Chapter 5
Amenities, Quality of Life, and Regional Development

Gordon F. Mulligan and John I. Carruthers

Introduction

The purpose of this chapter is to review recent advances in research on the role of amenities – broadly defined, to include both the natural and human varieties – in urban growth and regional development. The focus is on approaches that use secondary data at the aggregate level of scale to generate objective measures of quality of urban life (QOUL). The chapter extends and complements a survey by Mulligan et al. (2004) on QOUL and public policy, which reviewed hundreds of studies from a very broad pool of evidence. The main goal of this survey is to synthesize the literature in a way that informs an interdisciplinary audience of researchers and practitioners in the social sciences and public policy fields.

Amenities are key to understanding quality of life (QOL) because they are precisely what make some places attractive for living and working, especially relative to other places that do not have them and/or are burdened with their opposites, *disamenities*. Because they influence where households and firms choose to locate within and among regions – plus, in part, determine the costs incurred in doing so – amenities and disamenities exert an exceptionally strong organizing force within advanced economies. And, in response to the strength and reach of this force, a corresponding nexus between amenities and public policy has also emerged: Indeed, it is now common for urban and regional planning efforts to actively address quality

G.F. Mulligan
School of Geography and Development, University of Arizona,
#408, 1203 Pemberton Avenue, Squamish, BC V8B 0J7, Canada, USA
e-mail: mulligan@email.arizona.edu

J.I. Carruthers (✉)
Sustainable Urban Planning Program College of Professional Studies,
The George Washington University,
805 21st St NW, Suite 301, Washington, DC 20052, USA
e-mail: jic@gwu.edu

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of life. For example, in 2008, the Puget Sound region of Washington State in the USA, via the *Puget Sound Regional Council*, adopted a long-range planning document entitled *Vision 2040*[1]:

> …Vision 2040 is an integrated, long-range vision for the future that lays out a strategy for maintaining a healthy region — one that promotes the wellbeing of people and communities, economic vitality, and a healthy environment.

The plan explicitly reflects the fact that environmental quality and social well-being are fundamental to economic prosperity.[2]

What follows is an overview of recent research that has potential for guiding such activities. One empirical example shows how amenities have recently affected population and per capita income growth – two widely accepted measures of regional development – across the numerous and diverse counties of the USA. A second empirical example shows how housing values in the USA have come to depend upon the geographic incidence of amenities. Both studies are designed so that the behavioral and spatial econometric treatment of natural and human amenities is highlighted. Because of space limitations, most, but not all, of the discussion addresses interregional, as opposed to intraregional (local), issues. As an initial step, the chapter sets out some preliminary concepts – it is intended to clarify the nature of amenities and the behavioral mechanisms through which they influence both the process and the outcome of regional development. It then builds on this by providing a brief history of research on the consideration of environmental amenities as "compensating differentials" and further clarifies how amenity valuation is related to regional development. The remaining sections of the chapter deal more narrowly with:

- An empirical example of how natural amenities influence regional development
- The dual roles of production versus consumption in the development process
- Migration

Finally, the chapter closes with a summary and brief discussion of the material that is most relevant to planning and other forms of public policy.

Some Preliminaries

Amenities and Disamenities

Amenities are site- or region-specific goods and services that make some locations particularly attractive for living and working. Their opposites, disamenities, make places unattractive. Natural amenities are those, like climate, which are (for the most part) not influenced or produced by people, while human amenities are those, like culture, which are. Both types exist and are experienced at various geographic

[1] Excerpted from: http://www.psrc.org/projects/vision/index.htm

[2] See: http://www.psrc.org/projects/vision/pubs/V2040execsumm.pdf

scales and, in large part, determine relative QOL or social well-being (Smith 1977). Moreover, amenities influence the consumption decisions of households, the production decisions of firms, and the location decisions of both economic agents. Consequently, their implications for both local and regional development outcomes – and public policies aimed at shaping those outcomes – are enormous. Amenities were once thought to be mainly natural, as in the case of sunshine and/or landscapes, but the human-created variety is increasingly of interest to researchers and policy makers (Wong 2002; Welch et al. 2007).

Urban societies create and maintain many different kinds of human amenities, which often generate spillovers or so-called external economies (Harvey 1973; Tolley 1974; Diamond and Tolley 1982; Brueckner et al. 1999). At the most general level, these amenities include:

- Public goods and services (like education)
- Private consumption goods (like restaurants)
- Transportation and communication (transit)
- Cultural institutions (like museums)

Social capital, in various forms, seems to qualify as yet another type (Putnam 2000). In the USA, city-based information on such amenities is regularly updated in the *Places Rated Almanac* (Savageau 2007). Cities increasingly compete with one another in providing these amenities – consider the more visible examples of green spaces and public transportation systems (Henderson 1974; Fujita et al. 1999). In fact, some analysts (Glaeser and Mare2001) have argued that perhaps too much urban research in the USA has focused on the production of goods and services instead of on their consumption. Amenities are also of great interest to planners and policy makers working in nonmetropolitan regions, including micropolitan (emerging metropolitan) and low-density rural areas (Elliott and Perry 1996). Like metropolitan areas, nonmetropolitan regions compete for firms and households – sometimes on a seasonal basis – and these areas often market their comparative advantages in terms of recreation, landscapes, and waterscapes accordingly (Power 1996; Power and Barrett 2001). In fact, the most popular measure of natural amenities in the United States was specifically designed to assist planners and policy makers in addressing the problems that are endemic to nonmetropolitan counties (McGranahan 1993). Deller et al. (2001) discuss many issues of concern to regional development practitioners in these more peripheral economies.

Amenities (disamenities) influence urban growth and regional development by increasing (decreasing) the level of competition between different places. Other things being equal, people are particularly drawn to (away from) attractive (unattractive) settings – and because of this, expect to pay a premium (discount) via increased (decreased) housing prices and/or forgone (extra) wages. In Seattle – the so-called Emerald City – people colloquially refer to the combination of higher than expected rents and lower than expected wages as the "Mt. Rainier effect," meaning that it is owed to the region's world-renown natural beauty. In sum, by determining relative QOL, amenities and disamenities directly influence where people choose to live and at what cost.

