

**Appendix E**  
**Projections of Need and Demand**

**2008 Greater Minnesota  
Public Transportation Plan**

**February 2009**

**Prepared For**  
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## EXECUTIVE SUMMARY

Estimating the need and demand for passenger transportation is not an exact science. Need is a poorly quantified concept. There are no definitive relationships that can be applied to relate the demographic characteristics of an area, the nature of available passenger transportation services and the resulting demand. Various methods have been developed to assist agencies in assessing the needs in a community and to estimate the demand that is likely when service is supplied.

In this document, a variety of methods are applied to project the need and demand for passenger transportation service in each of the Minnesota Economic Development Regions. The range of estimates illustrates the range of variation that may be expected. From the multiple estimates, a “most reasonable” forecast based on Minnesota peer group data is developed. The estimates are prepared and reported for both fixed-route and ADA complementary services in five urban areas—Duluth, Mankato, Moorhead, Rochester and St. Cloud—and for the total services in the non-urban portions of twelve of the thirteen Minnesota Economic Development Regions. No forecasts are made for Region 11 (metropolitan Minneapolis/St. Paul).

Due to the rapidly changing conditions presented in 2007 and 2008, a modification was made to the initial estimates of demand. Actual ridership data for all of the non-urban (Category 1 and 2) systems was used for 2007 as the basis for estimating future demand. From this data, new values of the 80<sup>th</sup> percentile targets were established. For the urban fixed-route systems (Category 1), future year projections were based on actual 2008 ridership data and local area future year projections where available.

The forecast demand is then used to assess the amount of transit service, measured in annual vehicle-hours, which will need to be supplied to serve the demand. For the five urban centers, the current rate of passengers served per vehicle-hour is projected to be maintained. For the non-urban systems, a target value for productivity is established by class of service. This target—the 80<sup>th</sup> percentile (best productivity) reported by transit operations of the same type—is used to assess the number of vehicle-hours that will be required for each system. The system values are summed to total for each Economic Development Region and for the state. Table S-1 on the following page summarizes estimates of need and demand by region for 2010, 2020, and 2030.

Table S-1: Annual Demand and Required Vehicle-Hours by Economic Development Region

<b>Non-Urban Areas</b>		Demand based on MN Peers Annual Trips (thousands)			Annual Service Hours (thousands)		
Region		2010	2020	2030	2010	2020	2030
1		201	211	216	40	42	43
2		181	198	209	33	36	38
3		535	551	558	89	93	94
4		339	379	400	58	65	68
5		308	341	362	58	64	68
6E		315	332	343	55	58	60
6W		200	202	203	30	30	30
7E		314	396	464	57	72	85
7W		639	822	979	102	134	161
8		294	294	294	52	52	52
9		333	343	351	51	52	53
10		1,117	1,197	1,258	157	169	178
Total Non-Urban Areas		4,776	5,266	5,637	782	867	930
<b>Urban Areas</b>		Demand based on System Performance Annual Trips (thousands)			Annual Service Hours (thousands)		
Region	Area	2010	2020	2030	2010	2020	2030
3	Duluth	3,081	3,788	4,379	141	173	200
4	Moorhead	467	528	631	26	29	35
7W	St. Cloud	2,247	2,560	2,796	87	99	108
9	Mankato	452	481	505	30	32	34
10	Rochester	1,918	2,168	2,351	101	114	124
Total Urban Areas		8,165	9,525	10,662	385	447	501
Total Non-ADA (Non-Urban + Urban)		12,941	14,791	16,299	1,167	1,314	1,431
<b>Urban Area ADA Services</b>		Demand based on System Performance Annual Trips (thousands)			Annual Service Hours (thousands)		
Region	Area	2010	2020	2030	2010	2020	2030
3	Duluth	25	26	26	17	17	17
4	Moorhead	24	34	43	11	15	19
7W	St. Cloud	140	158	173	39	44	48
9	Mankato	14	15	16	6	7	7
10	Rochester	43	49	53	13	15	16
Total Urban Area ADA		246	282	311	86	98	107
Total Urban Area Systems		8,411	9,807	10,973	471	545	608
Total State Transit Systems		13,187	15,073	16,610	1,253	1,412	1,538
Under-Served Areas		657	718	760	110	120	127
Unserved Areas		363	387	401	57	61	63
<b>GRAND TOTAL</b>		<b>14,207</b>	<b>16,178</b>	<b>17,771</b>	<b>1,420</b>	<b>1,593</b>	<b>1,729</b>

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## **INTRODUCTION**

The 2008 Greater Minnesota Public Transportation Plan will identify Greater Minnesota (i.e., non-Twin Cities Metro areas) transit system needs through the year 2030. Between now and then, a combination of demographics changes (population and employment) is reshaping the United States and Minnesota. The result will be changes in the needs for passenger transportation services and the way in which these services are used. Understanding these changes is a major aspect of the context for this plan, and key to identifying transit system needs and options to address them.

## **PURPOSE OF WORKING PAPER**

This working paper develops estimates of both needs and demand. Using demographic data, both observed and projected, the need for passenger transportation services and the probable demand for these services if provided are estimated. Estimates of need are developed based on trip rates for households of various types observed in the North Central region as defined by the Bureau of the Census. Estimates of demand are developed in several different ways including both usage rates based on national data and usage rates based on observed conditions in Minnesota. When estimates of demand are compared to the number of trips actually served, an assessment can be made of the magnitude of demand, if any, that is unmet by the services currently provided and the amount of additional service that would need to be provided in order to satisfy all demand. This analysis gives guidance on how the amount of service provided will need to change over time in order to accommodate the changes in demand that will arise between now and 2030 as the demographics of the state and the regions within the state change.

## **ANALYSIS OF NEED AND DEMAND**

### **DEFINITIONS OF NEED AND DEMAND**

Need is poorly defined and difficult to measure. It is not dependent on services offered and in theory could be more easily estimated. The problem is definition. One person's need is another's want. There is no simple response to the question, "Are all trips that persons in rural areas or in any community wish to make truly needed? Could some be foregone?"

When assessing the need for transit service, it is generally defined as offering, to those who would otherwise be denied, the opportunity to travel in order to avail themselves of the opportunities and services available in American society. Almost all would agree that travel to and from work is a need. All would agree that most medical trips and many shopping trips are needed. Travel for dialysis, essential on a regular schedule to maintain life, is a need and most transit agencies—rural or urban—make special effort to assure these trips are served. Chemotherapy trips and those for similar services also receive special attention. But how about regular check-ups or massage therapy? Do these services fall into the same class of need?

Need is always greater than the demand for organized passenger transportation service. In any community, some portion of the need for travel by those who have limited mobility options is satisfied by friends or relatives who drive individuals having need for specific trips. When a new or enhanced organized passenger transportation service is offered, some of those trips will shift to the publicly supported system. One of the great problems in measuring unmet demand is estimating to what extent friends and relatives are acting to meet needs.

## ESTABLISHING THE LEVEL OF NEED

One approach is to consider need as a measure not of trips but rather of the number of persons who are likely to have a reason to use passenger transportation service. Most of the analytic methods applied across the nation consider the most likely users of rural passenger transportation services to be the poor, the elderly, and persons with disabilities. One quantifiable measure of need, therefore, is the number of people in each of these groups. However, the data show that the per capita annual trip rates for these groups can be quite different. Studies in Washington State found that the annual trips per capita for mobility limited persons ranged from 70 to 125; for “regular riders” (i.e. adults approximately age 16-64 ) the rate ranged from 9 to 21; and for seniors the rate ranged from 6 to 10 trips per capita per year.

A secondary approach to defining need is the Mobility Gap in which trip rates observed for households owning one or more personal vehicles are compared to trip rates observed for households having similar characteristics but owning no personal vehicles.<sup>1</sup> The basis of this approach is that households with a personal vehicle have few limitations and, therefore, make all the trips they “need.” The difference in trip rates is then multiplied by the number of households in each area to develop an estimate of the number of additional trips that might be taken if the households had access to a personal vehicle or other high quality transportation service. Data for such analyses are derived from national datasets.

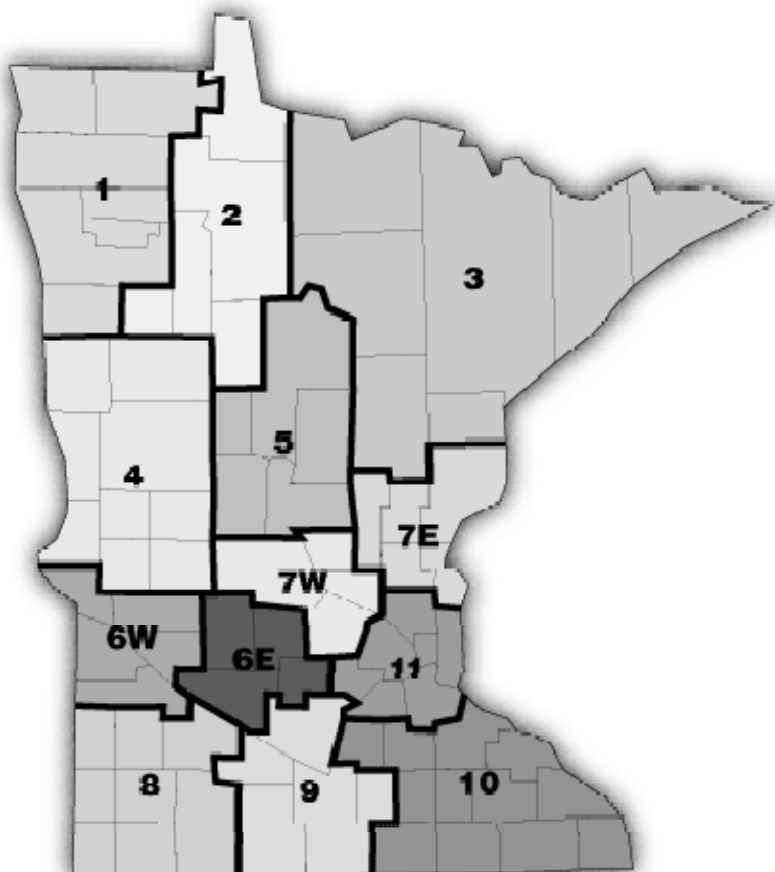
### *Analysis of User Groups*

This section provides background information on key demographic and employment trends that specifically influence the need for public transportation in Greater Minnesota. The Minnesota Demographic Portrait of the 2008 Greater Minnesota Public Transportation Plan identifies historic demographic trends and future projections with specific emphasis on four consumer groups that tend to have a higher transit dependency. These four consumer groups are as follows: seniors, persons with disabilities, low-income persons, and commuters. The following discussion describes each of the main population segments in terms of the overall State of Minnesota as well as within each of the economic development regions within Minnesota as defined by Minnesota’s Department of Employment and Economic Development (Figure 1).

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<sup>1</sup> Stoddard, A. T; F. Spielberg and C. Donahue, “ *Use of the Mobility Gap to Quantify Rural Transit Needs,*” Seventh National Conference on Transportation Planning for Small and Medium-Sized Communities, September 28-30, 2000, Little Rock, Arkansas.

Figure 1: Minnesota Economic Development Regions



Source: Minnesota Department of Employment and Economic Development (DEED)

### Seniors

According to the US Census Bureau Interim State Population Projections, in 2005, 12 percent of Minnesota's population was 65 years old or older. By 2030, almost 21 percent of the State's population will be 65 years or older. By 2030, rural Minnesota will have a higher percentage of senior residents, however higher numbers of seniors will be seen in the metropolitan areas.

The Census projects the elderly population for Greater Minnesota will double from 2000 to 2030 to about 650,000. Regions 7W and 10 will account for 41 percent of statewide elderly population growth and these two regions also contain the four counties that will see the largest increase in the elderly population. Additionally, every county in Greater Minnesota is projected to see an average increase of 8.5 percent share of the over-65 population. Table 1 contains a summary of the forecasted elderly population in each Economic Development Region.

**Table 1: Forecast Elderly Population by Economic Development Region**

Economic Development Region	Forecast Elderly Population (in thousands)		
	2010	2020	2030
1	15	18	24
2	11	15	20
3	55	73	92

Economic Development Region	Forecast Elderly Population (in thousands)		
	2010	2020	2030
4	37	49	65
5	25	35	48
6E	19	25	33
6W	9	11	13
7E	15	24	38
7W	42	67	104
8	21	25	30
9	31	40	51
10	71	96	132
<b>Total</b>	<b>353</b>	<b>479</b>	<b>650</b>

### Persons with Disabilities

The disabled population 5 years and older in Greater Minnesota ranges from 15 percent to 20 percent of the total population in most of the regions. Region 2 is the only region that is significantly lower than the rest of the state at 8 percent. The central and northern regions of the state have slightly higher percentages of persons with disabilities.

