

Kansas Regional Transit Pilot Study Fort Riley

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Introduction

Using the Fort Riley pilot area for review in the Kansas Regional Transit Pilot Study, this document is organized to include: a zonal analysis of trade activity in Fort Riley, an interaction analysis that examines competition with other pilot cities, a Journey-to-Work traffic flow analysis, and a net daily migration analysis. All demographic data were acquired from 2007 estimates that were derived using PCensus software. For variables where 2007 estimates were not available, such as persons with disabilities, projections were made using 2-year rates of change that were generated from 1990 and 2000 U.S. Census data. In addition, Journey-to-Work data were acquired from the 2000 U.S. Census.

For the maps that follow, two primary software programs were used to analyze and display the information used in this study—ESRI’s ArcGIS and Caliper’s TransCAD for the Web. While TransCAD was primarily used for examining Journey-to-Work traffic flows (pages 6 and 7), ArcGIS was used in a number of ways, including calculating zonal intensities around Fort Riley (page 4), overlaying other pilot city zones for an interaction analysis (page 5), and displaying net daily migrations for counties adjacent to Geary and Riley counties (pages 7 - 9).

While the TransCAD program was used in its entirety for the Journey-to-Work traffic flow analysis, two primary tools were used in ArcGIS, including “Thiessen Polygons” and “Generate Near Table.” A Thiessen Polygon is a polygon whose boundaries define the area that is closest to each point (i.e., a city) relative to all other points. Thiessen polygons are generated from a set of points and are mathematically defined by the perpendicular bisectors of the lines between those points. The “Generate Near Table” tool is used to determine the distance from each point to specifically defined points (i.e., pilot cities) and displays the results in a table for further analysis using ArcGIS.

Demographic Characteristics

Since the zonal analysis that follows calculates natural trade zones using distance as the primary impedance factor (as opposed to actual need by an area’s population), it is important to first look at county demographic data. Table 1 shows demographic information for Geary and Riley counties as well as the nine counties chosen for further analysis. For the purpose of comparing these values to Kansas averages, percentages that exceed the State average for their respective demographic characteristic are highlighted. Regarding the percentage of the population that is classified as elderly (60 years of age or older), seven out of eleven exceed the State average of 23 percent, including Clay, Dickinson, Marshall, Morris, Nemaha, Republic, and Washington counties. Regarding the percentage of the population that falls below the poverty level (as defined by the U.S. Census Bureau), Geary County and Republic County are the only two counties that exceed the State average of 12 percent. Regarding the percentage of the population that is classified as disabled between the ages of 16 and 64, Washington County is the only county that exceeds the State average of 14 percent. Finally, regarding the percentage of the population that has only one or no vehicle, Geary, Marshall, Republic, and Riley counties all exceed the State average of 34 percent. Altogether, it appears that Republic County exceeds the State average in three of the four demographic characteristics and both Geary County and Washington County exceed the State average in two of the four demographic characteristics. Therefore, these three counties should all be given special attention throughout the analysis that follows due to their greater relative need for transit.

