CHAPTER 7: TRANSIT SYSTEM PERFORMANCE

PEER SYSTEM ANALYSIS

A useful way to measure the productivity of a transit operation is to compare it to transit operations in other cities. Although few transit operations are directly comparable, there are transit operations serving small urbanized areas with similar densities and other demographic characteristics to the Shoreline Metro service area (Sheboygan) which are useful to analyze for comparative purposes. Five other small urbanized transit operations were selected for use in the comparison. Three of the transit operations are located in Wisconsin and two are located in neighboring Iowa. All of the transit operations are of similar size. The transit operations are located in Wausau, Janesville and Beloit, Wisconsin, and in Dubuque and Waterloo, Iowa. Data for comparison were published in the "agency profiles" section of the National Transit Database (NTD) for 2015 and 2016, published by the Federal Transit Administration (FTA).

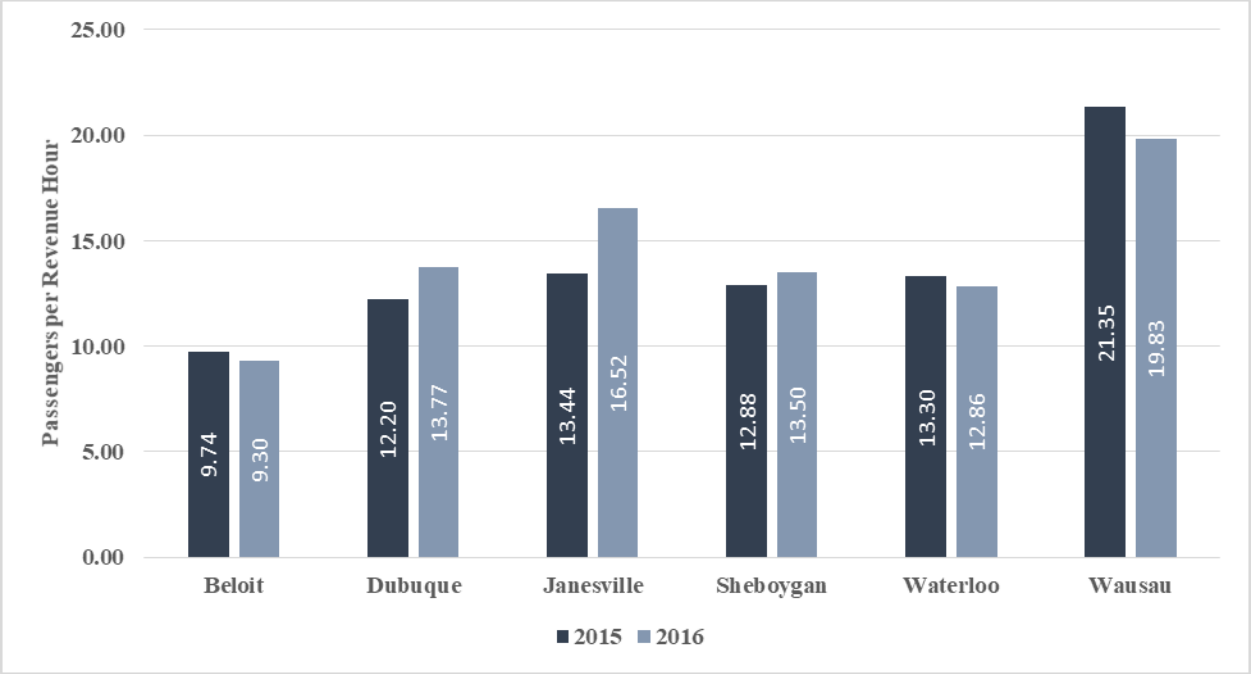
Four measures were selected for comparison of these systems. These are cost and productivity measures which are widely accepted in the public transit industry. These measures include: passengers per revenue hour; passengers per revenue mile; cost per revenue hour; and cost per passenger trip.

Please note that this peer system analysis only includes the fixed-route transit component at each transit operation, and typically does not include paratransit services.

