TRANSIT AND SMALL URBAN SPRAWL

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ABSTRACT

Small urban sprawl has resulted in new housing developments and business centers that have never been served by transit. Unfortunately, transit agencies are often not included in the land development process within small urban communities. The objectives of this study were to determine what steps small urban transit providers are currently taking to integrate transit service into sprawling communities, and to determine what can be done to improve relationships with local governments during the land development planning process. Many transit agencies indicated that they are involved in land-use planning within their metro area while others had specific communication methods to follow. Methods included meetings, planning activities, and personal networks, among others. However, there were also many small urban communities who indicated they were not involved in land-use planning and had no communication with local city planners. Involvement was found to vary widely from one community to the next. Transit agency representatives felt the best way to integrate transit within new developments was to be present during the development planning process. However, only four of 13 questionnaire respondents indicated they felt sufficient demand existed for fixed-route transit within their new developments. This indicates that even though they might have been involved in planning, new developments are often built at such low densities that implementing new service there would not be feasible. Also, other agencies indicated in both the questionnaire and case studies that even if sufficient demand existed for service, the finances are not available to extend service beyond its current structure.

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1. INTRODUCTION

Bus transit provides a mobility alternative to private automobiles within small urban communities. Transit serves the handicapped and low-income community that have no other travel options as well as working and aging populations who choose to ride because it is cheaper and less stressful than driving. Small urban sprawl has resulted in new business centers that have never been served by transit. Burchell et al. (2002) analyzed sprawl in the United States and highlighted 13 small urban communities within SURTC's service region as sprawling locations. Incorporating transit service in new developments within these sprawling communities will allow all citizens to utilize new business centers.

Coordination between transit agencies and land development projects is necessary. Unfortunately, transit agencies are often not included in the land development process within small urban communities. Transit service is often an afterthought once the infrastructure has already been built. At that point, access to feasible bus stops is often blocked by physical barriers incorporated within the design. Relationships between transit planners and local governments must be strengthened to improve the integration of bus transit and land use development. Christopher (2006) emphasized this by suggesting that cooperation among stakeholders is needed to develop solutions and strategies that will address the challenges that inhibit the integration of bus transit and land development. Large metropolitan communities have developed procedures to address these challenges while most small urban communities have done very little to deal with similar problems.

The objectives of this study are to determine what steps small urban transit providers are currently taking to integrate transit service into sprawling communities, and to determine what can be done to improve relationships with local governments during the land development planning process. Attention will also be given to a transit agency's ability to provide new service with limited financial capabilities. Rising energy prices (e.g., diesel fuel) may also play a significant role in determining whether or not new service can be provided, given current funding levels.

2. TRANSIT PLANNING IN SPRAWLING SMALL URBAN COMMUNITIES

Land use design to generate transit use is a concept that has recently drawn significant attention in the United States. Local government officials, transit service providers, and concerned citizens have looked at approaches to give greater travel choice to generate more efficient land use patterns and public services. Transit-sensitive land use designs develop land use patterns that are conducive to transit use and are located along designated transit corridors. Guidelines have been developed to assist in such land use designs and have been the subject at numerous meetings and conferences. Many of these guidelines and strategies are highlighted in the following review.

2.1 Sprawling Communities

Over the past several decades, numerous studies have analyzed the cost of development (Real Estate Research Corporation 1974; Burchell et al. 2002; Inam and Werbel 2002; The Coalition for Smarter Growth 2008). Most of these studies have attempted to prove the hypothesis that sprawling growth is more costly than compact urban growth. The research varies in terms of the definition of sprawl, methodologies, and findings, but most of the studies conclude that costs are generally higher with sprawl-type development compared to compact development or 'smart growth.' *The Costs of Sprawl* (Real Estate Research Corporation 1974) is often cited as the seminal research, using density and location as key variables in the cost of development.

Defining sprawl is difficult as varying definitions and misconceptions have blurred its meaning throughout the years. Burchell et al. (2002) developed a list of 10 common elements found in the varying definitions. Developments that contain most of these 10 elements are viewed as sprawl:

- Low residential density
- Unlimited outward extension of new development
- Spatial segregation of different types of land use through zoning regulations
- Leapfrog development
- No centralized ownership of land or planning of development
- Transportation dominated by privately owned motor vehicles
- Fragmentation of governance authority over land use between many local governments
- Great variance in fiscal capacity of local governments within a metropolitan area
- Widespread commercial strip development along major roadways
- Major reliance on the trickle-down process to provide housing for low-income households

Whether or not sprawl should be avoided at all costs is heavily debated (The Coalition for Smarter Growth 2008; Hayward 1999). Opponents cite its resource consumption and its contribution to urban downfall as two main problems. Proponents believe sprawl offers the ability to deliver home ownership benefits and lifestyle satisfaction.

The Coalition for Smarter Growth (2008 page 1) states that "Sprawl is cheaper for developers than careful planning because they can pass much of the cost on to the taxpayer." They believe that sprawl adds to the economic, environmental, and social cost of a community. Economic costs burden local governments by forcing them to provide new infrastructure to serve an isolated population. Commuters must also travel further to work and to other daily activities, which results in more money being spent operating and

maintaining personal vehicles. Environmental costs increase due to longer driving distances and car trips in poorly planned communities, which produces more air pollution. Socially, sprawl gives no option but to drive to every destination. Therefore, increased traffic congestion may take time away from things such as work or recreational activities. Also, increased driving and traffic can lead to a greater number of auto fatalities (The Coalition for Smarter Growth 2008).

Hayward and Mondale (2000) take a more 'hands-off' approach to sprawl and land use development, believing it must be put into its proper perspective. Hayward found that 20 years ago, if someone claimed to be living in a growing community, it would have been taken as good news. Today, it is often the contrary. However, according to the U.S. Geological Survey (2000), all development, including roads, highways, and military bases, as well as urban and suburban housing and commercial buildings, consumes only about 5 percent of the total land area of the continental United States.

Hayward believes the occurrence of sprawl has a simple explanation - more people can now afford to live in the suburbs compared to past generations. With this in mind, it is unrealistic to expect cities to grow at previous densities as the middle class grows more numerous and prosperous. Also, as more and more people enter the upper middle class, the demand for larger homes with larger yards increases as well. Hayward concludes by stating that, "Sprawl opponents criticize such housing developments and label the homes therein 'McMansions,' but can we use law to prohibit their creation? Sprawl is caused by affluence and population growth, and which of these do we propose to prohibit?" (Hayward 2000 page 1)

2.2 Obstacles to Integrating Transit Service within New Developments

At the American Public Transportation Association's (APTA) 2005 Bus & Paratransit Conference, Ronald Kilcoyne (2005 page 1) presented a paper on how to make any new development transit friendly. His paper stated that "transit professionals understand that if transit is to be effective, the area surrounding each stop should be transit friendly." Too often, however, professionals who are responsible for the built environment (planners, architects, engineers) are unaware of transit friendliness concepts and, therefore, do not include them within their design.

The fact that developers are unaware of transit needs for new developments is due to a number of factors. One main factor is that developers are not responsible for running the transit system. The feasibility of implementing and maintaining a transit system, while considering potential customer needs, is rarely given consideration (Morris 2002). This is not surprising since the development professionals will not likely benefit from a successful transit system. Another main reason that transit is often overlooked within new developments, according to many transit professionals, is because it is considered insignificant. Thus, if transit serves a small role within the development, why spend valuable time implementing transit friendly concepts that will go largely unused? (Kilcoyne 2005)

Levine and Inam (2004) found that city regulations are often a constraint on land-use innovation. While land developers often desire more transit-friendly, 'smart growth' developments, they are not feasible due to current regulations. Examples of these regulations include zoning that seeks to lower densities and transportation regulations that specify large roadways and parking lots. Research has shown that consumers desire a mix of both low- and high-density residential locations based on their personal preferences (Hayward 1999; Burchell et al. 2002).

A Levine et al. (2002) study analyzed the fit between household preferences and locational choices in two metropolitan areas. One offered housing choices across a number of neighborhood types and densities while the other offered only sprawling, car-dependent neighborhoods. They concluded that the

metropolitan area with a greater mix of housing choices delivered a closer match between preferences and choices for residents than the auto-dependent community (Levine et al. 2002).

Another significant obstacle when integrating transit service within new developments can be the transit agency itself. Many transit agencies do not view land use decisions as their responsibility. The transit agency's traditional role is to provide service, whereas planning is the responsibility of local government (Christopher 2006). Also, the goals of local government and the local transit agency may be different. There may be competition between the two for funding resources as well. However, if a communication network between the two agencies cannot be made, transit integration within land development planning will be impossible (Kilcoyne 2005).

Transit agencies may also be resistant to change within their system. Beimborn et al. (1995 page 4) found that "many organizations, particularly public agencies, are poorly equipped to deal with rapid change and innovation." New bus routing, for example, often has to be forced upon unwilling drivers, and it may take a long time for changes to be successfully implemented. Also, if ridership does not increase as a result of new service, drivers will become frustrated and unwilling to drive these routes (Beimborn et al. 1995).

2.3 Strategies to Integrate Transit within New Developments

The inclusion of transit planners early in the development design is key to successfully integrating bus transit service into new land developments. Christopher (2006) found that once transit is represented, three main strategies need to be implemented. These include institutional practices, funding strategies, and regulatory tools.

Some institutional practices that have proven successful include good communication networks with local governments and planning agencies, the presence of a "Champion" to represent transit, and the need to build partnerships with building owners (Christopher 2006). Many agencies noted that communication takes time, but having good communication networks builds credibility with decision-makers. Strong leadership can affect the integration of transit as well. Transit "Champions" and coalitions should support transit by building a transit-supportive policy structure and process that will have lasting value. Developers and building owners do not typically interact with transit officials and, therefore, are usually not familiar with transit interests. To deal with this unfamiliarity, transit staff should volunteer to give presentations highlighting the benefits of transit to new developments. Presenting new ideas can raise awareness, generate interest, and foster new relationships (Christopher 2006).

Successful funding strategies for transit within new developments vary widely. Three main strategies that have demonstrated effectiveness include developer support, planning funds, and land incentives (Christopher 2006). The developer is sometimes willing to provide transit facilities when their inclusion offsets the cost of road installation. For example, adding lanes or improving signalization is very expensive, while encouraging the use of transit within a development is often less costly. Although much of the planning funds are earmarked, funding for planning is available through SAFETEA-LU, section 1117. Metropolitan planning organizations, local governments, and tribal governments are eligible recipients of these grant funds. The federal share of these projects is 80%. Planning activity grants may be used to finance land use alternatives, coordinated transportation, and transit implementation plans, among others (Federal Highway Administration 2005).

