and a competitive problem for states in the worst shape. If states like Illinois have to sharply hike taxes to pay for benefits earned decades ago, companies and even citizens could end up moving to states in better fiscal condition. "You could see it turning into an economic desert in certain states," he warns (as cited in Nanette Byrnes and Christopher Palmeri, "Sinkhole! How Public Pension Promises are Draining State and City Budgets.")
48. National Innovation Initiative, *Innovate America: Thriving in a World of Challenge and Change* (Washington: The Council on Competitiveness, 2005).
49. Analysis of the Great Lakes Economic Region conducted by authors utilizing data from the *Science and Engineering Indicators*, 2006.
50. Institute of Higher Education, Shanghai Jiao Tong University, 2005.
51. *Science and Engineering Indicators*, 2006.
52. Analysis of the Great Lakes economic region conducted by authors utilizing data from the *Science and Engineering Indicators*, 2006. Survey of Doctorate Recipients sample design is based on employment location, whereas workforce data is based on respondents' residence; therefore, the reliability of data for areas with smaller populations is lower than for more populous states. Workforce represents employed component of civilian labor force and is reported as annual data, not seasonally adjusted. All degrees include bachelor's, master's, and doctoral degrees; advanced degrees include only master's and doctoral degrees. S&E degrees include physical, computer, agricultural, biological, earth, atmospheric, ocean, and social sciences; psychology; mathematics; and engineering.
53. U.S. Department of Energy, Energy Information Administration, 2005, accessed at http://www.eia.doe.gov/cneaf/nuclear/page/nuc_generation/gensum.html
54. *US News & World Report* "Top Hospitals 2005"

55. Joseph Cortright and Heike Mayer, *Signs of Life: The Growing Technology Centers in the U.S.* (Washington: Brookings Institution, 2002).
56. Analysis of the Great Lakes Economic Region conducted by authors utilizing data from the *Science and Engineering Indicators*, 2006.
57. *Ibid.*
58. Globalization and World Cities Project. The group has analyzed data such as the number of firms in specific industries and international airline connections to measure economic relationships between cities. (Quoted in *Towards an American Spatial Development Perspective*, a project of the Lincoln Land Institute, the Regional Plan Association, and the University of Pennsylvania School of Design, September, 2004).
59. Peter Taylor and Robert Lang, "U.S. Cities in the World City Network" (Washington: Brookings Institution, 2005).
60. CRS Report for Congress: Manufacturing Trends Long-term Context for Today's Policy Issues, Stephen Cooney Coordinator (Washington: Congressional Research Service, 2005).
61. William Testa, Thomas Klier, and Alexei Zelenev, *Estimating U.S. Metropolitan Area Export and Import Competition* (Chicago: Federal Reserve Bank of Chicago, 2003)
62. Robert Cranville, "Canadian Economic Ties to Western Pennsylvania Substantial, Important." www.post-gazette.com/pg/05009/438926.stm, January 9, 2005, retrieved March 27, 2006.
63. Audrey Singer, "The Rise of New Immigrant Gateways" (Washington: Brookings Institution, 2004).
64. U.S. Census Bureau, American Community Survey, 2006.
65. National Science Foundation, 2006.
66. American Society of Civil Engineers 2005 Report Card on America's Infrastructure, available at www.asce.org/reportcard/2005/index.cfm