

Carrying Capacity in the Metro Atlanta Region

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1. INTRODUCTION

1.1. Atlanta Metro Growth

In April 2007 the US Census Bureau announced that metro Atlanta was the fastest growing region in the country, having added more residents between 2000 and 2006 than any other metro; approximately 890,000 new tax paying Atlantans¹. Of course, babies are still being born, but the major population growth in Atlanta is due to people migrating here from other parts of the country. What brings them here is the relatively low cost of living, notably housing prices, good job prospects and nice weather. Those guiding Atlanta have a lot to be proud of, having turned around a once economically depressed, crime ridden and rapidly depopulating city. Atlanta has grown in geography as well; from 65 miles north to south in 1990 to 110 miles in 2006². The Atlanta Regional Commission has predicted that by 2030 nearly one million jobs will have been added to the city's economy fueling an influx of 2 million new residents within the same time frame³.

While this rapid population growth demonstrates Atlanta's popularity and economic viability, absorbing the 2 million people the city is expecting over a span of 20 years is a difficult task. We must ask ourselves if this region can handle such a violent growth spurt. After all, populations of over 5 million people have needs and it will be up to our city to meet them.

1.2. Carrying Capacity

In the 1970's scientist coined the term carrying capacity as "the number of individuals who can be supported in a given area within natural resource limits, without

¹ <http://www.planetizen.com/node/23539>

² <http://www.planetizen.com/node/23539>

³ <http://www.atlantaregional.com/arc/html/>

degrading the natural social, cultural and economic environment for present and future generations.”⁴ The principals of carrying capacity refer to all organisms, including humans. Among the most important principals is that carrying capacity is not fixed; it will shrink when the pressures that follow population increase becomes too much of a strain on the resources of the ecosystem. This would seem a doomsday prophecy for a boomtown like Atlanta, but the good news is that there are ways of expanding the city’s carrying capacity to accommodate the growth that it is bracing for.

To some extent coming up with a number for how many people Atlanta can support is only the expert’s best guess. Unfortunately, Atlanta does not have an approximated carrying capacity limit. However, it is not hard to imagine that we would fast approach the limit with the additional population we are expecting. To that end, knowing what effects carrying capacity and making adjustments to those variables may go a long way towards sustainable growth.

Carrying capacity is affected by the use of resources; land, water and air some of the most important among them. An increase in population predicts without question an increase in human activity which will require their use. Therefore, it follows that if each person reduces the effect they have on the areas resources more people could use them without depleting them. Individually, people can decide to drive more fuel efficient cars, use low flow toilets and recycle. However, those who would guide the long term growth of Atlanta as a whole have a large role to play and are poised to make the biggest impact in expanding the regions carrying capacity.

⁴ <http://www.gdrc.org/uem/footprints/carrying-capacity.html>

1.3. What Can We Do?

To sustain the population surge while encouraging the use of fewer resources, this city will need to grow in a different manner than has been its historical precedent. Since the 1950's, Atlanta has been decentralizing, partly owing to jobs leaving the city core, and partly in pursuit of the American dream which included a suburban lifestyle.

Cheaper land in far flung counties allowed more people to afford a single family home on a large lot, while interstate highways ensured that jobs far from home could be reached with relative ease. In recent years, we have begun to see the effects of this trend. The once plentiful and therefore affordable land is now gone leaving in its wake increased housing costs which price out huge segments of the population. This suburban scenario has also increased vehicles miles traveled, traffic, air pollution, the expense of expanding infrastructure as well as decreasing our ability to retain precious commodities like water.

Carrying capacity is by no means a new concept. In 1976, Sanibel, Florida instituted a master plan that would control for population growth⁵. The impetus for doing so was threefold. City officials and residents alike were primarily concerned with hurricane evacuation and being able to get everyone over the 2 lane causeway to the mainland in time, the fragile island ecosystem and its stewardship and over burdened infrastructure. They began with identifying ecological zones and made recommendations for appropriate land use, intensity and standards. Based on this, they threw out their existing development guidelines that would have allowed 30,000 residential units and settled on 7,800 units to house a population they felt would be sustainable in the long run.

⁵ <http://www.planning.org/newsreleases/2006/ftp12190610.htm>

Carrying capacity is not theoretical. There is an actual limit on growth beyond which we should not go for fear of our well being. It is with that in mind that we should explore a way of implementing our own carrying capacity study to begin to realize our growth boundaries.

In the 1980's the Florida Keys were designated an "area of critical state concern" due to their "valuable natural, environmental, historical, and economic resources that required thoughtful management." The state ordered the county they sit in to create a carrying capacity analysis model also known as CCAM. This model may act as a form around which Atlanta might build its own. The CCAM generates information based on 6 modules covering human activity, as well as the marine and terrestrial ecosystems. The Socioeconomic module acts as input for all the modules because it encompasses population estimates. The fiscal module produces indicators of fiscal impact while the human infrastructure module deals specifically with traffic considerations. The integrated water module produces data on storm water, waste water and common pollutants while the terrestrial module produces indicators on environmental impact. The sixth is the marine module; unfortunately, the Florida team found it to be too flawed to be useful.⁶

CCAM has begun the work of organizing and mining the information planners would need to come to decide on a carrying capacity for their regions. This is no small task, and as those involved with CCAM's creation admit, there are some flaws in this model. However, it does provide a more complete analysis of information that traditional urban management usually considers. Atlanta should take the opportunity to use the

⁶ http://books.nap.edu/openbook.php?record_id=10316&page=55

knowledge of plans like CCAM which have had the benefit of time to clarify their pros and cons and continue to build on them.

Armed with an idea of how much room we have expand, Atlanta now needs to look to new tools for growth, ones that control consumption while accommodating the needs of our new residents. Smart Growth, a burgeoning planning framework created to meet just such goals, has as of late been embraced by city planners as a method for combating sprawl and the pressures it puts on resources. Having recognized that the sprawling suburban model of the last 50 years will never sustain rising populations for years to come, we must look to smart growth principals to guide our decisions on how we shape our built environment.

1.4. Making an Impact

Water, transportation and development are major touchstones of growth. We feel the effects of their depletion acutely because they are integral to the function of our everyday lives. When we can't afford a decent place to live, when we burn expensive fuel sitting in traffic or when a draught forces us into water rationing we are faced with the approaching limit of Atlanta's carrying capacity. However, within the water, transportation and housing growth factors we have an opportunity to make policy changes that would enable that limit to expand while improving our quality of life.

Increasing awareness of resources depletion, changing demographics and trends that are pointing people back to the cities are beginning to turn the minds of the polis at large, who have come to embrace the kind of developments that are created by the implementation of these innovative policies. Smart growth is selling and as long as it is

financially viable it will continue to create sustainable projects that improve our built environment and expand our carrying capacity.

2. WATER RESOURCES

2.1. Defining Water Resource Boundaries

Atlanta has become more aware that it is naturally prone to drought conditions. While Atlanta has grown significantly over the past 20 years, the area's shrinking water resources are less a result of poor planning than the result of building a city in a drought prone region. Not ignoring the fact that Atlanta could do much in the realm of conservation, Atlanta's geography should not be ignored as a factor in the current drought conditions. The City of Atlanta emerged as a central transportation hub because of its ideal geographic location below the Appalachian Mountains, and because of its location at the intersection of several ridges, its streams are affected by prolonged drought.

This raises a key question for the carrying capacity of Atlanta as it pertains to water resources: how do we define water resource boundaries? Because of technology, we can now pump water to anywhere and from anywhere in the country. An example from Africa clearly illustrates the question at hand. A portion in central Africa, which makes up 18% of land on the continent, contains 49% of Africa's water resources while northern Africa, which contains a similar land size, only has 1.2% of the continent's water resources.⁷ Does this mean that Atlanta should continue to allow more growth, while it appears that it has exhausted its water resources, or should Atlanta continue

⁷ Food and Agriculture Organization of the United Nations www.fao.org

pursuing alternate sources of water? We would argue that Atlanta desperately needs to evaluate its carrying capacity as it relates to water resources.

2.2. Current Water Use

The average water use in developed nations is drastically different than that of developing nations. This can be evidenced in a study on carrying capacity conducted by Cornell University on how many people the Earth can reasonably support. In the study ecologists found that if we use the standards of developed nations, the Earth can only hold 2 billion people, while if everyone was more conservative in their consumption resources that up to 12 billion people could inhabit the planet.⁸ Western countries consume water at a significantly larger rate than those of developing nations.

Because developed nations consume so much water, serious measures need to be implemented in order to maintain their water resource carrying capacity and as Atlanta has evidenced, there is a limit to how many people our current water resources can support. The United States not only needs to implement methods in which to reduce water consumption but every metropolitan area should have a water planning district in which to gauge the carrying capacity of the area's water resources.

2.3. Current Planning for Water Resources

Currently the Atlanta region's water resources are governed by the Metropolitan North Georgia Water Planning District. Created in 2001 by the General Assembly, the water planning district was created in order to coordinate intergovernmental coordination on water issues as well as creating water resource policy and plans. While this planning district has been beneficial in gathering all the players to the table in order to create

⁸ Carrying Capacity Revisited, The International Society for Ecological Economics and Island Press, 1994.

various water resource plans, the water district has not focused on the issue of carrying capacity. The Water Supply and Water Conservation Management Plan does not discuss how many people our current resources can provide for but rather offers reservoir expansion plans and mentions the need for more reservoirs.

The topic of carrying capacity can be very political. This was evidenced this past year as the U.S. Army Corps Engineers sought to limit the amount of water that Atlanta received through Lake Lanier. While some argued that Atlanta should have had more control over the lake, the Army Corps knew that if Atlanta continued to drain the lake that there was the chance of endangering mussels and sturgeon down river in Florida. This is a true case involving carrying capacity; without limitations, set forth by the Army Corps, endangered species may have been affected by Atlanta's consumption of more water. To be more effective, the Metropolitan North Georgia Water District needs the ability to have more actual control over the use of our water resources.