Two main regulatory tools that can aid the integration of transit into new developments are zoning and controlled growth (Morris 2002). Land-use zoning is the process of segregating land segments for different uses. One common zoning technique is utilizing transit zones. These zones, for example, allow for mixed-use developments at high densities where frequent transit service is provided. Minimum

densities can be set for transit zones along with maximum parking requirements (Christopher 2006). Usually, financial incentives for developers are included to promote the planning of such zones (Hendricks et al. 2005). Incentive zoning is another land-use alternative that encourages particular development aspects with incentives for developers such as density bonuses, fee waivers, and reduced parking requirements. Another zoning technique favorable to transit is the reduction of zone size in new developments. This simple method brings different land-use developments into closer proximity and encourages greater pedestrian traffic (Christopher 2006).
Controlled growth also lends itself to transit integration. The state of Washington passed the Washington State Growth Management Act (GMA) in 1990. The GMA requires state and local governments to prepare comprehensive growth plans that are designed to improve the quality of life and protect critical areas within the state. Porter (2005) studied this act and its consequences. He found that the GMA had succeeded in promoting comprehensive planning in local governments by using development to improve communities and preserve critical environmental areas. It should be noted that the GMA has been one of the most controversial pieces of state legislation in Washington history, and has been promoted and criticized by various groups throughout the state.

Communities in states without controlled growth programs have passed laws for developers to design condensed developments that are favorable to transit as well. Boulder, CO, and Davis, CA, are small urban communities which have passed such reforms. Both communities have implemented open space programs by voting to tax themselves to protect open space and agricultural resources. These programs are not designed to deter growth, but to limit growth in designated areas. As a result, areas that are designated for new development are designed at higher densities (City of Davis 2002).

2.4 The Need for Guidelines

Having design guidelines for bus transit is necessary for any planning process. The Riverside, CA, Transit Agency (2004) developed an extensive document for the purpose of educating local planners, developers and decision-makers about transit's needs. Their guidelines defined criteria, dimensions, space, requirements, typical layouts, and designs for the following transit facilities and amenities:

- Pedestrian and bicycle access ways connecting with transit;
- Bus stops;
- Bus stop 'hardware': benches, shelters, lighting, and waste baskets;
- Bus stop signs and electronic information systems;
- Park-and-ride facilities;
- Transit centers.

In addition, they also provided information on vehicle characteristics, bus turning radius, and road grades. Planners can design proposed developments that are compatible with these guidelines. This eliminates the need for changes to be made after the new development has already been designed or constructed.

Unfortunately, most transit agencies do not have published guidelines to assist developers. A survey conducted by Christopher (2006) found that more than 70% of respondents did not have such guidelines. Agencies indicating that they had guidelines covered a wide range of topics. Some agencies provided documents with only a few pages, and others provided multiple volumes. The distribution of these guidelines varied as well. Less than half of the agencies indicating they have guidelines make them available on their websites. Website access can create a greater awareness of the issue and act as an educational tool for all stakeholders (Christopher 2006). It also allows other transit agencies to share these documents, enabling them to learn from the experiences of others.

2.5 The Effectiveness of Transit Friendly Developments

Planning and development policies that are intended to support increased transit ridership, and reduce the number and length of vehicle trips, include those that encourage Transit Oriented Development (TOD) and/or smart growth. However, questions remain about whether TOD and smart growth decrease traffic congestion (Levine and Inam 2004; Morris 2002). Hendricks et al. (2005) found that land use may be less important than other factors in affecting mode choice and vehicle miles traveled (VMT). More important factors include income, attitudes and preferences, and auto ownership. However, it was found that in cases where TOD appears to work best, other circumstances exist. These include "excellent transit service, land-use patterns that support the ability to provide regional access, the removal of incentives to drive one's personal vehicle, and the addition of incentives to use transit" (Hendricks et al. 2005 page 7).

Public policy advocates are not against the better planning that smart growth promises (Hayward and Mondale 2000), but some feel it needs to be applied in moderation. Hayward (1999) fears that such ideas are being implemented far too quickly. He describes his concern by illustrating a few of the anomalies of the issue. The central idea of smart growth is that cities should be developed at higher densities. Hayward and Mondale (2000 page 2) use the example of Portland, OR, to state that "Portland, OR, is considered the shining example of smart growth while Los Angeles, CA, is considered the epitome of sprawl. The population density of the greater Los Angeles area is about 7,000 people per square mile. Portland's population density is about 3,500 people per square mile. Portland residents say that Los Angeles represents the future they want to avoid. Yet the smart growth plan for Portland calls for doubling its density over the next 40 years to 7,000 people per square mile, the same as Los Angeles today."

Many smart growth advocates will counter the increased density argument by saying that it's not simply density itself, but the form density takes (Burchell et al. 2002; Inam and Werbel 2002; The Coalition for Smarter Growth 2008). Hayward believes this is a good point, but that many in the smart growth movement want to use stringent land-use regulations to implement smart growth, whether we want it or not. He added that the aim of some people in the movement is not simply improving the practical functioning of cities and suburbs, but transforming them completely (Hayward and Mondale 2000).

Runge (2006) studied the effect of smart growth laws in Green Bay, WI. These laws, drafted in 2000, were designed to encourage neighborhood designs that support a range of transportation options. It created financial incentives with the idea that smart growth would result in less expensive public services, so communities and counties that grow efficiently would be rewarded. Six years after the law was created, smart growth plans had been completed in 19 of 24 communities in Green Bay's Brown County. Unfortunately, many plan recommendations have not been implemented, and most plans are viewed as mere guides. Runge (2006 page 17) found that "the bottom line is that smart growth laws helped to create pedestrian and bike plans, but they do not necessarily create comprehensive pedestrian and bike systems." Plan implementation deadlines are January 1, 2010, and a number of required actions have already been reduced by Wisconsin legislatures. Overall, the lack of accountability within the law has proven to be its downfall.

3. TRANSIT AGENCY QUESTIONNAIRE

A questionnaire was designed to gain a better understanding of how transit agencies adapt to land-use issues within their local communities. The questionnaire focused on five areas: agency characteristics, communication with land-use planners, support strategies for transit, integrating bus service techniques, and amenities and design aspects that are often lacking within new infrastructure. The questionnaire was not sent to coastal states within the continental United States. We felt that by limiting the distribution to interior states, we would be better able to understand how agencies in the Small Urban & Rural Transit Center's (SURTC) primary service area are affected by land-use issues. The questionnaire was distributed via e-mail to 50 selected transit agencies within small urban communities whose metropolitan service area (MSA) population was between 50,000 and 250,000. Two to three agencies were selected from each state to get a nice cross-section of responses. A secondary purpose for the questionnaire was to choose between three and five respondents with whom to conduct case studies. The case studies would look into the land-use development of the communities and how different designs have affected transit's effectiveness to deliver quality service to local residents.

3.1 Questionnaire Results

Figure 3.1 shows the locations of the 13 transit agencies that responded to the questionnaire. Seven of the responding agencies were located in the four central U.S. states of Missouri, Illinois, Ohio, and West Virginia. Two respondents were located in Alabama while Texas, New Mexico, Wisconsin, and Montana had one responding agency each.

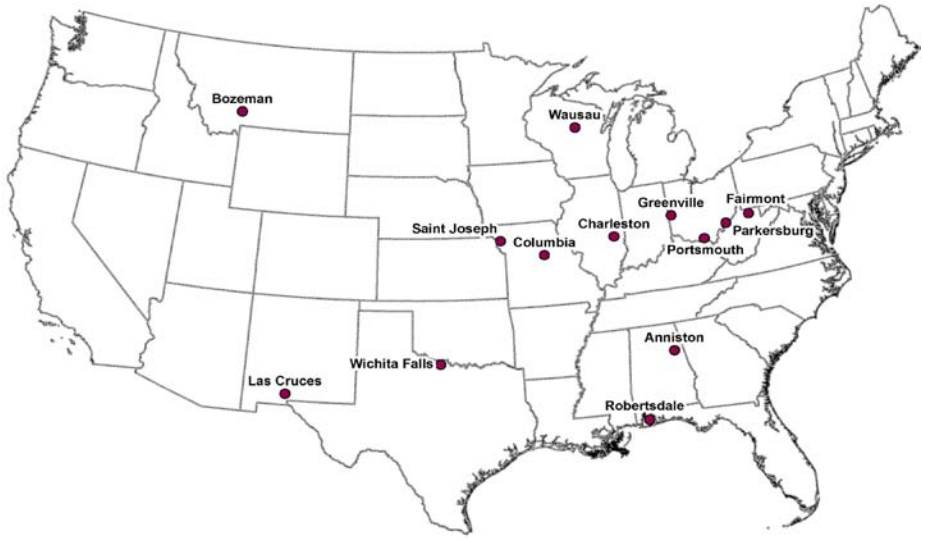


Figure 3.1 Respondent Map

Table 3.1 shows the location of each responding agency along with the corresponding city and micropolitan service area (MSA) population. The city of Las Cruces, NM, had the largest city and MSA populations for all respondents of 102,000 and 199,000 residents, respectively. The agency from the smallest community that responded was Greenville Transit System with a city population of 13,000 and a MSA population of 52,000. Four of the respondents represented relatively small cities, but were responsible for providing service to substantially larger MSAs. These included the Mid-Ohio Valley Transit authority of Parkersburg, WV, with a city population of 33,000 and a MSA population of 161,000; the East Alabama Regional Planning and Development Commission of Anniston, AL, with a city population of 24,000 and a MSA population of 113,000; Metro Ride of Wausau, WI, with a city population of 38,000 and a MSA population of 130,000; and Baldwin Rural Area Transportation System (BRATS) of Daphne, AL, with a city population of just 17,000 but a MSA population of 172,000.

Table 3.1 Population Data

Agency	Location	City Pop.	MSA
Greenville Transit System	Greenville, OH	13,000	52,000
Dial-A-Ride	Charleston, IL	21,000	62,000
Fairmont-Marion County Transit Authority	Fairmont, WV	19,000	57,000
HRDC/Streamline	Bozeman, MT	35,000	87,000
Access Scioto County Public Transit	Portsmouth, OH	21,000	76,000
Mid-Ohio Valley Transit Authority	Parkersburg, WV	33,000	161,000
East Alabama Regional Planning and Development Commission	Anniston, AL	24,000	113,000
City of St. Joseph	St. Joseph, MO	74,000	123,000
Metro Ride	Wausau, WI	38,000	130,000
Wichita Falls Transit System a.k.a. "Falls Ride"	Wichita Falls, TX	97,000	148,000
Columbia Transit	Columbia, MO	99,000	162,000
Baldwin Rural Area Transportation System (BRATS)	Daphne, AL	17,000	172,000
City of Las Cruces - RoadRUNNER Transit	Las Cruces, NM	102,000	199,000

Table 3.2 shows the changes in Micropolitan Statistical Area (MSA) population between July 1, 2000, and July 1, 2007. Bozeman, MT, saw the largest increase in MSA population among respondents during this time period of nearly 28% while the Portsmouth, OH, MSA saw the largest decrease in population of 4%. Other communities that saw large population increases included a 21.5% increase in the Daphne-Fairhope-Foley, AL, MSA, a 13.6% increase in the Las Cruces, NM, MSA, and an 11.2% increase within the Columbia, MO, MSA. Respondents that saw population deceases included MSAs in St. Joseph, MO; Greenville, OH; Wichita Falls, TX; Parkersburg-Marietta-Vienna, WV; Charleston-Mattoon, IL; and the aforementioned Portsmouth, OH MSA.

