AN ANALYSIS OF PUBLIC TRANSIT DEMAND IN LACKAWANNA AND LUZERNE COUNTIES

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Introduction

The purpose of this study is to use the best available data to determine areas that are underserved (or overserved) by public transportation in the Lackawanna and Luzerne County region by analyzing how well existing transit services correlate with the areas of highest demand for transportation. This will identify potential areas in which the region’s public transportation network can be improved with the goal of improving access to alternative transportation modes and enhancing the region’s sustainability with regard to transportation. This analysis is limited to evaluating transit use as a means of commuting. It does not address individuals that use public transit for shopping, health care, or other reasons. It does not include an analysis of accessibility for seniors (in terms of location or distance to a stop) or those who are physically challenged. These populations may experience additional barriers to transportation not addressed here. Finally, the study also does not address commuters in the region who utilize private bus operators to commute outside of Northeastern Pennsylvania, such as those who ride buses to New York City.

There are two main components to the analysis: transit demand and transit supply. Transit demand is analyzed qualitatively based on factors known to correlate with demand for and suitability of fixed-route public transit. The connection between transportation and factors such as land use and population density is well established. Sufficient population, housing, and employment density are necessary for a sustainable transit system.\(^1\)\(^2\)

There are other factors that also influence transit ridership. These include:\(^3\)

- Availability and cost of parking
- Traffic congestion and other barriers to car ownership
- Connectivity of transit services to one another and to other transportation modes
- Urban form and design
- Mix of land uses
- Marketing and perception
- Socioeconomic factors

These factors are difficult to study systematically by using available data and are generally outside the scope of this analysis.

The main unit of analysis is the census tract level, which provides neighborhood-scale granularity in the more urbanized portions of the region, though more rural census tracts can cover larger areas with more diverse types of built environments. The specific transit demand factors included in the analysis are population density, total primary jobs and job density, and the number of households without access to a vehicle. Furthermore, a “Transit Score” was calculated that synthesizes these three factors into a single value that attempts to quantify a community’s potential to sustain public transit, based on a methodology used by New Jersey Transit.\(^4\) Additionally, individual points were added to a map layer to represent key locations that drive trip demand, such as employment centers, shopping centers, educational institutions, and other activity centers in order to add an additional dimension to analyzing sources of transit demand.

The second component of the analysis is transit supply, defined as the availability of regularly-scheduled, year-round, weekday fixed-route bus service. Transit routes were digitized based on publicly
available data from all three transit operators in the region: COLTS in Lackawanna County, LCTA in the northern portion of Luzerne County, and Hazleton Public Transit in the southern portion of Luzerne County. Several routes that are seasonal or that operate only on weekends or evenings were excluded, as this study approaches public transit as an alternative mode choice for commuting to work.

Using a Geographic Information Systems (GIS) analysis, the demand and supply factors were then overlaid to qualitatively examine areas that were potentially overserved, underserved, and where connectivity between existing services can be improved.

**Transit Demand**

The map below shows population density at the tract level for the two county region. The region can be broadly divided into four types of population density patterns:

- The three urban cores of the region (Scranton, Wilkes-Barre, and Hazleton), represents areas of medium to high population density
- Medium density communities extending along much of the Interstate 81 corridor and northward in the Lackawanna Valley, as well as medium density suburbs such as the Back Mountain, Mountain Top, and The Abingtons.
- Outlying boroughs and cities, such as Carbondale, Conyngham, Freeland, Nanticoke, and Shickshinny, which have densities higher than the rural areas around them.
- Low density rural areas

**Population Density by Census Tract (2010 Census)**

![Population Density Map](image)
The total number of primary jobs is shown on the map below. The downtowns of both Wilkes-Barre and Scranton have a large number of jobs, as do many suburban areas that are home to industrial and office parks. The lowest job totals tend to exist in two different types of communities: neighborhoods that are near downtowns, which are largely residential rather than commercial/industrial, and the most rural communities in the two county region which have very low densities.