In a round about way the State of Georgia has been implementing some carrying capacity policies as it pertains to water resources. The Georgia Environmental Protection Agency places limits on how much every town may withdrawal and in order to surpass that amount a municipality must seek permission to withdrawal more water. Many coastal cities in Georgia found themselves at the mercy of the Georgia EPA as they sought to increase their water consumption via deep wells. Because of the salt water intrusion that can occur in coastal communities, the EPA banned several municipalities from withdrawing any more ground water and as a result the municipalities had to seek other means in which to obtain water. Many municipalities began either buying water

from other communities that had yet to surpass their water withdrawal limit or withdrawing their water from lakes and rivers.

2.4. Alternative Policies

One of the most significant improvements in water resource carrying capacity that could be made would be to consolidate water planning to one governmental agency. As it now currently stands, the responsibility of water planning is shared between water planning districts, the Georgia Environmental Protection Agency, metropolitan planning organizations (MPOs), and the individual municipalities. There is not enough centralized power in order to make significant strides in implementing policies for water resource carrying capacity that are needed in the Atlanta area. Preferably MPOs like the Atlanta Regional Commission could have the authority to limit local governments from issuing building permits if the MPO found that the area lacked sufficient water resources.

3. TRANSPORTATION

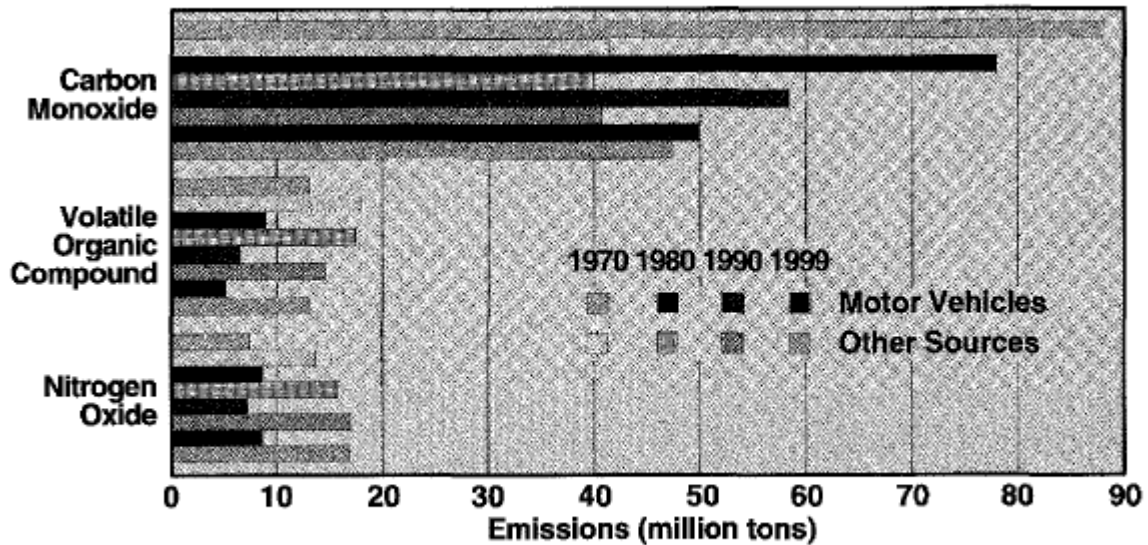
3.1. How Does Transportation Affect Carrying Capacity?

Transportation and its infrastructure system have an impact on carrying capacity. There are various forms of transportation including vehicular, rail, aviation, water and non-motorized methods. Each of these methods impacts carrying capacity in a variety of ways. For example, both vehicular and rail transportation change the character of the land with the construction of roads and rail road tracks. Also, vehicle or motorized transportation burn gasoline or coal which release CO₂ into the atmosphere. With regards

to air quality, data from the EPA shows that between 1970 and 1999, motor vehicles have the greatest impact in carbon monoxide emissions compared to other source measured.⁹

Figure 3.1

NATIONAL EMISSION TRENDS



SOURCE: Environmental Protection Agency's National Emission Inventory, Air Pollutant Emission Trends Office of Air Quality Planning and Standards, <http://www.epa.gov/ttn/chief/trends/index.html>.

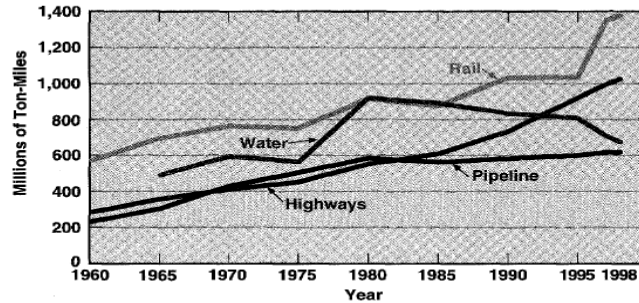
National Transportation Statistics from 2000, show that highway transport is growing at a fairly steady rate. This increase will impact the environment, congestion and thus, carrying capacity of an area. Figure 3.2 also shows that the value of highway transportation has well surpassed that of other methods.¹⁰

⁹ Federal Highway Administration. <http://isddc.dot.gov/OLPFiles/FHWA/013504.pdf>

¹⁰ Ibid

Figure 3.2

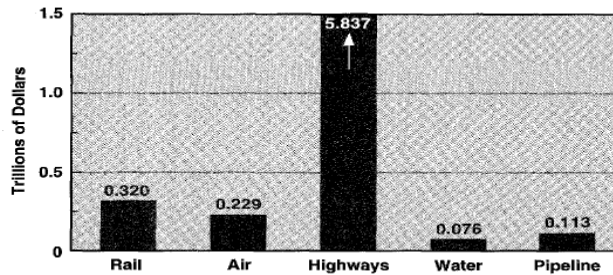
FREIGHT TRANSPORTATION BY MODE



SOURCE: Bureau of Transportation Statistics, *National Transportation Statistics 2000*.

The nation's highway system carried 28% of the total revenue of ton-miles of freight in 1998, compared to 19% in 1960. More significant is that as of 1997, almost 89% of the total dollar value of freight was highway transportation.

FREIGHT TRANSPORTATION VALUE BY SINGLE MODE - 1997



NOTE: The survey excludes establishments classified in the Standard Industrial Classification as farms, forestry, fisheries, oil and gas extraction, governments, construction, transportation, households, and some retail and service businesses.
SOURCE: Bureau of Transportation Statistics, *1997 Commodity Flow Survey*.

Water transportation affects marine life, in addition to releasing CO₂ and carbon monoxide into the atmosphere. Non-motorized transportation methods have the least impact on the environment and therefore a low effect on carrying capacity. Sometimes paths are provided to ensure the safety of the pedestrian or cyclist which can impact the land; however the change in the landscape is minimal and there is no CO₂ released into the air, except during its construction.

As a society, carrying capacity is most affected by vehicular transportation. This is because construction of roads promotes housing and business development, increased

rural transportation and connectivity. However, development and congestion management is only possible when carrying capacity limits are not yet reached.

The concept of the Traffic Environmental Carrying Capacity (TECC), were developed by Sheng, Lie and Xu in 1997 in order to calculate the transportation carrying capacity of a local. A study by Li Xiaoyan and Shi Zhongke defines Lie and Xu's concept of TECC as, "the maximum scale of the traffic development within the restrictions of the traffic environment in the specific phases and in specific areas, and wherein the function and the structure of the traffic system will not change for the worse."¹¹ This study by Xiaoyan and Zhongke create four additional formulas in order to help measure carrying capacity. The first formula, TERCC (Traffic Environmental Resource Carrying Capacity) takes into consideration the natural resources consumed by construction of the system, production operation and maintenance of the facilities as they are related to the ecological footprint. The second formula, TEPCC (Traffic Environmental Pollution Carrying Capacity) is measured by the minimum weighted values of various effects and externalities of the urban transportation system. The third formula, TEMCC (Traffic Environmental Mentality Carrying Capacity) is measured by the minimum weights of sociological factors. The last formula, TEEC (Transportation Environmental Economy Carrying Capacity), is theoretically a measure of all the relative weights of all three previously listed formulas.¹²

¹¹ Xiaoyan and Zhongke (2007) "Calculation Models of the Urban Traffic Environmental Carrying Capacity" From the International Conference on Transportation Engineering (ICTE 2007) pp.4044-4047

¹² Ibid

Table 3.1

Formula 1	
LCC	Land Carrying Capacity
+	
ECC	Energy Carrying Capacity
+	
MCC	Mineral Carrying Capacity
TERCC	Traffic Environmental Resource Carrying Capacity
Formula 2	
APC	Air Pollution Carrying Capacity
+	
NPC	Noise Pollution Carrying Capacity
+	
VPC	Vibration Carrying Capacity
TEPCC	Traffic Environmental Pollution Carrying Capacity
Formula 3	
PCC	Passenger Mentality Carrying Capacity
+	
RCC	Residential Mentality Carrying Capacity
TEMCC	Traffic Environmental Mentality Carrying Capacity
Formula 4	
TERCC	
+	
TEPCC	
+	
TEMCC	
TEECC	Traffic Environmental Economy Carrying Capacity

This formula is notable in that these authors have calculated a method in order to determine the maximum carrying capacity of an area. The authors do not mention policy or political implications of their research. Because of the varying levels of carrying capacity among regions it may be beneficial to permit local or regional governments to determine the specifics for each formula. Because this formula exists in the transportation context, it may suggest it is possible to estimate carrying capacity of an area by other

factors such as housing and retail development or other types of infrastructure such as utilities and waste management.