Table 3.2 Population Changes

MSA	July 1, 2007	July 1, 2000	%Δ 00-07
Bozeman, MT	87,359	68,363	27.8%
Daphne-Fairhope-Foley, AL	171,769	141,364	21.5%
Las Cruces, NM	198,791	175,013	13.6%
Columbia, MO	162,314	146,029	11.2%
Wausau, WI	129,958	125,908	3.2%
Anniston-Oxford, AL	113,103	111,353	1.6%
Fairmont, WV	56,728	56,508	0.4%
St. Joseph, MO-KS	123,339	123,978	-0.5%
Greenville, OH	52,205	53,290	-2.0%
Wichita Falls, TX	148,148	151,585	-2.3%
Parkersburg-Marietta-Vienna, WV-OH	160,656	164,452	-2.3%
Charleston-Mattoon, IL	61,853	64,345	-3.9%
Portsmouth, OH	75,958	79,100	-4.0%

Respondents were also asked to indicate what kinds of services they provide. Table 3.3 shows these findings. Seven of the agencies indicated they provide both fixed-route and demand-responsive service while two agencies in Greenville, OH, and Charleston, IL, provide only demand-responsive service. Agencies in St. Joseph, MO, Wichita Falls, TX, and Robertsdale, AL, all offer either route deviation and/or flexible transit service.

Table 3.3 Transit Services Provided

Agency	Fixed-Route	DR/Paratransit	Intercity Van	Other
Greenville, OH		X		
Charleston, IL		X		
Fairmont, WV	X	X		
Bozeman, MT	X	X		
Portsmouth, OH		X		
Parkersburg, WV	X	X		
Anniston, AL	X	X		
St. Joseph, MO	X			Route Deviation
Wausau, WI	X	X		
Wichita Falls, TX				Route Deviation
Columbia, MO	X	X		
Robertsdale, AL		X		Flexible Route
Las Cruces, NM	X	X		

Table 3.4 tells the amount of services provided for each respondent. Fairmont, WV, offers the most fixed-route service with 16-20 fixed routes operated while St. Joseph, MO, and Robertsdale, AL, offer the most demand-responsive service with more than 15 vehicles in operation. Agencies in Wausau, WI, Columbia, MO, and Las Cruces, NM, offer a nice mix of fixed-route and demand-responsive services with all agencies operating at least six fixed-routes and six demand responsive vehicles to serve their communities. Greenville, OH, Charleston, IL, Portsmouth, OH, and Robertsdale, AL, do not provide any standard fixed-route service, but they all operate at least 11 demand-responsive vehicles providing a combination of flexible fixed-route services and traditional demand-responsive service.

Table 3.4 Amount of Services Operated

Agency	Fixed- Routes Operated	Demand-Responsive Buses Operated
Greenville, OH	0	11-15
Charleston, IL	0	11-15
Fairmont, WV	16-20	6-10
Bozeman, MT	1-5	6-10
Portsmouth, OH	0	11-15
Parkersburg, WV	6-10	1-5
Anniston, AL	1-5	1-5
St. Joseph, MO	6-10	> 15
Wausau, WI	6-10	6-10
Wichita Falls, TX	6-10	1-5
Columbia, MO	11-15	6-10
Robertsdale, AL	0	> 15
Las Cruces, NM	11-15	11-15

Transit agencies were asked to indicate how they usually find out about new developments being planned in their communities. Table 3.5 shows these responses. News media is how agencies usually become aware of new developments in the communities of Charleston, IL, Fairmont, WV, Parkersburg, WV, and Wausau, WI. The majority of other transit agencies indicated they usually find out about new developments from their local government officials while Portsmouth, OH, indicated that word of mouth was their primary resource.

Table 3.5 Future Developments

Agency	News Media	Local Government	Other
Greenville, OH		X	
Charleston, IL	X		
Fairmont, WV	X		
Bozeman, MT		X	
Portsmouth, OH			Word of Mouth
Parkersburg, WV	X		
Anniston, AL		X	
St. Joseph, MO		X	
Wausau, WI	X		
Wichita Falls, TX		X	
Columbia, MO		X	Design Development Approval Process
Robertsdale, AL		X	
Las Cruces, NM		X	MPO Monthly Meetings

The level of communication between city planners and transit agencies was also questioned. Table 3.6 shows the results from these questions. Only Bozeman, MT, indicated they receive formal indication that a new development is being planned in their community. Informal communication was specified to be present in Anniston, AL, St. Joseph, MO, Wichita Falls, TX, Columbia, MO, and Las Cruces, NM. All other respondents indicated that either rare or no communication occurred between city planners and transit agencies with respect to new developments.

Table 3.6 Level of Communication

Agency	Formal	Informal	Rare	None
Greenville, OH			X	
Charleston, IL			X	
Fairmont, WV			X	
Bozeman, MT	X			
Portsmouth, OH				X
Parkersburg, WV			X	
Anniston, AL		X		
St. Joseph, MO		X		
Wausau, WI				X
Wichita Falls, TX		X		
Columbia, MO		X		
Robertsdale, AL			X	
Las Cruces, NM		X		

Table 3.7 shows the transit support strategies used by agencies to integrate transit friendly ideas within new developments. Eight of the responding agencies indicated they are involved in preparing long-range land-use planning within their community. This usually involves advising planners as to the infrastructure needs that accommodate transit vehicles and routes. We also asked if agencies had a primary communication method they used to incorporate their ideas. Five respondents indicated they used methods including meetings, planning activities, personal networks, and written reports.

Table 3.7 Transit Support Strategies

Agency	Land-use Planning	Agency Communication Method	Communication Method
Greenville, OH	No	No	
Charleston, IL	Yes	Yes	Meetings or Planning Activities
Fairmont, WV	No	No	
Bozeman, MT	Yes	Yes	Personal Networks and Planning Activities
Portsmouth, OH	No	No	
Parkersburg, WV	No	No	
Anniston, AL	Yes	No	
St. Joseph, MO	Yes	No	
Wausau, WI	No	No	
Wichita Falls, TX	Yes	No	
Columbia, MO	Yes	Yes	Meetings or Planning Activities
Robertsdale, AL	Yes	Yes	Personal Networks, Written Reports and Planning Activities
Las Cruces, NM	Yes	Yes	Meetings or Planning Activities

The integration of transit service within developments was also questioned. Table 3.8 shows the level of coordination and demand present within the new developments of respondents. Bozeman, MT, and Columbia, MO, were the only agencies that indicated transit service had been coordinated within all of the new developments in their communities. Robertsdale, AL, indicated that some coordination within new developments had occurred. Only four respondents indicated that sufficient demand was present for fixed-route service in new developments. This further establishes the findings of previous research that communities are building at such low densities that fixed-route transit service is not a feasible option for agencies to pursue.

Table 3.8 Integrating Service

Agency	Transit Coordination within New Developments	Sufficient Demand in New Developments
Greenville, OH	None	No
Charleston, IL	None	No
Fairmont, WV	None	No
Bozeman, MT	All	Yes
Portsmouth, OH	None	No
Parkersburg, WV	None	No
Anniston, AL	None	No
St. Joseph, MO	None	No
Wausau, WI	None	Yes
Wichita Falls, TX	None	No
Columbia, MO	All	Yes
Robertsdale, AL	Some	No
Las Cruces, NM	None	Yes

Open-ended questions focused on transit service amenities that are generally lacking in new developments and design aspects of new developments that hinder the effectiveness of transit service. Sidewalks, bus pull outs, and curb cuts were the most cited amenities lacking. A lack of operational funding was also found to be a major problem. It was stated often that even if proper amenities were included in new developments, agencies could not afford to run service due to lack of resources. Cul-de-sacs and insufficient right-of-way were the main design aspects of new developments found to hinder transit service. Several agencies stated that the use of cul-de-sacs often does not include proper through streets to main arterial roads. Building streets too narrow for sufficient bi-directional bus traffic with proper bus stops were the main right-of-way concerns. More than half of respondents indicated that if there was greater interaction during the planning stage between transit and developers, many of these issues could be mitigated.

3.2 Summary

The major themes found throughout the survey involved a lack of communication and funding. Several respondents indicated they only find out about new developments through local media outlets. Only one respondent indicated it has a formal communication network with its local land-use developers and planners. Also, only three responding agencies indicated that service was incorporated at some level within new communities. However, this was found to be more of a financial issue than an amenity issue. Finally, most respondents indicated that even if the correct amenities and funding were available for fixed-route service within a new development, low demand for ridership would make service infeasible anyway.

4. SMALL URBAN COMMUNITY CASE STUDIES

Case studies were developed in four small urban communities throughout the United States. Figure 4.1 shows the locations of these communities. These specific communities were chosen because they responded to the questionnaire, were located in different sections of the country, and had regional characteristics that varied by location. For example, Las Cruces, NM, is an international border community with Mexico, Columbia, MO, is located in the heartland of America, and Wausau, WI, represents the Upper Midwest and its volatile climate, and Parkersburg, WV, is a border town with the state of Ohio. Many other unique aspects of these communities are mentioned in the following discussion.

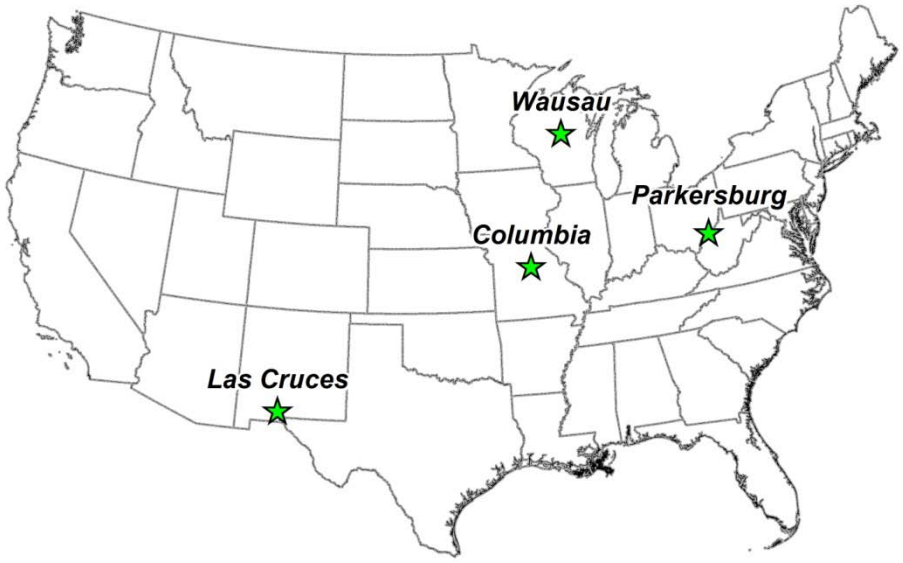


Figure 4.1 Case Study Locations

4.1 Las Cruces, NM

Las Cruces is located in south-central New Mexico (Figure 4.2). It is the second-largest city in the state and is located in the center of an agricultural region irrigated by the Rio Grande. Las Cruces is the county seat of Dona Ana County and is also the home of New Mexico State University (NMSU). NMSU is New Mexico's only land grant university with a student enrollment of more than 16,000 students.

