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Planning for “Megaregions” in the United States

Margaret Dewar
David Epstein

The population of the United States will likely grow by 40 percent by 2050 with the growth concentrated in eight to ten megaregions, connected networks of metropolitan areas. Planners in the United States have begun to plan for these large regions. Their work raises four persistent questions: what is a megaregion, and how does one determine where a megaregion exists? Why plan at the scale of megaregions rather than at metropolitan, state, and national levels? What are appropriate methods and useful data for megaregion planning? When is the megaregion a useful scale for policy and planning?

Keywords: regional planning; land use; spatial development planning; economic development; national planning

The U.S. Bureau of the Census expects the nation's population to continue to grow, with a 40 percent increase higher than the current level by 2050 (U.S. Bureau of the Census 2004). Population and employment projections by county show that 70 percent of the nation's population growth and 80 percent of its employment growth will likely occur in eight to ten megaregions, connected networks of metropolitan areas (Toward an American Spatial Development Perspective 2004; Carbonell and Yaro 2005; America 2050 2006b).¹ These are areas where population and employment are already concentrated. Regional planners interested in how the nation will accommodate the additional population have defined the pressing issue as how to transform these megaregions into economic engines for the nation (Carbonell and Yaro 2005; Regional Plan Association 2005; America 2050 2006a). Along with

national economic concerns, regional concerns about the economy and other factors that contribute to quality of life are stimulating efforts to plan at this scale, as are issues of equity between megaregions and within them. Much of this planning examines and addresses uneven development among different regions of the

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country, deteriorating infrastructure, loss of natural areas as suburban development spreads, differing impacts of national fiscal and economic policies, and varying connections to global markets and immigration streams.

Planning for large regions with linked metropolitan areas has received considerable attention in other parts of the world. The European Spatial Development Perspective, a set of policies and strategies adopted by the European Union in 1999, is working to integrate the economies of the member regions, reduce economic disparities, and increase economic competitiveness (Faludi 2002; Deas and Lord 2006). In Asia, especially East Asia, comprehensive strategic planning for large regions, centered on metropolitan areas, has become increasingly common and has progressed further than in the United States or Europe. Planning for the Hong Kong–Pearl River Delta region, for instance, aims to enhance the region's economic strength and competitiveness by overcoming local fragmentation, building on global economic cooperation, taking advantage of mutually beneficial economic factors, increasing connectivity among development nodes, and pursuing other strategic directions. Investment in transportation infrastructure in Japan aims to integrate Tokyo, Nagoya, and Osaka into a large urban region (Wu and Wang 2006; Laquian 2005; Douglass 2000, 2002).²

No such strategy to anticipate and manage population growth and strengthen economic prosperity in large regions currently exists in the United States. The creation of the Tennessee Valley Authority (TVA) more than seventy years ago exemplified a historic attempt to plan at this geographic scale. Political issues stymied further efforts at river basin planning and development (Friedmann and Weaver 1979). Today, *regional planning* tends to refer almost entirely to metropolitan planning (for example, see Katz 2000; Friedmann and Weaver 1979, 32).

America 2050's planning derives lessons from the European Spatial Development Perspective and from planning for the large regions of East Asia. America 2050's planning also refers to past efforts at national planning for regional development—for instance, the Gallatin Plan of the early 1800s for a system of roads and canals, Theodore Roosevelt's proposed conservation policies, and the plan for an interstate highway system in the mid-twentieth century (Lacey 2000). The planning effort has, however, almost no relationship to other broad regional movements. One of these is *bio-regionalism*, "a body of thought and related practice" that responds to "the challenge of reconnecting socially-just human cultures in a sustainable manner to the region-scale ecosystems in which they are irrevocably embedded" (Aberley 1999, 13). Bioregionalism's character as a

social movement separated from policy making means that it operates in a different domain than do those involved with America 2050. A plan for the Cascadia megaregion moves closest to bioregionalism in its attention to the identification of people of the Northwest with the salmon and the culture around it (Seltzer 2006).

As in the past, many challenges that face large regions of the United States show no respect for the boundaries of municipalities, metropolitan areas, states, or even nations. For instance, many communities in the Great Lakes region need to encourage diversification of their economic base to recover from deindustrialization and reduce economic vulnerability. The decline of the old industrial economic base has left many areas of the region with substantial employment loss while producer services employment has concentrated increasingly in Chicago and Toronto. The loss of the strong manufacturing economy has weakened the economic links among many parts of the region and contributed to uneven development. Pursuing economic development on the local level by courting potential employers, however, pits these communities against each other, creating the familiar prisoners' dilemma in which decisions become motivated by short-term growth, blame avoidance, and credit claiming (Wolman and Spitzley 1996, 128-31; Rubin 1988; Bartik 1995). At the same time, new economic activities in the region will continue to change the distribution of employment across the large region. The shrinkage of low-growth and no-growth parts of the Great Lakes region threatens the livability of many communities. Nevertheless, the Great Lakes region has many assets on which to build a better future—natural areas, adequate water supply, lack of congestion, less expensive housing than elsewhere, low vulnerability to natural disasters, a concentration of research universities, an agglomeration in transportation R&D, and airports operating below capacity, to name a few (Delgado et al. 2006b; Austin and Affolter-Caine 2006; Feser and Hewings 2007).

The Great Lakes example suggests that some solutions might exist at a broad regional scale and helps to explain the growing interest in planning megaregions. Planning at a large regional scale may suggest ways to integrate lagging areas into a stronger economy. Enjoying sustainable economic and recreational benefits from natural areas often requires intraorganizational and/or jurisdictional collaboration (Wondolleck and Yaffee 2000). Handling common infrastructure issues could facilitate new economic activity.

This article discusses the state of current megaregion planning in the United States, using the work of America 2050 planners as a case through an analysis of

their published plans. As planners work on developing plans for larger areas of the country and engage with policy makers in advancing emerging agendas (for transportation and energy use, for instance), an assessment is worthwhile about what this approach to planning is doing and what dilemmas it raises. The next section of this article provides an overview of current megaregion planning. The sections that follow consider four recurring questions of concern in megaregion planning in the United States.