In regards to the Metro Atlanta area, if the Atlanta Regional Commission or another local or regional entity could take the lead on defining the measurements for this formula, growth could be projected and limits of future growth could be set. This suggests limits on any type of new development. If these measurements are taken and limits are considered, the governing bodies can have significant control over new development.

3.2. History of Transportation

Of the various transportation methods that exist today, few have such an impact on the local carrying capacity as vehicular transportation and its infrastructure. In the 1930's the Bureau of Public Roads began development of the current federal interstate system. The Federal Highway Act (FHWA) of 1956 changed the way Americans use the transportation infrastructure system in order to improve their quality of life at that time. The construction of the interstate highway system provided mobility, defense and economic benefits; it enabled people to move away from the city and enjoy rural living. The interstate freeways contribute American values; short travel time and minimal congestion but do not contribute to other values such as pedestrian friendly sidewalks and easy access to local amenities.¹³

It is important to mention some of the other methods of transportation because although they do not have as much of a direct impact on the local carrying capacity, other methods have a more direct impact of on the carrying capacity of the earth itself. Air

¹³ National Resource Defense Council. <http://www.nrdc.org/>

transportation may be the most relevant to the carrying capacity of the earth's system.

Because fuel emissions are not regulated by any airline industry, planes continue to fly without considering air quality.

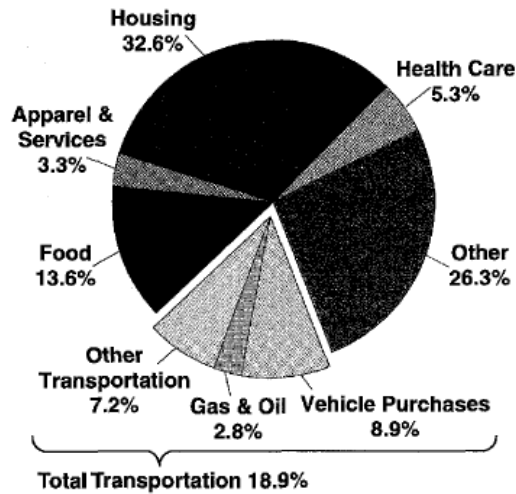
Rail transportation was used in Germany as early as the 1500s, constructed of wood rails and animal drawn carriages. The steam engine and other modern railroad transportation used today originated in the 1800s. Rail transportation is not only used as a long distance travel method; urban trains can also be used as mass transit so that people can maneuver between home and work without getting into their car.

Water transportation is one of the oldest forms of transportation that still exists today. Traditionally, boats had little impact on the environment and carrying capacity. Today, boat transport permits life on islands without construction of bridges or other higher impact methods of transportation. Boat transportation can reduce the use of cars, which have more of a direct impact of the area. Also, because of the size of water transportation, there is currently not much concern for congestion and accidents when considering boats as transportation. Motorized boat transportation has an impact on the environment and marine life. However, the impact is much less dramatic than the construction of bridges in order to facilitate the flow of cars from the island to the mainland. Seattle, Washington has a very sophisticated water transportation system that provides movement from a handful of islands off the Puget Sound into various locations in downtown Seattle. According to Figure 3.1, water transportation for freight transport has decreased since 1960.

3.3. Current State of Affairs

According to 1999 data, US residents spend about 18% of their budget on transportation needs.¹⁴

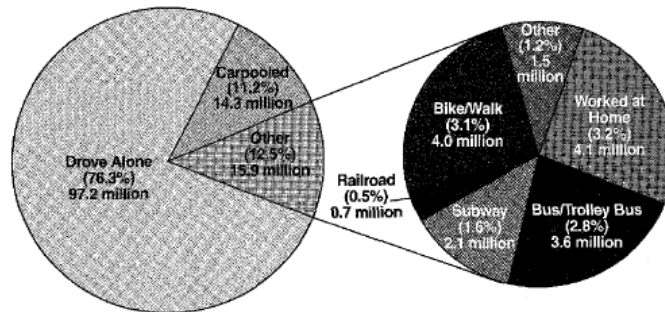
Figure 3.3



Most Americans use their personal vehicle to travel to work. In 2000, 76.3% of respondents in the American Community Survey data source traveled to work alone.¹⁵

Figure 3.4

JOURNEY TO WORK: MODE USED BY WORKERS
PERCENT AND NUMBER OF WORKERS, 2000



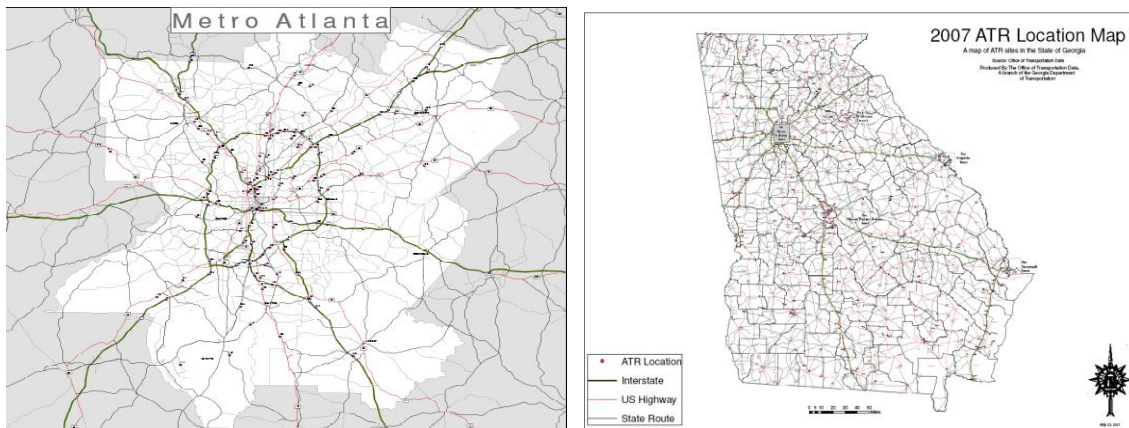
NOTE: Includes all workers 16 years and older living in households. C2SS did not survey Group Quarter Population.
SOURCE: 2000 American Community Survey (ACS); Census 2000 Supplementary Survey (C2SS).

¹⁴Federal Highway Administration. <http://isddc.dot.gov/OLPFiles/FHWA/013504.pdf>

¹⁵ Ibid

As of 2006, Georgia has a total of 102,118.32 miles comprised of 18,065.69 state highway miles and 84,052.63 county road system miles. The transportation infrastructure in Georgia will only continue to grow as the population of Georgia increases.

Figure 3.5



Source: Georgia Department of Transportation

The Georgia Department of Transportation (GDOT), the state agency that has authority over both state and local road systems in Georgia promotes a majority of vehicular transportation programs including passenger and commuter rail. The organization also has an emphasis on non-motorized transportation and special projects such as bike/pedestrian programs although the focus is minimal compared to the motorized transportation programs.

Because population growth is projected to reach almost 7 million in the region by 2030, long range plans are necessary if the metro area expects to successfully capture this growth and provide a high quality of life for new residents as well as old. Connect Atlanta is a group comprised of a variety of governmental agencies in order to create a comprehensive transportation plan (CTP) for the Metro Atlanta area. The CTP is supported by the City of Atlanta, ARC, GRTA, MARTA, Transit Planning Board and Georgia Department of Transportation. Working collaboratively these groups will strive

to insure mobility, continued economic growth, achieve desired quality of life for residents and visitors and to ensure efficient, effective and affordable transportation.¹⁶

Each organization has a plan that will work toward the CTP. For example, the Envision 6 long range plan created by the ARC attempts to address concerns of residents in the region. Concerns and interests include congestion, bottlenecks, truck station, accessibility to transit, accessibility for persons with disabilities, growth impacts, transit options, project implementation and environmental concerns.

3.4. Projected Transportation

The Envision 6 long rang plan addresses these concerns and issues of residents from 2008 to 2013. The plan addresses managed lanes such as occupancy restrictions and tolling at eight different freeway corridors and providing freeway upgrades at five of the regions worst areas subject to bottlenecking. On a smaller scale, the ARC plans to implement several street widening projects along surface streets to provide bicycle lanes and pedestrian space. In addition to the infrastructure changes, the ARC plans to implement new transit options such as the beltline, rapid bus transit, Peachtree Streetcar and expansion of the GRTA Xpress system. Envision 6 also encourages bicycling, living and walk-ability by supporting Transportation Demand Management (TDM) programs. TDMs provide both education and incentives for additional commuter options and the Livable Centers Initiative (LCI) which attempts to develop sustainable centers with accessibility and mobility.¹⁷

¹⁶ Connect Atlanta. <http://www.connectatlantaplan.com/>

¹⁷ Atlanta Regional Commission. http://www.atlantaregional.com/arc/documents/TIP_Fact_Sheet-2007_Draft.pdf

The ARC promotes HOV lanes that are intended to improve congestion and mobility along the state and local transportation systems. HOV lanes are high capacity lanes designed for public transit or car-pooling vehicles. HOV lanes are thought to be a viable option however, they are only beneficial if they are used to capacity meaning they are actually used by public transit or car-poolers. If not, they are transferred to an extra lane in the existing road system, defeating the goal of reducing congestion.