Zone	County	Total Population	Total Households	Total Elderly	Percentage Elderly	Total Poverty 1990	Total Poverty 2000	Rate of Change for Poverty (2 Year Interval)	Total Poverty 2007	Percentage Poverty 2007
1	Geary	23,675	11,530	3,170	13%	4,612	3,999	-3%	3,627	15%
1	Pottawatomie	19,437	7,954	3,400	17%	1,585	1,675	1%	1,742	9%
1	Riley	62,827	24,735	6,567	10%	11,557	6,578	-9%	4,594	7%
1	Wabaunsee	6,973	3,156	1,483	21%	594	505	-3%	452	6%
2	Clay	8,636	4,114	2,214	26%	1,119	1,025	-2%	965	11%
2	Morris	6,077	3,214	1,555	26%	824	704	-3%	632	10%
3	Dickinson	19,234	8,816	4,573	24%	2,083	1,977	-1%	1,907	10%
3	Marshall	10,304	4,981	2,820	27%	1,545	1,336	-3%	1,209	12%
3	Republic	5,026	3,004	1,682	33%	772	780	0%	786	16%
3	Washington	5,900	3,119	1,799	30%	1,028	829	-4%	717	12%
4	Nemaha	10,419	4,348	2,676	26%	1,517	1,141	-5%	943	9%
	Kansas Avg:	26,362	11,397	4,657	23%	2,643	2,619	-1%	2,649	12%
Zone	County	Total Disability 1990	Total Disability 2000	Rate of Change for Disability (2 Year Interval)	Total Disability 2007	Percentage Disabled 2007	Total 0 or 1 Car Households	Percentage 0 or 1 Car Households		
1	Geary	1,628	1,906	3%	2,134	9%	3,953	44%		
1	Pottawatomie	768	1,037	7%	1,291	7%	2,000	28%		
1	Riley	1,791	2,427	7%	3,030	5%	8,882	39%		
1	Wabaunsee	349	448	6%	537	8%	616	23%		
2	Clay	504	715	8%	925	11%	1,192	33%		
2	Morris	307	479	11%	667	11%	878	34%		
3	Dickinson	728	1,380	18%	2,245	12%	2,618	33%		
3	Marshall	732	833	3%	913	9%	1,481	35%		
3	Republic	227	405	16%	627	12%	770	35%		
3	Washington	445	719	12%	1,029	17%	813	33%		
4	Nemaha	518	801	11%	1,107	11%	1,260	33%		
	Kansas Avg.	973	1,808	22%	3,012	14%	3,729	34%		

Table 1: Demographic characteristics of counties within the Fort Riley analysis area. Highlighted values indicate above average values.

information is readily accessible (Figure 3). For Fort Riley, when not considering the counties already recommended for further investigation in the zonal analysis, it is clear that Clay, Dickinson, and Shawnee counties would benefit from further analysis due to its relatively high traffic volumes (represented by orange bands) with Geary / Riley counties.