The Economic Concept of Value

Because most, though certainly not all, environmental amenities are nonmarket goods – meaning that they are not bought and sold in conventional markets: there is no store where one can go to purchase a few additional "days of sunshine" – their value can only be estimated, not measured directly. The economic concept of value (for an in-depth discussion, see Bockstael and Freeman 2005) is derived from neoclassical welfare economics, which holds that the purpose of economic activity is to promote individual and, by extension, societal, well-being. In this context, people's well-being comes from consuming goods and services delivered via private markets, nonmarket goods and services delivered via governments, and nonmarket goods and services derived from the natural environment and the kind of external economies mentioned above. The neoclassical framework further assumes that people have well-defined and well-known, or understood, preferences and that these preferences have the property of substitutability. Substitutability is key because it establishes how people make trade-offs between alternative bundles of goods and services. In the context of QOUL, people clearly make trade-offs between what various cities have to offer in terms of both natural amenities and human amenities.

There are two distinct ways of observing these trade-offs and measuring the values associated with them:

- Stated preference methods, such as contingent valuation
- Revealed preference methods, such as hedonic price analysis (see Freeman 2003).

Economists generally prefer the latter approach because it is based on what people actually do, not on what they say they would do. Hedonic price analysis, discussed in detail later, involves estimating the transacted price of housing (or people's wages, the transacted price of their labor), taking into account the most important attributes of that housing (those workers). Thus:

- Housing prices are regressed on characteristics of the home, its site, its location vis-à-vis various points of attraction (downtown, parks) and repulsion (undesirable land uses), and so on.
- Wages are regressed on characteristics of the worker (experience, educational attainment) and the job (hardship, level of danger), plus characteristics of where the job is located (number of sunny days, annual temperature extremes).

In this way, the implicit values of various attributes, which are rolled up in the overall value of homes and wages, are revealed.

So, looking out across the country, other things being equal, people are expected to pay a premium for housing and/or work for lower wages in places having nice weather – that is, if good weather has economic value. Again, the reason this happens is that there is increased competition to live in places offering a high QOL, so the demand is high relative to supply in the housing market, and the supply is high relative to demand in the labor market.

Spatial Equilibrium

The outcome of these kinds of value-related trade-offs is a (theoretical) state of spatial equilibrium, wherein households are indifferent among locations. This situation – which is achieved via differentials in population, employment, and wage growth (see Carruthers and Mulligan 2008) – implies that, roughly speaking, the value of wages plus the value of quality of life minus the value of housing is more or less equivalent across the country (Glaeser 2007).

To understand how the equilibrating process works, it is useful to characterize the regional development process as happening in two interconnected ways:

- Via "demand-induced growth," which occurs when firms require additional labor, causing an increase in the demand for workers
- Via "supply-induced growth," which occurs when households move from one place to another for reasons that do not have to do with employment, causing an increase in the supply of labor

The classic example of demand-induced growth is when an export-oriented employer, like Boeing's commercial airliner operation, increases production and people move from elsewhere to fill newly created jobs. An example of supply-induced growth is when people relocate – for reasons having to do with personal preference – to the Puget Sound region because they value its temperate climate and abundant opportunities for outdoor recreation. In practice, both mechanisms matter, and neither happens in isolation (Borts and Stein 1964; Muth 1969; Carlino and Mills 1987; Clark and Murphy 1996; Mulligan et al. 1999).

Carruthers and Mulligan (2008) have recently extended the methodology for empirically modeling this process from one that focuses on only the two demographic outcomes (population and employment growth) to one that encompasses all three outcomes at the core of the equilibrating process. In particular, only demand-induced growth is precipitated by gains in the export market, but both mechanisms place pressure on the real estate market, raising rents and at the same time population and employment densities due to more intense competition over urban space. Expressing population and employment in terms of the density of land use ties the modeling framework directly to land rent and gives rise to the third equation for wages. Land use density measures the spatial intensity of activity, which is influenced by the average annual wage because of its relationship to land consumption: For people, land is a normal good, so the more they earn in wages, the more space they are able to consume, leading to a lower population density; for profit-maximizing firms, land is a factor of production, so the more they pay in wages, the less space they are able consume, leading to a higher employment density. Meanwhile, population density, which measures how concentrated the supply of labor is, and employment density, which measures how concentrated the demand for labor is, simultaneously drive the average annual wage. Working from Roback's (1982) model of compensating differentials, Mueser and Graves (1995) show how labor demand, labor supply, and wages combine to form a kind of "moving equilibrium" that calls for more or less

continuous migration as the space economy searches for an optimal organization of activity (for detailed expositions, see Mulligan et al. 1999; Carruthers and Mulligan 2007, 2008).

Compensating Differentials

For those new to environmental amenities research, this section provides an historical perspective on its role in QOL-oriented research. British observers commented on the economic growth of "fashionable watering places" like Bath and Brighton in the UK as early as 1811 (see Kendall and Pigozzi 1994). While largely forgotten today, Goodrich et al. (1936) identified a data based "plane of living" for US counties during the Great Depression. But the comprehensive assessment of urban amenities really began with Thorndike (1939), who rated the "goodness of life" in 300 cities.[3] While he did not actually use the term amenity, Thorndike included many variables that are commonly adopted today as QOL indicators, including per capita expenditures on schools, homicide rates, and infant mortality rates. Rogerson et al. (1988) provide a contemporary application of such indicator analysis for cities in the UK.

Ullman (1954) was the first to popularize the notion that amenities, or "pleasant living conditions," were in part responsible for differential growth rates in US regions. Careful to avoid being accused of environmental determinism, he believed that factors like climate and landscape had increasingly important roles to play in societies where affluence and mobility were both high. Perloff et al. (1960) reinforced this perspective when drawing out differences in the trajectories of economic development experienced by two Sunbelt states, California and Florida. Berry and Horton (1970) then argued that amenities were playing a very important role in the ongoing urban transformation of the entire American Sunbelt. Likewise, a key role for amenities is implicit in:

- Borts and Stein's (1964) theory of economic growth
- Galbraith's (1967) new industrial state
- Rostow's (1968) age of high mass consumption
- Bell's (1973) post-industrial society

By the mid-1960s, most social scientists recognized that affluent households were increasingly gauging their QOL by the level and variety of services they received instead of just the quantity of goods they consumed.