MEGAREGION PLANNING IN THE UNITED STATES

Efforts by planning scholars and regional planners have begun to sketch a national spatial strategy for the United States (Carbonell and Yaro 2005; Ross 2005; Delgado et al. 2006a, 2006b; Lang and Dhavale 2005a; Regional Plan Association 2005; Reinventing Megalopolis 2005; Seltzer 2005; Kern County Council of Governments, San Diego Association of Governments, and Southern California Association of Governments [hereafter, Kern County et al.] 2005). The work began in 2004 through an urban planning studio class at the University of Pennsylvania taught by Robert Yaro of the Regional Plan Association (RPA) and Armando Carbonell of the Lincoln Institute of Land Policy, and through roundtable meetings convened by the RPA and the Lincoln Institute (Toward an American Spatial Development Perspective 2004). Urban planning classes at the Georgia Institute of Technology, Portland State University, the University of Michigan, Arizona State University, and the University of Texas at Austin joined the RPA, the Lincoln Institute, and successive University of Pennsylvania studio classes in the work during the next few years. The Kern County Council of Governments, the San Diego Association of Governments, and the Southern California Association of Governments collaborated on a plan for the Southern California megaregion (Kern County et al. 2005). Planners and policy makers convened around specific issues that spanned the scale of the megaregion to discuss action. America 2050, a committee of policy makers, business leaders, and regional planners, formed in 2006 with leadership from the RPA to respond to the challenge of creating the foundation for the nation's "future competitiveness, sustainability and quality of life" (America 2050 2006a, 3).³

At the same time, scholars investigating changing metropolitan form in the United States and Europe describe large areas of connected settlements. This is the "new 'megapolitan' geography," according to Lang and Dhavale (2005b); "super regions" or "megas" (Lang and Nelson 2007); and the "new megalopolis,"

according to Florida (2006). Ten megapolitan areas contain more than two-thirds of the U.S. population (Lang and Dhavale 2005b). "The New Megas," asserted Florida (2006), "are the real economic organizing units of the world, producing the bulk of its wealth, attracting a large share of its talent and generating the lion's share of innovation." In Europe, Hall and Pain (2006, 18) investigated city regions in north-west Europe and found "an emergent development pattern" in which "clusters of towns and cities form a global mega-city region that is highly connected by information flows."

The analysis of a new metropolitan form is incomplete and not entirely convincing from a scholarly perspective, because, for instance, some of the analysis is based on clustering whole counties, not on measuring population density. The analysis of current metropolitan form informs the development of plans for megaregions, but the planning is not restricted to metropolitan counties, urbanized areas, or the "megapolitans" that some of these studies identify. The planning is more concerned with future settlement patterns than with current ones and frequently includes surrounding natural areas to improve land use and environmental planning efforts. Planning has proceeded without nailing down consistent ways to think about megaregions, as explained below.

As of late 2006, planners, students, and faculty had developed resources and preliminary plans for the Northeast, Great Lakes, Southern California, Piedmont Atlantic, and Cascadia-Northwest megaregions. Plans were also underway for the Arizona "sun corridor" and the "Texas Triangle." Figure 1 shows America 2050's generalized map of megaregions, approximate areas defined through discussion and debate with regional planners involved in the work. Each plan generally defined the megaregion, analyzed regional characteristics (sometimes distinguishing assets and challenges), and proposed strategies for solving problems. The plans have followed no template. Instead, each reflects the interests and concerns of the organizations and individuals who developed them, the constituencies who were involved in the processes, and the character of the particular megaregion. Although many of the broad issues identified would likely emerge from any planning effort, the strategies emphasized differ among the regions. The discussion below summarizes the issues the plans addressed. Differences in the content of plans could be due to differences in regions or differences in the perspectives of those involved in the development of the plans.

All plans addressed population characteristics, infrastructure, the environment, land development,

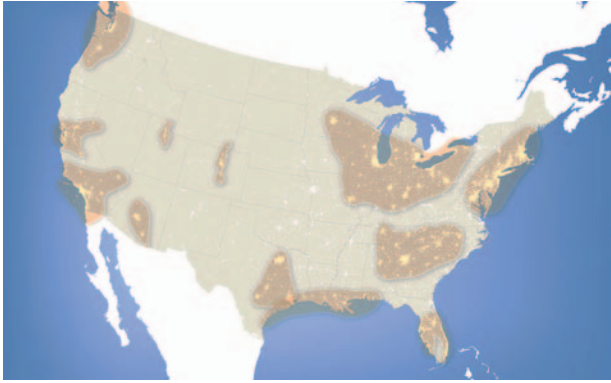


FIGURE 1. Emerging Megaregions of the United States

SOURCE: America 2050 (2006b).

the economy, socioeconomic patterns, and governance (see table 1). Piedmont Atlantic, Southern California, and Cascadia expect rapid population growth that will be associated with upward pressures on housing prices, increased sprawling development, and challenges for infrastructure, water quality, and natural habitats. The Northeast and Great Lakes expect more moderate population growth but still face loss of natural areas through low-density development. Parts of the Great Lakes megaregion are already experiencing sprawling low-density development at metropolitan fringes without population growth and also have extensive abandonment of inner cities.

All of the regions have well-developed infrastructure but underdeveloped public transportation systems, especially when compared to many European countries and to Japan. In all megaregions except the Great Lakes, infrastructure can handle little additional capacity. All plans cited highway congestion as a growing problem, and two (Great Lakes and Southern California) pointed to problems with heavy truck traffic. Southern California and Piedmont Atlantic face water shortages, whereas the Great Lakes and Northeast have abundant water threatened by pollution. All of the plans cited a number of economic strengths and numerous economic challenges. Three of the megaregions—Southern California, the Northeast, and the Great Lakes—are losing their share of national economic activity. The plans for all three of these megaregions noted poor job growth and high unemployment. The Great Lakes and Piedmont Atlantic plans pointed to continuing loss of manufacturing employment. The Northeast, the Great Lakes, and Southern California suffer from lack of housing

affordability. In the Northeast and Southern California, this is due to the high cost of housing. In the Great Lakes megaregion, housing is not costly, but incomes are low, making housing affordability a problem. All megaregions except Cascadia suffer from growing social and economic disparities among urban centers, suburbs, and rural areas. Piedmont Atlantic has concentrations of poverty in rural areas. In the Great Lakes megaregion, racial segregation in metropolitan areas is the worst in the nation, and income disparities among the races are considerable. The Great Lakes and Piedmont Atlantic plans pointed to weak land use controls as a significant problem. In the Northeast, the Great Lakes, and Piedmont Atlantic, the existence of many local governments means policy coordination is difficult.

Overall, the plans for the Northeast and Great Lakes portrayed regions that face many challenges but also have many assets on which to build. In contrast, the Southern California and Piedmont Atlantic plans emphasize the problems of their regions. The Piedmont Atlantic plan lacked mention of assets; the plan seemed to be saying that the economic success of the Piedmont Atlantic region is sowing the seeds of its own destruction. Authors of the plans often state that conditions are becoming crises that threaten to destroy quality of life and economic vitality, and that continuation of current trends is nonviable. The attention to crises appears at least partly due to planners' beliefs that only a sense of crisis will lead to constructive change.