Total Primary Jobs by Census Tract (2014)

The number of households without access to a vehicle amounts to 8.6 percent of Lackawanna County households and 10.9 percent of Luzerne County households, according to 2015 data from the U.S. Census Bureau. Households without cars are most concentrated in and around the urban cores of the region, as well as other denser and more walkable communities.
The Transit Score was calculated for each census tract based on employment and job density, and the number of households with no vehicle available, using the methodology used by New Jersey Transit. The Transit Score does not capture all facets of transit suitability in a community, so it is not a reliable predictor of whether or not an area should be served. However, it serves as a useful baseline comparison for comparing the suitability of communities for public transit.\(^5\)

The highest transit scores are concentrated in the urban cores of the region, as well as Nanticoke and Pittston. Other higher density communities and suburban areas have medium scores, while the rural parts of both counties have very low Transit Scores.
The map presented below details the most prominent potential trip generation sites throughout Lackawanna and Luzerne Counties in order to add an additional layer of complexity to the transit demand analysis and account for individual sites that may generate significant transit trips that were not captured in the previous maps. A total of 188 points in the two counties were identified, representing land use categories largely mirroring the classification structure utilized by the Institute of Transportation Engineers’ (ITE). The first category, for example, consists of airports and intermodal transportation centers, which reflects the port and terminal land use categories in ITE’s manual. The second category identifies major points of regional industry, such as manufacturing centers, warehouses, distribution centers, and industrial parks. The third category locates major lodging sites, including hotels, motels, and resorts. The map’s fourth category – recreational organizations – is the largest section represented, due to the myriad of attractions falling under its classification: parks, theaters, racetracks, casinos, amusement parks, ski areas, and recreational community centers. The fifth category identifies institutional facilities, such as colleges and universities, museums, and libraries. The sixth category locates all prominent medical resources, such as hospitals, clinics, and nursing homes. The seventh category, office buildings, includes government office buildings, post offices, and business
parks. The final category – retailers – spans a wide variety of stores, including shopping centers and malls, superstores, and supermarkets. For this analysis, only large shopping centers (enclosed shopping malls and shopping centers with more than one anchor tenant) were generally included. Other sites, such as industrial sites and office buildings, were also evaluated on a case-by-case basis for inclusion on the map.

Another category from the ITE manual – residential buildings – was omitted from this map, as this category includes apartment buildings, condominiums, and even single-family detached houses. Including such a category, as a result, would unnecessarily enlarge the scope and scale of the map as a tool for identifying key trip generation sites throughout Northeastern Pennsylvania.

Identified Trip Demand Points

The vast majority of identified trip generation points are located in the immediate vicinity of Scranton and Wilkes-Barre and the Interstate 81 corridor. There is also a cluster of points around the city of Hazleton and its surrounding area. Some smaller outlying communities such as Carbondale and the Clarks Summit/Abington area also have a number of identified points, and there are additional sites located in rural areas, including recreational facilities, educational institutions, and industrial parks.
In summation, the transit demand data suggests the highest demand factors are largely concentrated along the Interstate 81 corridor between Wilkes-Barre and Scranton, as well as Hazleton. Other outlying towns and established suburbs, such as The Abingtons, Carbondale, Dallas, Mountain Top, and Nanticoke, also show signs of significant transit demand.

Existing Transit Routes
To correspond with the above analysis of transit demand, transit supply is understood as the currently available bus service routes in the two counties. Other transportation services, such as paratransit and Shared Ride transit programs, also exist in the region, as do traditional taxicab services and mobile app-based ridesharing services Uber and Lyft. However, these services are beyond the scope of this analysis. Bus routes were digitized into GIS format based on the most recent available data from the three transit operators in the region. However, some routes were excluded, including seasonal routes, weekend routes, and evening only routes. LCTA routes are shown in red, COLTS routes are shown in gold, and HPT routes are shown in green.
The map of transit routes on the previous page, color coded by the operating agency, shows strong coverage in the urban cores of the region. Each of the three operators originate the vast majority services from a central hub: Lackawanna Transit Center in Scranton, Conahan Intermodal Center in Wilkes-Barre, and Church Street Station in Hazleton. Various routes extend from each hub to serve different parts of the region, and several routes connect the transit centers with one another. Because of this hub-and-spoke pattern, riders wishing to change from one bus to another must typically do so at a transit center, though there are other locations where routes intersect or overlap.

The three cities and adjacent communities are generally very well covered by existing transit routes. The map below shows the areas within ¼ mile of a public transit bus route in the Scranton/Wilkes-Barre area, shaded in pink. There are very few gaps in the urban cores of the region, and a number of outlying communities are also served.