3.5. Alternative Policies

The Smart Growth Network promotes alternative policies for more sustainable development. This organization provides educational materials, best practices guidelines, public awareness and strategies for development. The network addresses issues such as transportation, housing, design, environment, health and quality of life issues. Regarding transportation policies and strategies, the Smart Growth Network promotes policies that encourage the use of bicycles, walking and road improvements. The National Resources Defense Council (NRDC) is an environmental action group that attempts to influence policy decisions and create educational and resource tools in order to help the environment. Regarding transportation and smart growth policies, the NRDC recommends increasing density, creating regional accessibility, improving transit service and quality by increasing frequency of public transportation or reducing the walking distance between transit stops and homes or businesses, increasing connectivity by allowing direct travel between destinations, creating mixed use areas and promote multi-modalism which includes alternative transportation such as walking or biking.¹⁸

¹⁸National Resource Defense Council. <http://www.nrdc.org/>

4. DEVELOPMENT

4.1. Introduction

The story of metro Atlanta has been a success story since the 1990s. The city is unique because it has an enormous amount of open and affordable space for growth; a result of there being no natural boundaries to restrict growth as in many other American cities. During the 1980s, and the 1990s in particular, Atlanta grew to become one of the largest cities in America by using this space to attract development. While this story has been a success in terms of growth, we know as city planners that growth is not always good. Unplanned or poorly managed growth can often lead to adverse environmental, social, and economic impacts. This section of the report focuses on development in metro Atlanta. Points to be considered include how Atlanta's recent patterns of development have affected the environment and quality of life for residents, how much Atlanta is projected to grow in the future, what will happen if Atlanta attempts to incorporate this growth using historical patterns of development, and ways that Atlanta can use new patterns of development to sustainably absorb growth.

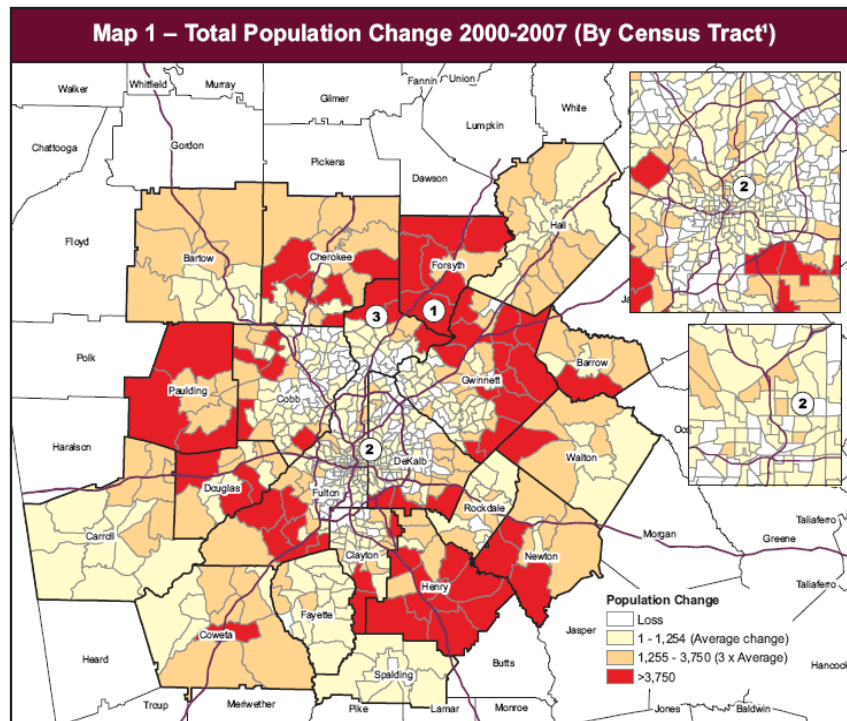
Of particular focus in this section is how patterns of development affect land use and air quality in the metro Area. Land use and air quality are the two most significant ways that Atlanta's carrying capacity is affected by growth and development. Specifically, low-density development radiating further away from the Atlanta downtown quickly engulfs greenfields surrounding the city. Infrastructure investments in schools, roads, sewers, water systems, and public safety forces are required to make these newly developed areas suitable for development. At the same time, areas closer to the city of Atlanta that already have much of this infrastructure on the ground are losing valuable

returns on past city investments, not to mention the effects that depopulation and a declining tax base have on the remaining residents. Additionally, developments in the suburbs of the city are car-oriented and decentralized, causing their new residents to increase the number and distance of their car trips. This increased reliance on cars has and will contribute to an already serious air quality problem in the Atlanta metro area.

4.2. Recent Patterns of Development

In the past three decades, the vast majority of Atlanta's development has occurred outside of the downtown core. The map below shows where growth has occurred in the past 7 years in the Atlanta metro area. As in the past, growth is still occurring on the outskirts of the metro area.

Figure 4.1. Total Population Changes in Atlanta, 2000-2007



Source: ARC Population and Housing Report 2007, p.3,
<http://www.atlantaregional.com/arc/documents/pah2007.pdf>

Christopher B. Leinberger, an urban studies expert, famously labeled the Atlanta region as the “fastest growing settlement in human history” in the late 1990’s. What Leinberger’s label captures is the result of policies pursued in Atlanta which have focused on creating single-family detached housing in suburban neighborhoods isolated from employment, recreation, and retail centers. The following quotation sheds some light of the consequences of these policies and resulting development patterns, “Atlanta has expanded more rapidly than just about any other urban area in the U.S. and has until recently expanded road capacity to accommodate the growth. Between the mid-1980s to the mid-1990s, Atlanta’s population grew by 32%. The total vehicle miles traveled in Atlanta in this period grew by 17%, the number of people commuting in a single-occupancy vehicle grew by 15% and commute times grew 1%.”¹⁹

Why is radiating low-density development bad? In October, 2005, Burchell, Downs, McCann, and Mukherji released a book entitled *Sprawl Costs* which is the culmination of a 10-year research project to comprehensively analyze just this question by looking at the economic costs of low-density development until 2025. One of the books coauthors, Burchell, tells the following story about the costs of sprawl, “Sprawl has direct and quantifiable costs to our economy and in our individual lives. This book shows that we are all paying a staggering price for sprawling development in this country, and that price will only go up as gas prices increase. Sprawling communities need longer public roads, increase the cost of new water and sewer hookups by 20% to 40%, impose higher costs on police and fire departments and schools, and more. These costs are passed on to businesses and residents though higher taxes and fees and

¹⁹ Burchell, et al, *Sprawl Costs*, 2005, Island Press.

sometimes through fewer public services. And in most cases, sprawling developments do not generate enough property taxes to cover these added costs.”²⁰ The analysis within this book further argues that residents of Atlanta “will pay \$227 billion over 25 years (2000 – 2025) to live in sprawling communities or \$44,678 per person.”²¹

What has sprawl led to specifically in the Atlanta region? Lester Brown of the Earth Policy Institute made the following observations about Atlanta based on article in the Scientific American entitled “The Science of Smart Growth.” “In a decade that began with preparations to host the Olympic Games, Atlanta led all other U.S. cities in population growth, home building, job openings, and highway construction. A part of the “new South,” the city exploded in size. Today it has become a nightmare, one with worsening air pollution, congestion verging on gridlock, and an escalating sense of frustration among residents. Sprawling over an area the size of Delaware, it has the longest commute time of any city in the country—longer even than in Los Angeles or Houston. Among the consequences of this extensive low-density development are rising automobile dependency, rising real estate taxes, longer commute times, worsening air pollution, and, above all, frustration because the population density is too low to support a meaningful public transport system.”²²

4.3. New Growth, Same Old Story

The Atlanta Regional Commission in its latest population and employment forecasts predict that by 2030 the 20-county metro Atlanta region will grow to nearly 7 million people and contain almost 4.9 million jobs. These levels of growth translate into

²⁰ Ibid.

²¹ Ibid.

²² Brown, *Eco-Economy: Building an Economy for the Earth* (W.W. Norton & Co., NY: 2001), Chapter 9 Redesigning Cities for People, http://www.earth-policy.org/Books/Eco/EEch9_ss3.htm.

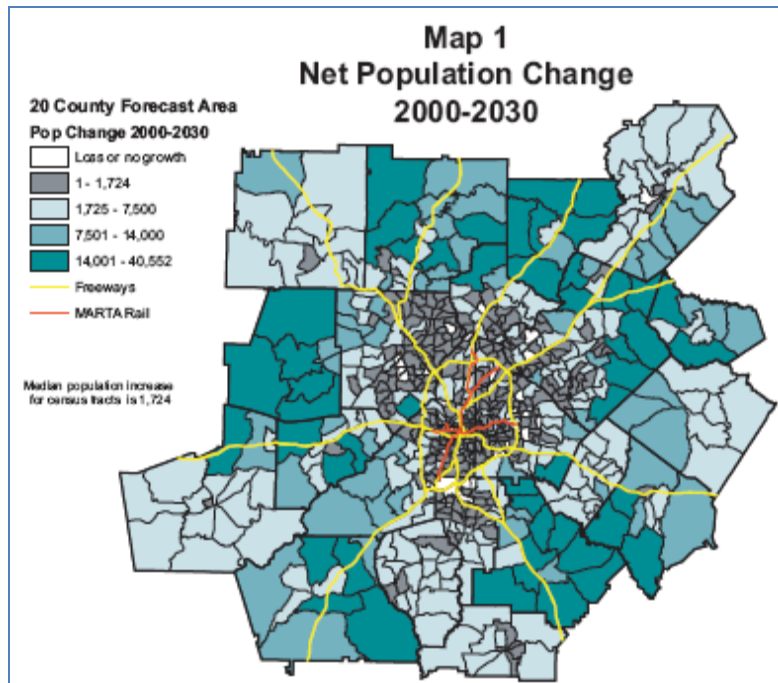
a 46% increase in population and a 67% increase in jobs between 2005 and 2030. The ARC's regional snapshot from October, 2006 points out that, "While the "core" 10-county region will capture almost 67 percent of the 20-county area's growth, most of the largest percentage gains are found in the "external" 10 counties."²³ The recent population surge within the City of Atlanta is also forecasted to continue, with the city adding 181,000 new residents for a 2030 population of 603,000.²⁴

The following two figures show how population growth is projected to be distributed throughout metro Atlanta. Figure 4.2 shows where the ARC expects to see population increases. Figure 4.3 shows the same increases, but in terms of people added per acre. Two things are apparent from these maps. First, a large amount of population growth is occurring on the outskirts of the metro area and will be low-density. Second, the large majority of population increases are outside of the MARTA rail network, meaning that much of the commuting for new residents will happen by car.