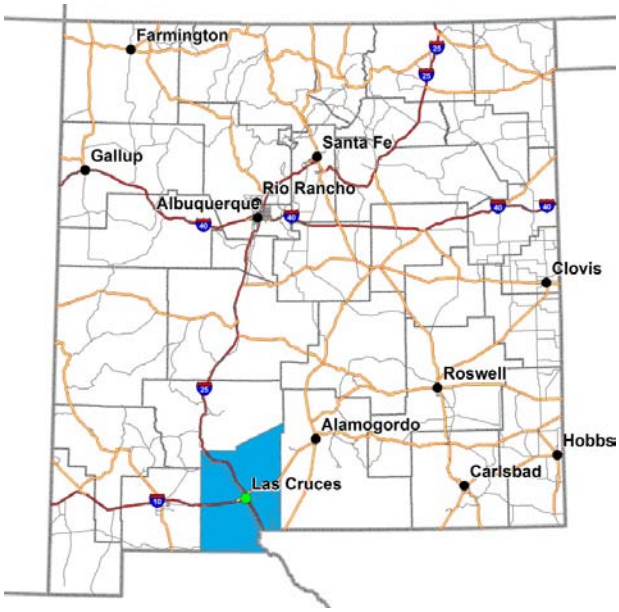


Figure 4.2 Las Cruces, NM

Unlike many cities its size, Las Cruces lacks a true central business district. This is due to a large urban renewal project in the 1960s that tore down a large portion of the original downtown area. The modern city center of Las Cruces is the rapidly developing eastside area running north and south along Telshor Boulevard and east and west along Lohman Avenue. Las Cruces' only shopping mall and a variety of retail stores and restaurants are located in this area. The historic downtown of the city includes a six-block stretch which was closed off in 1973 to form the "downtown mall" shopping area. The downtown mall has a farmers market where a variety of foods and cultural items can be purchased from small stands set up by local entrepreneurs. A new city master plan was adopted in 2005 calling for the reopening of narrow lanes of two-way traffic in the downtown area. This plan has drawn criticism from people who feel the project is too costly and from others who enjoy the aesthetics of the current layout (City of Las Cruces 2009).

The population density in Las Cruces was nearly 1,500 people per square mile as of the 2007 census estimates. Table 4.1 shows economic and demographic characteristics for Las Cruces compared to national averages. The labor force included 63% of those 16 years and older able to work in the community. Mean travel time to work was nine minutes less than the national average indicating a lack of traffic congestion during busy work commute times. The high school graduation rate was slightly less than the U.S. average while the percentage of those holding a bachelor's degree or higher was slightly greater than the U.S. average. This is probably due to New Mexico State University's location within the community and the numerous faculty and staff holding advanced degrees. The disability status was slightly lower in Las Cruces compared to the national average as well.

Table 4.1 Las Cruces 2007 Economic and Demographic Characteristics

Characteristic	Estimate	Percent	U.S.
Population	91,294		
Labor force	44,857	63%	65%
Mean travel time to work	16 min		25 min
High school graduate		82%	84%
Bachelor's degree or higher		30%	27%
Disability status	10,726	13%	15%
Median HH income	$35,625		$50,007
Per capita income	$18,021		$26,178
Families below poverty level		17%	10%
Individuals below poverty level		23%	13%
Owner-occupied housing	19,435	55%	67%
Renter-occupied housing	15,773	45%	33%
Monthly ownership costs	$1,048		$1,427
Under 5 years	6,633	7%	7%
18 years and over	68,441	75%	75%
65 years and over	11,731	13%	12%

U.S. Census (2007)

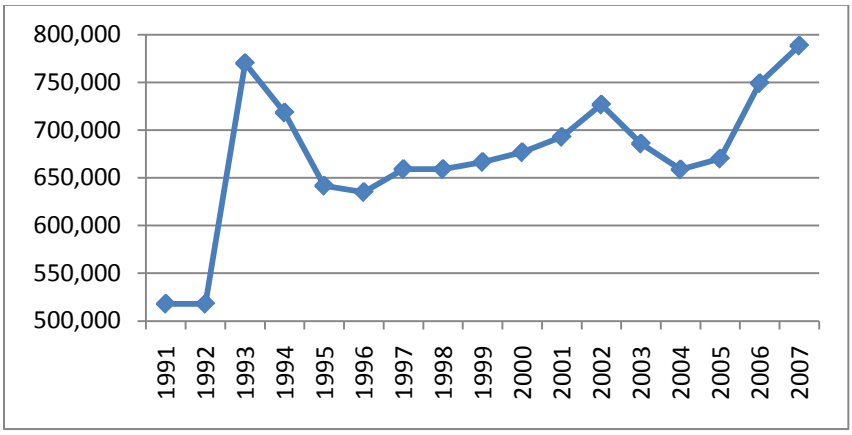
Economic characteristics in Las Cruces indicated that local incomes are substantially lower than the national averages. The median household income in Las Cruces is almost $15,000 less than the national average while the per capita income is more than $8,000 less than the U.S. average. Also, 17% of families and 23% of individuals live below the poverty level in Las Cruces compared to 10% and 13% nationally. These numbers where studied by the University of New Mexico Bureau of Business and Economic Research (2008). They found that although Las Cruces is the fastest growing community in New Mexico, there are issues city official and residents should be concerned about. The city's growth has not been accompanied by the economic development found in the state's other metropolitan areas including Albuquerque, Rio Rancho, Santa Fe, and Farmington. The study concluded that the structure of Las Cruces' economy remains overly dependent on low-wage service industries such as retail, accommodations, and food services. Also, the Las Cruces community lacks a significant presence in higher-wage industries such as manufacturing, transportation, professional, and management services. As a result, average annual incomes in Las Cruces are very low compared to national averages.

Housing statistics in Las Cruces also underscore a low-income community. Owner-occupied housing accounts for 55% of residents living in the community while 45% reside in renter-occupied housing. The national averages for owner-occupied housing and rental housing are 67% and 33%, respectively. Monthly ownership costs, however, for homeowners who have a mortgage are nearly $400 dollars below the national average. This highlights a characteristic of a low-income community where housing is relatively affordable, but nearly half of all residents still choose to live in renter-occupied housing.

The age makeup is also illustrated in Table 4.1. These statistics fall very close to the national averages. Residents under 5 years of age represent 7% of the community, those 18 years and older make up 75% of the community, and those 65 years old and over make up 13% of the community. This is only 1% more than the national average of 12% of individuals who are 65 years old and over who live in urban areas.

4.2 RoadRUNNER Transit

RoadRUNNER Transit is the public transportation system serving the city of Las Cruces, NM. Fixed-route service began in 1986 when RoadRUNNER consisted of four routes, one of which served NMSU. Two more routes were added in 1988 and again in 1991 as the popularity of the system continued to grow. Since its inception, the fixed-route system has operated on a pulsed or timed-transfer schedule, with one-way loop routes designed to maximize coverage. Until 1994, all routes operated on 30-minute headways. Increased traffic congestion and lengthening of routes caused the timed-transfer system to become unreliable, and as a result the headways were increased to 40 minutes. When the headways increased, ridership suffered (Figure 4.3). However, ridership has steadily increased since 2004. Many new buses were put into service in 2004 while gas prices have risen substantially as well, making the system more attractive (Transit Strategic Plan 2007).



FTA (2007)

Figure 4.3 Las Cruces fixed-route ridership

In 2006, a new bi-directional route network was designed for the transit system. The transit agency felt that expanding upon the current service plan in its existing form would be costly and impractical, so the bi-directional (two-way) route network was adopted. RoadRUNNER Transit sees the bi-directional route network as easily scalable in that it enables an increase or decrease of service merely by adding an additional bus at certain times of the day. With the old looped route system, it would be nearly impossible to increase the headways and still serve the entire area of the looped route. Frustrating for many customers were looped routes that resulted in some trips only being available in one direction. The new bi-directional routes increase the number of origins and destinations through its timed connection between the two transfer points and allows for the ability to board a bus at the middle point of every route every 30 minutes (Transit Strategic Plan 2007).

One of the most pressing challenges RoadRUNNER transit faces is the continued population growth of Las Cruces itself. As shown in the previous chapter, the city's micropolitan population increased by almost 14% in only seven years, between 2000 and 2007, while annexations have increased the land area by nearly 10% in the same time frame. As a result, developing areas of the community are not getting fixed-route service, although eligible citizens can still use paratransit service within city limits. This has put a tremendous strain on RoadRUNNER's paratransit service as ridership has increased by more than 35% over the past 10 years. Paratransit service is more convenient than fixed-route service because it is curb-to-curb and eliminates the need to walk to the bus stop. This feature also makes it significantly more expensive. In 2005, RoadRUNNER transit found that the cost of providing one trip on fixed-route service was $2.93, while the cost of providing one trip on paratransit was more than four times as high at $12.71 (Transit Strategic Plan, 2007). While the cost is significant, demand continues to rise, and this has resulted in many seniors being unable to use the service during peak demand periods.

New Mexico state law also prohibits the collection of impact fees for transit from new developments, so if new developed areas are to be served, the entire community will have to pay for service, not just the new development. The types of developments that are being built are largely unaccommodating to transit as well. In order for fixed-route transit to be cost-effective, residential densities of 7 to 15 dwelling units per acre are typically necessary (Downs 2004). Most new developments in the Las Cruces community are typically built at 4 to 5 dwelling units per acre. Many new developments are also lacking pedestrian-friendly amenities such as wide sidewalks, buffers for traffic, and well-connected pedestrian routes. Las Cruces would like to create routes within one-fourth mile of new major residential areas, but the city currently has few policies to encourage this kind of transit-friendly development (City of Las Cruces 2009).

Figure 4.4 illustrates the population per square mile in the Las Cruces region. Darker colors in the figure represent denser populations. The fixed-route system is also represented as an overlay on the map. The current fixed-route system is unable to serve a large portion of the total community. As mentioned earlier, the community has grown rapidly over the past 10 to 20 years and service has been unable to keep pace. Census block points are represented as black dots within the map, and the denser the population of a given area, the denser the cluster of census block points. Clustered areas of census block points to the northeast along U.S. Highway 70 and select areas along Interstates 10 and 25 indicate more densely populated areas. However, the vast majority of points are not densely clustered at all, indicating that developments containing the previously stated 4 to 5 dwelling units per acre are the norm for the area.