Some of the best known QOL research originates from the so-called compensating differential framework and hedonic price methodology developed by Rosen (1974, 1979) and extended by Roback (1982, 1988). In these studies, desirable (undesirable) living conditions negatively (positively) influence wages because, everything else

[3]The earliest example of all is apparently Ravenstein 1885 – see Greenwood and Hunt's 2003 review of early migration research.

being equal, people living in attractive (unattractive) places demand less (more) pay for their work; conversely, desirable (undesirable) living conditions positively (negatively) influence housing values because people living in attractive (unattractive) places are willing to pay more (less) for their homes. Both Rosen (1979) and Roback (1982, 1988) used their estimates to develop place-to-place QOL rankings, which rated regions having nice weather and other natural amenities, like San Francisco, at the top. Key studies that have extended this approach to developing quality-of-life rankings include Berger et al. (1987), Hoehn et al. (1987), Blomquist et al. (1988), and Gyourko and Tracy (1989, 1991). These are reviewed in Mulligan et al. (2004) and elsewhere.

In order to correct for "counter-intuitive" rankings, Albouy (2008) has recently recommended making three adjustments to the traditional approach:

- Incorporate other household cost items besides housing.
- Account for differential federal taxes in the payment of wages.
- Include non-earnings income in the resources available to households.

These adjustments serve to simultaneously narrow the disposable income differences and widen the cost-of-living differences across American cities. Or to look at things differently, more weight is placed on housing-cost differences, and less weight is placed on wage differences. Both exogenous (precipitation, sunshine, coastal location, and so on) and endogenous (for example, air quality, violent crimes, incidence of bars and restaurants) amenities are accounted for in the new imputed QOL estimates. Honolulu and places like Santa Barbara and San Francisco in California are given the highest scores. Moreover, the overall rankings that come out of the analysis resemble those listed in the *Places Rated Almanac* (Savageau 2007). In fact Albouy (2008) argues that popular publications like the *Almanac* should place even greater weight on climate factors and on location. It is important to note that the size of a city does not appear to have an effect on its (adjusted) QOL. The various amenities and disamenities of urban life appear largely to cancel one another out. So, any calls for restricting the sizes of large cities because of estimated welfare losses seem premature. If anything, in the interest of national economic efficiency, areas with favorable natural amenities should make greater attempts to accommodate larger populations.

The hedonic approach is demanding both in terms of analytics and the amount of data required. So, it is not surprising that a somewhat simpler approach to estimating the impact of amenities has been devised. Following Harris et al. (1968), Glaeser et al. (2001) have recommended using the residuals from a simple, bivariate regression model wherein median house value is the dependent variable and median household income is the independent variable. Geographic variation in this relationship should depend in part on the interplay existing between natural advantages and any scale effects in consumption (Krupka 2008). Observations above (below) the trend line – that is, positive (negative) residuals – indicate places where households spend more (less) than an average amount of their income on housing. The sizes of the positive (negative) residuals are a measure of the value placed on place-specific amenities (disamenities). In a study of almost all counties in the USA, Carruthers

and Mulligan (2006) have extended this logic to include natural amenities as a second independent variable. So, one possible interpretation is that positive (negative) residuals point to places having a surplus (deficit) of human-created amenities.

Regional scientists have had somewhat different perspectives on the uneven access to amenities found in capitalist societies. Economists have stressed that different people command different resources, and therefore, households must place different demands on amenities. Demographers have recognized that factors like age, race, and gender often mediate these demands, and geographers have often pointed out that amenities are inequitably distributed across space (Massam 1975, 1993; Dicken and Lloyd 1981; Diamond and Tolley 1982). But these disparate views have slowly converged, and now, social scientists generally recognize that accessibility *per se* impacts a wide range of social and economic issues at different spatial scales (Glaeser and Kohlhase 2004; Des Rosiers et al. 2005; Partridge et al. 2008a). Comprehensive literature reviews on amenities – some being more technical than others – have already been compiled by Bartik and Smith (1987), Gyourko et al. (1999), Dissart and Deller (2000), Mulligan et al. (2004), and Lambiri et al. (2007). Moreover, discussion in the social sciences and public policy fields continues with regard to the conceptualization and measurement of QOL, where it is recognized that biases have sometimes occurred in the selection of amenity indices. Serious discussion is also needed to clarify how amenities relate to various facets of social justice, especially geographic and intergenerational equity (Nussbaum and Sen 1993; Smith 1994; Sen 1999; van Praag and Frijters 1999; Lee 2006; Rothschild 2009).

Natural Amenities and Regional Development: Empirical Examples

There has emerged a considerable literature measuring natural amenity and its relationship to regional development. That has included attempts to derive natural amenities indices and studies which attempt to model the relationship between amenities and population density and growth.

The McGranahan Natural Amenity Index

McGranahan's (1993) well-known county-level study was in some ways a turning point for the study of natural amenities in the American space economy. From a somewhat wider pool of potential candidates, he selected six different measures of natural amenities, which, as a set, exhibit surprisingly little intercorrelation. Along with the signed preferences by households, these were:

- Average January temperature (+)
- Average January sunshine (+)

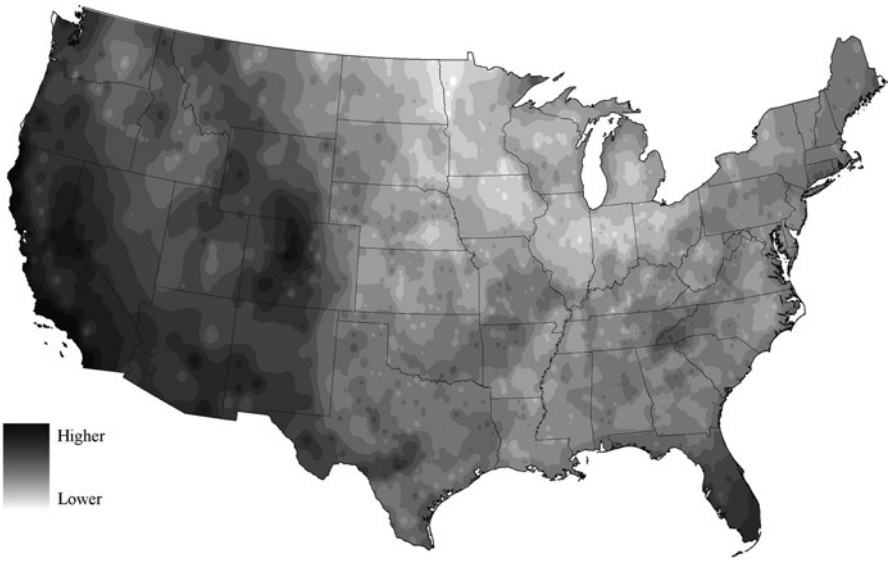

Fig. 5.1 Natural amenity index: U.S. (Source: Carruthers and Mulligan 2009)

- Average July temperature, computed as a residual (–)
- Average July humidity (–)
- Topography (+)
- Percentage of land in water (+)

Standardized *z*-scores were computed for each subindex and then for an overall index – mapped in Fig. 5.1 – based on the summation of the signed subindices.