²³ Atlanta Regional Commission, 20 County Forecast Part 2,
<http://www.atlantaregional.com/documents/forecastsnapshot.pdf>

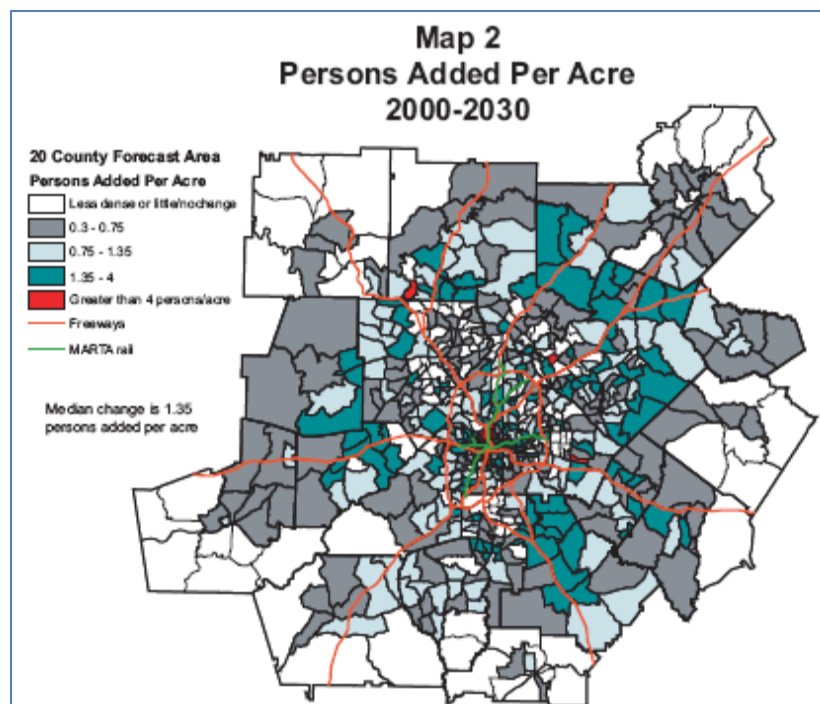
²⁴ Ibid.

Figure 4.2. Net Population Changes in Atlanta, 2000-2030



Source: Atlanta Regional Commission, 20 County Forecast Part 2, p.1,
<http://www.atlantaregional.com/documents/forecastsnapshot.pdf>

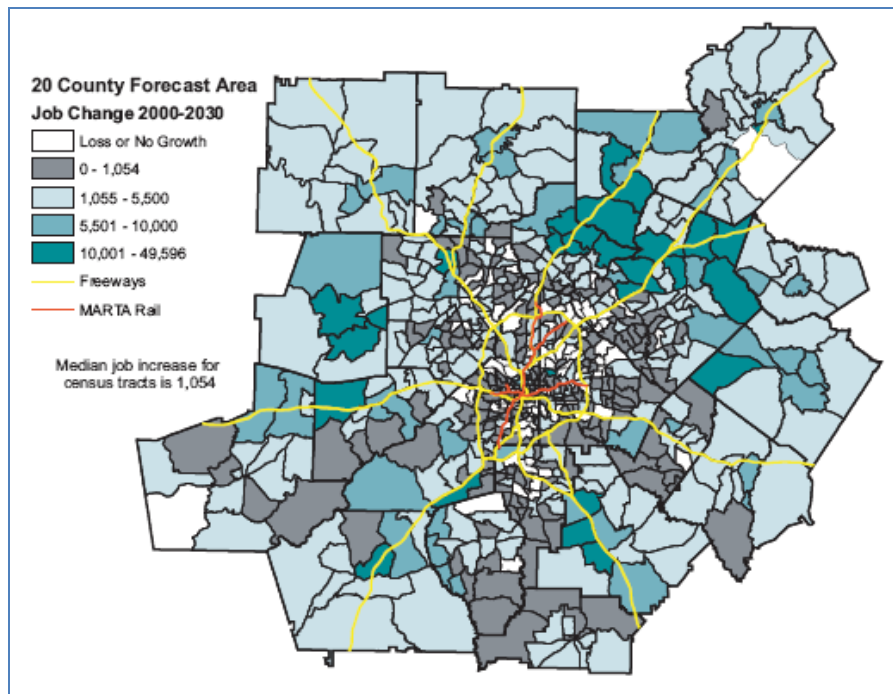
Figure 4.3. Population Changes in Atlanta in Persons Added per Acre, 2000-2030



Source: Atlanta Regional Commission, 20 County Forecast Part 2, p.1,
<http://www.atlantaregional.com/documents/forecastsnapshot.pdf>

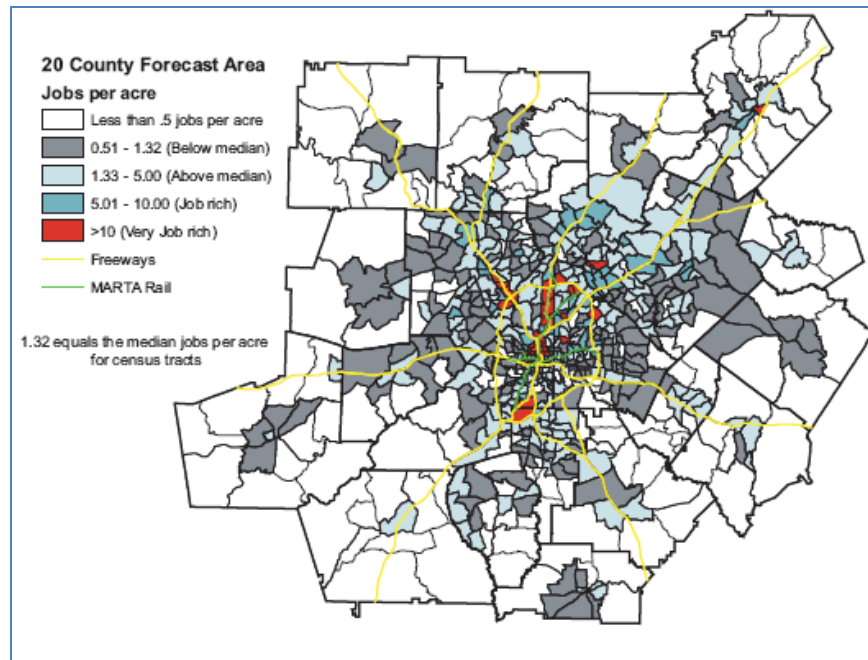
After looking at where new residents will live, it is important to think about where they will work. Figure 4.4 below shows where net employment changes will occur in the metro area from 2000 to 2030. Figure 4.5 shows projected job densities in terms of jobs per acre in 2030. Employment additions, like population additions, are also forecasted to occur largely on the outskirts of the Atlanta metro area. However, even with these population increases, areas surrounding downtown Atlanta will still have below median job density in most areas, with some above median job density on the north side of Atlanta's perimeter. The census tracts designated as very job rich are almost entirely concentrated within, or very close to, the Atlanta perimeter.

Figure 4.4. Net Employment Changes in Atlanta, 2000-2030



Source: Atlanta Regional Commission, 20 County Forecast Part 2, p.2,
<http://www.atlantaregional.com/documents/forecastsnapshot.pdf>

Figure 4.5. Job Densities in Atlanta in Jobs per Acre, 2030



Source: Atlanta Regional Commission, 20 County Forecast Part 2, p.2,
<http://www.atlantaregional.com/documents/forecastsnapshot.pdf>

4.4. Sustainable Growth, a New Story

From looking at the projections for population and employment growth in Atlanta until 2030, we can see that historical patterns of development in Atlanta are expected to continue. The purpose of this report is to propose strategies for Atlanta to more sustainably accommodate its forecasted growth. Before moving on to this question, we can first use statistics reported in *Sprawl Costs* to consider whether Atlanta could have grown more sustainably in the past, and if it had, what the potential benefits would have been. To recap from earlier in this report, between the mid-1980s and the mid-1990s Atlanta's population grew by 32%. The results of population growth for Atlanta were a 17% increase in VMTs (vehicle miles traveled), a 15% increase in the number of people commuting in single-occupancy vehicles, and a 1% increase in commute times. The population in Portland, Oregon grew by a similar 26% during the same period. However,

Portland, “one of the few U.S. areas with a long-standing urban growth boundary, pursued a comprehensive strategy to create walkable neighborhoods.”²⁵ “During that same time period, Portland’s population grew by 26%, total vehicle miles traveled in Portland edged up just 2%, the number of people commuting in a single-occupancy vehicle dropped by 13% and Portland’s commute times dropped by 9%.”²⁶

This comparison between Portland and Atlanta is revisited through another source. This source makes the same argument that Portland has grown in percentage terms close to the same as Atlanta, without many of the negative effects of development that Atlanta has experienced. “The contrasting experience of Portland, which has engaged urban sprawl head on, and Atlanta, which ignored the issue, is revealing. Between the mid-1980s and mid-1990s, the growth in population, jobs, and income in the two cities were about the same, but that’s where the similarity ends. [See Table 4.1] Property taxes dropped 29 percent in Portland and rose 22 percent in Atlanta. Energy use, which actually declined in Portland, climbed in Atlanta. Air pollution (ozone) dropped 86 percent in Portland while climbing 5 percent in Atlanta. And finally, neighborhood quality, measured by an amalgam of indicators, improved by 19 percent in Portland while declining 11 percent in Atlanta.”²⁷

²⁵ Burchel, et al, *Sprawl Costs*, 2005, Island Press.

²⁶ Burchel, et al, *Sprawl Costs*, 2005, Island Press.