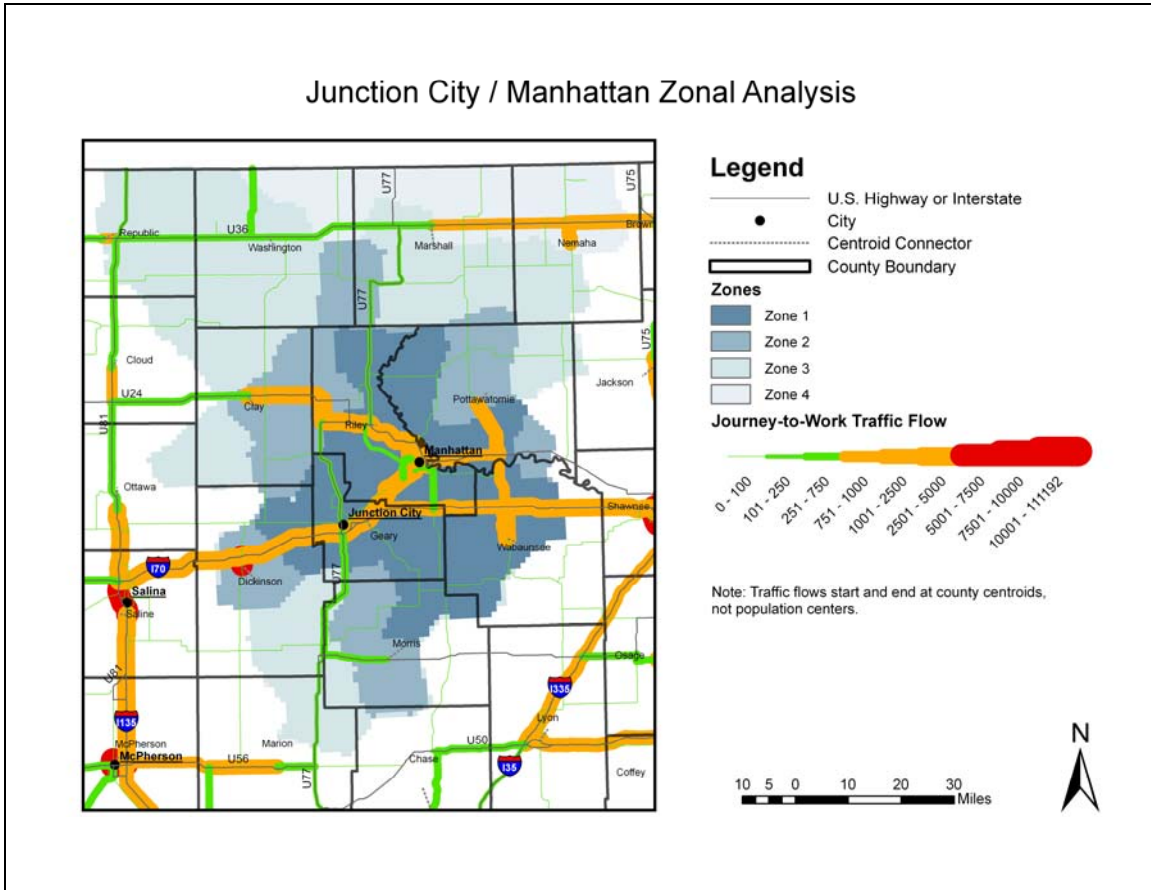


Figure 3: Journey-to-Work traffic flows. Green bands depict relatively light traffic volumes and orange and red bands reflect relatively higher traffic volumes.

Although Figure 3 only shows bi-directional traffic flows that require the assumption that adjacent counties do, in fact, interact with one another, an analysis of net daily (work) migration patterns support this assumption (Figure 4). Counties that are shaded a color of purple indicates a negative net daily migration, meaning that more people leave the county than enter on a daily basis. The opposite is true for counties that are shaded a color of blue. Finally, counties that are shaded brown have a zero net daily migration and are, therefore, considered neutral. Although Geary County has a negative net migration value, Riley County has a positive net migration value and, therefore, attracts workers on a daily basis for employment.

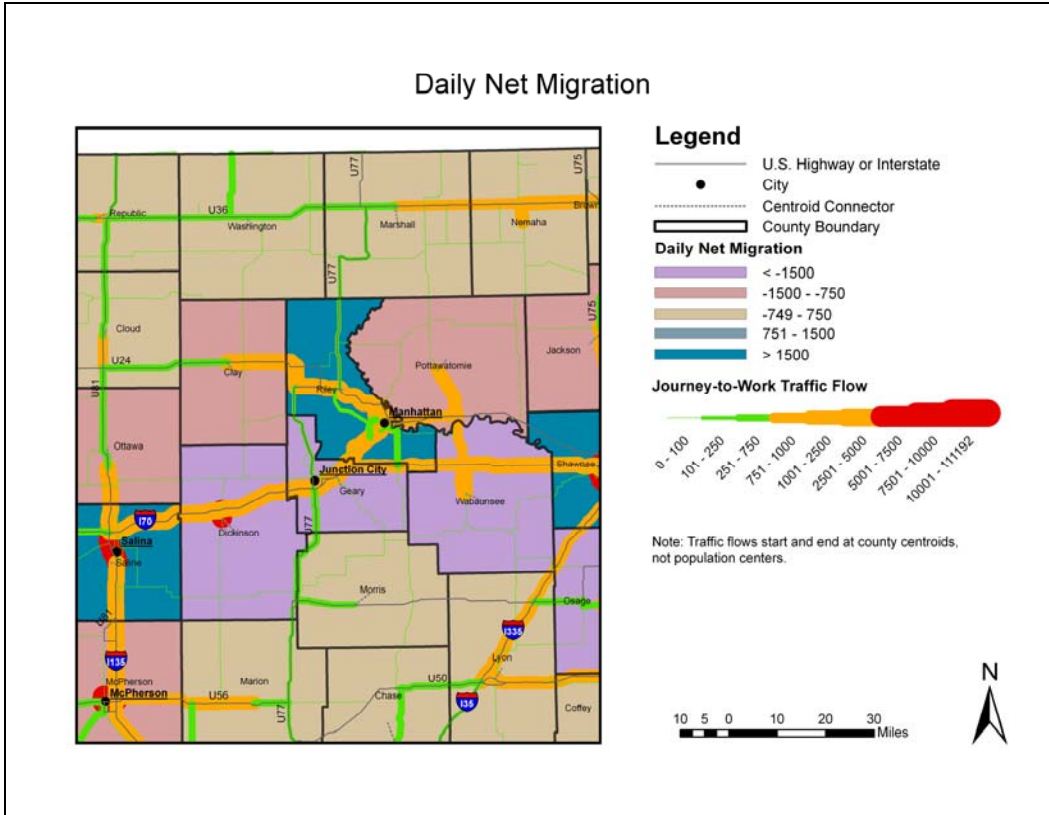


Figure 4: Daily net migration for counties in the Fort Riley analysis area.