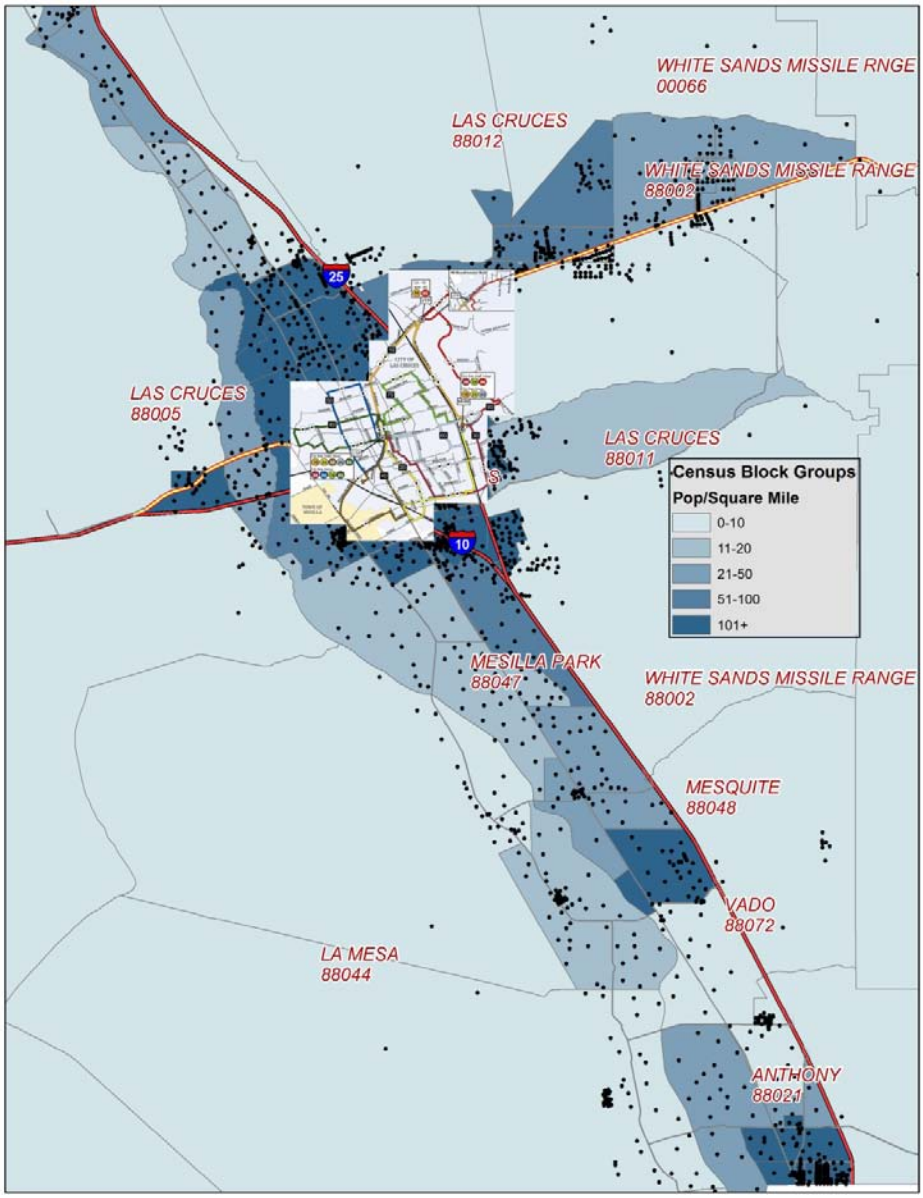


Figure 4.4 Las Cruces metro area and fixed-route system

4.3 Columbia, MO

Columbia is located in central Missouri (Figure 4.5). It is the fifth largest city in the state with a population of just over 100,000 residents as of 2008. Columbia is the county seat of Boone County, and is also the home of the University of Missouri. Over half of Columbians possess a bachelor's degree and over a quarter hold graduate degrees, making it the 13th most highly educated municipality in the United States. The town is politically liberal and often known by the nickname "The Athens of Missouri" (Money 2008).

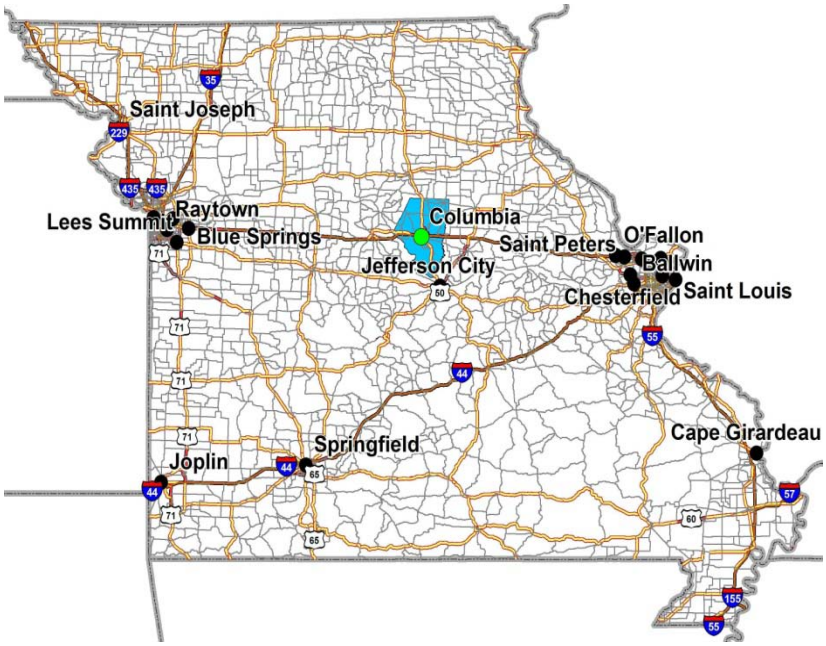


Figure 4.5 Columbia, MO

In 2006, Columbia embarked on a plan to manage the continued growth as the community population continues to grow. The city is growing primarily toward the Missouri River in southwest Boone County. The downtown district is a cultural center that has maintained its status throughout the years and is undergoing significant development, both residentially and commercially. Downtown comprises an area of approximately one square mile surrounded by the University of Missouri on the south, Columbia College on the north, and Stephens College to the east. The area also serves as Columbia's financial and business district. The city's most dense commercial areas are primarily located along Interstate 70, U.S. Route 63, Stadium Blvd, Grindstone Blvd., and the downtown area (City of Columbia 2009).

Table 4.2 illustrates the economic and demographic characteristics for Columbia compared to national averages. The labor force included 70% of those 16 years and older able to work in the community. Mean travel time to work was nine minutes less than the national average, indicating that traffic congestion is of minimal concern during work commutes. The high school graduation rate was 10% higher compared to the national average while the percentage of those holding a bachelor's degree or higher was double the national average. This is likely due to the University of Missouri and its work force. The disability status of residents was 3% lower than the national average as well.

Table 4.2 Columbia 2007 Economic and Demographic Characterstics

Characteristic	Estimate	Percent	U.S.
Population	93,863		
Labor force	54,275	70%	65%
Mean travel time to work	16 min		25 min
High school graduate		94%	84%
Bachelor's degree or higher		54%	27%
Disability status	10,123	12%	15%
Median HH income	$40,178		$50,007
Per capita income	$23,684		$26,178
Families below poverty level		11%	10%
Individuals below poverty level		20%	13%
Owner-occupied housing	19,827	49%	67%
Renter-occupied housing	20,328	51%	33%
Monthly ownership costs	$1,181		$1,427
Under 5 years	5,898	6%	7%
18 years and over	75,879	81%	75%
65 years and over	8,368	9%	12%

U.S. Census (2007)

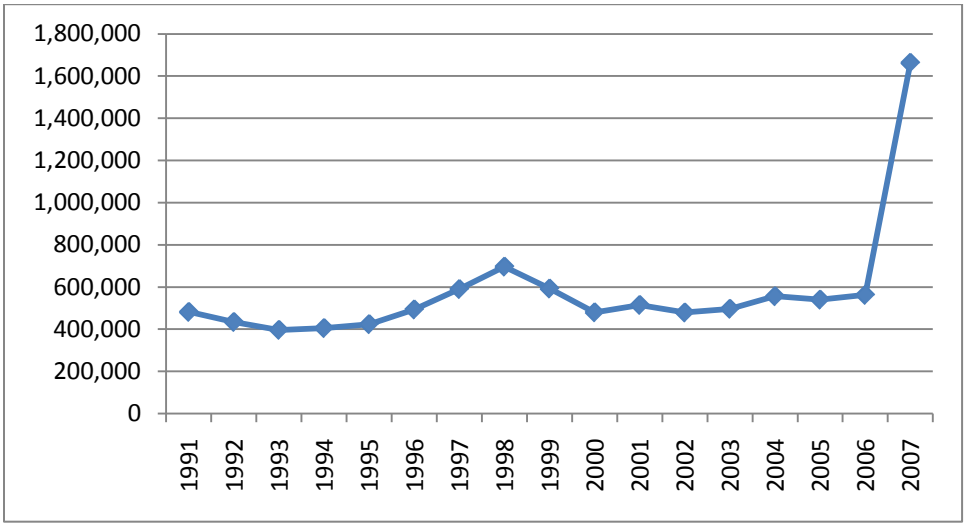
Economic characteristics show that Columbia incomes are noticeably below the national averages. The median household income in Columbia is almost $10,000 less than the national average while the per capita income is about $2,500 less than the U.S. average. Also, 11% of families and 20% of individuals live below the poverty level in Columbia compared to 10% and 13% nationally. A recent study by the University of Missouri studied these characteristics while comparing the economy of Columbia to 24 comparable communities around the country (Waters III 2009). Columbia ranked first in retail and sixth in manufacturing job growth from 2002-2006. Columbia's retail strength produces a lot of sales tax revenue for the city, but the average annual compensation for a Missouri retail job is only $21,568. Columbia ranked 17th in technology job growth while these positions earn a state average of $66,505 annually. Thus, more high-tech jobs are needed to raise the economic characteristics of Columbia relative to its peer communities. In the past 10 years, competent development officials have been added to the University of Missouri's staff and are pursuing big-dollar research and development grants. The research concluded that high-tech jobs will not increase overnight, but the growth should increase throughout the next five to 10 years.

Housing statistics for Columbia highlight a large college and lower-income community. Owner-occupied housing accounts for just 49% of residents living in the community while 51% reside in renter-occupied housing. The national averages for owner-occupied housing and rental housing are 67% and 33%, respectively. It is very unique that a community the size of Columbia would have more of its residents renting than owning, even for a large college community. The monthly ownership cost of owning a house in Columbia is almost $250 less than the national average. So while the cost of ownership is relatively inexpensive, most still choose to reside in renter-occupied housing.

The age makeup of Columbia is also shown in Table 4.2. Young and middle-age adults account for 81% of community residents. This is 6% higher than the national average of 75% and quite typical for a college community. Those over 65 years of age in Columbia account for roughly 9% of residents while the national average is 12%. Finally, 6% of residents are under 5 years old which is 1% less than the national average of 7%.

4.4 Columbia Transit

Columbia Transit is the public transportation system serving the community of Columbia, MO. In 1965, the city took over operation of the system. System improvements implemented by Columbia Transit to better serve the growing community have included route enhancements, an emphasis on customer service, and policy enforcements. The system is constantly experiencing growth in service and technology. Recent developments include the expansion and refurbishment of the Wabash Bus Station, a rail depot constructed in 1910; the addition of routes along the growing student housing complexes in south Columbia; and the introduction of new fare boxes and fare cards, and electronic destination signs. Ridership exploded in 2007 (Figure 4.6). This was due to the implementation of many of the previously mentioned items and the University of Missouri shuttle routes (Columbia Transit & Paratransit 2009).