These measures have allowed various studies to determine the role of natural amenities in various facets of regional development, particularly in the so-called jobs versus amenities debate, as the prime engine for local and regional growth. Prior to these indices being available, much analysis was confined to metropolitan areas, where the information resources of the *Places Rated Almanacs* could be conveniently drawn upon.

Modeling Relationships Between Amenities and Population Density Growth

An analysis of county-level growth in the US during the closing decades of the twentieth century highlights various issues that are of central interest to researchers in economic geography and regional economics.

Two widely adopted measures of local or regional change are the focus of the analysis:

- Growth in population density
- Growth in per capita income

Table 5.1 Amenity elasticities

	Population density growth			Per capita income growth		
	1970s	1980s	1990s	1970s	1980s	1990s
Intercept	–0.031	–0.022	–0.413	3.464	3.276	1.615
	(–1.0)	(–0.2)	(–3.2)	(36.6)	(30.2)	(16.2)
NAMEN	0.174	0.528	0.570	–0.045	–0.059	–0.057
	(20.9)	(18.7)	(22.2)	(–1.8)	(–2.4)	(–2.9)
COAST	0.021	0.096	–0.033	0.004	0.091	-0.015
	(5.7)	(7.8)	(–2.9)	(0.4)	(8.4)	(–1.7)
DENSE	0.009	0.016	0.017	0.000	0.026	0.012
	(19.4)	(9.9)	(11.0)	(0.1)	(18.8)	(9.8)
DEGRE	0.014	0.051	0.004	0.078	0.111	0.048
	(5.8)	(7.0)	(0.5)	(10.9)	(17.5)	(8.8)
PCINC	–0.004	–0.030	0.027	–0.352	–0.358	–0.165
	(–1.2)	(–2.3)	(1.87)	(–33.1)	(–30.6)	(–15.1)
Adj R^2	0.285	0.226	0.181	0.284	0.315	0.081

Source: McGranahan (1993)

Note: *t*-scores are shown in parentheses; all county estimates ($n = 3{,}107$) are controlled for prior population density, percentage college educated, and per capita income (in $2000). Sources: U.S. Bureau of the Census; U.S. Bureau of Economic Analysis

Density is often preferred to size because counties vary so much in areal extent. Practitioners of local and regional development often use sustained population (density) growth as an indicator of economic development, whereas regional economists favor sustained per capita (personal) income growth as an indicator of local or regional economic development. In any case, the two are used in combination here to examine how economic growth across the US space economy changed during the last three decades of the twentieth century.

Table 5.1 presents estimates from an ordinary least squares (OLS) regression model where McGranahan's composite index of natural amenities is supplemented by a second natural amenity, coastal location (Rappaport and Sachs 2003). The various regressions also include a number of so-called initial conditions, including per capita income, population density, and percentage of the population aged 25 plus with a college degree. Initial conditions provide some required context for the estimates of decadal growth and also address, at least in part, thorny issues related to circularity or endogeneity (see below). Moreover, two of these measures are widely known to represent human-created amenities. Population density captures opportunity or variety in the availability of both private and public goods, while the incidence of college education among residents reflects the availability of human capital in the region. So, the regressions, although somewhat underspecified compared to some in the literature, shed useful, if simplified, light on several amenity-related growth issues, including the "jobs versus amenities" debate in the USA

The left-hand panel of Table 5.1 lists estimates of (instantaneous) population density growth over each decade, and the right-hand panel lists estimates of (instantaneous) per capita income growth over each decade. In both sets of models, a single

composite index for natural amenities has been used instead of the six separate amenity subindices. All of the variables are transformed into natural logarithms – so, all parameter estimates are elasticities.

Although there are some interdecadal changes, the overall story is one of remarkable stability, echoing the remarks of Rappaport (2004) about persisting patterns in US population movements. On the one hand, local population (density) growth has depended on a mixture of natural and human amenities; on the other hand, local per capita income growth has largely depended on human amenities. For population growth, the positive effect of natural amenities only grew over time. During the 1970s, a 1% shift upward in the composite index brought forth a 0.17% increase in the population growth rate, while in the 1990s, this natural-amenity effect was a remarkable 0.57%, some three times as great. Coastal locations had higher population growth rates through the first two decades, and dense, well-educated regions – or major metropolitan areas – enjoyed higher population growth through all three decades. In contrast, bountiful natural amenities appear to have diminished any regional growth that was experienced in per capita (personal) income during the 30-year study period, a result entirely consistent with Rosen's (1974, 1979)/Roback's (1982, 1988) compensating differentials theory outlined above. Improvements here were largely confined to dense, highly educated areas, though the negative signs on prior per capita income levels suggest a sustained pattern of convergence.

During the middle decade – the 1980s – the effects of both prior density and prior education benefitted from their concentrations of human capital, and urban regions found in desirable environments were especially well-off. Rural regions with prized natural amenities experienced population growth but not per capita income growth; rural regions in undesirable locations simply lagged behind along both dimensions of local and regional growth.

Although these are both very simple models, together they establish that the role of QOL in regional economic development will always be complicated by the fact that amenities impact the two main components of economic development – growth in people and growth in income – in somewhat different ways.

The findings of the research outcomes presented in Table 5.1 probably raise as many issues as they answer. For example, on the one hand, population growth depends upon relative change in various components of change, including natural increases, interregional in-migration and out-migration, and immigration. Moreover, none of these components are homogeneous; for example, migration rates intimately depend upon personal characteristics like age, race, and income. On the other hand, per capita income growth is not homogenous either. Income levels depend upon the balance between earnings and non-earnings streams, where the former in turn depends upon things like wage levels and unemployment rates and the latter depends upon the local mixture of both (private) factor returns and (public) transfer payments. Of course, bringing more demographic or economic detail to the growth models only complicates our interpretation of the role of amenities in regional development. Nevertheless, many of these effects are highlighted in the literature reviewed in subsequent sections.

For now, the discussion returns to county-level population growth and then address a couple of other issues of great interest to regional scientists.