**Table 2: Forecast Persons with Disabilities by Economic Development Region**

Economic Development Region	Forecast Population with Disability (in thousands)		
	2010	2020	2030
1	13	14	14
2	14	16	17
3	60	62	63
4	35	38	40
5	27	30	32
6E	19	20	20
6W	6	6	6
7E	22	28	32
7W	60	74	86
8	16	17	16
9	29	31	32
10	71	78	82
<b>Total</b>	<b>373</b>	<b>412</b>	<b>441</b>

### Low-income Persons

The percentage of Minnesotans below the poverty line grew from 7.9 percent in the 2000 Census to 9.2 percent according to 2005 estimates. Poverty levels are the greatest in Clearwater, Mahnomon, and Beltrami Counties in Region 2 at 15 percent. Region 7W, adjacent to the Twin Cities Metropolitan area, has the lowest poverty level at 7 percent. Overall, the northern regions of Minnesota have higher poverty levels than those in the southern regions.

**Table 3 : Forecast Persons in Poverty by Economic Development Region**

Economic Development Region	Forecast Population in Poverty ( in thousands)		
	2010	2020	2030
1	9	9	9
2	12	14	15
3	40	42	42
4	25	27	28
5	16	18	19
6E	10	11	11
6W	4	4	4
7E	9	12	14
7W	30	36	42
8	12	12	12
9	2	23	23
10	43	46	49
<b>Total</b>	<b>232</b>	<b>253</b>	<b>268</b>

### Commuters

In 2000, approximately 27 percent of workers in Greater Minnesota were employed outside their county of residence. In the state as a whole 32 percent of workers reported commuting from one county to another. Suburban counties around the Twin Cities Metro Area have the lowest percentages of residents who live and work in the same county. It is expect that as employment growth continues in areas adjacent to the Twin Cities Metro Area and in regional centers in other areas of Greater Minnesota that the trend of Minnesotans working outside their county of residence will continue to increase.

A report produced by the Minnesota State Demographic Center in July 2003 provided an analysis of regional work flows.<sup>2</sup> The analysis included the percentage of residents working within each region and the in-flow and out-flow of workers across regions. The regions with the largest percentages of residents working in another region are 7E and 7W. Outside of the Twin Cities Metro area the percentage of inter-county work trips making use of transit ranges from 0 to 2 percent of all work trips. When total inter-county movements are less than 2000 commuters, the number reporting use of transit is, in almost all cases, fifty or fewer.

### Mobility Gap Analysis

Mobility Gap measures were developed using data from the 2001 National Household Transportation Survey. As the sample rates are low, the data do not support a valid state-by-state analysis. For this study we have used the West North Central Division (Census definition) which includes North Dakota, South Dakota, Nebraska, Kansas, Missouri, Iowa, and Minnesota. The dataset contained no records for Nebraska, North Dakota, or South Dakota.

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<sup>2</sup> More Minnesotans work outside of county where they live. Minnesota State Demographic Center. July 2003.

Figure 2 illustrates the average daily trips per day for urban and rural households related to income level as reported in the 2001 National Household Transportation Survey for the West North Central Division that includes Minnesota. Data are reported for households with incomes ranging from the poverty level to twice the poverty level. For both urban and rural households the trip rate is about five trips per day at the poverty level with the trip rate increasing with income but leveling out at about 150 to 175 percent of the poverty level. At that point, the rural household trip rate is about eight trips per day and the rate for urban households is about seven trips per day. The gap, or the difference between the trip rate for higher income households and households at or below the poverty level, is between two and three trips per day. A rate of 2.5 trips per day is used to estimate need for households at or below the poverty level. This rate represents the midpoint of the rural and urban trip rate gap for the average household regardless of income level.

It is of interest that rural households in this income category have slightly higher trips rates than urban households of the same income. It is conjectured that this is due to a higher auto ownership rate for the rural households since low-income households in urban settings may be able to make do with fewer cars.

**Figure 2: Household Trip Rates vs. Income as Percent of Poverty Level**

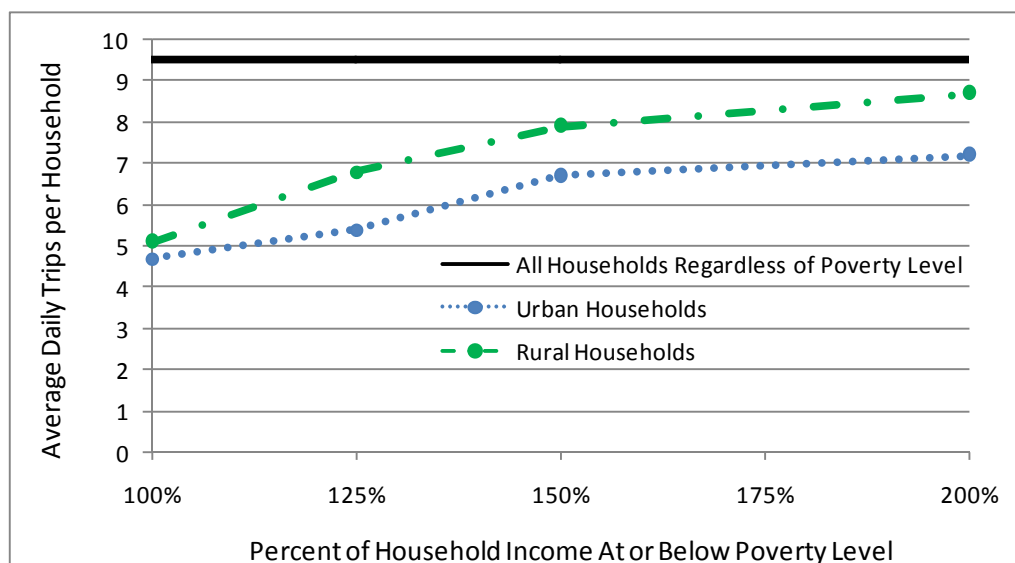
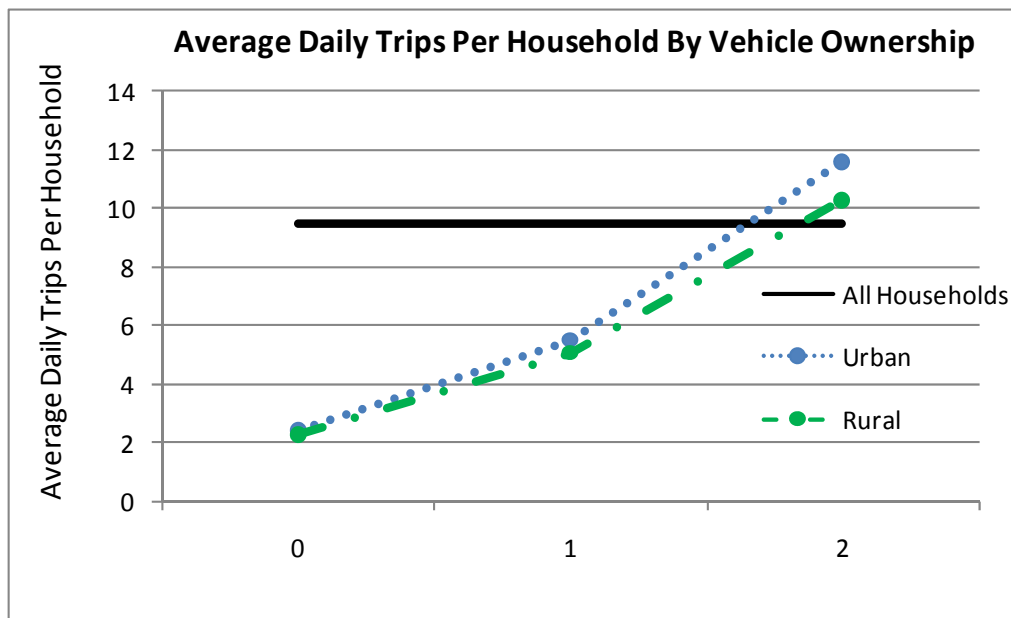


Figure 3, from the same data source, illustrates how the daily household trip rate varies by vehicle ownership. The average household makes just under 10 trips per day. If it is assumed that a household with one vehicle will make the trips most needed, then a rate of about 5.5 trips per day is a reasonable measure of need. This rate represents the average of rural and urban households, as shown in Figure 3. Since households owning no vehicle make only about 2.5 trips per household per day, we define a “gap” of 3 trips per day for each household owning no vehicle.

Figure 3: Household Trip Rate vs. Vehicle Ownership



Figures 4 and 5 illustrate the trip rates per household for urban and rural households with at least one member over age 60, showing the rate for all such households and for lower income households. Figure 4 presents the information for urban household income levels ranging from 100 percent of the poverty level up to 200 percent of the poverty level as well as the average for all households with an elderly resident. Figure 5 presents similar information for rural households.

For all households the average trip rate shows a steady decline from age 60 through age 85 from about 6 trips per day to just over three trips per day for urban households and a similar trend for rural households. This decline could be due to many factors including household members leaving the workforce, change in daily habits, smaller household size or simply change in the desire to travel. Some part of the decline is due, no doubt, to changes in health and mobility or surrendering of driver licenses. However, the degree to which these contribute to the decline cannot be ascertained from these data. For all of the referenced age groups in both environments, lower income households have lower than average daily trip rates. This suggests that the trip gap is more directly related to income and auto ownership than to age.

Figure 4: Trip Rate for Urban Households vs. Age of Household Member and Household Income

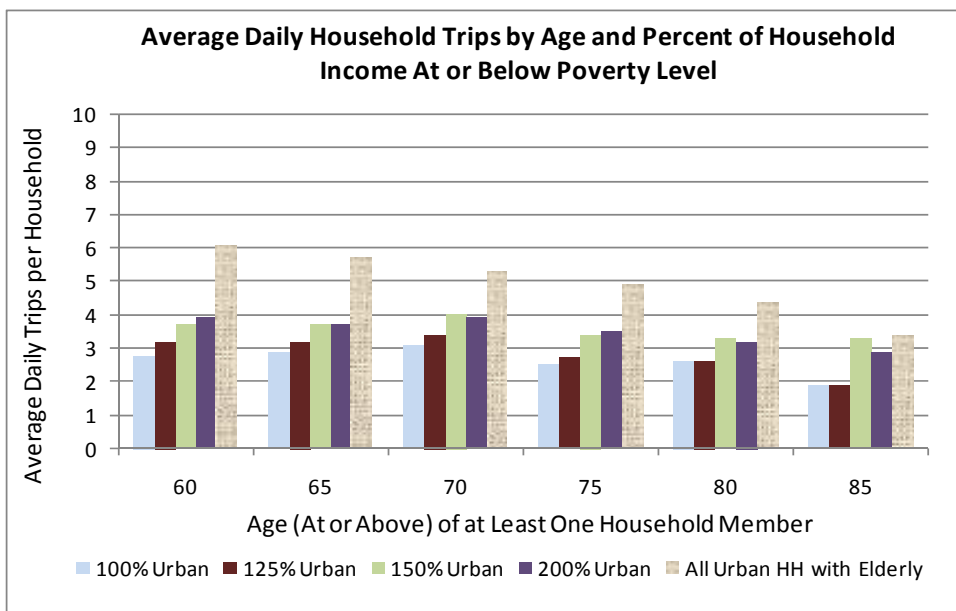


Figure 5: Trip Rate for Rural Households vs. Age of Household Member and Household Income

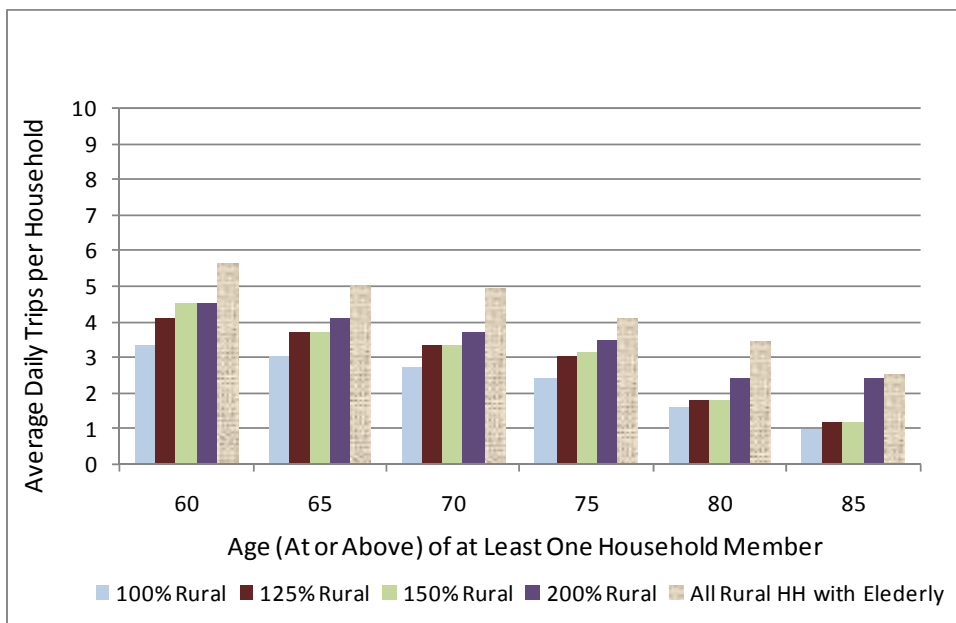
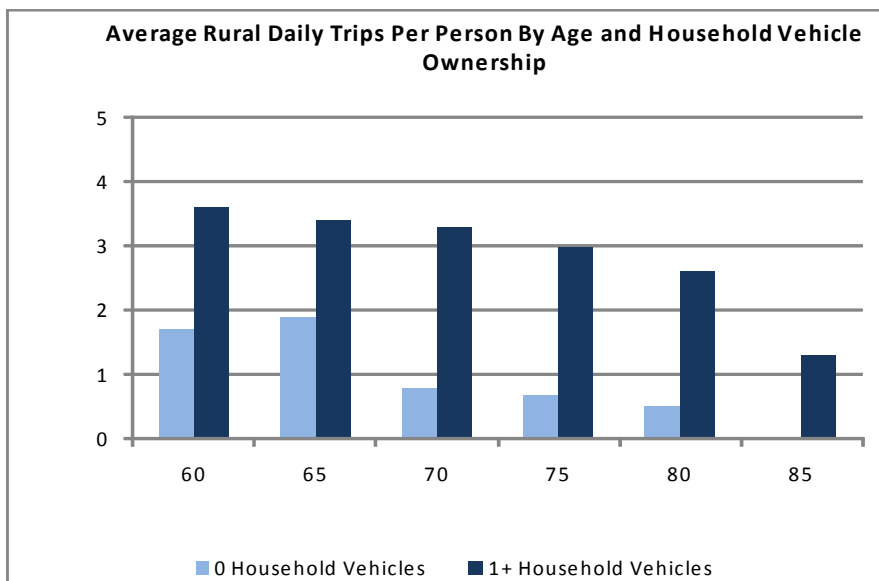


Figure 6 illustrates how the daily trip rate per person declines from age 60 through age 85. The daily rate declines for both those living in households with cars and those without. The difference remains at about 1.5 to 2 trips less for persons living in households without cars.