The plans proposed strategies for addressing the megaregions' challenges and building on their assets (see table 2). All of the plans emphasized ways to manage growth, especially through the wiser use of land to protect natural areas and increase residential density. All plans advocated protections for the environment. The Southern California plan also underlined the need to deal with energy issues, air quality, and water availability. All the plans proposed ways to deal with transportation problems, especially through high-speed rail and public transportation systems. All saw a role for governance structures—but not new governments—that will make regional solutions possible. All except the Piedmont Atlantic plan pointed to ways to strengthen the economy and build regional identity. The Northeast, Great Lakes, and Southern California plans placed the most emphasis on this direction. The Southern California plan stressed the opportunity to strengthen the logistics industries. The Great Lakes plan emphasized encouraging the emergence of new industries by assuring adequate venture capital and building on the strength of universities. All except Cascadia pointed to ways to address inequality, especially across metropolitan areas.

TABLE 1. Assets, Challenges, and Trends Discussed in Plans for Megaregions

Characteristic	Megaregion				
	Cascadia	Northeast	Great Lakes	Southern California	Piedmont Atlantic
Population					
Manageable rate of population growth			√		
Rapid population growth	X			X	X
Proportion elderly increasing		O		X	X
Proportion immigrant increasing		O		O	O
Proportion immigrant decreasing			X		
High school graduation and/or SAT		√	√		
Low educational achievement				X	X
Low proportion with college degrees		X			
Emigration of young, single, and educated			X		
Influx of young, single, and educated	√				
Infrastructure					
Extensive highway system		√	√		
Extensive rail system		√	√		
Extensive bus system and ridership				√	
Major airports and international gateways		√	√	√	
Strong research universities		(√)	√		
Overreliance on private car and truck			X		X
Highway congestion	X	X	X	X	X
Truck traffic			X	X	
Airport congestion		X		X	
Port congestion and problems		X		X	
Low rail efficiency		X	X		
Strain on energy supply				X	
Strain on solid waste management capacity				X	
Environment					
Coastline	√	√	√		
Abundance of water		√	√		
Abundance of forests	√	√	√		
Abundance of farmland	(√)	√	√		
Consumption and/or conversion of farmland		X	X		
Clear-cutting of forests	X				
Loss of habitat and open space			X	X	
Air pollution		X		X	X
Strain on water supply				X	X
Water pollution		X		X	X
Brownfields		X			
Urbanization Pattern					
Sustainable and/or green building	√				
Infill development in core				√	
Sprawl and lowering densities	X	X	X	X	X
Land consumption (unspecified source)		X	X		X
Jobs and/or housing imbalance; long commutes				X	X
Economy					
High-quality and/or -pay jobs created				√	
High proportion of headquarters		√			

Specialization: finance, insurance, and real estate		√			
Specialization: transportation and logistics			√	√	
Specialization: agriculture and food production	√		√		
Specialization: pharmaceuticals		√			
Specialization: professional, scientific, and technical			√		
Specialization: health care and social services		√	√		
Well-known tourism and/or cultural attractions	√	√			
Potential linkages with strong-economy cities		√	√		
Unemployment and poor job growth		X	X	X	
Regional per capita income falling compared with U.S. average				X	
Difficult to compete with megacities and/or world	X	X			
Loss of national share of employment		X	X	X	
Job loss: manufacturing			X		X
Job loss: agriculture					X
Consolidation within primary industry	X				
Low housing affordability		X	X	X	
Losing advantage of lower cost of living					X
Low wages no longer an advantage					X
Lack of venture capital			X		
<hr/>					
Socioeconomic Pattern					
<hr/>					
Growing economic, social, and/or educational disparity		X	X	X	X
High regional poverty rate		X		X	
High poverty rate in rural areas					X
Racial segregation			X		
Racial and ethnic disparities in urban cores			X		X
Inequalities between growing and shrinking areas	X		X		X
<hr/>					
Governance and Planning					
<hr/>					
Weak land use controls			X		X
Fragmented governments and governance		X	X		X
Differing demands of urban and nonurban residents	X				

SOURCE: Cascadia (2006), Contant et al. (2005), Delgado et al. (2006b), Ecolopolis (2005), Kern County et al. (2005), Reinventing Megalopolis (2005), and Uniting People, Places and Systems (2006).

NOTE: √ = asset. X = challenge. O = trend. (√) = implied.

The content of these plans reveals persistent questions. The next sections of this article elaborate on answers to four of these questions. First, what is a megaregion? Second, why plan for megaregions now? Third, what are appropriate methods and data to use in megaregion planning? Fourth, when is the megaregion unit of analysis useful for policy and planning? As planning for megaregions advances, pursuing answers to these questions can strengthen the plans.

WHAT IS A MEGAREGION?

One persistent question in megaregion planning is What is a megaregion? America 2050 defines a *megaregion* as "large connected networks of metropolitan

areas" (America 2050 2006c). These megaregions are characterized by "environmental, cultural, infrastructural and functional characteristics" (America 2050 2006b, 3). Again, in the words of America 2050, "The emerging megaregions of the United States are defined by layers of relationships that together define a common area that can be used to organize policy decisions." These relationships are "environmental systems and topography, infrastructure systems, economic linkages, settlement patterns and land use, and shared culture and history" (America 2050 2006a, 8). These descriptions of a megaregion do not provide an operational definition that can be used to delineate megaregions in a consistent way across the nation. This raises three questions: (1) how did the America

TABLE 2. Strategies Recommended in Plans for Megaregions

Strategy	Megaregion				
	Cascadia	Northeast	Great Lakes	Southern California	Piedmont Atlantic
Build Regional Identity and Develop Economy					
Emphasize tourism opportunities	(√)	√	√		
Emphasize "learning community" on sustainability	√				
Market regional products, "branding"	√				
Create synergies between successful and struggling cities		√	(√)		
Support industry clusters				√	
Encourage logistics industries				√	
Preserve cultural landscapes (urban and rural)		√			
Leverage research universities			√		
Find new sources of venture capital			√		
Encourage private-public and other collaborations	(√)	√	√		
Manage Growth					
Emphasize infill and smart growth	(√)	√	√	√	√
Increase diversity of denser residential choices				√	√
Assist in property rehabilitation		√	√		
Improve urban infrastructure and services		√	√		
Encourage transit-oriented development		√		√	
Improve Transportation					
Introduce high-speed rail	√	√	√	√	√
Strengthen public transit		√	√	√	
Improve freight rail		√	√	√	
Expand intelligent transportation systems		√	√	√	
Emphasize freight modes other than truck		√	√	√	
Enhance intermodal connections		√	√		
Emphasize access over mobility					√
Use traffic-calming techniques					√
Link airports with rail				√	
Protect Environment					
Protect and restore waterfront			√	√	
Protect critical habitats				√	
Continue range of cutting-edge efforts	√				
Invest in green infrastructure networks of open space		√			√
Tie transfer of development rights to urban reuse		√			
Connect natural and urban areas to protect water quality		√			
Encourage energy-efficient uses				√	
Encourage regional energy planning				√	
Invest in renewable energy		√		√	
Reduce air pollution				√	
Address water supply and solid waste management				√	
Address Inequalities					
Increase regional tax base and revenue sharing			√		√
Encourage more low-income housing		√			
Attract wealthier residents to poorer areas		√			
Encourage worker training for high-paying jobs				√	
Improve Government and Governance					
Build alliances among institutions in all sectors	√	√	√		
Create new or stronger regional organizations and/or alliances		√		√	√
States or cities contribute to regional planning fund		√		√	
Use user fees				√	

SOURCE: Cascadia (2006), Contant et al. (2005), Delgado et al. (2006b), Ecolopolis (2005), Kern County et al. (2005), Reinventing Megalopolis (2005), and Uniting People, Places and Systems (2006).