Table 5.2 Natural amenity elasticities: population density growth

	OLS			2SLS		
	1970s	1980s	1990s	1970s	1980s	1990s
Intercept	−0.115	−0.188	−0.388	−0.573	1.041	−0.265
	(−3.1)	(−1.3)	(−2.7)	(−13.9)	(6.08)	(−1.5)
JATEM	0.178	0.539	0.507	0.161	0.524	0.508
	(18.8)	(16.7)	(16.9)	(18.0)	(16.6)	(16.9)
JASUN	0.043	0.190	0.147	0.052	0.135	0.145
	(3.1)	(4.0)	(3.3)	(4.0)	(2.9)	(3.2)
JUTEM	−0.225	−0.733	−0.754	−0.172	−0.725	0.757
	(−7.9)	(−7.6)	(−8.4)	(−6.5)	(−7.7)	(−8.5)
JUHUM	−0.015	−0.068	−0.134	−0.006	−0.065	−0.133
	(−2.2)	(−3.0)	(−6.7)	(−0.9)	(−2.9)	(−6.6)
TOPOG	0.012	0.021	0.053	0.004	0.024	0.053
	(2.9)	(1.5)	(4.1)	(1.0)	(1.8)	(4.2)
WATER	0.023	0.077	0.044	0.019	0.076	0.045
	(3.2)	(3.1)	(1.9)	(2.9)	(3.1)	(1.9)
COAST	0.012	0.068	−0.027	0.007	0.067	−0.026
	(2.7)	(4.6)	(−2.0)	(1.7)	(4.7)	(−1.9)
DENSE	0.006	0.009	0.013	0.099	0.226	-0.007
	(9.9)	(4.3)	(6.4)	(22.0)	(−11.6)	(−0.4)
DEGRE	0.023	0.074	0.019	0.045	0.004	0.014
	(9.0)	(9.4)	(2.5)	(17.4)	(0.5)	(1.6)
PCINC	0.006	0.008	0.036	0.040	−0.097	0.026
	(1.5)	(−0.5)	(2.4)	(10.2)	(−6.1)	(1.5)
EMPLY	−0.094	0.235	0.021	(−20.8)	(12.1)	(1.2)
Adj Rsq	0.292	0.232	0.174	0.379	0.266	0.175

Source: McGranahan (1993)

Note: *t*-scores are shown in parentheses; all county estimates ($n = 3{,}107$) are controlled for prior population density, percentage college educated, and per capita income (in $2000). Sources: U.S. Bureau of the Census; Bureau of Economic Analysis

Disaggregating the Amenity Index into Its Component Parts

The first step is to disaggregate McGranahan's single composite index into its various components. This is done in order to determine if American households responded differently to the array of natural amenities during each of the three decades of the study period – that is, the purpose here is to examine if human *behavior* changed in the face of a constant stock of natural amenities. The left-hand panel of Table 5.2 shows the results for the various subindices, with the human amenities still included. As noted before, however, population growth is embedded in a variety of other growth processes, a fact that means there is a degree of endogeneity in the growth model. In order to address this problem, the models employ an adjustment mechanism that includes employment as another exogenous variable (Carlino and Mills 1987). The right-hand panel of Table 5.2 shows these results, which are the second stage of a two-stage least squares (2SLS) estimation.

The results in the left-hand panel of Table 5.2 indicate that a remarkable stability existed in the preferences of American households during the 1970–2000 timeframe.

With only two exceptions – for income in the second decade and coastal location in the third decade – there is complete consistency in the signs; moreover, all of the natural amenities are signed according to McGranahan's a priori expectations (see above). Evidently, among these amenities, the most important driving forces of growth were temperature in January (+) and residual temperature in July (−). Here again, if anything, the role of the *individual* natural amenities strengthened over time as the positive and negative amenities played off against one another. This, of course, is the underlying reason for the significant rise in the estimate for NAMEN noted earlier in Table 5.1.

Disaggregation of McGranahan's index also leads to some recalibration of the elasticities for human capital, with the estimates for density moving lower and those for college education moving higher at each point in time. However, the results in the right-hand side of Table 5.2 are even more interesting. Note that employment is included as an endogenous variable, and in the adjustment model, this is the "targeted" level of employment reached at the end of each decade. The estimates entirely endorse the findings for natural amenities, as just discussed. But as might be expected, the introduction of employment into the population growth estimation shifts the estimates – and generally diminishes the importance – of the human-created amenities, at least in the later decades. Moreover, the prior level of per capita income now appears to be an important factor in local demographic change. All in all, the results of Table 5.2 suggest that natural amenities played a steady and consistent role in population growth throughout the US counties during the late twentieth century.

A Recent US Study

Perhaps the best recent study of the role of natural amenities in US regional growth is by Partridge et al. (2008b). Here, county-level employment growth was examined between 1990 and 2004 using the well-known REIS data generated by the Bureau of Economic Analysis.

A series of data vectors was first created, accounting in all for nearly 40 variables, and these were arrayed along four main dimensions:

- Amenity (with 5 of McGranahan's 6 indices),
- Demography (recent immigration, education levels, age shares, race and ethnic composition),
- Economic (industry mix, initial unemployment), and
- Distance (five distances to size-tiered nearest urban centers).

Next, in addition to the standard linear regression (OLS) approach, the authors estimated both a spatial error model (SEM) and a geographically weighted regression (GWR) model. This was done to address *spatial heterogeneity*, where both the mean and the variance of job growth could vary geographically (Anselin 1988; Fotheringham et al. 2002). The thinking – which is entirely correct – was that many marginal impacts could vary across space, depending upon the location-specific

preferences expressed by firms and households. In fact, as GWR recognizes, these preferences may not even be global, for amenities like topography or water cover and factors like unemployment or racial composition could have larger effects on job growth at some locales than at others.

In the Partridge et al. (2008b) research, two tables of estimates and a series of maps developed separately for nonmetropolitan and metropolitan counties proved to be very instructive. In nonmetropolitan counties, natural amenities like January sun and July humidity turn out to be significant locally but not significant globally as indicated by either the OLS or the SEM approach. And in both types of counties, a college degree proves to be significant locally but not significant globally again by either method. Moreover, here, the greatest positive impacts are distributed across the western part of the country, suggesting a possible brain drain from the east. All methods indicate that access to water has much more important implications for job growth in rural than in urban areas. Partridge et al. (2008b) conclude that public policy might well be incorrect unless local conditions are fully accounted for. But these local conditions can in fact be very difficult to assess because they involve not only the levels of different factors but also the interactions among those different factors.