Transit Access (1/4 Mile) in Scranton & Wilkes Barre Area
Similarly, routes in the southern half of Luzerne County cover the large majority of Hazleton as well as Humboldt Industrial Park and developed areas and smaller communities on the outskirts of Hazleton.

Transit Access (1/4 Mile) in Hazleton Area
Analysis

Transit Service Assessment

In general, existing transit routes provide good levels of service to the densest communities in the region. The map below shows transit routes overlaid on population density by census tract. Virtually all of the medium and high population density tracts in the region are served by one or more routes, and there is a higher route density in the urban cores. Some lower density areas also receive service as well.

For a region its size, Northeastern Pennsylvania is home to a relatively robust network of public transportation. For example, Arlington, Texas, a city of nearly 400,000 residents, a larger population than Luzerne County, has virtually no fixed-route public transit. A high-level scan of other comparable metro areas found that while most offer fixed-route transit, many have more limited service and fewer routes than Lackawanna and Luzerne Counties, as well as fewer transit trips per capita.  

Transit Routes & Population Density
The map below depicts job density by census tract and exiting transit routes. Again, the areas with the highest concentration of jobs per acre are served by existing routes. Some medium and high-employment density tracts in suburban areas are served by fewer routes, or are only marginally served by routes that traverse the edge of the census tract.

Transit Routes & Job Density

The following map shows the overall Transit Score of each census tract with existing transit routes. The existing routes correlate quite well with Transit Scores. The highest scores, mostly found along the Interstate 81 corridor and around the Wilkes-Barre and Scranton areas, tend to be well served by multiple transit routes.

Many of the suburban communities and smaller towns with medium Transit Scores are also served by one or more routes. Some communities with relatively high population density, such as Carbondale, Freeland, and other smaller dense communities at the edge of or outside the region’s core have medium to high Transit Scores but are served by fewer routes due to their distance from the nearest urban center from which bus services originate.
The final map that follows shows a ¼ mile radius around each transit route with the transit demand points referenced earlier in this report. Of the 188 total points identified, 146 of them, or 78 percent, are located within ¼ mile of at least one bus route. Among those that are not, the vast majority are located in more rural areas, as well as industrial parks at the edge of the region’s urbanized core.
In general, fewer routes connect the three urban cores of the region with each other. To some extent, this can leave out some communities and employment centers that are located in between. This strategy would fill regional gaps in service as well as provide more opportunities to residents and workers in those areas to access more frequent services and help them better connect to other routes and regional hubs.

Increased inter-agency collaboration and/or an eventual merger of transportation agencies may be a useful step in providing more connectivity between the three urban cores. In March 2017, LCTA and COLTS launched an inter-county bus pass that can be used on both systems to travel seamlessly between counties. Agencies should ensure that timetables and stops are coordinated as well as possible so that inter-county transfers between routes are as convenient as possible.

One issue in future service planning is whether to prioritize serving new communities without existing access to fixed-route transportation, or to enhance service in areas already being served. The maps above show that many of the communities not currently served by transit may not be good candidates for fixed-route service at this time, as a result of low population density, low employment density, few
households without a car, their distance from a regional transit center from which service originates, or a combination of these.

Instead, it may be a better allocation of limited transportation resources to ensure that areas already served by the transportation network are better served by increasing service frequency on existing routes or strategically adding or extending routes to fill in key gaps within the existing network, such as areas along Interstate 81 between Wilkes-Barre and Scranton, as mentioned above. It has been suggested by some transportation planners that higher frequencies are preferable to multiple, spread-out routes where wait times are longer. As a result, there may even be some routes that serve primarily rural areas that are superfluous and could be considered for elimination or consolidated with other routes.

**Current Usage Levels**

Despite availability of transit service across large portions of the region’s population centers, usage of public transit as a mode of commuting to work remains relatively low. In Lackawanna and Luzerne counties, only about one percent of workers use public transit as their mode of commuting. The vast majority, over 80 percent, commute by driving alone. Rates of transit usage are slightly higher in the three largest cities in the region, though still below the statewide and national rates of public transit commuting, which are 5.6 percent and 5.1 percent, respectively, as of 2015.