In an effort to determine the actual flow between counties, especially those that are not adjacent, it is necessary to examine actual traffic flows between Geary and Riley counties and all available counties within the analysis area. Figure 5 depicts bands of flow into (green) and out of (red) Geary County. Examined in conjunction with Table 2, it appears that Geary County does provide more people than attract from counties within the analysis area. However, it should be noted that a substantial number of people are commuting from Riley and Dickinson counties.

Figure 6 depicts similar information regarding Riley County. Examined in conjunction with Table 3, it appears that Riley County attracts a substantial number of people from counties within the analysis area, especially Geary and Pottawatomie counties.

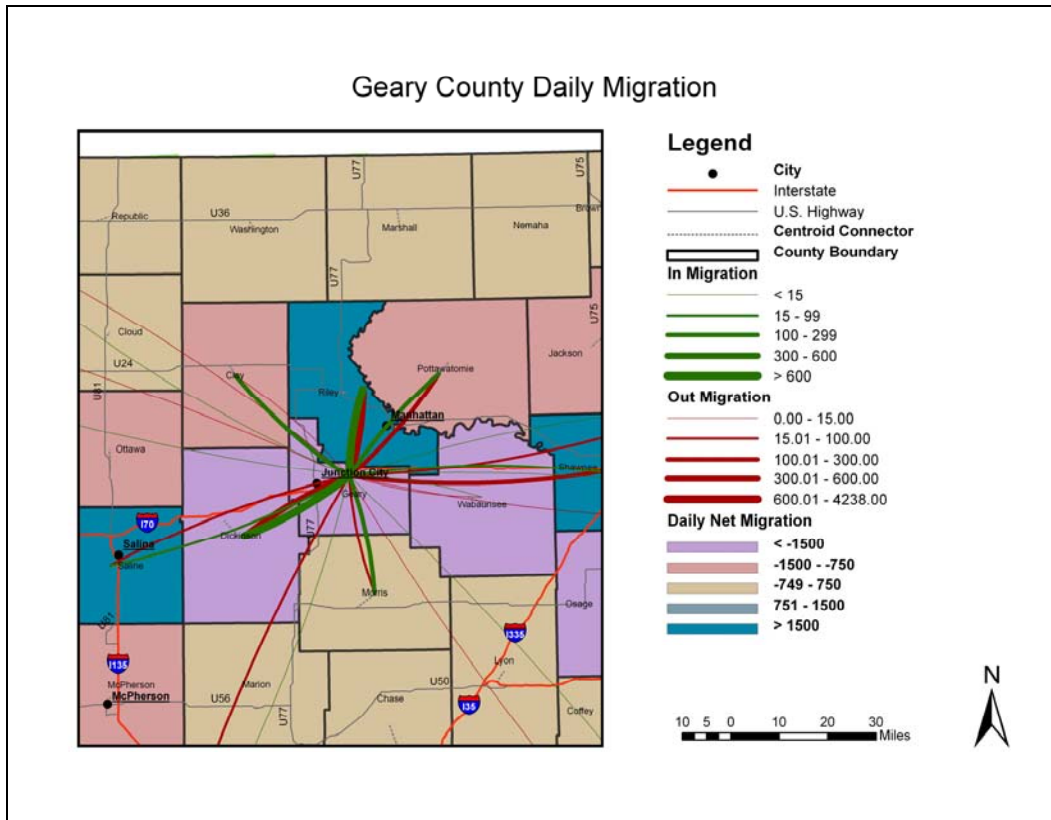


Figure 5: Journey-to-Work traffic flows. Green bands depict daily in-migration to Geary County and red bands reflect daily out-migration from Geary County.

County	In-Migration	Out-Migration
Riley	2,013	4238
Dickinson	691	376
Clay	249	6
Pottawatomie	181	131
Morris	173	59
Shawnee	27	101
Saline	25	66
Johnson	15	0
Wabaunsee	14	0
Sedgwick	8	18
Marshall	1	3
Cherokee	0	10
Jefferson	0	16
Jewell	0	10

Table 2: Daily migration into and out of Geary County.