FTA (2007)

Figure 4.6 Columbia fixed-route ridership

Columbia Transit operates six fixed-routes Monday through Saturday. All fixed-routes begin and end at the Wabash Bus Station operating on an orbital-pulse schedule. Buses operate on one route throughout the day without changing routes at any time. Buses operate from 6:25 a.m. to 6:25 p.m. Monday through Wednesday, from 6:25 a.m. to 10:25 p.m. Thursday and Friday, and from 10 a.m. to 7:30 p.m. on Saturday. Peak service is offered between 6:25-9:45 a.m. and 2:25 p.m.-6:25 p.m. Monday through Friday. At peak service times, two buses operate in both directions. Columbia Transit began operating an independent route system for its Saturday service in August 2007. Also, buses operate without peak service on Saturdays meaning one bus per route operates all day long (Columbia Transit & Paratransit 2009).

Columbia Transit has been able to meet many of the challenges of a growing community by altering routes and service times. Contracting service with the University of Missouri has been its most promising endeavor. Columbia Transit provides the U of M with an extensive shuttle system to students and employees. The majority of the U of M routes are free to students while some select routes do collect fares. The routes that collect fares are usually contracted by student housing complexes, and residents of those complexes often receive free bus transportation along the route where they live. Funding for the majority of the shuttle system is collected through service fees charged to residential students. Operation times vary from route to route and some offer late night service. All routes for the U of M shuttle system operate from fall semester through spring semester and do not operate during the summer. This system currently accounts for almost half of Columbia Transit's annual ridership. Unlike the standard fixed-route system, routes do not begin and end at the Wabash Bus Station (Parking & Transportation Services 2009).

New developments in Columbia must go through a design development approval process. Growth plans cannot be approved unless there is a mutual agreement reached by city departments, including transit. While transit is involved with planning and development, it is not funded through new developments. Thus, no routes to new developments have been established during the past 10 years even though all of the amenities (curb cuts, sidewalks, etc.) are required within new developments.

Figure 4.7 shows the population density in people per square mile in the Columbia region. Darker colors represent denser populations. The Columbia fixed-route system is represented as an overlay in the map. The current system serves the downtown area well, but is unable to serve the extended community and its new developments. Census block points are represented as black dots within the map, and the denser the population of a given area, the denser the cluster of census block points. The largest section of clustered census block points not served by Columbia Transit is located south of Interstate 70 and west of U.S. Highway 63. A lot of new development has occurred in recent years along this corridor, but funding has been unavailable for transit to serve the location. Beyond this area, new developments have been built primarily at seven or fewer dwelling units per acre, making fixed-route transit service infeasible even if additional funding were available.

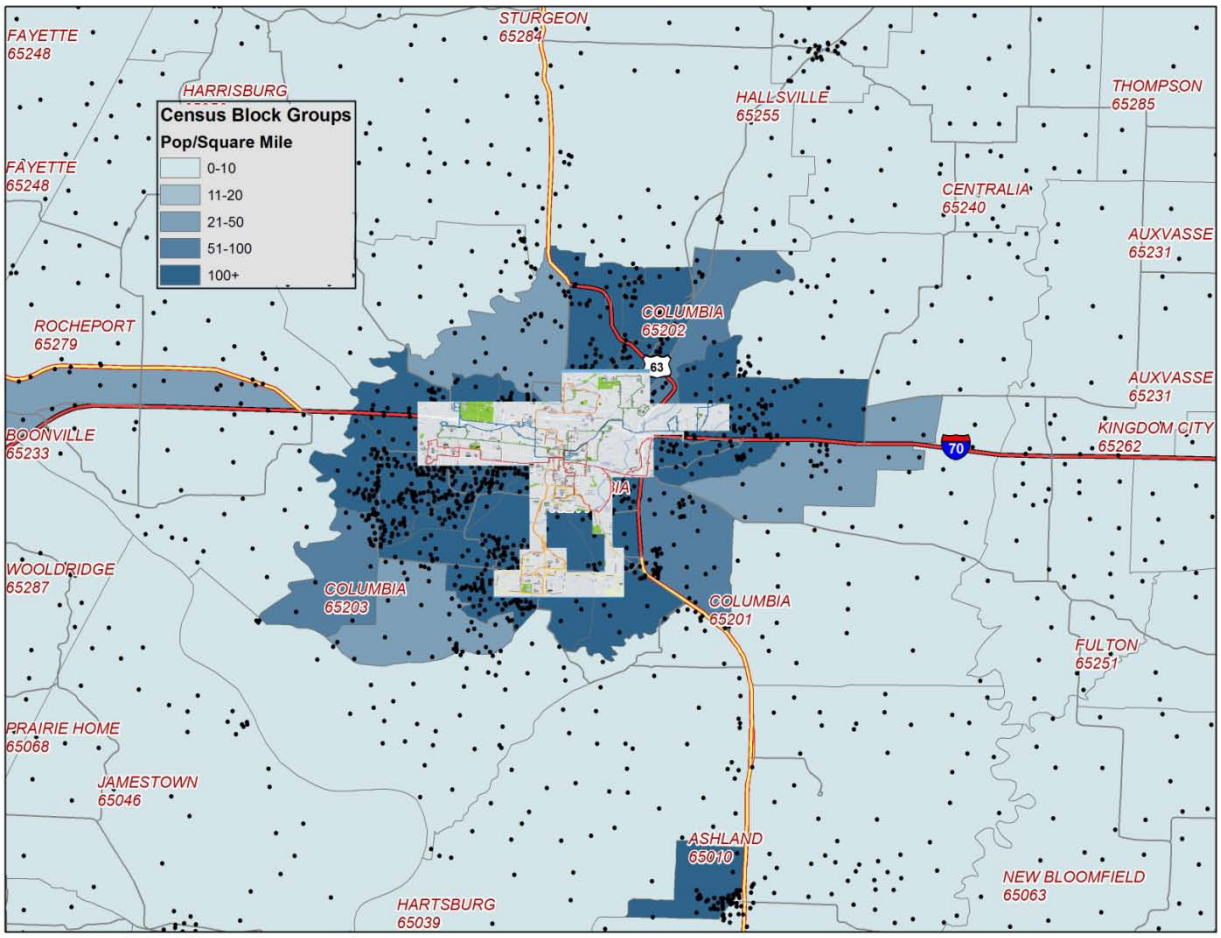


Figure 4.7 Columbia metro area and fixed-route system

4.5 Wausau, WI

Wausau is located in central Wisconsin (Figure 4.8). It is the county seat of Marathon County with an economy based largely on manufacturing. Wausau is also the former headquarters of Wausau Insurance, which is now Liberty Mutual. Its climate sees dramatic temperature swings between the seasons as the January average temperature is nearly 65 degrees lower than the average in July (City of Wausau 2009).

Figure 4.8 Wausau, WI

Wausau's favorable location on the Wisconsin River was initially responsible for the city's survival. The region's image was reformed in the 1950s by the Wausau Insurance Companies. Its logo was the downtown Milwaukee Road Railroad Depot, which was set against the backdrop of the community's skyline. This company put Wausau in the minds of people across the country. In 1983, the Wausau Center shopping mall opened and still exists today. During the 1990s, the city began purchasing and developing its west industrial park to meet the needs of its expanding economy. In the late 1990s, Wausau began to tear down a number of decrepit buildings downtown. This created what is today known as the 400 Block, an open, grassy block with paved sidewalks. The square is a focal point for summer festivals and serves as a meeting area within the city's attractive downtown district (City of Wausau 2009).

Table 4.3 shows the economic and demographic characteristics for Wausau compared to national averages. The labor force included 67% of those 16 years and older able to work in the community. Mean travel time to work was 10 minutes less than the national average indicating a lack of congestion during peak travel times. The high school graduation was slightly higher than the national average while the percentage of those holding a bachelor's degree or higher was less than the U.S. average. This is probably due to there being no local four-year college in the community. Therefore, locals who want to pursue a bachelor's degree are forced to look elsewhere and many likely do not return to Wausau as permanent residents. The disability status of Wausau residents was similar to that of the national average as well.

Table 4.3 Wausau 2007 Economic and Demographic Characteristics

Characteristic	Estimate	Percent	U.S.
Population	36,976		
Labor force	19,961	67%	65%
Mean travel time to work	15 min		25 min
High school graduate		85%	84%
Bachelor's degree or higher		23%	27%
Disability status	4,970	15%	15%
Median HH income	$41,296		$50,007
Per capita income	$25,185		$26,178
Families below poverty level		7%	10%
Individuals below poverty level		10%	13%
Owner-occupied housing	10,271	63%	67%
Renter-occupied housing	5,993	37%	33%
Monthly ownership costs	$1,090		$1,427
Under 5 years	2,078	6%	7%
18 years and over	28,795	78%	75%
65 years and over	6,165	17%	12%

U.S. Census (2007)

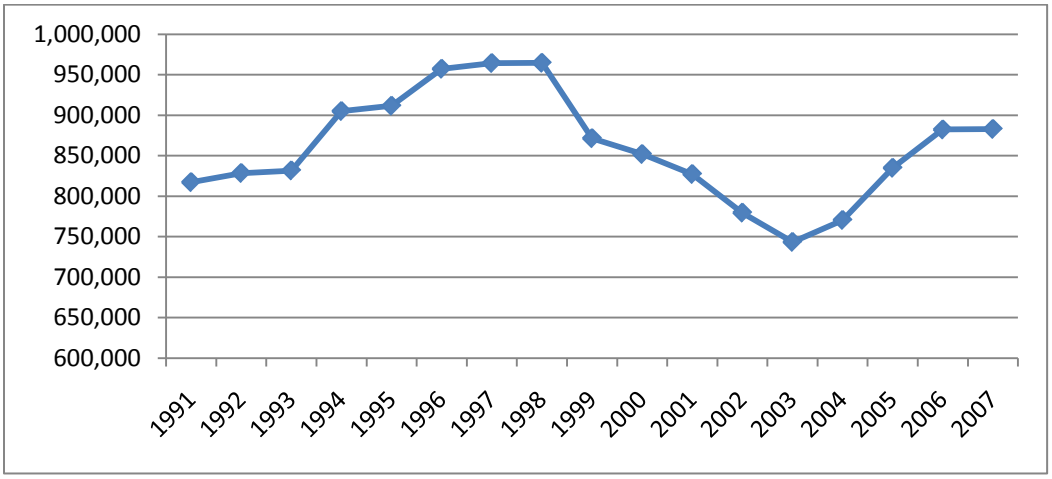
Economic characteristics in Wausau indicate that local incomes are lower compared to national averages. The median household income in Wausau is nearly $9,000 less than the national average while the per capita income is $1,000 less than the U.S. average. This conflicts, however, with the poverty statistics as just 7% of families and 10% of individuals live below the poverty level in Wausau compared to 10% and 13% nationally. This is likely due to the fact that the cost of living in Wausau is substantially lower than that in larger metropolitan areas, and therefore lower family and individual incomes in the community are marginalized.

Housing statistics in Wausau also highlight its low cost of living. Although median household incomes in Wausau are well below national averages, 63% of residents live in owner-occupied housing, only 4% lower than the national average, while only 37% live in renter-occupied housing. Also, monthly ownership costs for owning a home in Wausau are only $1,090 per month, more than $300 below the U.S. average.

Finally, the Wausau community age makeup is also illustrated in table 4.3. Residents under 5 years of age make up 6% of the community, those 18 years and older account for 78% of residents, and those 65 years old and over represent 17% of residents. The elderly population (65 years and older) is the only category showing a significant difference compared to national averages. This shows that Wausau is an aging community that will likely see heightened transportation needs for its elderly citizens in the years ahead.