NOTE: √ = strategy. (√) = implied strategy.

2050 megaregion planning efforts address the issue of geographic extent, (2) what existing theoretical frameworks can be used for this task, and (3) what are the implications of these frameworks or models for the work of megaregion planners?

Plans' Definitions of Megaregions

The various plans paid attention to different parts of the America 2050 definition of a megaregion. Piedmont Atlantic, the Great Lakes, and the Northeast began by including adjacent metropolitan areas, although measures did not exist to determine to what extent they were connected. Environmental, cultural, infrastructural, and functional characteristics led all the plans to include substantial areas of rural and non-metropolitan areas. In Cascadia, the three metropolitan areas of Portland, Seattle, and Vancouver make up a small part of the megaregion's area.

The megaregion plans vary in their specificity in defining boundaries and in their methods. Three rough categories describe the differences in boundary specificity: fuzzy boundary plans, multiple-boundary plans, and single-boundary plans. *Cascadia* refers to a place with both borders and history that are "imprecise" (Cascadia Ecolopolis 2.0 2006, 12). Roughly, Cascadia is the region around the Cascade Mountains or within an environmental unit defined by the Columbia River. Although this definition makes resolving the status of individual counties difficult, the plan states that the cities of Portland, Seattle, and Vancouver are definitely in Cascadia. The authors of the Southern California megaregion plan describe an area bounded by the Pacific Ocean and the state lines of Arizona and Nevada. They specify also that the megaregion "includes the inland agricultural communities of Kern and Imperial Counties." Some maps, however, include part of Santa Barbara County, whereas others do not. Both the Northeast and Piedmont Atlantic plans identify megaregions consisting of two or more parts: an urban core and outer areas. The boundaries follow county lines. The Great Lakes plan also exploits county lines but defines a megaregion without subdivisions that covers numerous metropolitan areas and many nonmetropolitan counties (Cascadia Ecolopolis 2.0 2006; Kern County et al. 2005; Delgado et al. 2006b; Contant et al. 2005; Reinventing Megalopolis 2005).

Those plans that define the region with a clear border use different criteria, but all three efforts (the Northeast, Piedmont Atlantic, and the Great Lakes) identify a set of metropolitan areas that are definitely in the region. The Piedmont Atlantic plan identifies fifty-eight counties that constitute the urban core. The Northeast plan starts with the contiguous metropolitan statistical areas from Boston to Washington, D.C. The Great Lakes plan

begins with ten metropolitan areas that share a similar industrial heritage (Contant et al. 2005; Delgado et al. 2006b; Reinventing Megalopolis 2005).

The Northeast and Great Lakes plans extend the regions beyond the urban cores by different methods. The Great Lakes megaregion annexes all counties with coastal property and counties with population growth rates greater than 8 percent (the average growth rate for those states adjoining the lakes). The Northeast plan identifies all counties sending at least 15 percent of its workforce to the urban area and adds them to the "urban core." The Northeast plan identifies a "support zone" that includes natural areas threatened by urban expansion, the area defined by river basins, and adjoining state and federal reserves. The Piedmont Atlantic plan begins with six states. After defining the urban core, the plan identifies a support zone within the six states that extends from the Virginia border to Jacksonville, Florida, and from the Atlantic Ocean to the Appalachians and the Alabama border. By anchoring their megaregions around cities but basing the geographic extent on factors such as population growth or commute patterns, these plans define regions that will likely change should the same process be repeated later (Reinventing Megalopolis 2005; Delgado et al. 2006b; Contant et al. 2005).

Some of the boundary definitions are more stable than others. Those with unclear boundaries are especially changeable. Whereas the Cascadia plan accepts (even embraces) the informality of the term *Cascadia*, the authors of the Southern California plan attempt more exact demarcation. Because they use a combination of natural (i.e., the Pacific Ocean) and political boundaries, the megaregion has some constant edges but can vary in its extent to the north (Cascadia Ecolopolis 2.0 2006; Kern County et al. 2005).

The degree to which the boundary-making process can be repeated using the same criteria, its level of operationalization, also varies among the plans. This characteristic measures whether an answer exists to the question "Why is this point inside the region?" besides simply "We just decided to include it." Of those plans with constant boundaries, the definition of the Great Lakes megaregion appears the most operationalized, based on the written documentation, and the Piedmont Atlantic region the least operationalized, with the Northeast definition falling somewhere in between (Delgado et al. 2006a, 2006b; Contant et al. 2005; Reinventing Megalopolis 2005).

Models of Regional Definition

The methods used to define boundaries for the different megaregions reflect several frameworks for identifying, analyzing, and communicating spatial

TABLE 3. Models of Regional Definition

Framework	Spatial Information Communicated By	Typical Example
Linkages	Connections between points	Freight flow analysis
Gradient	Fluctuation of a phenomenon	Air and water pollution analysis
Bounded	Contiguous extent	Political jurisdiction, watersheds

phenomena, although they do not do so consistently or necessarily consciously. Three models of representation can communicate regional phenomena in large-scale planning: (1) a graph⁴ or map of “nodes” and “linkages,” (2) a spatial gradient, and (3) a bounded territory. Table 3 summarizes these three approaches. As Friedmann and Weaver (1979, 123-24) describe, the first representation captures the movement of capital, information, and people. This model encompasses the elements of Manuel Castells’s space of flows. Whereas the nodes represent “specific places, with well defined social, cultural, physical, and functional characteristics,” graphs allow researchers to focus on the “sequences of exchange” (Susser 2002, 345) that occur between places, along what computer scientists sometimes refer to as the *edges*. Visualization and transportation software can readily manipulate node-edge information, often in a vector format.

In the second representation, what Friedmann and Weaver refer to as a “dynamic spatial system” (1979, 124), the value of a function or an index varies over space. Modern software frequently uses a raster format for such data and displays value fluctuations through differences in hue or tone. If the criteria for inclusion in a megaregion were defined quantitatively, such a technique could be used to visualize the degree to which a location merits inclusion, but the region would not necessarily have sharp boundaries. These two kinds of representation can be superior to the third, that of enclosed territorial units, in identifying and relating regional phenomena because they convey more information.