**Figure 6 : Trips per Person by Age and Household Ownership (Rural Households)**



Application of the Mobility Gap analysis yields very high estimates of need. Table 4 summarizes the application of the Mobility Gap method to the Minnesota planning areas. While this method may provide a true measure of the relative mobility limitations experienced by households that lack access to a personal vehicle, the estimates of need derived are far in excess of the actual demand observed in Minnesota for 2007-2008.

**Table 4: Mobility Gap Summary by Minnesota Economic Development Region**

Economic Development Region	Mobility Gap (Annual Trips in Thousands)		
	2010	2020	2030
1	2,371	2,479	2,545
2	2,2521	2,471	2,615
3	13,021	13,400	13,614
4	6,379	6,925	7,253
5	4,364	4,839	5,140
6E	2,903	3,055	3,152
6W	1,243	1,218	1,196
7E	2,649	3,330	3,890
7W	8,375	10,165	11,646
8	3,098	3,107	3,107
9	5,684	5,926	6,104
10	14,061	15,282	16,171
<b>Total</b>	<b>66,402</b>	<b>72,201</b>	<b>76,434</b>

## ESTIMATING DEMAND

Demand can be more strictly defined and reflects the number of trips made given the level of service provided and cost, in both time and money, to the rider to make a trip. There are various approaches to estimating demand, including peer comparisons and best available comparisons.

Peer comparisons relate the trip rate per person as measured by passengers per capita in specific categories in the market of interest to the trips per capita observed in other systems, typically within the same state. A given county or service area can then decide if it wishes to attempt to provide services that will result in per capita trip rates that are the best in the state, that exceed 80 percent of the other counties, that are average for their state or peer group, or that are less than the mean. These measures suffer from the failing that they measure only the demand that is served in other areas, not the need (however one would wish to define it), and the relationships are not fixed. As some areas add improved services, the mean rises, and half of all systems will always fall below the 50<sup>th</sup> percentile. However, peer approaches do have the benefits of being easy to comprehend, of recognizing the funding policies of individual states and of reflecting the travel behavior of the residents of the state. The approach used to estimate demand in the Greater Minnesota Public Transportation Plan (2001) is a peer-based approach using data from Minnesota transit systems.

Best available comparisons look not to peer systems but rather to those systems or groups of systems that are reputed to provide high quality service to one market group or another. For example, Wisconsin is known for providing high quality service to its disabled population. Pennsylvania provides free service to all over age 65. The number of trips per capita in the specific markets served in these states should represent some approximation of the maximum—in essence, the number of trips that will be made when high quality service is offered. These do represent good measures, but even in these exemplary situations many agencies would argue that they still are not fulfilling all needs.

### *National Peer Rates*

Various methods are available to estimate the demand for rural passenger transportation services. The simplest approach is to apply a single per capita rate based on the average use observed across the nation. A rate of 4.0 trips per capita was used. This approach, the results of which are summarized in Table 5, yields reasonable values for general planning but cannot reflect the different population composition or trip making characteristics of different regions.

**Table 5: Demand Based on National Trip Rates**

Economic Development Region	Demand Based on National Rates (4.0 Trips per Capita) (Annual Trips in Thousands)		
	2010	2020	2030
1	336	352	361
2	303	331	350
3	1,313	1,361	1,388
4	877	950	995
5	579	643	683
6E	489	516	534
6W	185	181	178

Economic Development Region	Demand Based on National Rates (4.0 Trips per Capita) (Annual Trips in Thousands)		
	2010	2020	2030
7E	535	677	795
7W	1,742	2,163	2,517
8	467	468	468
9	847	889	918
10	2,034	2,221	2,357
<b>Total</b>	<b>9,710</b>	<b>10,754</b>	<b>11,545</b>

### *Demand Based on Population Groups*

As noted, the populations used to define a need for passenger transportation are those that, for differing reasons, cannot or do not have the ability to use a personal vehicle to satisfy their mobility needs. These include the elderly, persons in poverty, and persons with disabilities. An estimate of demand can be generated for each of these populations by using standard trip rates. As more detailed state-by-state data become available from the rural national Transportation Database or the Public Transportation-Human Service Coordination Plans it will be possible to develop state- or region-specific estimates of the typical annual trip rates for persons in each group. Lacking such data we have applied rates derived from studies in other locations and from information from states known to have strong programs for specific groups. The rates applied are shown in Table 6.

**Table 6: Annual Demand Rates by Population Segment**

Population Group	Annual Passenger Transportation Trip Demand per Capita
Elderly	8.4
Persons with disability (ages 16 – 64)	14
Person in household with income below the poverty level	30

For these estimates the rates are applied to the entire population of the subgroup within each Economic Development Region. No distinction is made between the population in rural areas and the population residing in areas served by fixed-route and complementary ADA paratransit services. Table 7 summarizes the results by region.

**Table 7 : Passenger Transportation Demand based on National Best Practice Rates**

Economic Development Region	Annual Trip Demand (in thousands)		
	2010	2020	2030
1	643	698	755
2	698	791	872
3	2,830	3,059	3,265
4	1,715	1,935	2,140
5	1,246	1,440	1,616
6E	864	951	1,040
6W	326	335	352
7E	911	1,193	1,477

Economic Development Region	Annual Trip Demand (in thousands)		
	2010	2020	2030
7W	2,561	3,293	4,040
8	840	869	914
9	1,443	1,569	1,709
10	3,333	3,784	4,255
<b>Total</b>	<b>17,410</b>	<b>19,917</b>	<b>22,435</b>

### *In-State Peer Groups*

The method of forecasting transportation need that is most sensitive to the characteristics of the population and the components of transportation programs in a specific state is the use of in-state peers. This methodology can be applied when sufficient data are available to examine the current values obtained by multiple systems. Fortunately, the data collected for system operating in Minnesota provide such a base.

The Greater Minnesota in-state peer groups analysis compares in-state systems among themselves, divided into different categories by size, service area, and type of service provided. For the in-state peer group review, the systems were initially divided into eight categories: *urban, ADA paratransit, rural, county, multi-county, small urban systems within county systems, small urban systems over 10,000 population, and small urban systems under 10,000 population.* There were no longer any systems classified in the *rural* and *small urban systems within a county* categories; those two classifications have been omitted from this analysis.

The purpose of the in-state peer group analysis is to define as a target a high level of performance related to other systems in each specific system category. This represents a target which other like systems can strive to achieve. To define appropriate target values, cumulative frequency distributions were plotted for each category using the following 2005 performance data:

- Passengers per Revenue Mile
- Revenue Hours per Capita
- Revenue Miles per Capita
- Passengers per Capita

The target was defined as the 80<sup>th</sup> percentile for each category. This is generally regarded as the “knee of the curve” when looking at the cumulative frequency distribution, or the point where the curve tends to flatten out, representing that little change is expected beyond that point. The 80<sup>th</sup> percentile also represents a reasonable level for systems to attempt to achieve, as opposed to attempting to meet the highest level on record. The 50<sup>th</sup> percentile value for each is also shown on the charts to show the point at which half of the systems in the state are above or below in terms of performance. For systems at the bottom of the range, this midpoint target will be more easily attained as local demand levels begin to move toward the overall target. Diagrams illustrating the first three performance measures using 2005 data are contained in Appendix A.

### *50th Percentile*

Table 8 shows the 50<sup>th</sup> percentile of the 2005 performance measures based upon the cumulative frequency of the in-state peer group analysis for each system category. The 50<sup>th</sup> percentile is the

point at which half of the Minnesota systems are performing above or below the line. This level could serve as the interim target for those systems performing near the bottom of the range.

**Table 8: 50th Percentile, 2005 Performance Measures**

<b>Category</b>	<b>Passengers Per Revenue Mile</b>	<b>Passengers Per Revenue Hour</b>	<b>Revenue Miles Per Capita</b>	<b>Revenue Hours Per Capita</b>	<b>Passengers Per Capita</b>
Category 1: Urban Fixed Route Systems	1.32	18.13	8.76	0.58	13.27
Category 2: ADA Paratransit Systems	0.23	2.63	1.80	0.27	0.46
Category 4: County Systems	0.33	4.59	6.92	0.48	2.04
Category 5: Multi-County Systems	0.28	4.04	8.96	0.51	1.67
Category 7: Urban Systems Serving over 10,000	0.52	5.64	5.32	0.49	2.86
Category 8: Urban Systems Serving under 10,000	0.86	7.20	10.16	1.62	10.93

### *80th Percentile*

Table 9 below shows the 80<sup>th</sup> percentile of the 2005 performance measures based upon the cumulative frequency of the in-state peer group analysis for each category. The 80<sup>th</sup> percentile indicates the target service level in the state.

**Table 9: 80th Percentile (Target) Values, 2005 Performance Measures**

<b>Category</b>	<b>Passengers Per Revenue Mile</b>	<b>Passengers Per Revenue Hour</b>	<b>Revenue Miles Per Capita</b>	<b>Revenue Hours Per Capita</b>	<b>Passengers Per Capita</b>
Category 1: Urban Fixed Route Systems	1.56	21.28	10.76	0.77	19.20
Category 2: ADA Paratransit Systems	0.25	3.48	3.57	0.41	1.00
Category 4: County Systems	0.40	5.97	10.89	0.73	2.77
Category 5: Multi-County Systems	0.36	5.32	10.62	0.53	2.09
Category 7: Urban Systems Serving over 10,000	0.78	9.60	6.08	0.55	5.30
Category 8: Urban Systems Serving under 10,000	0.96	8.50	15.13	1.80	14.50

### *2007 Data Update*

Minnesota transit systems underwent a significant change in ridership between 2005 and 2007. In order to reflect those changes, the passengers per capita measure was recalculated using 2007

data. Table 10 presents the 2007 80<sup>th</sup> percentile passengers per capita values for the analysis peer groups.

**Table 10: 80<sup>th</sup> Percentile (Target) Values, 2007 Passengers Per Capita**

Category	Passengers Per Capita
Category 1: Urban Fixed Route Systems	23.3
Category 2: ADA Paratransit Systems	1.0
Category 4: County Systems	2.74
Category 5: Multi-County Systems	2.23
Category 7: Urban Systems Serving over 10,000	5.38
Category 8: Urban Systems Serving under 10,000	14.47

The data for the 2007 passengers per capita measure are illustrated in Figure 7 through Figure 12. The 80<sup>th</sup> percentile and 50<sup>th</sup> percentile are both denoted in the figures.