European Studies

Similar analyses using a different mix of variables have been recently carried out in Europe.

Building on earlier work, Cheshire and Magrini (2006) have examined annualized population growth rates across some 100 of the largest cities (Functional Urban Regions (FURs)) in the European Union (EU-12). Variables were first introduced into a family of basic models to address the attributes of prior economic bases, port locations, ongoing national population trends, and the integration gains – measured as a form of economic potential – that resulted from lower tariffs and lower transportation costs across much of the continent (Bruinsma and Rietveld 1993). Then another family of models was developed having several measures of climate – including rainfall, frost, cloudiness, and temperature – all expressed in ratio form. When these climate variables were expressed using EU-wide means, the various ratios were insignificant; however, when those variables were expressed using nationwide means, the ratios were significant. Even though intercity mobility is much lower in Europe than in the USA, it is very clear that cold, cloudy weather impeded urban population growth and warm, dry weather promoted population growth. Moreover, the climate variables proved to be superior to any location proxies in modeling recent urban population growth.

Cheshire and Magrini (2008) then returned to their topic in order to test the comparative drivers of population growth and per capita income (GDP) growth. Introducing a new variable to allow interaction between FURs and adjusting for spatial lags improved the econometrics of their original population growth model.

A few new variables, including closeness to R&D facilities and densities of university students, were used along with the basic variables to estimate income growth across the cities during the same period, 1980–2000. Human capital clearly promoted income growth, but the role of natural amenities proved to be insignificant at best. In fact, these results are very similar to those illustrated in the United States example above. The authors concluded by saying that productivity differences would persist among large European cities even though the population might be equilibrating in space.

Jobs Versus Amenities

Various research efforts focusing on matters like urban–rural wage gaps, the importance of skills and education, and the nature of agglomeration economies have come together to inform the so-called debate of jobs versus amenities. Here, the interest is in identifying the relative roles of production (firms) and consumption (households) in driving regional development. Depending on the purposes of the study, a variety of indicators – including population growth, job growth, wage growth, and GDP per capita growth – have been used to measure differential levels of urban or regional performance.

Following the path-breaking ideas of Rosen and Roback (referred to earlier), the early literature was developed by Beeson (1991), Rauch (1993), and others who analyzed the so-called urban wage gap (for a review, see Mulligan et al. 2004). An important distinction was eventually drawn between individual-level and city-level effects in how factors like education and work experience affect worker productivity. Glaeser and Maré (2001) have reported that workers in American metropolitan areas earned 33% more than their nonmetropolitan counterparts, but only one third of this wage premium was attributable to any differences in ability or skills. Clearly then, large cities must have substantial production advantages based on agglomeration economies that raise the wages of (most, if not all) urban workers. Moreover, these high wages might also include payment for a variety of large-city disamenities, including violent crime and congestion.

The Relationship Between Education and City Size

Adamson et al. (2004) have examined the relationship between education and city size in some detail. A wage equation was specified, which addressed more than 4,300 workers aged 23–36 in the 1988–1993 National Longitudinal Survey of Youth. Educational attainment was captured by five indicators running from high school graduates to professional degrees. Dropouts with little human capital were simply omitted. Included amenities existed along various dimensions:

- Population in quadratic form to capture urban scale in the variety of private (for example, entertainment) and public goods

- Six climate variables (including annual heating and cooling degree days) and indices of water coverage and topography
- Serious crimes per capita
- Local government fiscal conditions.

Other variables in the wage equation captured demographic differences among the workers and labor market differences among the cities, including employment density.

Adamson et al. (2004) interpreted their results by focusing on the various regression interactions between education and population. If the demand for labor dominated – where skill biases and agglomeration drive wage change – then this interaction term was positive. On the other hand, if households (and, to a lesser extent, firms) enjoyed many amenities, then the supply of labor was affected, and the education–population interactions were negative.

The results suggest that the latter effect dominated US cities in the early 1990s. While urban workers clearly have a nominal wage advantage, this gap is largely due to the presence of highly educated workers. However, having said that, it seems that returns to investment in education fall steadily with city size. Even in the nation's very largest cities, urban amenities, largely reflecting scale effects, dominate skill-based advantages in driving metropolitan productivity. Adamson et al. (2004) reach the conclusion that policy makers should pay more attention to the role of urban amenities in driving or maintaining city employment and population growth. Unfortunately, many amenities are used only as control variables and are not included in the discussion of the regression estimates. Consequently, their impact on wage growth cannot be discerned. In fact, the all various relationships discussed in detail in the paper have only marginally significant estimates even though the overall model manages to account for much of the wage variance. That finding suggests that other variables, those not highlighted in the paper, may be responsible for most of the wage spreads among US counties. In the end, the authors endorse the findings of Glaeser et al. (2001), arguing that, to be more successful, cities should focus as much on QOL issues as on training and skill enhancement programs.

Amenities and High-Tech Manufacturing

Other aspects of the jobs versus amenities debate are evident in the recent research by Dorfman et al. (2008) on high-tech manufacturing in the USA. Here, a nonparametric smoothing method is used to assist in discerning how amenities of various types might affect county-level job growth. The thinking was that, while rural areas often offer an array of natural amenities, they usually lack human-created amenities that are associated with either localized (clusters) or urbanization economies. In particular, rural areas often lack knowledge spillovers and pooling in labor markets. Job growth between 2000 and 2006 across 14 4-digit NAICS industries is examined over nearly 3,000 urban and rural counties; those counties with fewer than 10

employees in high-tech industries were simply eliminated. Numerous variables were introduced as explanatory or control variables:

- The incidence of college education in the adult population
- McGranahan's composite index expressed in ordinal form
- Housing prices to control for the cost advantages of low-density areas
- Initial high-tech employment in those 14 industries
- The various distances to three different tiers of metropolitan places and also distance to the nearest major university.

The main finding of the analysis was that local job creation was strongly enhanced when there was a prior pool of college graduates. In fact, the estimates suggest that a 1% increase in such workers induced more than 50 new high-tech jobs over the 6-year study period. The anticipated effects for natural amenities and for accessibility to larger places were largely unrealized, however. Moreover, high-tech firms did not always seem to benefit from locations adjacent to large metropolitan centers once the initial level of high-tech employment was taken into account. So, starting or enhancing a university research park would likely not be a successful strategy in most rural areas. But widening and deepening the local pool of human talent likely would be a good strategy even though natural amenities (usually a normal good) did not seem to be responsible for attracting high human-capital pools to rural areas.