Clearly marked boundaries can, however, focus political action or define an area for data analysis. The third model, using self-contained units, corresponds most closely to Castells’s “space of places” (Susser 2002, 354). The first two representations can be mapped to such discrete units (geographic, environmental, or political entities) through a system of rules. For example, (1) any county crossed by an edge representing freight flow or containing a node representing a destination or origin becomes part of the region, or (2) any county with a combined input and output of freight shipments greater than the national average becomes part of the region. Because the motivation behind large-scale regional planning is not just to inventory assets and challenges

but also to address them through political action, bounded areas that may be political jurisdictions, such as counties, are often desirable.

Implications of the Models for American Megaregion Planning

Consideration of the three models of regional definition leads to several questions about the approach to defining megaregions in the United States. The America 2050 definition is vague enough and inclusive enough to make any approach acceptable and none compelling. The first question is whether a region should be defined as a specific place with boundaries. The answer among regional planning scholars, and the growing consensus in America 2050, is that any boundaries need to be appropriate for the purpose, and these are not constant. As Markusen (1987, 238) states,

Geographical areas of the earth . . . become regions when societies build distinct economies and political systems within their boundaries. Regions are thus built environments, rather than strictly natural ones, and they change over time in size, shape, and significance.

Gottmann (1964) in *Megalopolis*, which has inspired America 2050’s work in the northeastern United States, used counties that were metropolitan by 1950 and 1960 but did not observe strict boundaries for the large urbanized and urbanizing region because “details on the fringes matter little in our search for a better understanding of the development of this huge concentration” (26). “City-regions,” Scott (2001) asserted, could take numerous forms, among these “spatially overlapping or convergent urban areas . . . with a surrounding hinterland,” or “geographically distinct but proximate urban centers working together to harvest the benefits of mutual cooperation” (4).

An alternative approach to determining a megaregion is to emphasize the linkages model and gradient model for defining a region, to examine the connections among metropolitan areas and within city regions—to focus on the “space of flows,” not on a place with boundaries. Peter Hall and his colleagues define a “mega-city-region” as contiguous “functional urban regions,” each with an employment core and a commuting ring. Their research then examines what

relations exist among the functional urban regions, if any. They look especially at commuting and at flows of information in advanced business services. The linkages define the nature of the region and the relations with places inside and outside the mega-city region (Hall and Pain 2006; Taylor and Pain 2007). The growing literature on world cities and city regions also focuses on connections among cities through major service industry firms (for example, Taylor 2004).

Besides differences in views about the best models for defining regions, disagreements about regional definitions have implicit in them differences in disciplinary perspective. Should definitions of regions reflect current relationships, or should they consider change that can occur in the future? The geographer's perspective takes most interest in understanding the nature of the network of cities and how that relates to a region. This perspective characterizes Lang and Dhavale's approach to defining a megaregion, for instance. The past thirty years of deindustrialization in the Midwest may have broken the connections among parts of the region, and, as a result, perhaps "this is not a region" because linkages define a region (R. Thompson, personal communication, Madrid, March 10, 2006). The regional planner's perspective leads to defining regions to provide policy and planning opportunities. Broken industrial trade links among cities in the Great Lakes megaregion are not as important in defining what the region is, from the planning perspective, as is the potential to make linkages in the future. Toronto should be part of a plan for the Great Lakes megaregion, America 2050 members argue, largely because Toronto has extensive trade and information exchange with American cities in the megaregion and is already part of a "North American region-state," rather than a city characterized primarily by interactions within Canada (the geographer's perspective; Courchene 2001). Toronto, however, should also be part of the Great Lakes megaregion plan because greater connections with Toronto might bring mutual benefits and strengthen other parts of the megaregion (the planner's perspective).

Another question about definitions of megaregions is whether a region is one of relationships revealed in data or one of cultural and political identity as well (Markusen 1987). The megaregion plans have depended on economic, environmental, and demographic data. Because megaregions are so large and diverse, residents do not readily identify themselves as coming from a megaregion, and little sense of common cultural and political identity exists. To what extent could organizations like America 2050 seek to encourage regional self-identity to advance planning goals? Those living within a region can define it to project an identity to lobby for assistance (Markusen 1987) and to

"brand" a region. In the Great Lakes megaregion, the political self-definition of the region is expressed through the Northeast Midwest Coalition, an alliance of members of the U.S. House of Representatives to work on economic vitality, environmental quality, and regional equity for the large northeastern and midwestern regions. Looking for a common cultural identity on which to build a future, Morrison offered a definition of the midwestern megaregion as the "pierogi belt," where concentrations of Eastern European immigrants and their descendants continue to enjoy Polish food and share other customs (H. Morrison, comments at an America 2050 meeting, Tarrytown, New York, February 2006). The region's legacy of racial conflict, however, likely undermines the usefulness of an identity based on any ethnic heritage for planning the future. The Great Lakes megaregion plan argued that a regional self-definition could emerge around the asset of the Great Lakes and natural resources for "branding" to supersede the "Rustbelt" label of industrial decline, to emphasize the need for environmental management and restoration, to highlight quality-of-life issues, and to aid economic development based on these assets (Delgado et al. 2006b).

In sum, what does this review of the practice of defining megaregions and of the theoretical frameworks for regional definition imply for what practice should be? The boundaries of megaregions should remain changeable and adjust to the purpose of a plan. Megaregion plans should also work to incorporate as much consideration as possible of flows of goods, people, and information. Drawing on Castells, megaregion planning requires understanding of how these flows can connect and privilege distant elites, change intraregional linkages, and increase or decrease inequities within and among regions. To define the area of study for similar work involving eight European regions, Hall and Pain (2006) used an iterative approach initially premised on commute patterns and then adjusted according to later information about interactions. Frequently questioning the significance of a megaregion boundary and testing whether it captures the intended spatial phenomena may prove useful and even necessary to planning at this scale. A single boundary cannot serve for formulating plans for the range of challenges facing an area. Different subareas of the region or areas that crosscut the megaregion in different ways are appropriate for addressing specific issues such as water quality or transit feasibility (an example is the approach in *Uniting People, Places and Systems* 2006). Although the Great Lakes megaregion remains defined by metropolitan areas that share an industrial heritage despite the loss of historic economic linkages, effectively addressing city-suburb inequities

and coastal restoration requires creating different spheres of attention within the greater unit. The area of a large region considered for specific issues can and should shift, but the value of considering issues at the scale of a megaregion remains, as discussed below.

WHY PLAN FOR MEGAREGIONS NOW?

Planners associated with America 2050 point to the need to plan for megaregions to assure future economic competitiveness. They frequently argue that as the Europeans pursue a continent-wide spatial development policy, and as the Chinese develop plans across regions that include multiple metropolitan areas, other countries will realize benefits that the United States will forgo without planning on this larger scale (Carbonell, Pisano, and Yaro 2005).