**Figure 7: Passengers per Capita, Urban Fixed Route Systems**

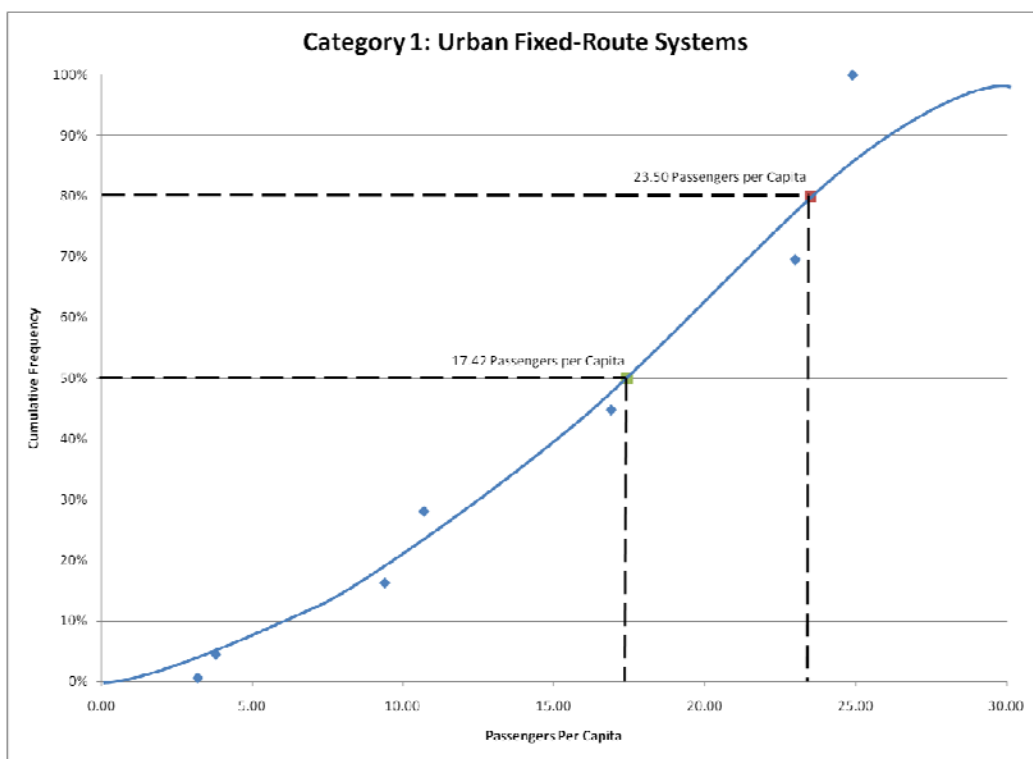


Figure 8: Passengers per capita, ADA paratransit systems

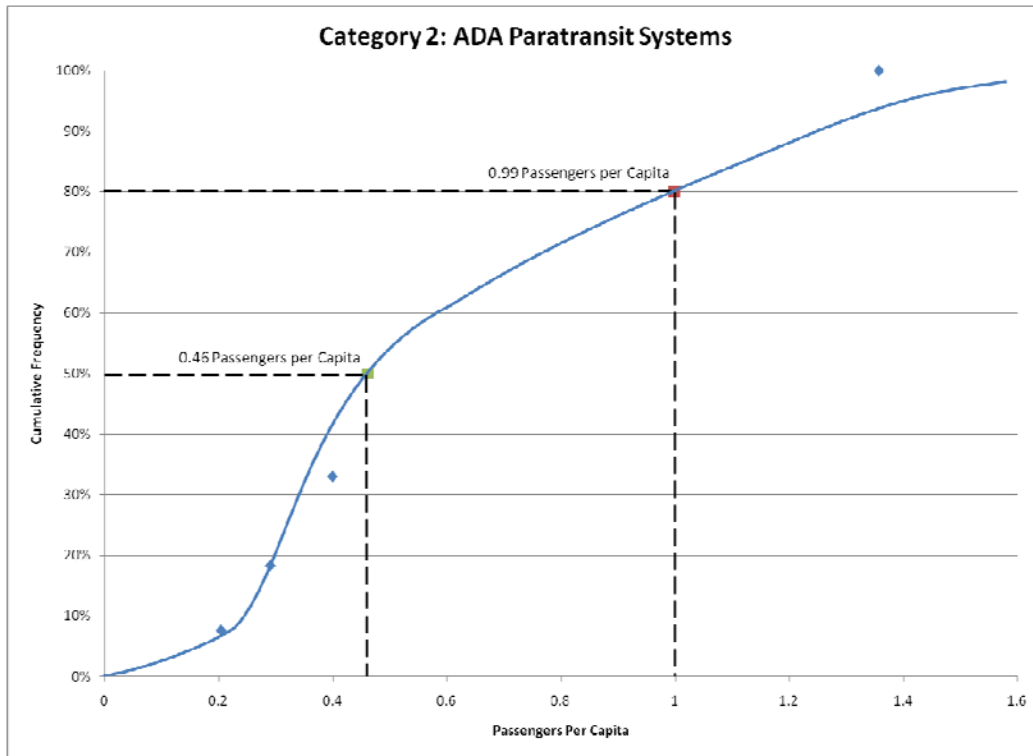


Figure 9: Passengers per capita, county systems

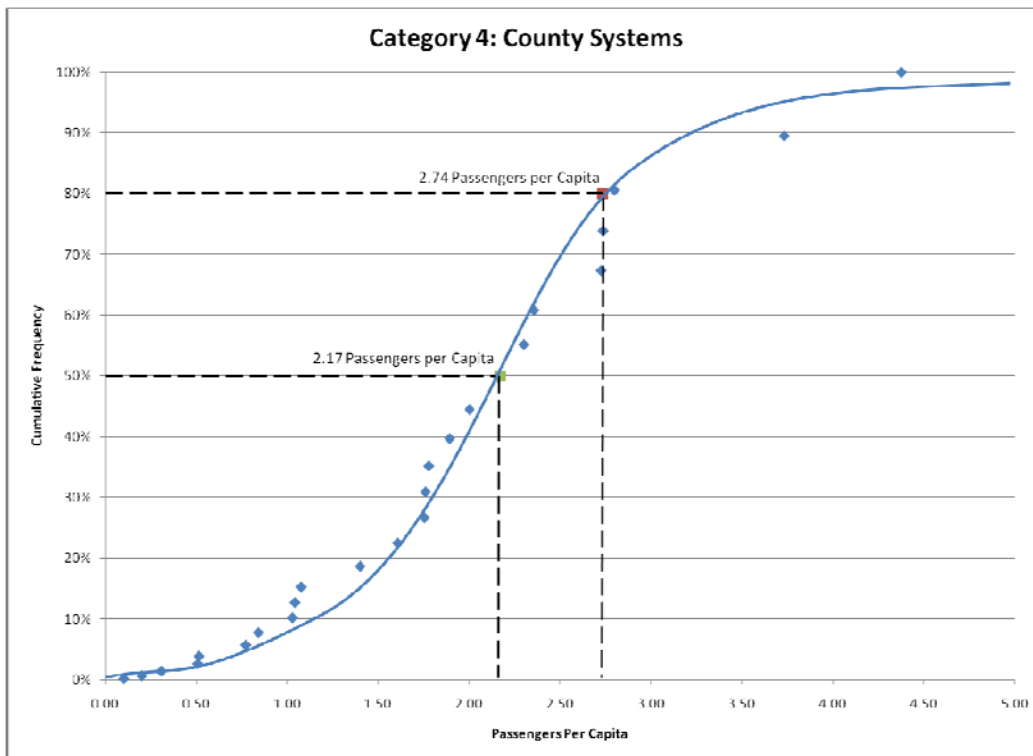


Figure 10: Passengers per capita, multi-county systems

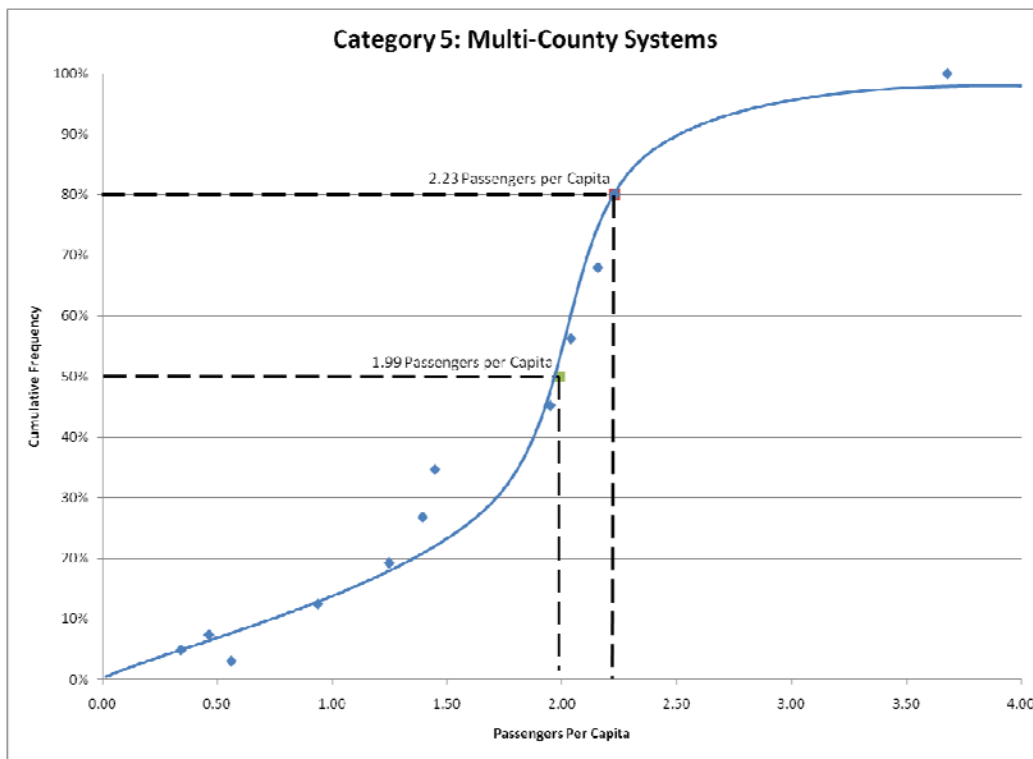


Figure 11: Passengers per capita, urban systems serving over 10,000 population

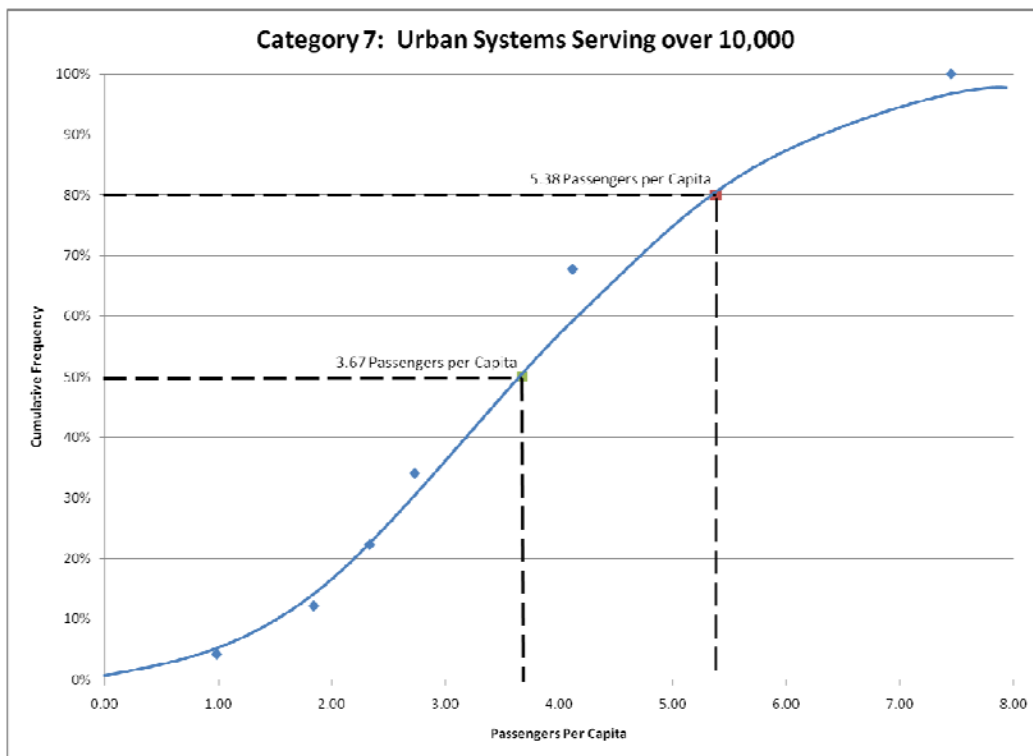
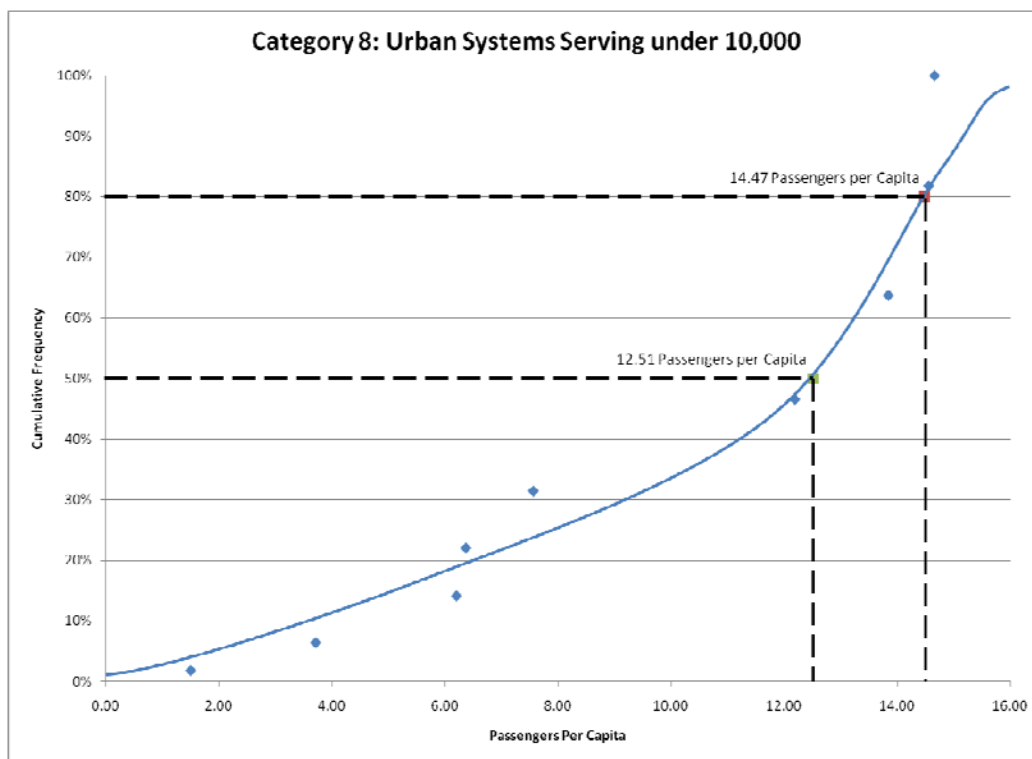


Figure 12: Passengers per capita, urban systems serving under 10,000 population



### *Passengers per Capita Estimate of Demand*

To calculate the projected demand within each Economic Development Region, the population projected for each region was allocated first to counties and then to the corresponding transit agency or agencies serving those counties.