From 2000 to 2015, the percentage of commuters utilizing public transportation grew in all seven geographic areas shown on the chart below. Hazleton saw a particularly large increase; transit commuters more than doubled from 1.2 percent to 2.8 percent since 2000. Scranton and Wilkes-Barre saw slight declines from 2010 to 2015.
Other Considerations

In addition to the density and dispersion of transit routes, there are many other factors that affect the viability of public transit as a mode choice, particularly for commuting. Frequency and reliability are of high importance. Riders of transit need to know that buses will come sufficiently often to meet their needs without forcing them to wait for unacceptable lengths of time.9

Additionally, times and days that service is provided is also important. Many transit agencies focus services on the weekday daytime hours, and offer curtailed service on weekends and evenings. However, a large number of workers commute during non-traditional work hours. In many manufacturing and distribution industries, for example, alternative work schedules are common, including overnight shifts, evening and weekend shifts, and extended workdays that would require workers to commute during early mornings or later in the evening. For bus transit to be a viable option for those workers, schedules must be flexible enough to accommodate them, including workers who have regularly changing schedules and therefore may need to ride a bus at different times each day.

Cost of ridership can also be a factor; however, this is less important for “captive riders,” those who lack an alternative mode of transportation and use public transit mainly out of necessity. However, if transit fares are excessive, even this group may curtail unnecessary trips to the extent that they can. Research has found little evidence of a link between fare payment options (exact change, tokens, fare cards, mobile apps, etc.) and ridership.10

Finally, behavioral factors that affect riders are also important. This includes perceptions of transit and stigma that some associate with use of public transportation. Awareness of transit services and effective communication by transit agencies is also important in both combating stigma and misconceptions and disseminating information about services that are available.

Comparison to Other Regions

Compared to many other regions with its population size and geographic characteristics, Northeastern Pennsylvania offers a fairly robust public transit network. While the vast majority of comparable metro areas offer fixed-route transit, many have more limited service and fewer routes than Lackawanna and Luzerne Counties, as well as fewer transit trips per capita.11 Among twenty comparable metropolitan statistical areas identified in The Institute’s Pillars for a Strong Community project as having similar characteristics as the Lackawanna and Luzerne County region, transit ridership in the region ranks just below average.

Erie is one metro area in Pennsylvania that has a higher utilization of public transit. That region averages 18.2 transit trips per capita annually, compared with 6.9 in the Scranton-Wilkes-Barre-Hazleton area. There are several major differences between transit in the Erie area and Northeastern Pennsylvania. Single ride fares are comparable between the region, though day passes are priced slightly lower in Erie.12 Thus, it does not appear that cost is the biggest driver in the difference in transit trips per capita. However, the schedule in the Erie area offers greater flexibility. In Erie, many routes run until the 9:00 pm hour, and several operate as late as 11:00 pm. The Erie MTA also offers service seven days per week. In Northeastern Pennsylvania, most routes stop operating in the earlier evening hours, though there are several later evening lines serving Scranton. Northeastern Pennsylvania also offers no Sunday bus service and limited Saturday service, and most routes cease service prior to 7:00 pm. Erie also offers free service to local university students.13
Another comparable metro area, Duluth, Minnesota, averages 26.7 trips per capita. That region’s bus system has fewer routes than the three Northeastern Pennsylvania transit systems combined, but it offers more frequent service on its main corridors. Some corridors that are served by multiple routes are served by headways of 10 minutes or less at various times of the day. The table that follows shows all 20 comparable regions with their transit trips per capita and rank among all metro areas nationwide for which ridership data was available.

<table>
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<tr>
<th>Area</th>
<th>Ranking</th>
<th>Trips Per Capita</th>
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<tr>
<td>Champaign-Urbana, IL Metro Area</td>
<td>#7</td>
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<tr>
<td>Spokane-Spokane Valley, WA Metro Area</td>
<td>#43</td>
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Conclusion & Next Steps

Going forward, steps are being taken to continue regionalization of the region’s public transit. Several other service enhancements are also planned within the two counties, including service to the Wilkes-Barre/Scranton International Airport and additional night service to several industrial parks scheduled to commence later this year.

As this analysis shows, the region has a significant asset in a public transit network that extends to a large portion of the two counties’ communities. There do not appear to be large portions of the region that lack public transit entirely despite having the density to support it. Nevertheless, the considerations discussed above, such as timing and headways, may still pose barriers to ridership that could help explain the region’s relatively low utilization of public transportation. As this study was primarily focused on accessibility of transit routes without a focus on timetables, frequency of service, or connectivity of routes, further study of issues affecting public transportation in Northeastern Pennsylvania is warranted.
Endnotes

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