4.6 Metro Ride

Metro Ride is the public transportation system serving the city of Wausau, WI. It also has a successful local partnership with the towns of Rothschild, Schofield, and Weston. Metro Ride operates a hub and spoke route structure. Routes originate at hubs including the Metro Ride Transit Center in downtown Wausau and Shopko in Rothschild. Ridership has remained relatively steady throughout recent years (Figure 4.9). The system has seen, however, an increase of over 100,000 fixed-route riders from 2003 to 2007.



FTA (2007)

Figure 4.9 Wausau fixed-route ridership

Metro Ride operates eight fixed-routes which run at 30-minute intervals, and also a route to Rothschild and Schofield which runs at 60-minute intervals. Metro Ride also operates a route in Weston which runs on 30-minute intervals and provides transfers in Rothschild. They have coordinated services across local boundaries for many years including partnering with Marathon County to access additional state and federal funding for both parties, and they jointly contract with them for services as well. They also partner with the Wausau School District to provide additional transportation service for students while reducing the cost of their operation to the City of Wausau. In 2008, over 300,000 students rode Metro Ride to and from their school of choice. Metro Ride is currently in the planning process, considering a multi-county transportation program designed to further increase coordination of transportation services in the Wausau community and beyond (Metro Ride Executive Report 2009).

With respect to new developments, Metro Ride indicated there is a lack of sidewalks and through streets which makes providing service to these areas difficult. Also, many new facilities are situated considerable distances from the street, which makes door-to-door service impossible. Metro Ride also indicated that there is no communication between them and new development planners, and that for the design of feasible transit service, they must be involved in the planning stages for all developments, both residential and business.

Figure 4.10 illustrates the population per square mile in the Wausau region. The darker the color in the figure, the denser the population signified in that segment of the community. The fixed-route system is also represented as an overlay on the map. Obviously, the fixed-route system is unable to serve a large portion of the community. Even the segments with population densities of 100 people per square mile or greater, represented by the darkest shade, are relatively underserved. Census block points are represented

as black dots within the map. The denser areas of population in Wausau and its surrounding area are shown with denser dot patterns. Highly clustered areas just east of the fixed-route system and just northeast of the fixed-route system off of Interstate 39 may be feasible for expanded fixed-route service in the future. Many corridors along the major highways, however, are sparsely populated with new housing developments built at four to five dwelling units per acre. These are very similar growth patterns compared to other communities analyzed in this research.

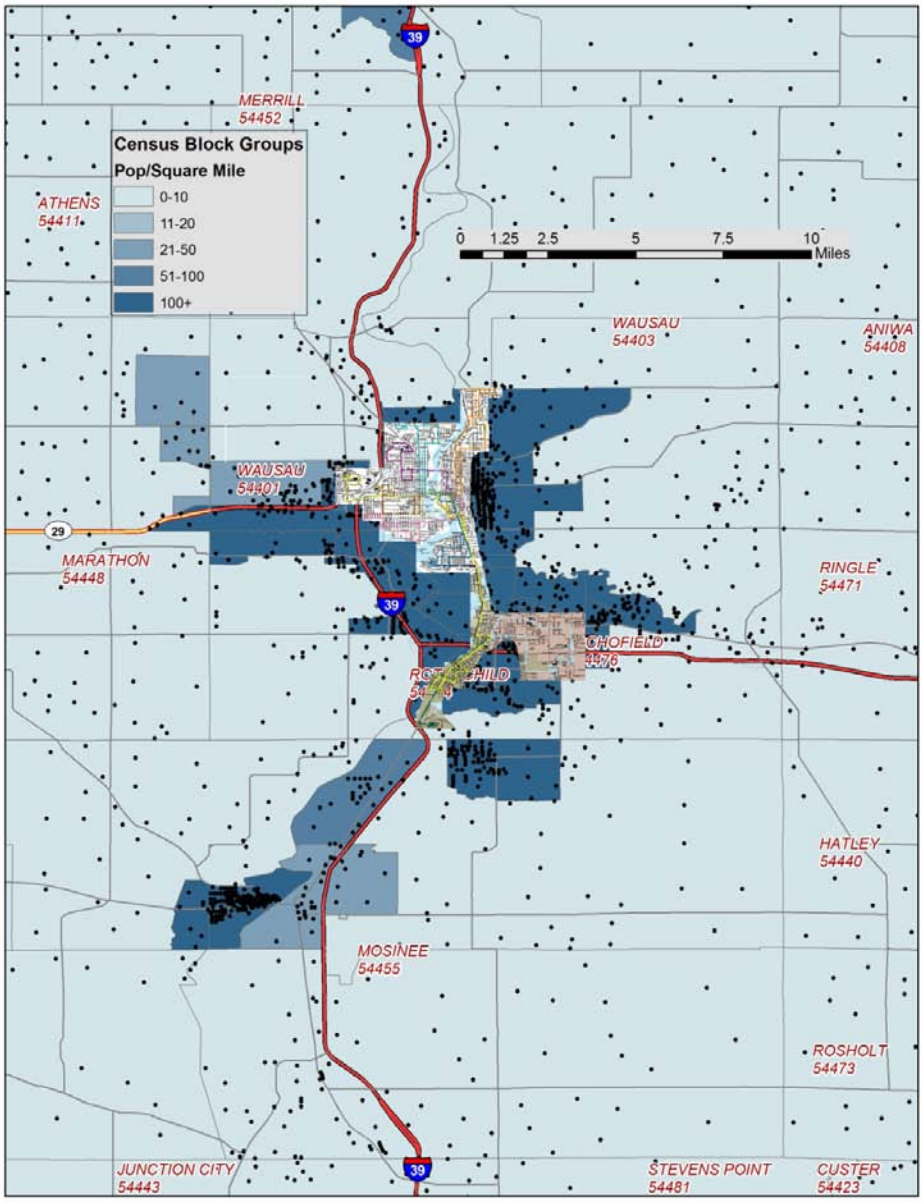


Figure 4.10 Wausau metro area and fixed-route system

4.7 Parkersburg, WV

Parkersburg is located at the convergence of the Ohio and Little Kanawha Rivers in western West Virginia (Figure 4.11). It is the third largest city in the state and is also the county seat of Wood County. Parkersburg is the largest city in the Parkersburg-Marietta-Vienna Metropolitan Statistical Area. Marietta is located across the Ohio River in Ohio while Vienna is located just north of Parkersburg in West Virginia.

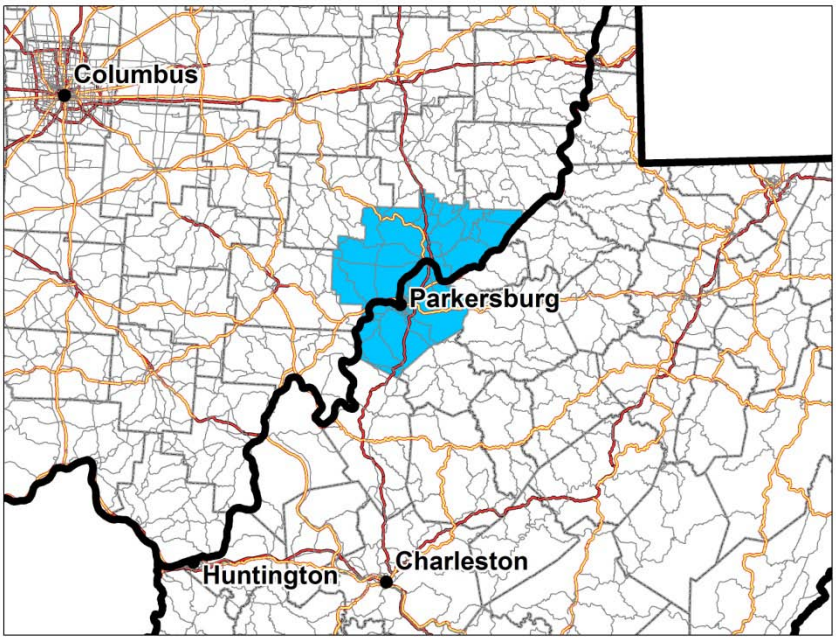


Figure 4.11 Parkersburg, WV

Parkersburg has been home to the U.S. Treasury Department's Bureau of Public Debt since 1957. It is also currently home to the DuPont Company's largest plant in North America. Parkersburg recently completed the renovation of its downtown business district. Projects included an Intermodal Transportation Center, housing developments, acquisition of property for commercial development, and an expansion of the Riverfront Park. The Riverfront Park project included a renovation that allows the docking of large riverboats and will also include an amphitheater, a 1,200-foot promenade, and a picnic area. A 400-vehicle parking garage funded by the Federal Transportation Administration was recently completed as well. Before completion of the parking garage, an estimated 25% of the city's land use was for parking. The garage allows more room for construction of buildings for other uses, as well as a centralized parking location where shuttles can be utilized to move people throughout the downtown area (Pullin 2002).

Table 4.4 shows the economic and demographic characteristics for Parkersburg compared to national averages. The labor force included 54% of those 16 years and older able to work in the community, which was 11% lower than the national average. As expected in a relatively small community, the mean travel time to work was seven minutes less than the national average. The high school graduation rate in Parkersburg was only slightly lower than the national average, but the percentage of citizens holding a bachelor's degree or higher was 13% lower than the U.S. average. This indicates a lack of highly skilled employment opportunities within the community that would necessitate a college degree. Surprisingly, citizens claiming disability status in Parkersburg was 12% higher than the national average. This should

create demand for transit as many disabled Americans are unable to operate their own vehicles and must ride the bus as their means of transportation.