The urban service areas were considered separately, with both per-capita demand and route service productivity, for both fixed-route and paratransit, based on the observed values for the current system. For those portions of each region outside of an urban center, the non-urban population served by each non-urban transit agency was identified. The 2007 80th percentile target rate for passengers per capita, determined from the Minnesota in-state peer analysis, was then applied to the population served by each transit agency. Rates were applied based on the system category for each transit system. The results were then aggregated to Economic Development Regions.

Estimates were also produced for underserved areas of the state as well as unserved areas. Underserved areas are counties within which a small urban transit system currently operates but county-wide service is not available. The demand estimate uses the county population unserved with the county passengers per capita rate. Underserved counties, as of 2007, are as follows:

- Blue Earth
- Cass
- Freeborn
- Le Sueur
- Nicollet

- Olmsted
- Otter Tail

Unserved areas are counties that have no current level of public transit service. Demand estimates incorporated the full county population as well as the county passengers per capita rate. Unserved counties, as of 2007, are as follows:

- Clearwater
- Kanabec
- Kittson
- Pine
- Todd
- Waseca
- Wilkin

In addition, the city of Waseca was identified as the only city in Minnesota with population above 5,000 without some type of public transit. A demand estimate was also included for the city of Waseca using the small urban trip rate. Table 11 presents the summary of demand.

Table 11: Demand Based on Targets Derived from Minnesota Systems

<b>Non-Urban Areas</b>		Demand based on MN Peers Annual Trips (thousands)		
<b>Region</b>		<b>2010</b>	<b>2020</b>	<b>2030</b>
1		201	211	216
2		181	198	209
3		535	551	558
4		339	379	400
5		308	341	362
6E		315	332	343
6W		200	202	203
7E		314	396	464
7W		639	822	979
8		294	294	294
9		333	343	351
10		1,117	1,197	1,258
Total Non-Urban Areas		4,776	5,266	5,637
<b>Urban Areas</b>		Demand based on System Performance Annual Trips (thousands)		
<b>Region</b>	<b>Area</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>
3	Duluth	3,081	3,788	4,379
4	Moorhead	467	528	631
7W	St. Cloud	2,247	2,560	2,796
9	Mankato	452	481	505
10	Rochester	1,918	2,168	2,351
Total Urban Areas		8,165	9,525	10,662
Total Non-ADA (Non-Urban + Urban)		12,941	14,791	16,299
<b>Urban Area ADA Services</b>		Demand based on System Performance Annual Trips (thousands)		
<b>Region</b>	<b>Area</b>	<b>2010</b>	<b>2020</b>	<b>2030</b>
3	Duluth	25	26	26
4	Moorhead	24	34	43
7W	St. Cloud	140	158	173
9	Mankato	14	15	16
10	Rochester	43	49	53
Total Urban Area ADA		246	282	311
Total Urban Area Systems		8,411	9,807	10,973
Total State Transit Systems		13,187	15,073	16,610
Underserved Areas		657	718	760
Unserved Areas		363	387	401
<b>GRAND TOTAL</b>		<b>14,207</b>	<b>16,178</b>	<b>17,771</b>

Having developed projections of the trip demand for services for systems within each Economic Development Region, estimates of the revenue vehicle-hours of service that would be appropriate to serve this demand were prepared. The methodology used to prepare the estimates of vehicle-hours is similar to that used to quantify demand. The currently reported productivity, measured in passengers per vehicle-hour, was plotted by category for each system. The 50<sup>th</sup> percentile and 80<sup>th</sup> percentile values for each category were then determined (Figures 13-18).

**Figure 13: Passengers per revenue hour, urban fixed-route systems**

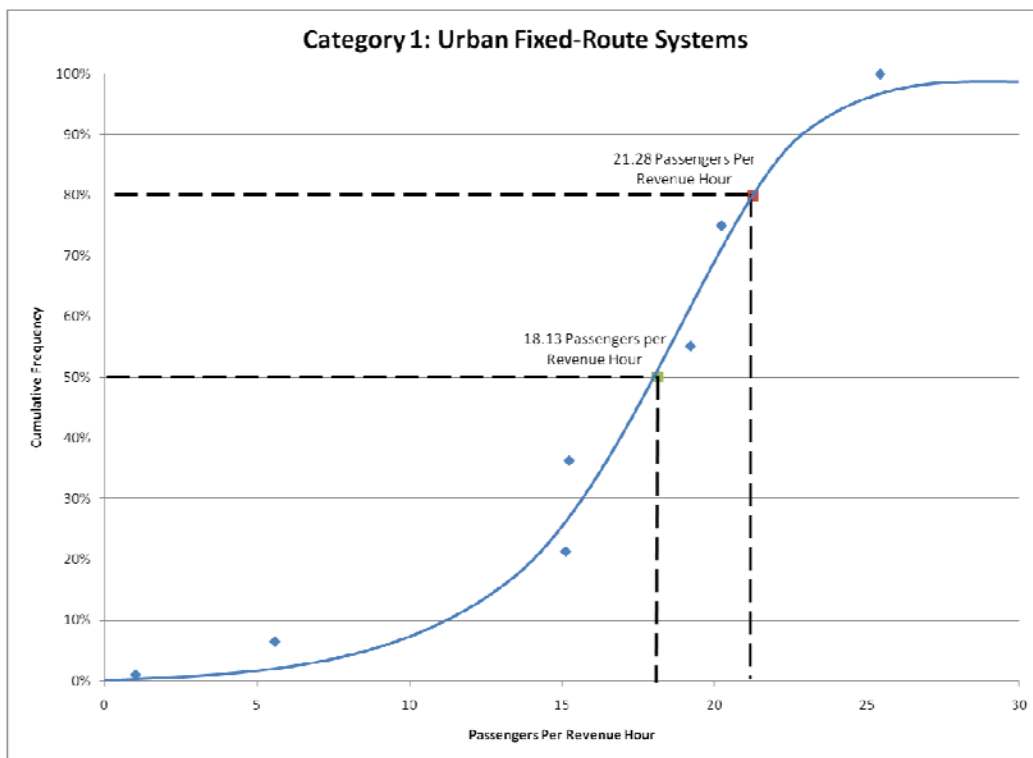


Figure 14: Passengers per revenue hour, ADA paratransit systems

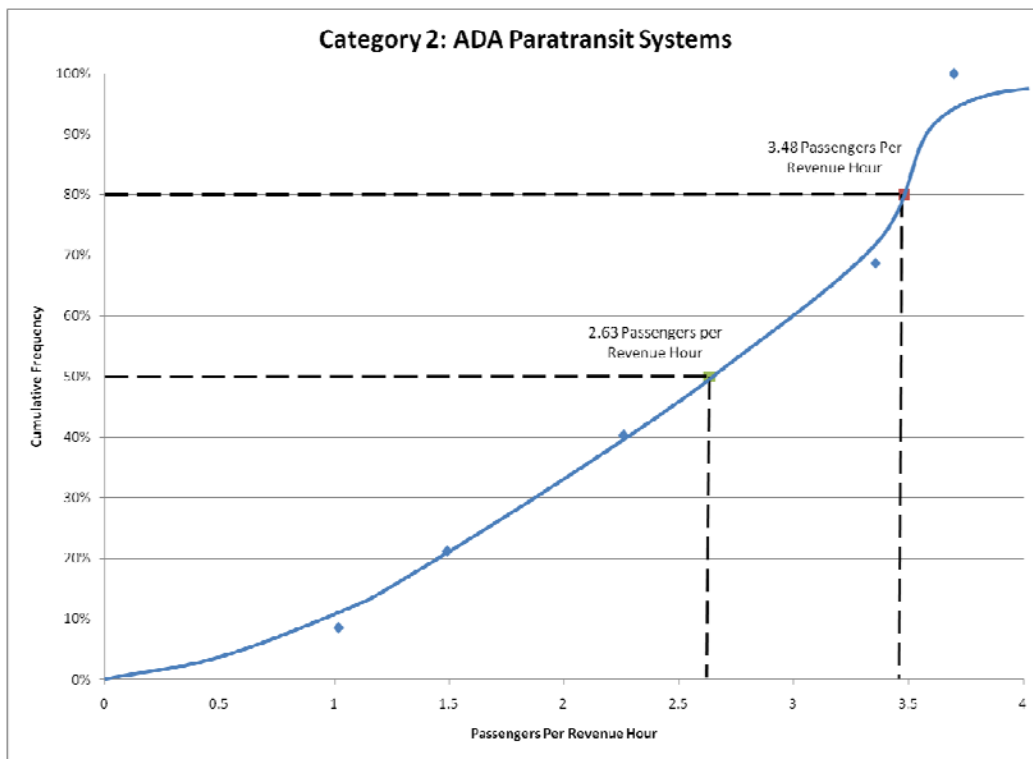


Figure 15: Passengers per revenue hour, county systems

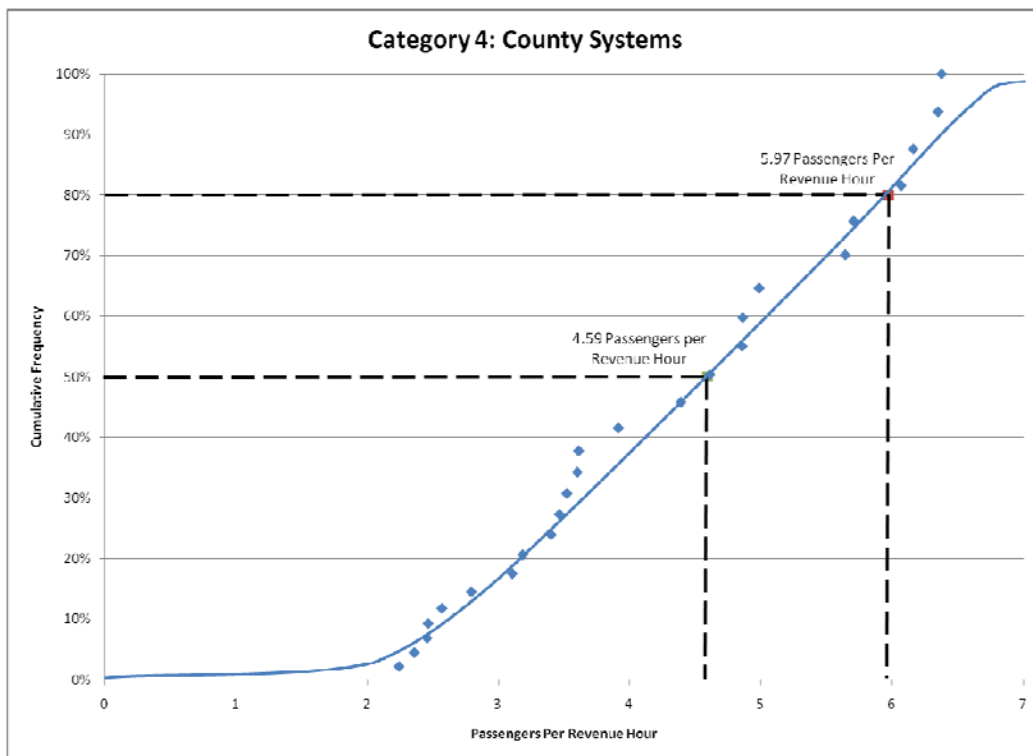


Figure 16: Passengers per revenue hours, multi-county systems

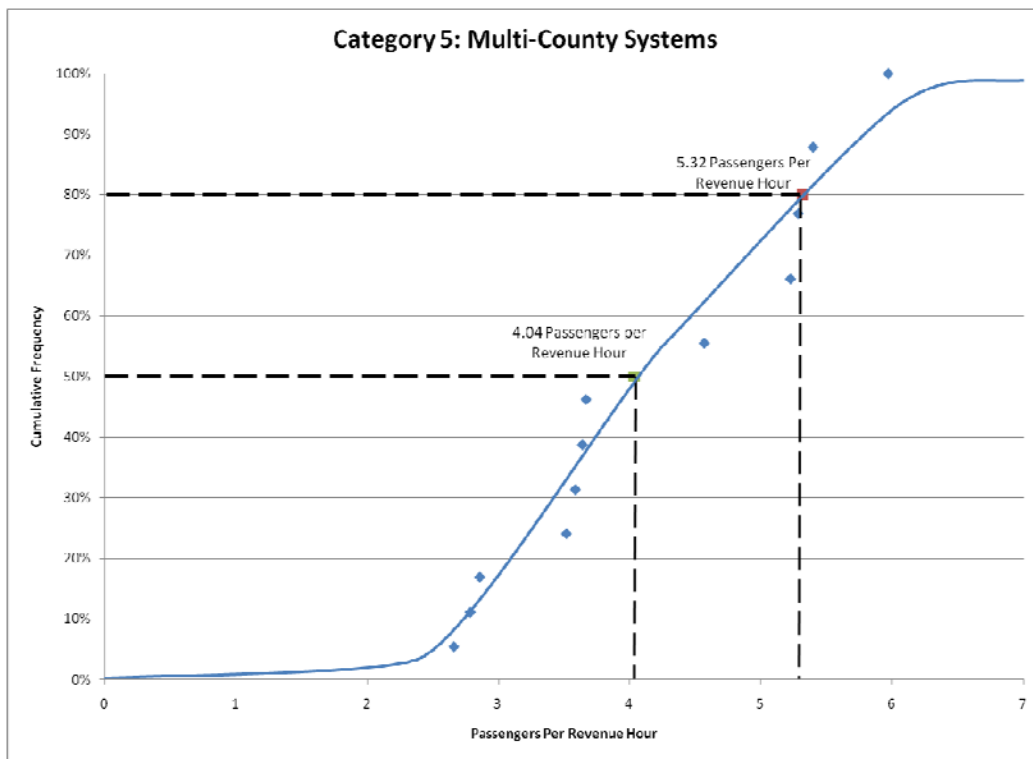


Figure 17: Passengers per revenue hour, urban systems serving over 10,000 population