Although the Europeans and Chinese have not yet implemented their spatial development plans, and thus strong evidence of their effectiveness does not exist, there are better reasons for large-scale planning in the United States than to keep up with what other countries are doing. Perhaps most importantly, as Yaro emphasizes, metropolitan planners need to look beyond their metropolitan areas to deal with pressing metropolitan issues (R. Yaro, personal communication, November 2006). The problems of slow travel among the cities of the Northeast or the Texas Triangle, for instance, cannot be solved by any one city or metropolitan area. Managing water issues for large metropolitan areas cannot be addressed within a metropolitan area. These issues frequently involve more than one state as well, as the Piedmont Atlantic plan points out. The issues are not likely to rise to the level of national policy unless regional alliances form (America 2050, 2006a; Contant et al. 2005). Therefore, finding solutions to the problems could benefit from a megaregion approach to planning.

Why plan at the megaregion scale *now*? Challenges that reach beyond metropolitan boundaries have existed for many years, and regional efforts and national policy to address regional issues have at least considered these. In the late 1930s, President Franklin Roosevelt pushed for more regional authorities like the TVA, based on comprehensive watershed planning, but did not receive congressional backing (Friedmann and Weaver 1979, 73). Regardless, from the early 1960s to the early 1970s, regional organizations developed to manage the Delaware River basin and address poverty in Appalachia. By 1972, seven new commissions existed to manage river basins elsewhere in the nation, and seven commissions existed to plan the economic development of large areas of the country that lagged in economic growth (Derthick 1974). During debates over a national growth policy in the

early 1970s, the concern focused on the redistribution of population from rural to urban areas and the rapid growth of suburbs (President's Report on National Growth 1972 1972). Congress required biennial reports on national growth and development.

The focus of these regional research, policy, and planning efforts had different emphases than planning for megaregions now has. The motivation for the current initiative is that the scale of expected population growth, especially in the South, the Southwest, and California, but also in the Northwest and Northeast, will pose enormous challenges to infrastructure capacity and environmental quality and thus economic competitiveness as well. Planning ways to accommodate the population growth now can lead to more enlightened infrastructure investments and better quality of life while strengthening economic prosperity. The increase in land development predicted by the Piedmont Atlantic and Northeast plans is much greater than the increase in population. Land development is irreversible and greatly increases threats to water supply, air quality, and preservation of natural systems. Despite the somewhat different motivations, megaregion planning relies on the knowledge that metropolitan planning alone cannot address today's pressing issues, the same conclusion reached by regional planning in the past century in response to the issues of that period.

WHAT ARE APPROPRIATE METHODS AND USEFUL DATA FOR MEGAREGION PLANNING?

Another persistent question in megaregion planning is what data and methods are most useful for analyzing and planning for megaregions. Data availability poses major challenges in understanding the character of megaregions. Available data force considerable attention to attributes of places and allow little concern with flows. How a place connects with other places is important in defining a region, as explained above, and is also important for identifying ways to address challenges.

Public data for the United States allow analysis of commute flows and truck freight flows but not of other kinds of linkages. An analysis of the U.S. Census journey-to-work county-level data reveals that commuters connect parts of the Great Lakes megaregion—Chicago and Milwaukee, for instance, and Detroit and Toledo—but that the area as a whole is not tightly linked through overlapping commute sheds (see figure 2; Delgado et al. 2006a). Extensive areas that do not send many commuters to the urban centers or receive many commuters from them still exist between, for instance, Columbus and Akron or between Indianapolis and Fort Wayne. The

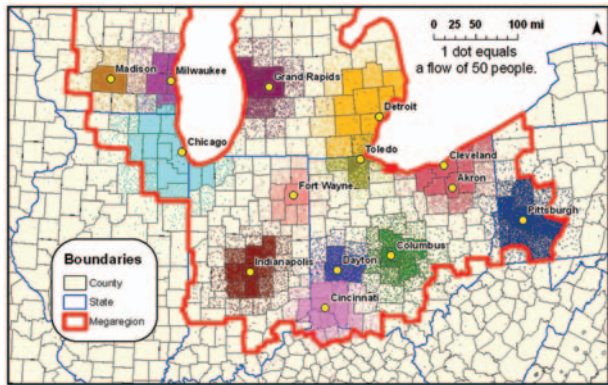


FIGURE 2. Overlapping Commute Sheds within the Great Lakes Megaregion

SOURCE: Delgado et al. (2006a).

Freight Analysis Framework (FAF²) from the Federal Highway Administration allows analysis of shipments by origin, destination, commodity, and mode (U.S. Department of Transportation 2002). Unlike the journey-to-work data, however, which use the county consistently as the unit of analysis, the FAF² geographic resolution varies. Locations in the United States are assigned to one of 131 classifications ranging in scale from specific gateways to metropolitan statistical areas to entire states. The size of defined areas is unevenly distributed across the country, facilitating a finer-grained study of freight movement in the Northeast than in Southern California or the Great Lakes region. Identifying administrative, financial, manufacturing, and information⁵ linkages among places remains a large undertaking. This knowledge would, however, improve the capacity of planners to describe megaregions and plan for the future.

Data on connections other than the journey to work and freight flows must be assembled through work with private sources or direct collection. For instance, airline schedules show the number of daily nonstop flights between places, but they do not reveal how many passengers are on the flights or how many go on to other destinations. Readily available Amtrak ridership reports show aggregated boardings and alightings at each station, but not how many people travel between specific locations. Although these data indicate connections between places, they do not necessarily indicate the relationships that characterize megaregions. Taylor's analysis of connections among cities of the world relied on analysis of a database created from information about the locations of headquarters and branches of major producer services firms (Taylor 2004). Taylor's approach does not work for measuring connections among the

range of less-than-world-cities in a megaregion, and Hall and Pain's (2005) approach discussed above would require substantial funding and time.

Comparable data are not necessarily available across national boundaries, and information about connections between places on different sides of the border is weak. Incompatible data and data of different quality lead to "lots of guessing and fantasy" in putting together comparisons across large areas that cross national boundaries, just as they do in Europe (A. Faludi, personal communication, Mexico City, July 15, 2006). Connections between the United States and Canada and Mexico have increased greatly, but data do not readily show the details of the interaction between places on each side of the boundary. For instance, 40 percent of the value of Canada's exports to the United States pass through the two land gateways between Ontario and Michigan, Detroit–Windsor and Port Huron–Sarnia. Sixty percent of the value of Canada–U.S. trade through these gateways is related to the auto industry (Bureau of Transportation Statistics 2004; Border Transportation Partnership 2004). No data show, however, the origins and destinations of the goods traveling through the gateways.