Table 4.4 Parkersburg 2007 Economic and Demographic Characteristics

Characteristic	Estimate	Percent	U.S.
Population	33,099		
Labor force	13,885	54%	65%
Mean travel time to work	18 min		25 min
High school graduate		81%	84%
Bachelor's degree or higher		14%	27%
Disability status	7,909	27%	15%
Median HH income	$30,817		$50,007
Per capita income	$19,452		$26,178
Families below poverty level		20%	10%
Individuals below poverty level		28%	13%
Owner-occupied housing	8,525	60%	67%
Renter-occupied housing	5,716	40%	33%
Monthly ownership costs	$791		$1,427
Under 5 years	1,676	5%	7%
18 years and over	24,959	79%	75%
65 years and over	5,863	19%	12%

U.S. Census (2007)

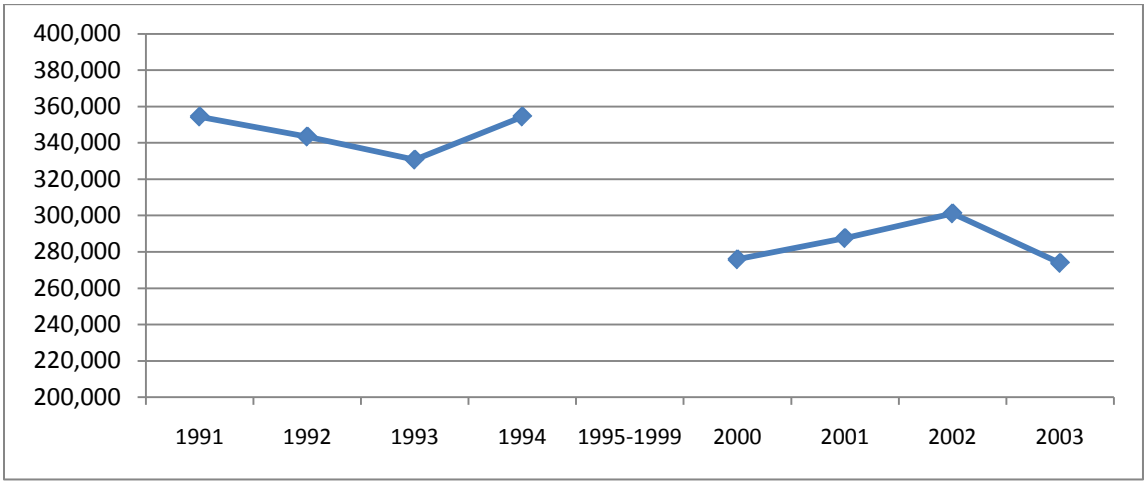
Economic characteristics in Parkersburg show that local incomes, both median household and per capita, are well below national averages. The median household income in Parkersburg is nearly $20,000 less than the U.S. average while the per capita income is almost $7,000 less. Also, 20% of families and 28% of individuals live below the poverty line in Parkersburg. The recent national economic downturn has also had an effect on the Parkersburg community. In June 2009, West Virginia's state unemployment rate jumped to 9.4% while the unemployment rate in Wood County, whose county seat is Parkersburg, was 10.5% (Dunlap 2009).

Housing statistics in Parkersburg illustrate a financially struggling community. Even though monthly home ownership costs are nearly $700 less than the national average, only 60% of occupied housing units are owner-occupied. This is 7% less than the national average. With 40% of housing being rented in Parkersburg, there is definite potential for a rapid decline in population if the local economy continues to struggle because renting residents will not have to sell their homes before relocating.

Finally, age statistics are also shown in Table 4.4. The under 5 years old and 18 years and over statistics align themselves closely with national average while the 65 years and older statistic does not. Nearly one out of every five residents in Parkersburg, 19%, indicated they are 65 years old or older. This shows that Parkersburg has an aging community (very common among towns similar in size and scope), that will be faced with many transportation issues in coming years. Public transportation could play a large role in transporting elderly citizens who may no longer want, or be able, to operate their own personal automobile.

4.8 Easy Rider

Easy Rider is the public transportation system serving the community of Parkersburg, WV. In 1975, a privately owned local bus system terminated all transit service in the area. By the time operations ended, plans were under way to form a local mass transit authority, and in November 1975, the Mid-Ohio Valley Transit Authority (MOVTA) was created. It serves as the board overseeing Easy Rider's service and fare structure. Limited fixed-route ridership information was available on Easy Rider (Figure 4.12). Boardings decreased an average of roughly 60,000 rides per year comparing the ridership between 1991-1994 and 2000-2003. Although exact ridership numbers are not available for the past few years, the system is experiencing growth due to the increase in gas prices and quality of service (Adkins 2008). Also, Easy Rider recently purchased eight new buses with the help of federal stimulus funds. At least six of the current buses in the fleet were said to be past their prime and the newest of the entire fleet was a 1999 model. The eight bus purchase will result in a totally new fleet for the fixed-route system (Seely 2009).



FTA (2007)

Figure 4.12 Parkersburg fixed-route ridership

Easy Rider's fixed-route system has seven routes. These include a combination of circular and bidirectional routes that operate on a flagged route system. Flagged routes do not have specific bus stops. They operate by stopping whenever a rider 'flags' down the bus indicating they need a ride. Timetables within this kind of system are used for reference only.

Figure 4.13 shows the population per square mile in the Parkersburg region. Darker colors in the figure represent denser populations. The fixed-route system is also represented as an overlay on the map. The Parkersburg metro area has grown at very low densities over the past 10 years. Fixed-route service is unfeasible throughout much, if not all, of these new developments. Census block points are represented as black dots within the map, and the denser the population of a given area, the denser the cluster of census block points. Clustered areas of census block points are seen just north of the current fixed-route system in Vienna, and east of the fixed-route system along U.S. Highway 50. These may be areas where Easy Rider can expand its services, but the majority of developments have not been built at densities high enough to expand fixed-route service.

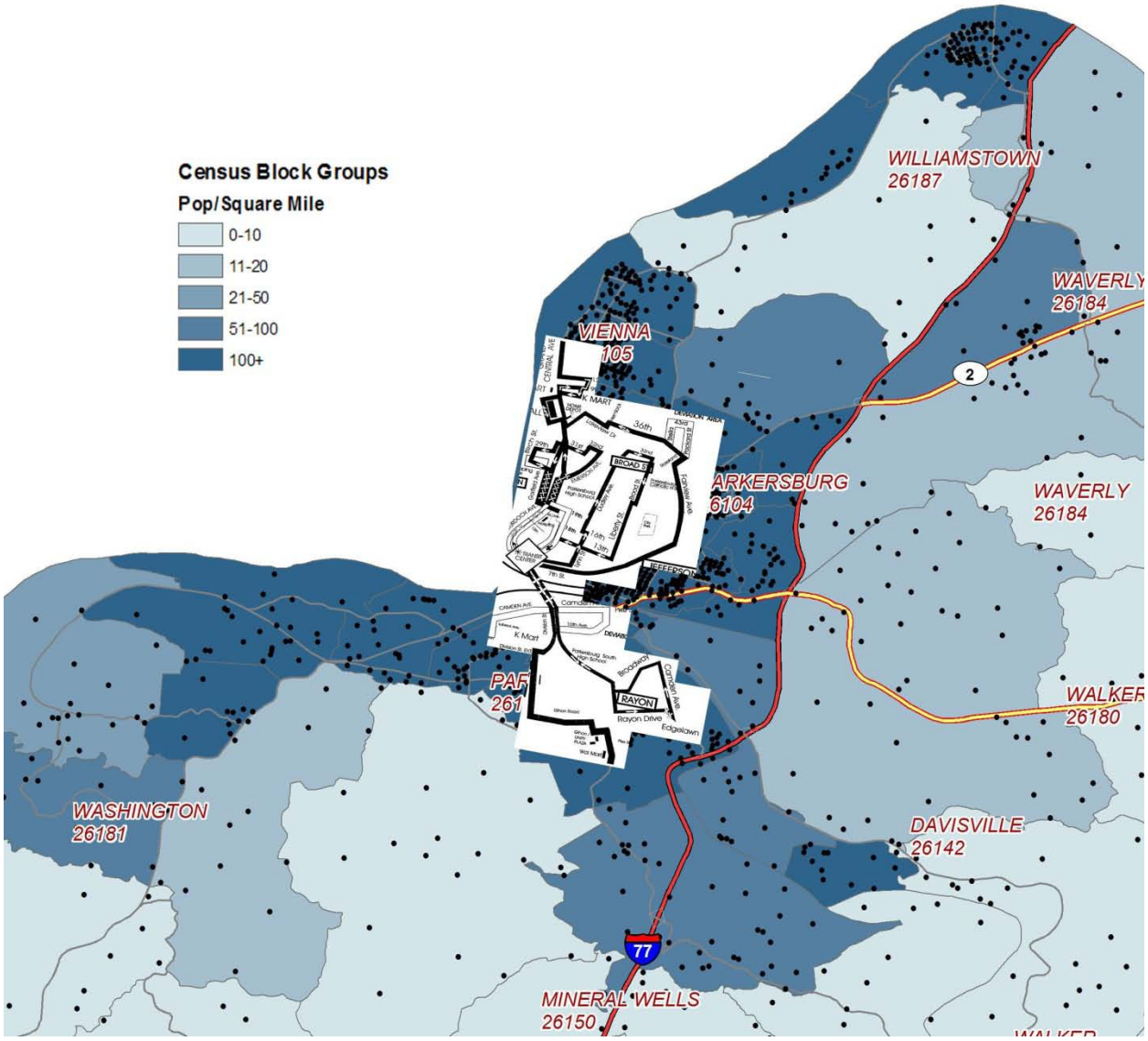


Figure 4.13 Parkersburg metro area and fixed-route system

4.9 Summary

The case studies highlighted a cross-section of small urban communities confronted with sprawling developments at varying degrees. Some transit agencies are involved in the new development planning process while others are not. However, even though an agency may be involved in the process, this does not mean it will have the resources available to extend fixed-route service to new developments. Therefore, high-cost demand response service must often be utilized. Also, a common theme that seems to hinder expanding fixed-route service in nearly all small urban communities is a development planning process that builds at much lower densities than necessary to make fixed-route service a feasible option.

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The objectives of this study were to determine what steps small urban transit providers are currently taking to integrate transit service into sprawling communities and to determine what can be done to improve relationships with local governments during the land development planning process. Attention was also given to a transit agency's ability to provide new service with limited financial capabilities. Furthermore, case studies highlighted the demographic and financial characteristics of communities in an attempt to determine which characteristics are favorable for transit.

Small urban communities are currently taking various steps to integrate transit service into their communities. Many indicated they are involved in land-use planning within their metro area while others had specific communication methods to follow. Methods included meetings, planning activities, and personal networks, among others. However, there were also many small urban communities who were not involved in land-use planning and had no communication with local city planners. Involvement was found to vary widely from one community to the next.

Transit agency representatives felt the best way to integrate transit within new developments was to be present during the development planning process. Only two of the 13 communities indicated in the questionnaire that transit expansion had been coordinated within new developments. Both of these agencies had a part in the planning process, highlighting the need to be involved from the beginning of the planning process. However, only four of 13 respondents indicated that they felt sufficient demand existed for fixed-route transit in new developments. This shows that even though they might have been involved in planning, new developments are often built at such low densities that service will be infeasible anyway. Also, other agencies indicated in both the questionnaire and case studies that even if sufficient demand existed for service, funds were not available to extend service beyond its current structure.

Case studies looked deeper into which characteristics of a community lend itself to improved transit service. Characteristics that often lead to greater transit ridership such as low income, age, and low education levels were found to have an insignificant effect on service. The exact opposite was found to be true. The community with the highest income, lowest percentage of citizens age 65 and older, and highest education attainment had the most advanced transit system. This was primarily because they valued transit and what it brought to their community. Also, successful communication was found to be the means to maintaining and growing transit in small urban communities. When citizens are aware of what transit service provides to their town and surrounding area, they are often willing to support its existence and expansion beyond what would be considered traditional service in a small urban setting.

Recommendations for transit agencies to consider when dealing with land use issues include:

- Take an active role during the planning process
- Make planners aware of the benefits of transit to new developments
- Express that communities who adequately fund transit have seen promising results
- Make citizens aware of transit and how to use it.

This research was an overview of transit planning as it relates to small urban sprawl. The case studies were limiting in that they only looked at four locations throughout the country while many small urban communities are dealing with similar issues. Information and data limitations did not allow for comprehensive results pertaining to ridership changes in all communities. Finally, future analytical research is needed to determine what levels of density are necessary to accommodate fixed-route transit in small urban communities.

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