²⁷ Brown, *Eco-Economy: Building an Economy for the Earth* (W.W. Norton & Co., NY: 2001)., Chapter 9 Redesigning Cities for People, http://www.earth-policy.org/Books/Eco/EEch9_ss3.htm.

Table 4.1

Changes in Portland and Atlanta Regions from Mid-1980s to Mid-1990s		
Indicator	Portland, OR	Atlanta, GA
	(percent change)	
Population growth	+26	+32
Job growth	+43	+37
Income	+72	+60
Property tax	-29	+22
Vehicle miles traveled	+ 2	+17
Single occupant vehicle	-13	+15
Commute time	- 9	+ 1
Air pollution (ozone)	-86	+ 5
Energy consumption	- 8	+11
Neighborhood quality	+19	-11

Source: Brown, Eco-Economy: Building an Economy for the Earth (W.W. Norton & Co., NY: 2001)., Chapter 9 Redesigning Cities for People, http://www.earth-policy.org/Books/Eco/EEch9_ss3.htm.

The case of Portland has shown us that more sustainable development is possible. Sustainably accommodating growth does not mean limiting growth, and further, growth can be used to strengthen many areas of a regional economy. Can Atlanta reach a greater level of sustainability, and put less of a strain on the regions carrying capacity, by carefully managing growth to 2030? The answer is yes. One result of the sprawling development in Atlanta is that there are many urban areas ripe for infill development and compact development projects. Air quality and the amount that people drive in Atlanta are two of the city's most important problems. Both of these problems can be mitigated by policies and strategies that minimize VMTs by building compact developments close to alternative transportation centers with walking access to commercial and retail uses.

One of the first obstacles to consider is that Atlanta has been growing the wrong way for so long. Is it possible to substantially alter the built environment of such a large city, and if so, how long will it take to do so? Fortunately, as pointed out by Dan Reuter

from the ARC, “Georgia has made substantial public investments in cities during the past 100 years. Cities and urban places across the Atlanta region have much greater potential to have more housing, become more walkable, mixed use and transportation efficient.”²⁸ A recent article from Business Week entitled “Cities: A Smart Alternative to Cars” points out just how large this potential to enhance the urban environment may be in the next few decades, “Because of population growth, the ongoing development churn in cities with buildings being remodeled or replaced, citywide infrastructure projects and changing tastes, half of the American-built environment will be rebuilt between now and 2030. Done right, that new construction could enable a complete overhaul of the American city.”²⁹ The article further points out changes that can occur within a few years, “...we don't need to change every home to transform a neighborhood. Many cities prevent denser development through bad building codes. But many inner-ring suburban neighborhoods, for instance, could become terrific places simply by allowing infill development. Strip-mall arterials could be converted to walkable mixed-use streets. This transition can happen in a few years.”³⁰

Part of creating more walkable, mixed-use development is overcoming misguided public opinion about higher-density development as well as political opposition. The Urban Land Institute released a report confronting these issues entitled “Higher-Density Development – Myth and Fact.” The following quotation is the heart of what this report seeks to address, “New compact developments with a mix of uses and housing types throughout the country are being embraced as a popular alternative to sprawl. At the core

²⁸ Reuter, “Common Thread,” p.2.

²⁹ “Steffen, *Business Week*, Cities: A Smart Alternative to Cars”, p.1,
http://www.businessweek.com/innovate/content/feb2008/id20080211_959496.htm?chan=top+news_to_p+news+index_innovation+%2B&%3B+design

³⁰ Ibid.

of the success of these developments is density, which is the key to making these communities walkable and vibrant. Unfortunately, in too many communities higher-density mixed-use development is difficult to construct because of zoning and building codes that favor low-density development with segregated uses and because of opposition from the community. This publication looks at several myths surrounding higher-density development and attempts to dispel them with facts to help dismantle the many barriers such developments face.”³¹

Support for higher-density, mixed-use development is growing, in fact, “Most land use professionals and community leaders now agree that creating communities with a mix of densities, housing types, and uses could be the antidote to sprawl when implemented regionally.”³² Despite growing support, myths about negative impacts for higher-density development still prevail. The following tables illustrate some of these myths and compare them with actual facts. What we see is that in fact these negative perceptions of higher-density development are not true in existing communities.

³¹ Urban Land Institute, Higher Density Development: Myth and Fact, p.5,
<http://www.uli.org/Content/ContentGroups/PolicyPapers/MFHigher010.pdf>

³² Ibid, p.7.

Table 4.2. Myths and Facts of Higher-Density Development

MYTH	FACT
Overburdens public schools and other public services, requires more infrastructure	Maximizes benefits from more compact infrastructure investments
Lowers property values in surrounding areas	If anything, surrounding property values are increased because of increased access to mixed-use amenities
Creates more traffic congestion and parking problems	Creates less traffic per unit than low-density development, encourages walking and mass transit, creates shared parking
Leads to higher crime rates	Crime rates are not significantly different from low-density developments

Source: Urban Land Institute, Higher Density Development: Myth and Fact, <http://www.uli.org/Content/ContentGroups/PolicyPapers/MFHigher010.pdf>

Table 4.3. Myths and Facts of Higher-Density Development

MYTH	FACT
Is more environmentally destructive	Low-density development increases air and water pollution and destroys natural areas by paving and urbanizing.
Is unattractive and does not fit in a low-density community	Attractive, well-designed, and well-maintained higher-density development attracts good residents and fits in
Those in suburban areas do not want higher-density development	Population is diversifying, many now prefer higher-density housing even in the suburbs
Only for low-income households	People of all income groups choose higher-density housing

Source: Urban Land Institute, Higher Density Development: Myth and Fact, <http://www.uli.org/Content/ContentGroups/PolicyPapers/MFHigher010.pdf>

From a policy standpoint Atlanta is beginning to build support for higher-density mixed-use development. The Livable Centers Initiative (LCI) program provides planning grants to develop transportation efficient land use studies and then links implementation

actions to transportation project funding. The goal of the LCI program is to encourage local governments to take advantage of existing infrastructure to promote denser, mixed-use development that is closely tied to transportation improvements. 86 studies have been conducted under the LCI program since 1999. Most LCI plants plan to increase residential uses near existing community centers, provide a more balanced mix of uses, improve air quality, and maintain or expand existing jobs. Since 2000, the LCI program has assisted 90 communities with \$140 million in grants. The development that has occurred within the LCI areas has accounted for 3.7 % of all new residential units and 10.5% of all new commercial development in the region.³³ The large proportion of commercial development located within LCI areas shows how much the private market recognizes the potential of these developments and how they are willing to invest in them.

4.5. Identifying and Planning for Carrying Capacity

We have traced through recent growth in Atlanta, how that growth is adversely affecting the regional environment and quality of life, and what new policies and strategies are more sustainably accommodating growth. The last topic considered is whether the Atlanta region can scientifically measure its carrying capacity and use this analysis to either limit growth or to provide more support for strategies of sustainable growth. One model on how to do this is taken from a carrying capacity study conducted in the Florida Keys region.

³³ Atlanta Regional Commission, Press Release Feb. 14, 2008, "ARC Livable Centers Initiative Awards Four Smart Growth Grants," p.2, http://www.atlantaregional.com/documents/LCI_Studies_2008_press_release.pdf

“In 1996, as a result of many years of discussion, negotiation, and litigation, the Florida Administration Commission issued an Executive Order requiring the preparation of a “carrying capacity analysis” for the Florida Keys. To fulfill this requirement, the U.S. Army Corps of Engineers and the Florida Department of Community Affairs jointly sponsored the Florida Keys Carrying Capacity Study (FKCCS). The key component of this study is a carrying capacity analysis model (CCAM) that provides a technical tool for state and local jurisdictions to ‘determine the ability of the Florida Keys ecosystem, and the various segments thereof, to withstand all impacts of additional land development activities.’”³⁴

“The Draft CCAM is composed of several modules: Socioeconomic, Fiscal, Human Infrastructure, Integrated Water, Marine, and Terrestrial. These modules are designed to work together to evaluate the impact of further development in the Florida Keys.”³⁵ In terms of development, the human infrastructure, socioeconomic, and fiscal impact portions of the model are most important. Table 4.4 below illustrates some of the indicators used to measure the ecological, social, and infrastructure systems of the region. This model could be used and expanded upon by Atlanta to begin documenting the carrying capacity of the region and localities. Several indicators can and should be added to this analysis, including air quality and vehicle miles traveled.

³⁴ National Research Council, A Review of the Florida Keys Carrying Capacity Study, 2002, http://books.nap.edu/openbook.php?record_id=10316&page=1

³⁵ Ibid, http://books.nap.edu/openbook.php?record_id=10316&page=2

Table 4.4. Carrying Capacity Indicators

Indicators	Definition	Comments
Population demand for non-residential uses	Demand is higher than the available non-residential uses	Population demand for retail, services and other non-residential uses, increases development demand. The user may input further development in the scenario and run model again.
Business demand for employees	Demand is higher than the available local labor force	If the business demand for employees surpasses the available local labor force, pressure builds to increase commuting employees.
Per capita government expenditures	Increase in the per capita expenditures as a result of the scenario	An increase in per capita government expenditures means that the government will have to seek increased revenues to match increased expenditures. Therefore, it indicates pressure to increase taxes.
Level of Service of U.S. 1	Median speed. U.S. 1 wide, the threshold speed of 45 mph. Required speed may be different for different segm	Current regulations require the Monroe County maintain an adequate LOS. A failure to maintain the required LOS results in a building moratorium.
Hurricane evacuation clearance time	The time required to evacuate the keys in case of an impending hurricane.	Current regulations required that the keys population evacuate in 24 hours.
Permitted volume of water supply	Daily average: 15.83 MGD Maximum day: 19.19 MGD	Per South Florida Water Management District permit which expires December 2005.
Minimum patch size for upland Keys forests	13 acres	Keys hammocks smaller than 5.9 ha. are considered all edge, with forest interiors lacking the buffering effects of edge vegetation (Strong and Bancroft 1994).
Lower Keys marsh rabbit habitat	Species is in danger of extinction	Species is currently in danger of extinction, mainly due to habitat loss (Forys and Humphrey 1994). Only habitat restoration would be beneficial for the Lower Keys marsh rabbit.
Key deer habitat	Habitat quality classification Tier 2 and 3 (Figure 9.3)	Recent studies (Lopez 2001) have determined habitat needs for Key deer.
Patch size requirement for forest- nesting birds in the Florida Keys	Minimum patch size: White Crowned Pigeon Fledglings hatch in mangroves but require large (12 acres) hammock patches within 72 hours. Black-whiskered vireo: 0.5 acres; White-eyed vireo: 5 acres; Northern flickers: 7.5 acres; Yellow-billed cuckoo: 16 acres; Mangrove cuckoo 12.8	Documented in Bancroft et al. (1995), who studied 27 Upper Keys forests ranging in size from 0.5 to 217 acres.