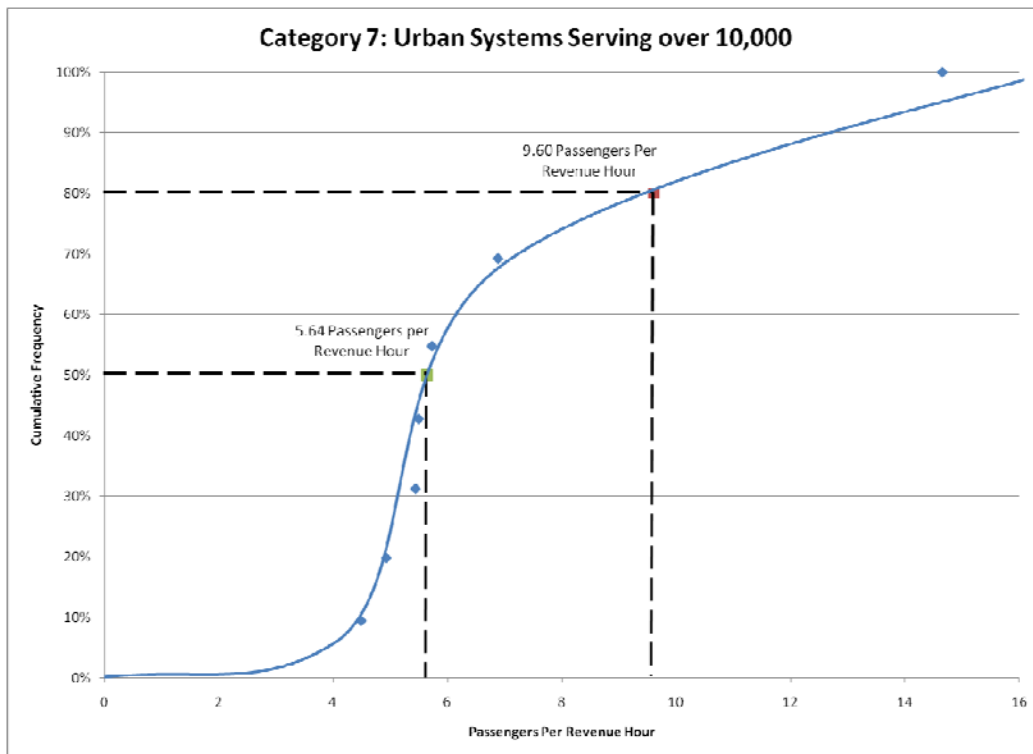
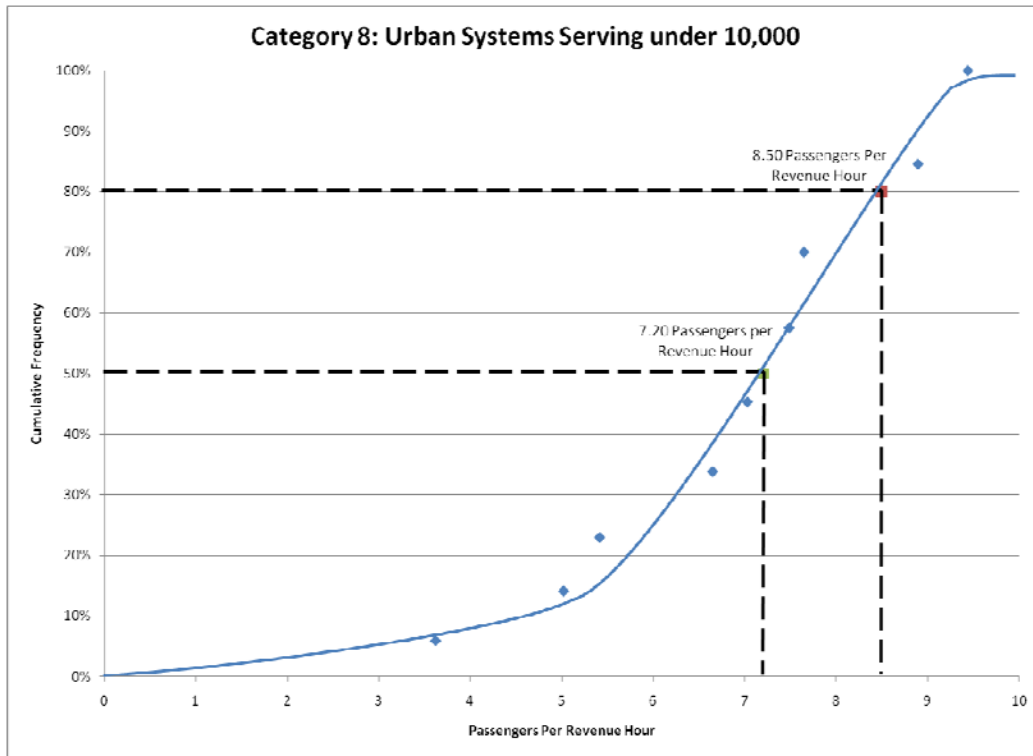


Figure 18: Passengers per revenue hour, urban systems serving under 10,000

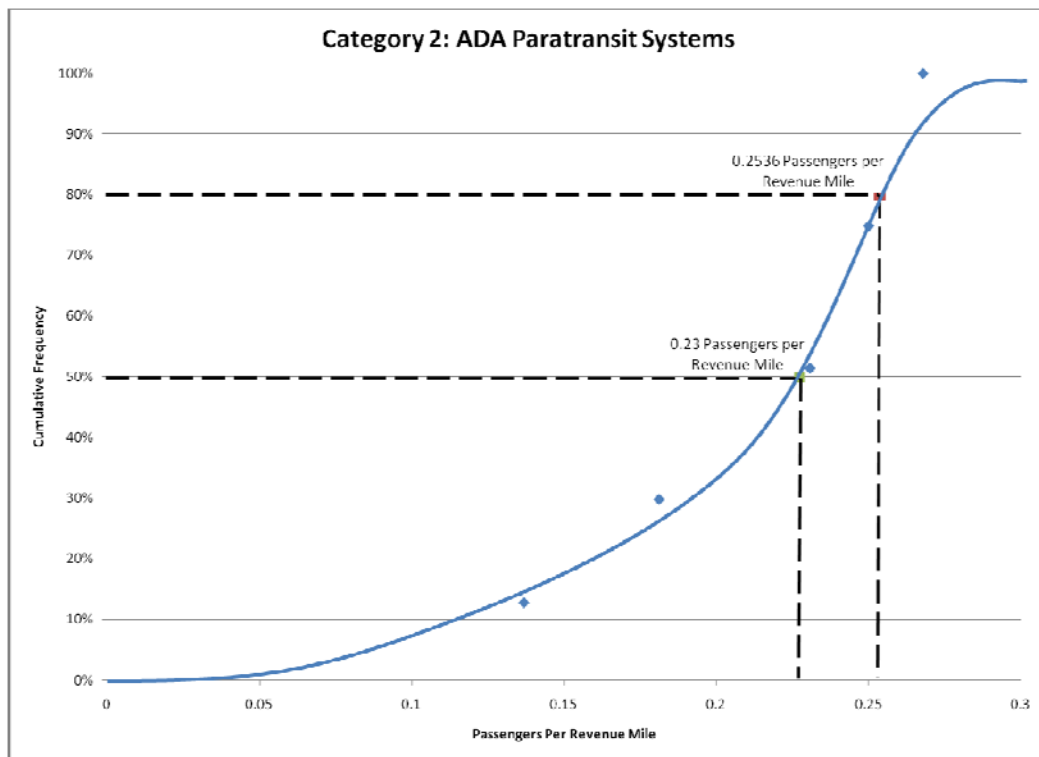
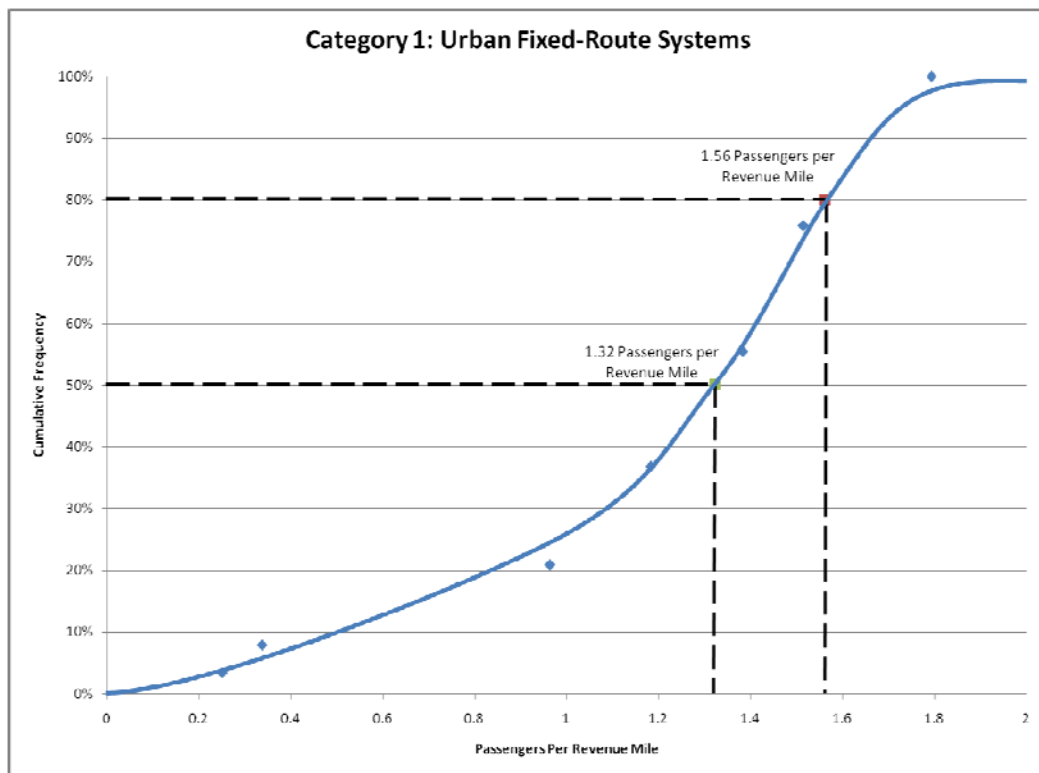