Data availability is a challenge for all megaregion planning. In addition, plans for different megaregions use varied methods and therefore do not necessarily produce comparable findings when they address similar questions with available data. Two examples are calculation of regional domestic product and forecasts of future land development. In the Northeast, plans used the sum of the domestic product for major metropolitan areas to estimate the domestic product of the megalopolis (P. Todorovich, personal communication, Madrid, March 9, 2006). For the Great Lakes region, the plan calculated the share of state payroll attributed to the counties included in the megaregion in each state and took the same share of the gross state product; adding these shares of state domestic product resulted in an estimate of the domestic product in the megaregion (Delgado et al. 2006a). In the Piedmont Atlantic megaregion, the estimate of gross regional product is the sum of that for six states; this includes the significant Florida economic activity south of Jacksonville, not necessarily included in the megaregion in other analyses (C. Ross, personal communication, Tarrytown, NY, February 23, 2006).

The plans for the Northeast megalopolis and for the Great Lakes megaregion modeled land use change to show how current trends continued into the future would affect development patterns and destruction of natural areas. The two used different approaches, and both had unresolved problems (D. Kooris, personal communication, Madrid, March 9, 2006; Delgado et al.

2006a). Future modeling could use yet other variations without necessarily building on or improving on the work already completed because details of the methods are not necessarily documented and readily available.

America 2050's collaborative megaregion planning effort would benefit from intensive workshops on data needs and methods. Reaching out to disciplines such as environmental science, regional science, and economics could help planners use proven quantitative techniques when they already exist and balance the more qualitative aspects of large-scale planning. Also, more attention to methods would serve to help identify specific research needs for assembling and analyzing new kinds of data; to share, critique, and improve methods to assess specific issues; and to cumulate innovations in methods.

WHEN IS THE MEGAREGION A USEFUL SCALE FOR POLICY AND PLANNING?

The fourth persistent question in megaregion planning is identifying when the megaregion can be a useful scale for policy and planning. The megaregion scale is appropriate for policy making concerning some phenomena that transcend political boundaries. It is also useful at times even when the scale is not quite right for handling a particular issue. Lastly, the megaregion concept can provide guidance and contextual cues when the policy or planning effort is for a smaller geographic area. The following discussion deals with each of these points in the context of the plan for the Great Lakes megaregion. It concludes with consideration of policy making without a government at the megaregion scale and of issues for which megaregion planning has not been useful.

Usefulness for Policy

First, planning at the megaregion scale is useful for dealing with policies about environmental protection, economic development, and other concerns that cross political lines and demand a wide lens. A look at related work in the natural sciences, for example, proves instructive. Environmentalists, hydrologists, and ecologists define regions for purposes of resource protection, conservation, and restoration. This idea resonates with common megaregion project goals: to protect, restore, and improve the economic, cultural, and environmental well-being of interconnected places. Streams and rivers necessitate large-scale planning because they transfer pollutants downstream. Initial problems can spread, making more waters nonpotable, fish unfit for consumption, and recreational areas subject to warnings and restrictions (Randolph 2004, 398). Second-order impacts may follow: injury to wildlife, human health

problems, and a decline in activities such as fishing, hunting, and tourism. To address some of these concerns, watershed management and ecosystem management attempt to delineate natural, functional units. These units frequently are of the same scale as megaregions. Watershed management relies on a tiered approach of regions and subregions defined by the flow of rainwater to streams and rivers. Ecosystem management defines regions by examining "climate, vegetation, geology and other ecological and environmental patterns" (Nature Conservancy 2006). The Nature Conservancy defined eighty-one "ecoregions" in the United States using this ecosystem management approach (Nature Conservancy 2004).

In economic development policy, the megaregion perspective makes obvious that competition for business location, often among jurisdictions and states within the same megaregion, does not change the overall character or direction of the region's economic development challenges. Instead, in the Great Lakes megaregion, for instance, the broader regional perspective highlights the low rate of innovation and technology transfer, the small amount of venture capital to finance new ideas, and the continuing regional economic dependence on the auto industry and related manufacturing despite their recurring losses in employment (Austin and Affolter-Caine 2006; Delgado et al. 2006b). The perspective of the megaregion scale reveals new policy directions for encouraging innovation that can help the region move to a prosperity based on different kinds of economic activity than in the past.

Second, the megaregion scale may prove useful even when it is not the ideal scale for handling some issues. For example, several facts suggest a need for national freight planning. Seventy-three percent of U.S. freight crosses state lines (Smith 2002). Shipping by truck increases congestion along major corridors throughout the country. Key gateways serve sizeable segments of the population, not just local or even regional constituencies. The Ambassador Bridge and Windsor Tunnel connecting Detroit to Canada, for instance, facilitate freight shipment for every state in the United States (Bureau of Transportation Statistics 2004). The political will to address freight-related problems likely varies, however, depending on the extent of local impacts. Thus, an interconnected, nationwide phenomenon may give rise to only small pockets of concern. The megaregion scale may be large enough to address the crux of the issue and small enough to make the practical political organization possible.

Third, the megaregion perspective is often useful as well when a policy or plan addresses only a small part of the megaregion. For example, the plan for the Great Lakes megaregion emphasized the Great Lakes as a

defining characteristic of the identity of the region. Developing an identity around the Great Lakes depends, for example, on protecting shorelines from development, improving public access to waterfronts, supporting projects that enable cities to turn toward their waterfronts, and preserving the environmental quality of the Great Lakes. The Detroit Riverfront Conservancy, led by General Motors, other corporate leaders, elected city officials, and major regional foundations, is building a riverfront promenade (Detroit Riverfront Conservancy 2006). Seen from the perspective of local politics, this alliance of elites is making an investment that promotes downtown and neglects neighborhoods. From the perspective of the Great Lakes megaregion, however, the need is to redefine regional identity in terms of natural amenities, especially the Great Lakes. The development of the promenade is an essential part of turning Detroit's previously industrial and now underused waterfront into a regional asset, complementing efforts in Cleveland, Milwaukee, and Chicago. Such a project is one part of transforming the region for a more prosperous and environmentally sustainable future.

Similarly, decisions about other issues can benefit from thinking "megaregionally" and acting locally. Frameworks for environmental planning consider overarching issues but focus on smaller areas for action. Watershed planners study the basin but concentrate activities on the more manageable subwatershed level (Randolph 2004, 258). Rather than act directly on vast ecoregions, the Nature Conservancy identifies ecoregion "portfolios," selected sets of places that represent the diversity of native species, natural communities, and ecosystems (Nature Conservancy 2006).

Governance and Government

Planners and scholars interested in megaregion planning assert that governance, not government, is needed to plan for megaregions because no government exists to match the megaregion scale and the variety of possible megaregion boundaries (for instance, A. Faludi, personal communication, Madrid, March 2006). The plan for the Great Lakes megaregion emphasizes the need to create new forms of governance, building on existing quasi-governmental and nonprofit institutions such as the Great Lakes Commission and the International Joint Commission (Delgado et al. 2006b). In the Piedmont Atlantic and Northeast megaregions, policy makers and business leaders, operating in ways that provide some aspects of governance, have assembled to formulate and gather support for policy directions for energy use, land use, transportation infrastructure, and other issues.