Source: Florida Keys Carrying Capacity Study, http://www.sfrpc.com/gis/fkccs/sg1_Scenario_Report.html

If Atlanta could build a model to scientifically measure carrying capacity, this would be the first step to restricting or altering growth patterns to accommodate these environmental, social, and economic limits. While there are few sources of models and methodologies to measure carrying capacity, there are even fewer sources on how the results of measuring carrying capacity can be translated into policy. Using carrying capacity to guide policy in Atlanta would involve the following broad steps: using an accepted, scientific model to measure the carrying capacity of the region, merging the results of this analysis with population forecasts for the region, and identifying policy tools that could be used to limit or accommodate growth. This section of the report has

focused on accommodating growth more sustainably, because it seems the political climate for limiting growth would be next to impossible to overcome. It would, however, be more feasible to use a model demonstrating that current development practices will lead to adverse outcomes to garner support for alternative, more sustainable policies.

The question, then, is to determine whether growth can be legally constrained in the Atlanta region based on these environmental or fiscal impacts, and, if so, what planning tools can effectively control that growth.

5. LEGAL ANALYSIS AND POLICY RECOMMENDATIONS

5.1 Legal Analysis of Planning Tools

A variety of tools are available for planners to limit growth based on environmental or fiscal considerations. Some of these, such as Urban Growth Boundaries, though proven to be quite successful in some areas, are rendered ineffective in Georgia. Other tools, such as Development Impact Fees, have proven to be successful. Here, I will provide a brief legal analysis of some of the tools most commonly used in Georgia.

5.1.1 Regional Planning Agencies

The main drawback with regional planning authorities such as the Atlanta Regional Commission is that without official sanction from the General Assembly, it has no direct control over a particular local government's land use decisions. Instead, they must rely on advisory expertise and persuasion in order to encourage local governments to act within the overall plan. While it may be that agencies such as these have no teeth to enforce adherence to any regional plan, they have been able to somewhat forge a spirit

of cooperation within the various municipalities without usurping the authority granted the local governments.

The Georgia Regional Transportation Authority (GRTA), O.C.G.A. § 50-32-1 et seq., was created by legislative act in 1999 in response to Atlanta's nonattainment status under the Federal Clean Air Act. Created for the purpose of "...managing or causing to be managed land transportation and air quality within certain areas of this state;" the General Assembly gave GRTA the ability to reject projects that do not meet minimum standards designed to reduce environmental impact.

A recent Supreme Court ruling, *Massachusetts v. EPA*, 127 S.Ct. 1438 (2007), compels the Environmental Protection Agency to monitor greenhouse gases such as carbon dioxide and methane, as these are within the Clean Air Act's definition of air pollutants. Because of this ruling, GRTA would have additional authority to reject projects that do not meet environmental thresholds.

5.1.2 Zoning

Article IX, Section 2, Paragraph 2 of the Georgia Constitution provides home rule status to the municipalities. It states that, "The General Assembly may provide by law for the self-government of municipalities and to that end is expressly given the authority to delegate its power so that matters pertaining to municipalities may be dealt with without the necessity of action by the General Assembly."

In addition, Article IX, Section 2, Paragraph 4 states that, "The governing authority of each county and of each municipality may adopt plans and may exercise the power of zoning. This authorization shall not prohibit the General Assembly from enacting general laws establishing procedures for the exercise of such power."

Thus, the State of Georgia has delegated the authority to enact zoning ordinances to the counties and municipalities, but has retained little authority to challenge zoning ordinances once they are enacted. The state has reserved for itself the power to determine how the zoning proceedings must take place, but this is primarily to insure that equal protection and due process rights have not been violated.

Down-zoning is the rezoning of land -- normally over the objection of the landowner -- to a less intensive use. For example, commercial land may be rezoned for residential use, or residential land may be rezoned to a less dense residential category. The usual result is that the land is worth a lot less after down-zoning than it was before.³⁶

Although there is the constitutional limitation against taking private property without just compensation, *Lucas v. South Carolina Coastal Council*, 505 U.S. 1003 (1992) held that as long as the land still retained economic value, it would not be considered a taking for Fifth Amendment purposes. As long as the down-zoning does not violate the owner's vested rights, the owner would have little recourse.

However, nearby property owners could successfully fight a down-zoning attempt. In *Miller v. Fulton County*, 258 Ga. 882, 884 (1989), the court stated that a property owner affected by a rezoning must show "special damage or injury not common to all property owners similarly situated. In this regard, the following have been held sufficient, in some cases, to meet the special damage requirement: diminution in value of a homeowner's property exceeding that of the neighborhood in general; noise, odor and visual intrusion on peace and privacy, traffic problems related to the particular property."

³⁶ <http://www.omlaw.com/updates-memos--91.html>

Furthermore, in *Brand v. Wilson*, 252 Ga. 416, 417 (1984), the court held that, “the property of one of the complainants, which adjoined to tract in question, would suffer a reduction in value of between 15 and 20 percent by reason of the rezoning. This is sufficient evidence upon which a trial court might find substantial damage to a substantial interest.”

Thus, it appears that courts would probably rule against a property owner in a direct challenge to a down-zoning, yet would allow adjacent property owners who can demonstrate a greater diminution of value of their property in general than that of others in the area to at least have standing to challenge the down-zoning.

5.1.3 Development Impact Fees

Perhaps the most powerful tool that can be used to help limit growth is the Development Impact Fee. According to Eban Fodor, an urban planner and author of *Better Not Bigger*, “Development impact fees are an increasingly popular means of funding the many types of public infrastructure required by growth. With a system of impact fees, developers and new home buyers must pay more of the full cost of their impact on the community; courts have consistently upheld all reasonable and properly designed impact fees.”³⁷

Georgia’s Development Impact Fee Act, O.C.G.A. §36-71-1 et seq., has been called “one of the best impact fee acts ever written.”³⁸ This legislation explicitly gives counties and municipalities the authority to “require that new growth and development

³⁷ Fodor, E., “Better Not Bigger: How to Take Control of Urban Growth and Improve Your Community, 1999, New Society Publishers

³⁸ Julian C. Juergensmeyer. Growth Management Law lecture, 2008.

pay a proportionate share of the cost of new public facilities needed to serve new growth and development.”

There have been no major challenges to Development Impact Fees in Georgia, although the Georgia Court of Appeals, in *Cherokee County v. Greater Atlanta Homebuilders Ass'n, Inc.* 255 Ga.App. 764, 566 S.E.2d 470. upheld the statute, finding that, “...county ordinance imposing impact fees for fire protection, sheriff's patrol, and public safety, on developments in unincorporated areas of county did not violate equal protection or due process.”

Furthermore, in *Greater Atlanta Home Builders Ass'n, Inc. v. City of Atlanta, Ga.*, 149 Fed.Appx. 846, the federal appeals court refused to hear a case where the plaintiffs asserted that the City's application of the impact fee program violated the Takings Clause.

5.2. Other Policy Recommendations.

Several private- and public-interest groups have espoused their own policy recommendations in an effort to limit growth. One of the most compelling is the Urban Land Institute, in conjunction with Smart Growth America, a public interest group. In their book *Growing Cooler: The Evidence on Urban Development and Climate Change*,³⁹ Ewing, *et al.*, promulgated several policy recommendations designed to reduce carbon emissions within a geographical region. These policies, which can be either federally, state, or locally derived, are all relatively easy to undertake and inexpensive to employ.

³⁹ Growing Cooler: The Evidence on Urban Development and Climate Change.
<http://www.smartgrowthamerica.org/gcindex.html>

Some of these policies are already in place in other countries or states. Therefore, guidelines are available that would assist in the design and implementation of these policies. Other policies were in place at one time, but have been abandoned in recent years. Some policies involve minor additions or alterations of policies currently in place.

Although growth management is primarily a local or regional concern, federal policy and regulations are an important part of any long-term plan, especially given the capricious nature of government policy and programs. In addition, the federal government wields a very big stick in terms of compliance and a very big carrot in terms of incentives.

5.2.1. Federal Policy Recommendations

Federal legislation should require regional transportation planning organizations to pass a conformity test for carbon dioxide emissions similar to tests already in place for other pollutants such as ozone and carbon monoxide. It is the lack of conformity to the current guidelines that caused Atlanta to lose federal transportation funds for new road projects, which in turn prompted the creation of the Georgia Regional Transit Authority.

The Supreme Court ruling in *Massachusetts v. EPA*, 127 S.Ct. 1438 (2007) requires the Environmental Protection Agency to include greenhouse gases such as carbon dioxide and methane to be classified as pollutants under the Clean Air Act. Monitoring stations in place to monitor ozone and carbon monoxide throughout the region could easily be modified to monitor the greenhouse gases.