Ferguson et al. (2007) repeated this basic methodology in an analysis of population change in some 2,400 census consolidation subdivisions during 1991–2001. These units – typically much smaller than US counties – were classified as urban (21% of the total), where they were parts of census agglomerations or census metropolitan areas or as rural (79%), where they comprised small towns or rural areas.

The model incorporates the following vectors:

(a) A comprehensive amenity vector contains eight natural and 10 human-created (modern) varieties:
    - Five of the natural amenity variables represent climate, and the others relate to coastline, forest cover, and topography.
    - The modern amenities include violent and property crime and accessibility to various private and public (for example, distance to the nearest hospital, college) goods.

(b) The economic vector has 11 variables (per capita income, overall industry mix, industry shares).
(c) The demography vector has four variables.
(d) The geography vector has four regional dummies.
(e) The human vector, three variables (measures of human capital).
(f) The social vector, four variables (percent home ownership, social capital).
(g) The agglomeration vector, three variables (population size, proximity to large cities).

The analysis, which uses variance decomposition, identifies those bundles of local factors that are chosen by different age cohorts. Economic factors tend to

dominate in both urban and rural areas. Moreover, amenities count more in urban areas, where they are perhaps responsible for as much as 22% of the overall variation in population growth. But this figure falls to 9% in rural areas, many of which are particularly vulnerable during economic downturns (Frenette 2008). Amenities are valued especially high by the two youngest age cohorts, those aged 5–19 years and from 20 to 34 years. Surprisingly, seniors (aged 60+) do not appear to demand locations with mild winters as much as might be expected, although weak effects indicate that urbanites, as a whole, seek warm winters and to avoid humid summers. Violent crime diminishes overall population growth (for all cohorts except the elderly) and this effect is strongest in cities. Young adults show preferences for particular natural amenities, like the presence of mountainous terrain, and seniors dislike the penalties of having to travel great distances to hospitals and physicians.

Ferguson et al. (2007) conjecture that differences with the USA likely arise in part because of cultural factors (there is less mobility across a language barrier) and because incomes are lower in Canada, making the demand for income-elastic amenities somewhat lower.

Alasia et al. (2008) provide a somewhat different perspective on these Canadian communities. Paralleling the work done earlier in Australia (Stimson et al. 2001), the authors examine "vulnerability,", which they claim is a more forward-looking perspective on socioeconomic disadvantage than is economic deprivation. Specifically, they address the likelihood of worsening conditions in these various places, as measured by either population or employment decline. Their conceptual framework is a "stressor–asset–outcome" triad, wherein 29 different stressors (for example, low incomes, weak labor markets) and asset (for example, educational attainment) indicators are used as dependent variables in a probit model. The post-2001 viability of each local economy is predicted based on the earlier 1981–2001 trend. Global exposure and certain conditions of distress, such as high unemployment rates and low participation rates, are shown to increase community vulnerability. Strong community assets, including high human capital, diversification, and proximity to larger places, work to reduce vulnerability. Nearly 20% of the communities are targeted as being vulnerable to long-run population growth, but only 5% are thought to be vulnerable to long-run employment decline. Unfortunately, indicators for natural amenities and social capital (although mentioned) were not developed and brought into the two models. Of course, long-run vulnerability can also vary substantially with the policies of federal and state governments who make decisions regarding the tradeoff between national efficiency and interregional equity (Canaleta et al. 2004).

Migration

In the past few decades, it has become increasingly appreciated that QOL factors do not uniformly affect migrating populations. In fact, this perspective led in part to the emergence of a "spatial-equilibrium" (described previously) school whose tenets

complement, but sometimes counter, those of an earlier "disequilibrium" school in migration research. Households recognize that they can become compensated for lower wages by either better amenities or improved public goods, and they vote with their feet, as Tiebout suggested half a century ago. In some cases, this movement has been sufficient to dramatically lower the local demand for housing (Allinson 2005). The two theoretical perspectives have been resolved, however, in research by Greenwood and Hunt (1989) and Mueser and Graves (1995).

In the USA, as indicated by the earlier numerical example, natural and human-created amenities appear to have had a fairly constant effect on levels of interregional migration but, in contrast, the effect of employment-based opportunities seems to have been much more cyclical (for details, see the review by Mulligan et al. 2004). In recent years, analysts have continually stressed that national or regional populations should be considered heterogeneous, as opposed to homogeneous entities in terms of their composition. Following Clark and Hunter (1992), Cushing (1993), and others, this segmentation of households or families has been developed along various lines, including education, income, age (life cycle), or even gender. Several recent studies in this vein of research are worthy of special attention.

Investigating the Drivers of Migration by the College-Educated

Gottlieb and Joseph (2006) join a growing list of scholars (Herzog et al. 1986; Yousefi and Rives 1987; Hansen et al. 2003) interested in the ever changing geography of human capital in the USA, by analyzing the metropolitan out-migration of the college-educated. The authors use a restricted database supplied by the National Science Foundation that allows them to examine intercity moves made between 1993 and early 1995. The main purpose is to see whether economic opportunities, the traditional driver of migration behavior, or amenities and lifestyle considerations are largely responsible for the out-migration patterns of recent graduates. The results have obvious implications for region- or state-based policies aimed at stemming a "brain drain."

A distinction is made between all college graduates and doctorate-earning graduates, recognizing that migration behavior could vary markedly across these two groups. Doctorate holders tend to participate in narrower labor markets and, as a result, may be less responsive to natural or human-made amenities; on the other hand, they certainly enjoy more bargaining power and might vote with their feet for a better QOL. Fifty large metropolitan destinations are included in the study, and special dummies are introduced for San Francisco, New York, Boston, and Atlanta. Personal characteristics, occupation data, geographic separation, and various properties of the destinations are addressed. Amenities include crime, climate, and recreation, where data are taken from the 1993 *Places Rated Almanac*. Estimates are provided using both the binary logit and the mixed logit (RPL) models, where the former is inferior in addressing substitution issues (because of the IIA property).