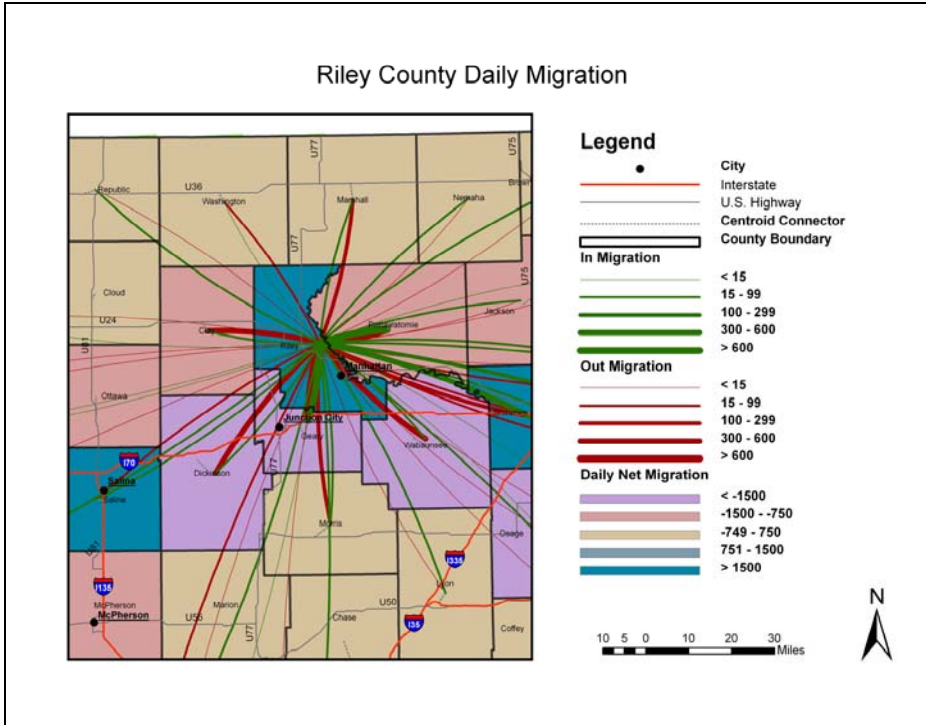


Figure 6: Journey-to-Work traffic flows. Green bands depict daily in-migration to Riley County and red bands reflect daily out-migration from Riley County.

County	In-Migration	Out-Migration	County	In-Migration	Out-Migration
Riley	9,110	5277	Anderson	0	21
Geary	4,238	2013	Brown	0	18
Pottawatomie	2,694	1821	Cowley	0	16
Dickinson	573	62	Franklin	0	10
Clay	398	95	Gray	0	18
Wabaunsee	328	19	Lyon	0	42
Morris	230	33	Sumner	0	12
Shawnee	187	506			
Marshall	157	57			
Johnson	56	162			
Douglas	40	17			
Washington	40	9			
Sedgwick	34	64			
Jefferson	28	0			
Wyandotte	27	72			
Saline	22	69			
Trego	15	0			
Mitchell	12	7			
Ellis	9	10			
Jackson	9	51			
Nemaha	7	42			
Republic	4	20			

Table 3: Daily migration into and out of Geary County.

Conclusion

Overall, the counties in Fort Riley's analysis area can be organized into three groups based on their dependence on Fort Riley for services, from greatest dependence to least dependence. Those with the greatest dependence have high zonal intensities, including: Geary, Pottawatomie, Riley, and Wabaunsee counties. Those with the next level of dependence have strong traffic flow interactions with Fort Riley, including Clay, Dickinson, and Shawnee counties. Finally, those with the lowest relative dependence rely on Fort Riley typically for specialized services only and do not display strong traffic flow interactions. These counties include Marshall, Morris, Nemaha, Republic, and Washington. However, it must be restated that demographic characteristics indicate a potential *need* for coordinated transit service in both Republic County and Washington County.

Further analysis should consider potential transit demand by acquiring the actual number of employees from every major employer in the area. This information can be acquired at a generalized level (a.k.a. zip code information only). Additionally, current ridership information would be beneficial in identifying actual travel patterns for transit-dependent populations.