Since January, 2005, the European Union (EU) has employed a “cap-and-trade” system designed to reduce carbon emissions and, in turn, generate additional revenue

when those shares are traded on an open market⁴⁰. Utilizing the guidelines and blueprints established by the EU, such a system could be launched here at the federal, state, or regional level. Similar in nature to Transferable Development Rights (TDRs), government or corporate entities would have a cap placed on their annual carbon emissions levels. Entities would then be compelled to reduce their carbon output and buy or sell available shares on the open market. These shares, being actively traded in an open market, could generate in excess of \$50 billion annually by 2020, which, in turn, could be used to fund other programs designed to increase carrying capacity.

Current federal transportation funding allocations are determined by formulae which include factors such as fuel use, vehicular miles traveled, and lane-miles of paved road. Perversely, the primary method for states to increase transportation funding would be to pave more roads, increase fuel usage, and drive more miles.⁴¹ A more practical solution would be to establish a baseline using current parameters, then factor reductions in fuel use and vehicular miles driven as incentives for increased funding.

Another potential policy revision would be to provide federal funds directly to the Metropolitan Planning Organizations (MPOs). As they were developed in the 1970's and early 1980's, a number of federal programs, and thus federal funds, went directly to these organizations.⁴² Federal reorganization during the Reagan Administration caused these funds to dry up, and MPOs became dependant on the states for their funding.

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and the subsequent Transportation Efficiency Act for the 21st Century (TEA-21) helped to

⁴⁰ EU Greenhouse Gas Emission Trading Scheme, <http://ec.europa.eu/environment/climat/emission.htm>

⁴¹ Center for Clean Air Policy, <http://www.ccap.org/transportation/smart.htm>.

⁴² Wolf, Sanchez, and Farquahr, *Metropolitan Planning Organizations and Regional Transportation Planning* (2007). CRC Press.

increase the authority and responsibility of the MPOs, and required the states to earmark more funds for the MPOs. However, these funds only represent, on average, about five to ten percent of the state's federal highway allocation.⁴³ In addition, some funds that are, by definition, meant to be used directly for areas within the MPOs are, instead, suballocated at the state's discretion to areas outside the MPOs. Instead of sending money directly to the states and expecting them to allocate funding based on need, the Federal government should allocate funds directly to the Atlanta Regional Commission.

Currently, many people "drive 'til they qualify," that is, they drive further out from the city center in order to find more affordable housing options. The increased costs of transportation, pollution, insurance rates, gridlock, and the decrease in productivity makes this a less than attractive option. Recent studies have shown that much of the need for housing over the next thirty years can be met within walking distance of the nation's 4000 existing transit stations.⁴⁴ These studies hold true for Atlanta also. Developers and builders who build affordable units near transportation centers should be rewarded with tax incentives which would, in turn, promote even denser construction in these areas. In addition, tax credits and other incentives could be provided to help rehabilitate and revitalize existing housing in these same areas.

Finally, the federal government could provide funding to 'rewrite the rules'. Many cities want to do the right thing and amend their old planning codes. However, budget restrictions often prevent planners from redesigning their codes while they are

⁴³ Puentes and Bailey, *Increased Funding Accountability for Metropolitan Transportation Decisions* (2005)

⁴⁴ Hidden in Plain Sight: Meeting the Coming Demand for Housing Near Transit, Center for Transit Oriented Development 2005 at www.reconnectingamerica.org

currently operating the development process. Funding directly earmarked for this could help in updating codes.

5.2.2 Georgia Policy Recommendations

Some of the policies mentioned above could be directly implemented by the individual states, rather than waiting for the federal government to act. For example, California has already begun to develop a “cap-and-trade” policy similar to the one used by the EU.⁴⁵ Not only could Georgia adopt some of the policies mentioned above, but also could implement some of the other policies best suited for state action.

A primary example would be for Georgia to initiate its own incentive program to reward communities and municipalities if they are able to reduce its vehicular miles traveled. Incidentally, this policy defies conventional wisdom. Current transportation allocation practices reward increased fuel use and miles traveled. Even now, some states such as California⁴⁶ and New York⁴⁷ have realized how short-sighted this plan is. They currently encourage municipalities to reduce their miles traveled and fuel consumption. Many areas, including Atlanta, are already monitoring vehicular miles traveled in order to assure compliance with the Clean Air Act, so this is not a heavy burden on the municipalities. This merely requires cities to supply similar data to other agencies.

The prevailing method of transportation planning in most areas is to attempt to keep up with demand by simply “projecting and providing”. However, this has proved to be more expensive and less successful than many would wish. In spite of large

⁴⁵ EU Greenhouse Gas Emission Trading Scheme, <http://ec.europa.eu/environment/climat/emission.htm>

⁴⁶ California Energy Commission, “The Role of Land Use in Meeting California's Energy and Climate Change Goals,” 2007. <http://www.energy.ca.gov/2007publications/CEC-600-2007-008/CEC-600-2007-008-SF.PDF>

⁴⁷ Recommendations to Governor Pataki for Reducing New York State Greenhouse Gas Emissions.” http://www.ccap.org/pdf/04-2003_NYGHG_Recommendations.pdf.

investments, congestion continues to worsen each year. Further, future projected needs far outstrip estimates of available funds. Finally, climate change, an aging population, changing market demand, and other trends suggest that a continuation of strategies which rely almost exclusively on automobile transportation is untenable.

The California Department of Transportation is supporting an approach to identify future land use and transportation scenarios through its BluePrint project. Here, localities proactively examine future growth scenarios and make investments to achieve the desired scenario. Similar processes have worked in Utah (Envision Utah) and Oregon (The LUTRAQ project). Once those scenarios are approved, states can direct new development toward achieving that scenario. This differs from the current paradigm wherein the states are reactive instead of proactive.

Finally, many municipalities in Georgia often compete to attract “big-box” stores and other retail establishments. Cities will offer tax incentives to encourage corporations to build within their boundaries, hoping that the associated increase in sales tax revenue and jobs will compensate for the incentives. Often, however, they attract establishments that already have a location nearby. Thus, the company will abandon their location, and build a new establishment in the new area.

In Arizona, local tax incentives became so large and so frequent that the state banned them in the Phoenix area. Georgia could enact similar legislation designed to limit the size and frequency of such incentive packages.

5.2.3. Regional and Local Policy Recommendations

Over 650 mayors have signed the U.S. Conference of Mayors' Climate Protection Agreement,⁴⁸ and approximately 400 have been signed as "Cool Mayors" with ICLEI's Mayors for Climate Protection program.⁴⁹ Many communities nationwide have already developed and enacted plans to reduce the carbon footprint, even without federal and state incentives. Several communities in Georgia are included. Following are some policies that local governments can employ to assist them in achieving that goal.

Many communities want to create mixed-use neighborhoods, allow more density and more compact neighborhoods, offer more types of housing, or require sidewalks, bike lanes, and other bicyclist and pedestrian amenities. But many find that their development rules do not allow them to achieve the type of development they want.

Several tools are available to assist communities in determining what changes are necessary to achieve the desired type of development.⁵⁰ Opportunities for reform include zoning codes, subdivision regulations, street design and parking standards, annexation rules and design guidelines.

Predictability in the development process is valuable to everyone concerned, including the developers, local government, and its citizens. Communicating the guidelines and rules for what the local government considers a "good" development project makes the process more predictable and fair, as does defining the benefits developers will get from meeting or exceeding the community's standards. Two primary means of rewarding good projects are to offer developers flexibility in project design and

⁴⁸ <http://usmayors.org/climateprotection/listofcities.asp>

⁴⁹ http://www.coolmayors.com/common/directory/browse_mayors.cfm?clientID=11061

⁵⁰ See, for example, the policy and code audit tools from the Smart Growth Leadership Institute at <http://www.sgli.org/implementation.html>

to expedite the approval process. If a development project meets or exceeds the community's goals and vision, the developer should be rewarded with, for example, a density bonus that allows the developer to build more in exchange for providing an amenity the community wants, such as affordable housing.

In addition, developers favor an approval process where projects that follow certain guidelines get streamlined or approvals are fast-tracked. Communities might guarantee review of the project within a certain amount of time, or coordinate the approval process with the various departments so that the review happens expeditiously.

Ultimately, local governments should prioritize funding, including infrastructure spending, to support development that helps meet community, economic, and environmental goals. By directing infrastructure funds to infill projects, whether to repair existing infrastructure or build new facilities, the community is investing in the type of development that can help reduce emissions and create more options for residents.

Finally, for plans to be as successful as possible, the populace who will be living and working in the community must be involved in the creation process. Residents must be given opportunities to learn about the issues and give their input prior to the final decision-making. When residents are engaged in the decision-making process from the beginning and feel like their concerns and ideas are being heard and considered, they are less likely to fight new development. Education could include public meetings, gathering and publishing data and maps in an easily understood format, or keeping a Web site updated with local development issues.

6. CONCLUSION

This report has explained the concept of carrying capacity and how this scientific model can be applied to the development of urban areas. The carrying capacity model applied to the metro Atlanta region could help the city avoid future deteriorations in the environment and quality of life for current and future residents. This report has shown that ignoring the environmental constraints of development in the Atlanta metro area has and will lead to problems of sustainability. The carrying capacity model could be a way for Atlanta to understand the environmental limitations of the region and to plan subsequent development accordingly.

If the carrying capacity theory were to be used by Atlanta, it would require using the steps and policy tools outlined in this report. Some of this discussion was theoretical because applying carrying capacity to urban development is a relatively new idea. The first step to guiding future policy using a carrying capacity framework would involve developing a comprehensive model to quantify the effects of development in the metro Atlanta area on the natural environment. This model would then be used to understand the current state of the environment in metro Atlanta and as a baseline to consider how future actions will affect the current situation. Using such a comprehensive model to inform future policy in the metro Atlanta area is essential to accommodating future growth in a sustainable way.