The Interplay Between Life-Course Attributes and Location-Specific Attributes

Next, in an update of a well-known paper by Herzog and Schlottmann (1986), Whisler et al. (2008) provide a different perspective in demonstrating that household migration depends upon the interplay between personal characteristics – life-course attributes – and location-specific attributes, including both natural and human-made amenities. Their appreciation of the importance of demographic segmentation was deepened by traditional migration research, including that of Plane and Heins (2003) as well as the identification of such entities as power couples (Costa and Kahn 2000) and the creative class (Florida 2002) in contemporary society. Whisler et al. use a binary logit model to examine metropolitan out-migration ("stayers" versus "leavers") during the time period 1995–2000; the 2000 Census Bureau, 5% of the PUMS controls the estimates for household characteristics. Performance data for cities were drawn from the 1997 *Places Rated Almanac*, where city scores are provided for seven different amenities:

- Climate
- Recreation
- Education
- Crime
- Health care
- Transportation
- The arts

along with city-wide cost-of-living and job outlook variables. The authors include other contextual variables, including population size, density, and recent change in the city's stock of college graduates.

Amenities and Migration by Seniors

A third perspective on migration is given by Jensen and Deller (2007) who, in building on earlier work by Deller et al. (2001), focus specifically on how US seniors evaluate different types of amenities in their migration decisions. The authors are particularly interested in understanding why some older households move to micropolitan and rural areas across the nation. They recognize, of course, that when non-earnings income is introduced into many of these nonmetropolitan places, considerable numbers of jobs are created through local expenditures and subsequent multiplier effects.

The research looks at county-level in-migration and out-migration during 1995–2000 across four adjacent age cohorts: 55–64; 65–74, 75–84; and 85+ years. The prior characteristics of each county include a variety of demographic, economic, and land-use variables, and Beale codes are used to control for the urban-rural continuum. A very wide array of recreational data, capturing built amenities, is reduced through

principal component analysis to a handful of indices. Temperature, water, and snowfall data address natural amenities, tax and expenditure data address fiscal policy, and crime rates address social conditions. Two health-care variables and one human-capital variable are also included.

Migration and the Stock of Knowledge and Prior Experience

Krupka (2007) has provided fundamentally new insights into the destination choices of households based on their stock of prior knowledge and experience. He argues that amenities work through household production and not through consumption. Individuals cannot control their locations during preadult years, and they have added incentive to invest in the appreciation of all the amenities that are present in their origin region. These investments are very location-specific and are not similarly valued by households when living in very different areas. Once these location-specific investments are made, the opportunity costs of moving to dissimilar locations are increased. The overall result is that migrants prefer moving to areas that are more similar than not to their childhood residences. So, national population distributions result from people sorting into their most preferred locations as measured by bundled amenities, a point not adequately stressed by the current QOL literature.

The research uses geocoded US data from the National Longitudinal Survey on Youth 1979 cohort to test the prediction that exposure to certain types of areas during youth increases the likelihood of finally settling in such areas, even for long-distance migrants. A very wide array of amenities is used, including natural, cultural, social, and retail-variety types. Even when eliminating nonreturn migrants from the household sample, origin-region exposure appears to trump other factors like human capital in driving interregional migration. The author makes a genuinely new contribution to understanding the behavioral decision-making of households.

Push Factors and Migration: Reacting to Big-City Diseconomies and Congestion

Lastly, another interesting perspective on recent US migration has been provided by Davies et al. (2008). As the nation's population continues to react to big-city diseconomies and congestion, many households have migrated down through the national urban hierarchy to more peripheral communities (Plane et al. 2005). Push factors have also included the presence of foreign-born populations, especially in gateway cities, and the lack of affordable housing in many large metropolitan areas. The authors provide solid evidence that much intercounty migration, especially between states, is being driven by housing-cost adjustments. An index is constructed by forming a ratio between median housing values and median household income. Movement is then studied between the years 1995 and 2000 and compared to the

change in that index over the same 5-year period. Special attention is given to the 100 largest intercounty moves, where suburban Washington, Las Vegas, and Phoenix were among the most popular destinations.

Davies et al. (2008) found that while most migration streams were associated with an increase in median income, some 60% of the moves were associated with moves to places having more affordable housing. Nuances on this broad theme are provided: For example, Hispanics are shown to have been more likely to adjust their housing costs than other ethnic groups. Four-quadrant typologies of county-to-county migration are given with change in housing cost indicated on one axis and change in income indicated on the other. The authors argue that different types of households react differently to issues like social capital and labor-market segmentation, hence, the somewhat different hierarchical streams.

Summary and Conclusion

This chapter has reviewed recent advances in research on the role of amenities in urban growth and regional development. A main goal was to synthesize the literature in a way that informs an interdisciplinary audience of researchers and practitioners in the social sciences and public policy fields. Having met that objective, the few remaining comments are observations for planning activities aimed at shaping the outcome of urban and regional development.

Foremost, amenities – and QOUL more broadly – need to be the central focus of urban and regional planning. As illustrated in this chapter, they direct interregional migration flows, influence intraregional settlement patterns, and generate compensating differentials in labor and housing markets. These forces are powerful and only continue to grow more, so it seems logical that public policy should attempt to leverage them to every extent possible. For example, Power (1996) and Florida (2002) argue persuasively for natural and human amenities, respectively, to be made central components of economic development policy. In many places throughout the country, the natural environment itself is literally the engine of economic growth: Both people and jobs are drawn to scenic landscapes and a favorable climate. While public policy cannot influence the climate in the short run, the growing focus on greenhouse gas emissions is an explicit acknowledgement that it can in the intermediate and long run. Land-use planning does directly influence the character of the built environment and the territory that accommodates it. What's more, culture, human capital, and other human amenities are readily influenced and, indeed, created via public policy. To cite one example, the USA has entered a period of widespread divestment from public education,[4] and

[4]For example, according to the *Census of Governments* between 1992 and 2007, the number of instructional employees at state institutions of higher education fell by 50,497 from 435,789 to 385,292 – a cutback of more than 11%.

this, however forced (by economic circumstance) and/or undesired, may have lasting consequences for urban and regional QOL.

Overall, natural and human environmental amenities are perhaps best thought of – in the public policy context – as both fulcrums that can be used to help leverage desired outcomes and desirable outcomes in and of themselves. Places that are desirable to live and work in develop inertias of their own, but great care has to be taken to ensure that growth and change does not somehow erode the very quality of life that makes them successful. As the Puget Sound region's *Vision 2040* is proof that (QOL) can be at the heart of broad-based urban and regional planning strategies. The question, for that and similar planning efforts, is whether or not there is enough local-level implementation to turn visions into reality.

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