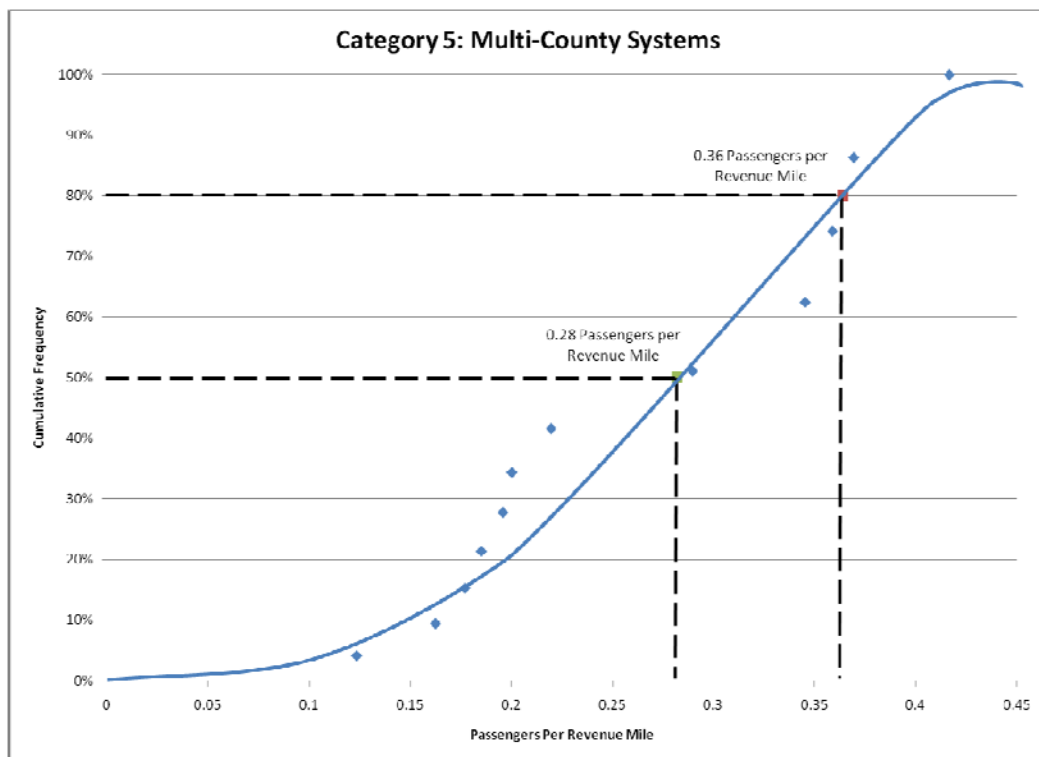
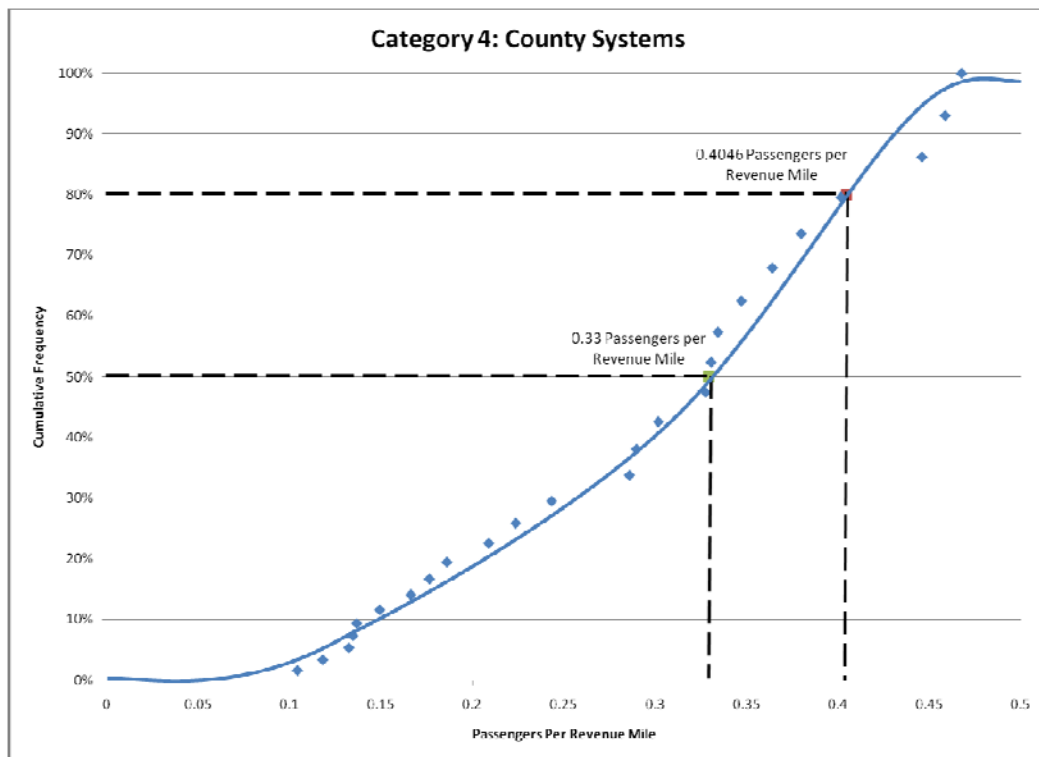
For purposes of projecting service needs it was assumed that the urban systems would maintain their current levels of productivity. For other systems it was assumed that each would achieve the 80<sup>th</sup> percentile productivity identified for the appropriate category. Table 12 presents the estimate of service hours needed to meet the 80<sup>th</sup> percentile target service levels throughout Greater Minnesota.

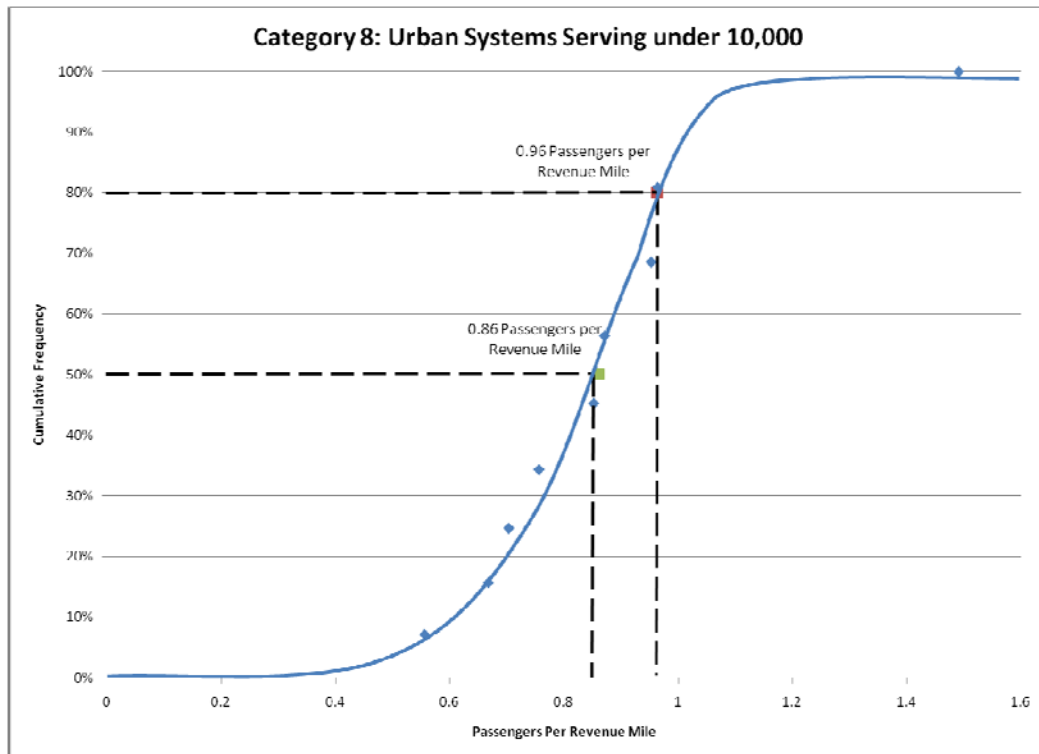
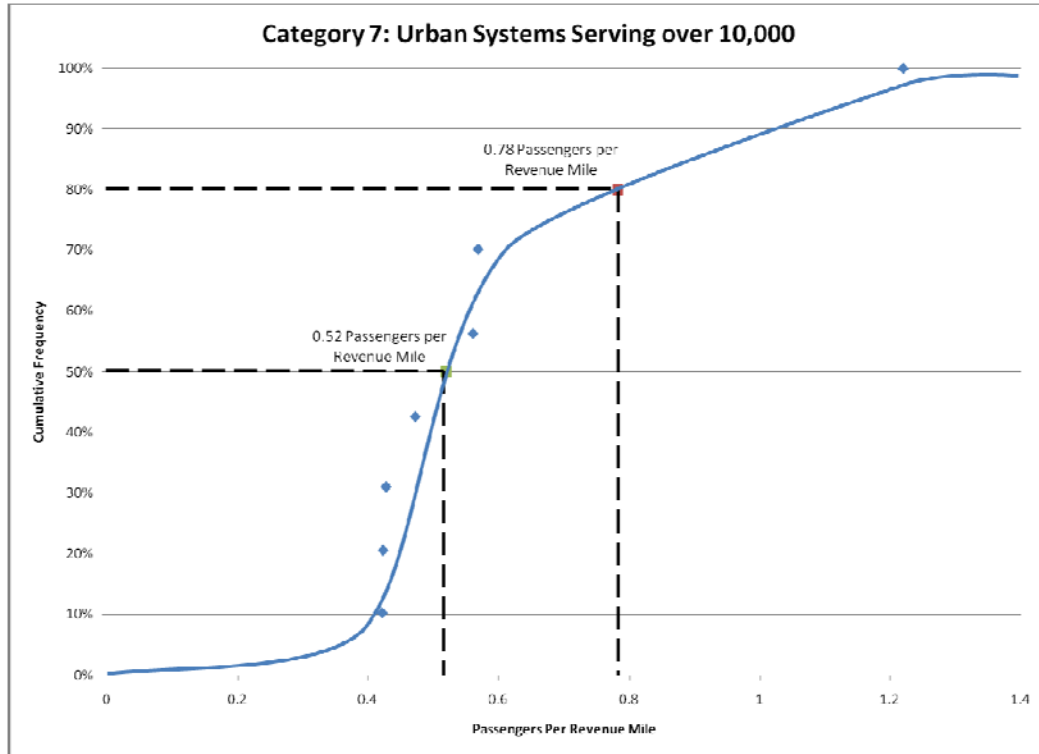
Table 12: Estimate of Required Service Hours

<b>Non-Urban Areas</b>		Annual Service Hours (thousands)		
Region		2010	2020	2030
1		40	42	43
2		33	36	38
3		89	93	94
4		58	65	68
5		58	64	68
6E		55	58	60
6W		30	30	30
7E		57	72	85
7W		102	134	161
8		52	52	52
9		51	52	53
10		157	169	178
Total Non-Urban Areas		782	867	930
<b>Urban Areas</b>		Annual Service Hours (thousands)		
Region	Area	2010	2020	2030
3	Duluth	141	173	200
4	Moorhead	26	29	35
7W	St. Cloud	87	99	108
9	Mankato	30	32	34
10	Rochester	101	114	124
Total Urban Areas		385	447	501
Total Non-ADA (Non-Urban + Urban)		1,167	1,314	1,431
<b>Urban Area ADA Services</b>		Annual Service Hours (thousands)		
Region	Area	2010	2020	2030
3	Duluth	17	17	17
4	Moorhead	11	15	19
7W	St. Cloud	39	44	48
9	Mankato	6	7	7
10	Rochester	13	15	16
Total Urban Area ADA		86	98	107
Total Urban Area Systems		471	545	608
Total State Transit Systems		1,253	1,412	1,538
Under-Served Areas		110	120	127
Unserved Areas		57	61	63
<b>GRAND TOTAL</b>		<b>1,420</b>	<b>1,593</b>	<b>1,729</b>