Most existing nongovernmental institutions would have difficulty covering the tasks that governance often encompasses, however. Laquian (2005, 107) enumerated these as articulating interests and issues in an open and participatory fashion; integrating various interests into specific policies and projects; mobilizing resources to support policies and programs; implementing policies and programs effectively; adjudicating competing interests through laws, regulations, and standards; and monitoring and evaluating programs. The policy domain of many existing institutions is narrow, and they do not necessarily have legitimacy in working on other issues at a broad regional scale.

This discussion of the usefulness of the megaregion scale shows that an approach that is perhaps more fruitful is to consider what megaregion planning suggests policy should be at the federal, state, and local levels—when governments do exist. In addition, the megaregion perspective suggests that metropolitan regional planning can contribute in numerous ways to stronger megaregions. America 2050 participants are thinking in this way with respect to the federal government's role in national transportation legislation and energy policy, for instance (America 2050 2006a, 2006d). In California, Teitz and Barbour (2007) pointed out, the state encompasses two megaregions, so the state government is the appropriate forum for tackling the concerns of large regions.

Policy Shortcomings

Despite the usefulness of considering policy issues from the scale of the megaregion, at least two major shortcomings exist in this approach for considering policy directions. One major problem of the megaregion scale for policy making and planning is that it veils inequities within the region that need to be addressed for social justice reasons and that can interfere with the megaregion resolving issues related to the environment, infrastructure, and the economy. The inequities do not require action at the scale of the megaregion; they could be addressed by state and local governments. If no action to deal with social justice issues occurs, however, conflict over resources can interfere with building political alliances to address megaregion-wide challenges. Laquian (2005) noted this as an issue needing resolution in plans for megaregions in Asia as well. Planners have to take care to examine inequality within metropolitan areas and between urban and rural areas within the megaregion to assure such inequality is not overlooked. In the Great Lakes megaregion, metropolitan area per capita incomes did not differ much; in 1999, they ranged from about \$21,000 in the Pittsburgh area to about \$25,000 in the Chicago area. Inequality within metropolitan areas

was, however, much greater. In the Detroit metropolitan area, suburbanites had per capita incomes 83 percent greater than those of city residents. In the Milwaukee and Cleveland metropolitan areas, suburban residents' per capita incomes exceeded those of city residents by 71 percent (Delgado et al. 2006b, 21). Analysis of poverty and educational attainment shows concentrations of people vulnerable to economic hardship in parts of the central cities of every large metropolitan area in the megaregion. Metropolitan areas in the Great Lakes megaregion have high levels of residential segregation between whites and African Americans. In 2000, the megaregion had five of the eight most segregated metropolitan areas in the nation, including the two most segregated, Detroit and Milwaukee (Iceland and Weinberg 2002). This means that African Americans and whites have unequal access to jobs, education, quality housing, and public services. Inequality and the history of racial antagonism interfere with the formation of political alliances to bring about changes that could benefit the region. As the plan for the Great Lakes megaregion emphasizes, one of the most important undertakings in the megaregion is regional land use planning to assure reuse instead of abandonment of central areas and to preserve natural areas at the fringes of metropolitan areas (Delgado et al. 2006b). Emphasis on maintaining the quality of life in cities can help reduce the inequality that interferes with agreement on *any* issue.

A second problem with the megaregion approach may be that because megaregions are defined as "large connected networks of metropolitan areas," this kind of regional planning leaves out large areas of the country that are not part of such systems (see figure 1). It therefore tends to overlook questions such as how changes in policy affect population growth in areas that are not now major centers, how farm policy should affect regional development (L. Hopkins, personal communication, Mexico City, July 15, 2006), and how changes in technology and relative prices will lead to changes in trends and to new patterns of regional growth and decline in the next forty years. Planners did not foresee the regional transformations that occurred in the past forty to fifty years and may well not foresee those in the next half century.

CONCLUSION

The movement to analyze and plan for regions at a "mega" scale in response to projections of large increases in population by 2050 raises persistent questions. This article has laid out issues underlying four of these and has drawn on planning scholarship to suggest directions for answers to the following: (1) what is

a megaregion, (2) why plan for megaregions now, (3) what data and methods are useful for megaregion planning, and (4) when is a megaregion scale useful for policy and planning? The articulation of a particular megaregion should change depending on the appropriate geography for addressing specific policy issues. Planners should try to understand regions with increased attention to connections between places compared to the character of specific places; but until data on "flows" are more readily available, this will rarely be possible. Because planning is future oriented and policy directed, the geographic extent of a megaregion should depend on what geography can lead to useful future changes. Megaregion planning has emerged in the past few years in the United States to address challenges that individual states, localities, or metropolitan regions cannot solve and to work toward national policy changes that can solve problems facing large regions. Megaregion planning would benefit from the availability of better, more consistent data for the United States, Mexico, and Canada, but planners can advance their work considerably even without better data by attending to the quality of the methods they use. Megaregion planning is useful in numerous policy situations: in addressing issues at the scale of the megaregion, organizing the political will to solve problems whose negative effects are concentrated in certain areas, and informing local decision making. The wide lens of megaregion planning can, however, overlook inequities within metropolitan areas and between urban and rural areas, which—if left unattended—damage the capacity of citizens to work together toward positive change. Thus, plans that do not include social justice strategies may undermine their other goals in the long term. Furthermore, because megaregion planning relies on current knowledge and extrapolation, it cannot predict radical departures from existing trends, such as those triggered by immigration shifts and technological improvement.

This article has analyzed the state of megaregion planning in the United States through the work of America 2050 at a point when the planning effort is only a bit more than three years old. As megaregion planners confront the persistent questions their work raises, planning at the scale of megaregions can continue to become more effective in the coming years.

NOTES

1. The Regional Plan Association's projections of county population and employment growth used Woods and Poole projections by county through 2025, then extended these by straight-line projection to 2050. The RPA then calculated the percentage of the employment and population growth expected within designated megaregion counties (P. Todorovich, e-mail communication, March 2007).

2. The regions of networks of metropolitan areas contrast with the United Nations' "mega-city," defined as "urban agglomerations of ten million persons or more," most of which are in the developing world (United Nations 2004).

3. The America 2050 Web site (America 2050 n.d.) offers a chronology of activities related to planning megaregions.

4. The term *graph* is used in a manner common in computer science, referring to a data structure of connections ("edges") between points ("vertices" or "nodes") (Storer 2002, 289). These basic elements can be used to describe and analyze complex phenomena. For example, commute flows consist of edges tagged with a magnitude and direction of flow. Graph theory is the basis for two measures of commuting connectivity developed by Green (2005), *special functional polycentricity* and *general functional polycentricity* (Hall and Pain 2006).

5. Ongoing attempts to "map" the Internet may prove useful in measuring the degree of electronic connectivity among places.

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