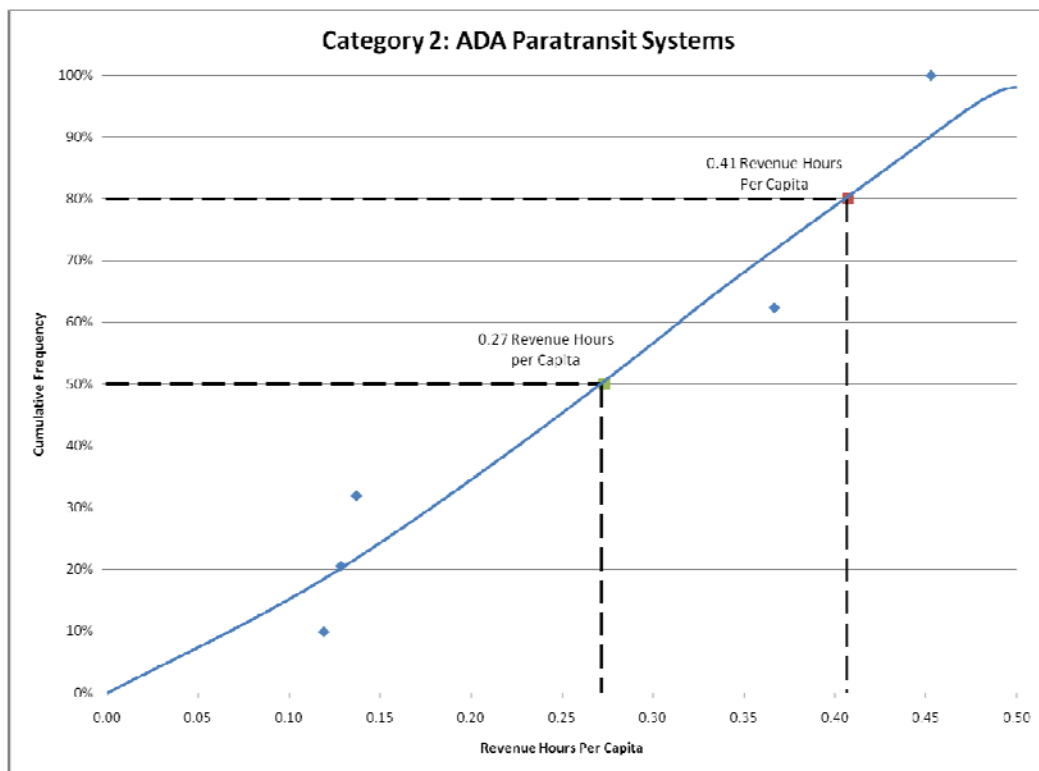
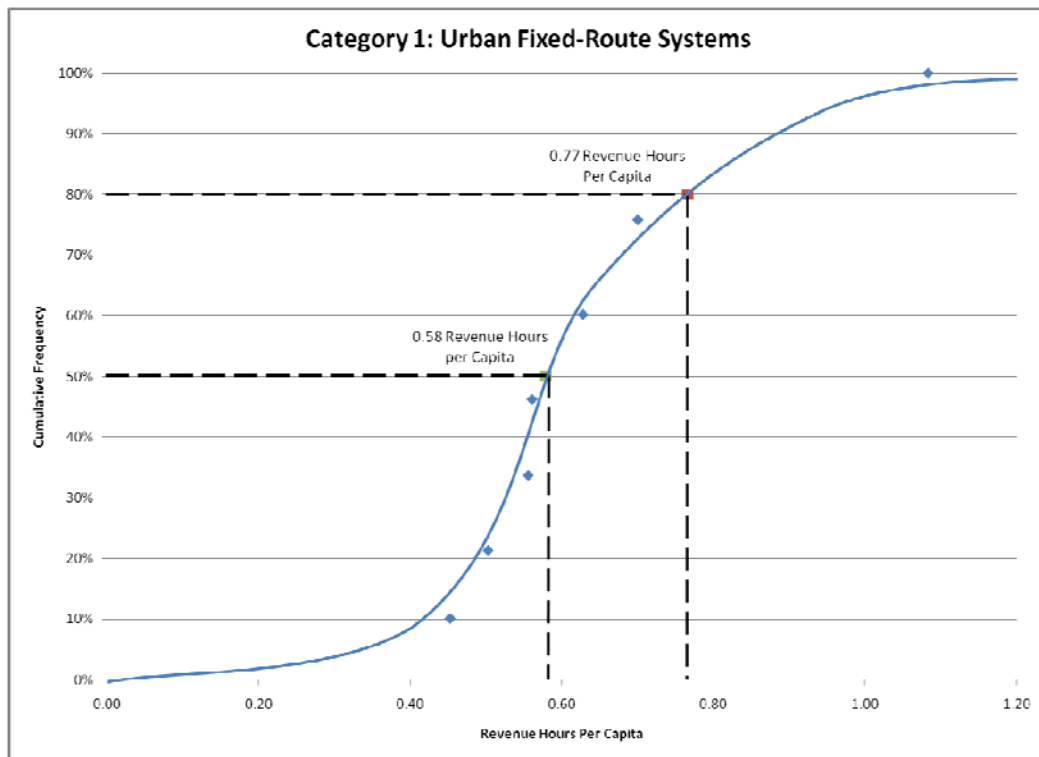
### APPENDIX A: PASSENGERS PER REVENUE MILE

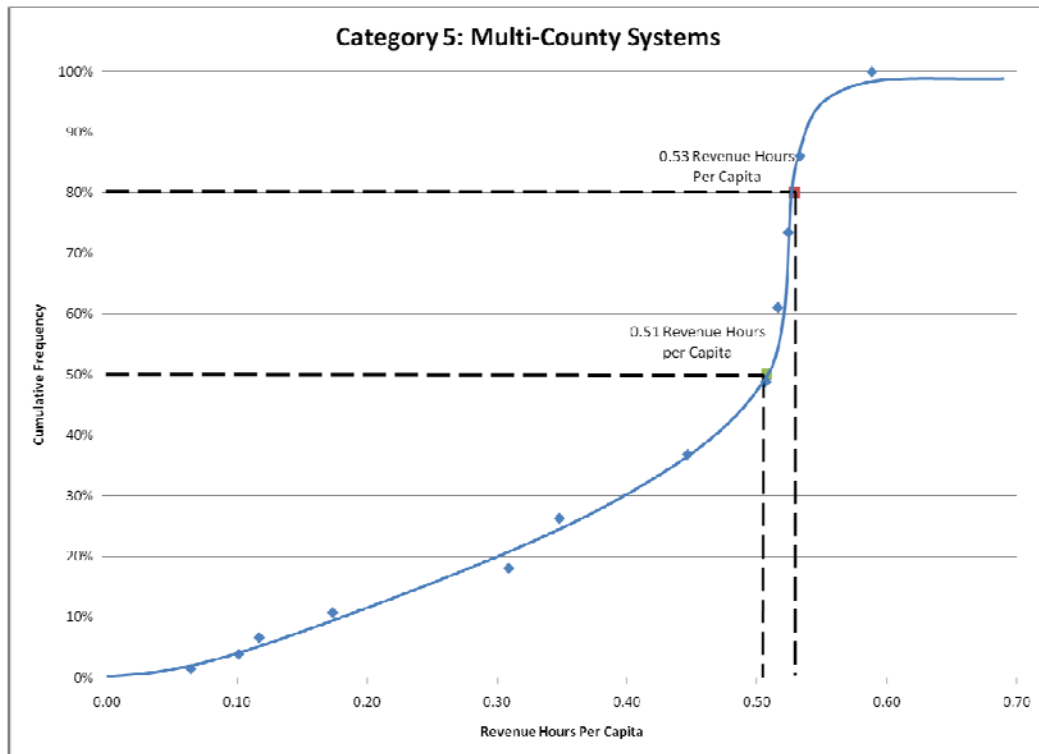
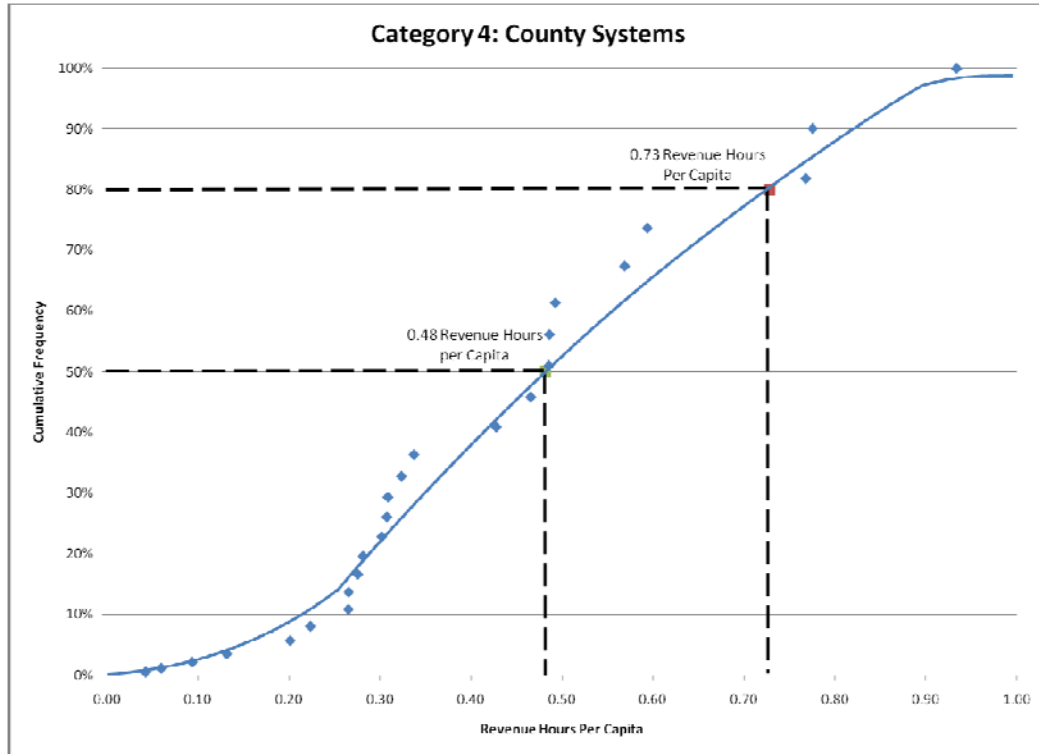


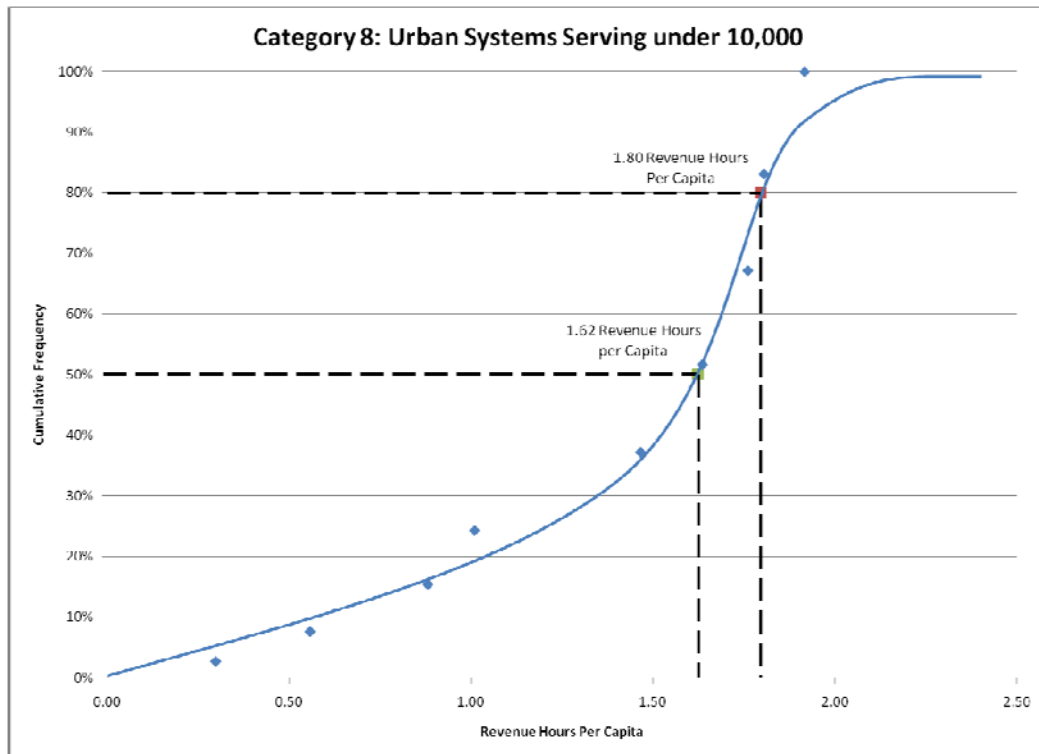
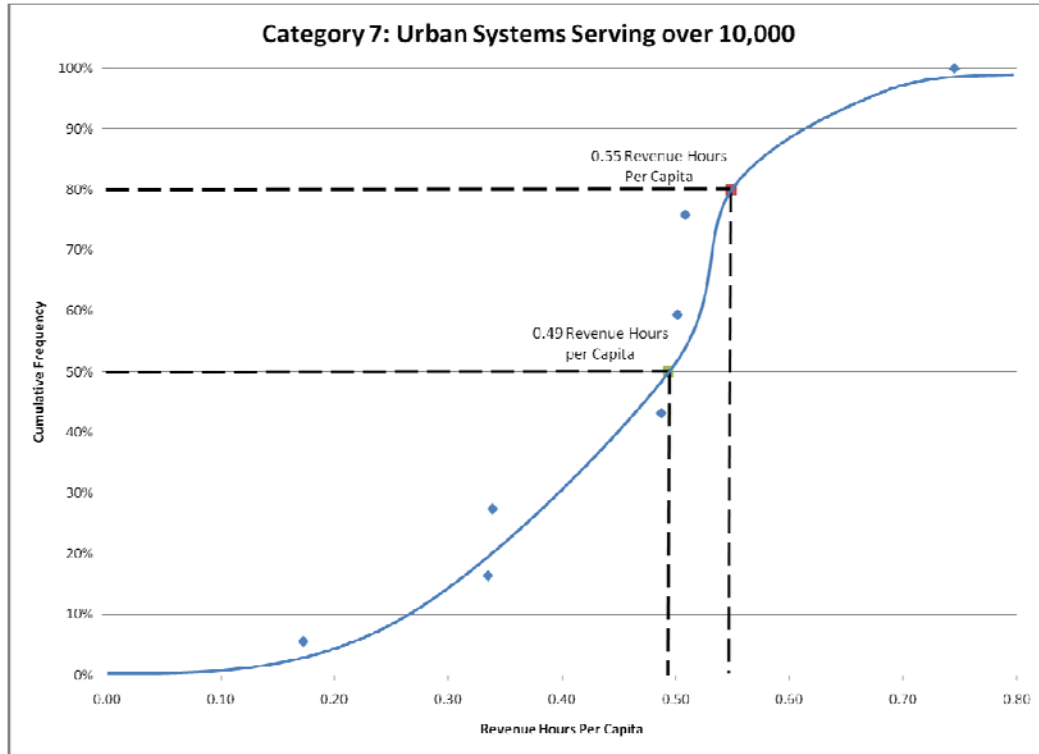




## APPENDIX B: REVENUE HOURS PER CAPITA







### APPENDIX C: REVENUE MILES PER CAPITA