Passengers per Revenue Hour

Figure 7.1 shows productivity in terms of passengers per revenue hour. Shoreline Metro, at 12.88 passengers per revenue hour, was the fourth highest of the six transit systems in the comparison in 2015. Utilization of Shoreline Metro increased to 13.50 passengers per revenue hour in 2016, an increase of about 4.8 percent; this compared to decreases of 7.1 percent or less in Beloit, Waterloo and Wausau, along with increases of greater than 12 percent in Dubuque and Janesville from 2015 to 2016. As in 2015, the 2016 passenger per revenue hour statistic for Shoreline Metro was the fourth highest of the peer systems.

Figure 7.1: Passengers per Revenue Hour

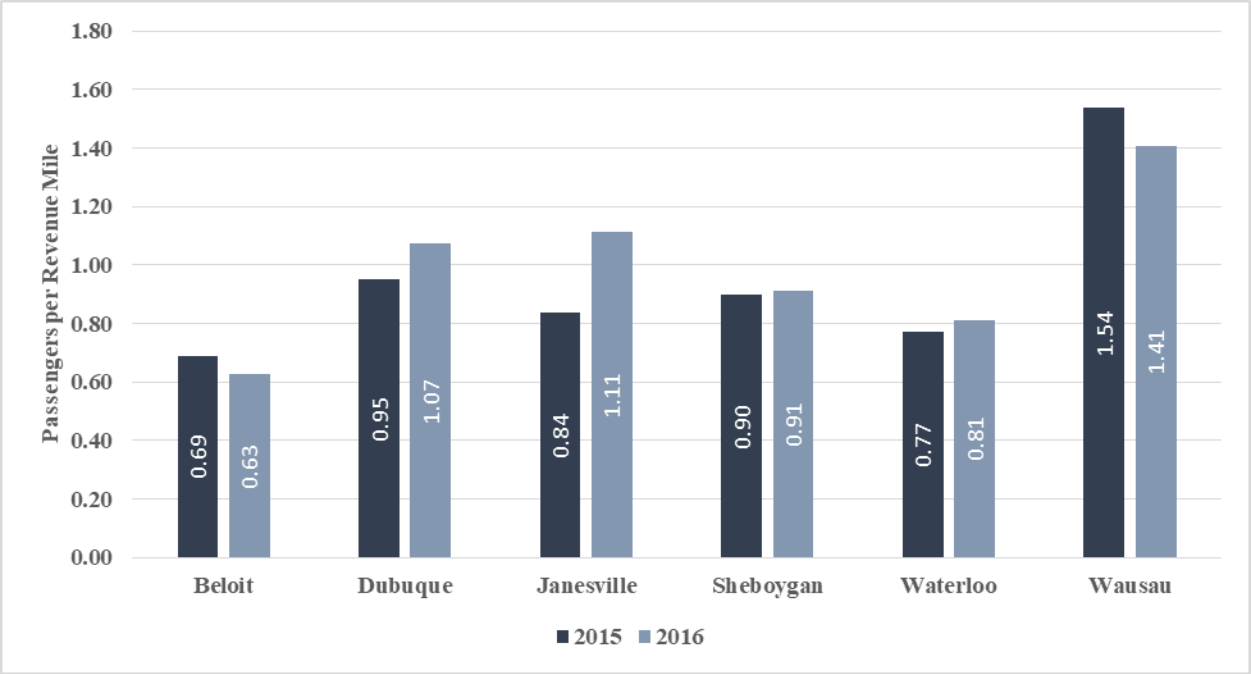


Source: *2015 and 2016 National Transit Database Agency Profiles*, Federal Transit Administration; and Bay-Lake Regional Planning Commission, 2018.

Passengers per Revenue Mile

The number of passengers per revenue mile is shown in Figure 7.2. Shoreline Metro, at 0.9 passengers per revenue mile, was the fourth highest of the six transit systems in the comparison in 2015. Utilization of Shoreline Metro increased to 0.91 passengers per revenue mile in 2016; this compared to decreases of less than 10 percent in Beloit and Wausau, and increases ranging from 5 to about 32 percent in Dubuque, Janesville and Waterloo from 2015 to 2016. The 2016 passenger per revenue mile statistic for Shoreline Metro was the fourth highest of the peer systems.

Figure 7.2: Passengers per Revenue Mile

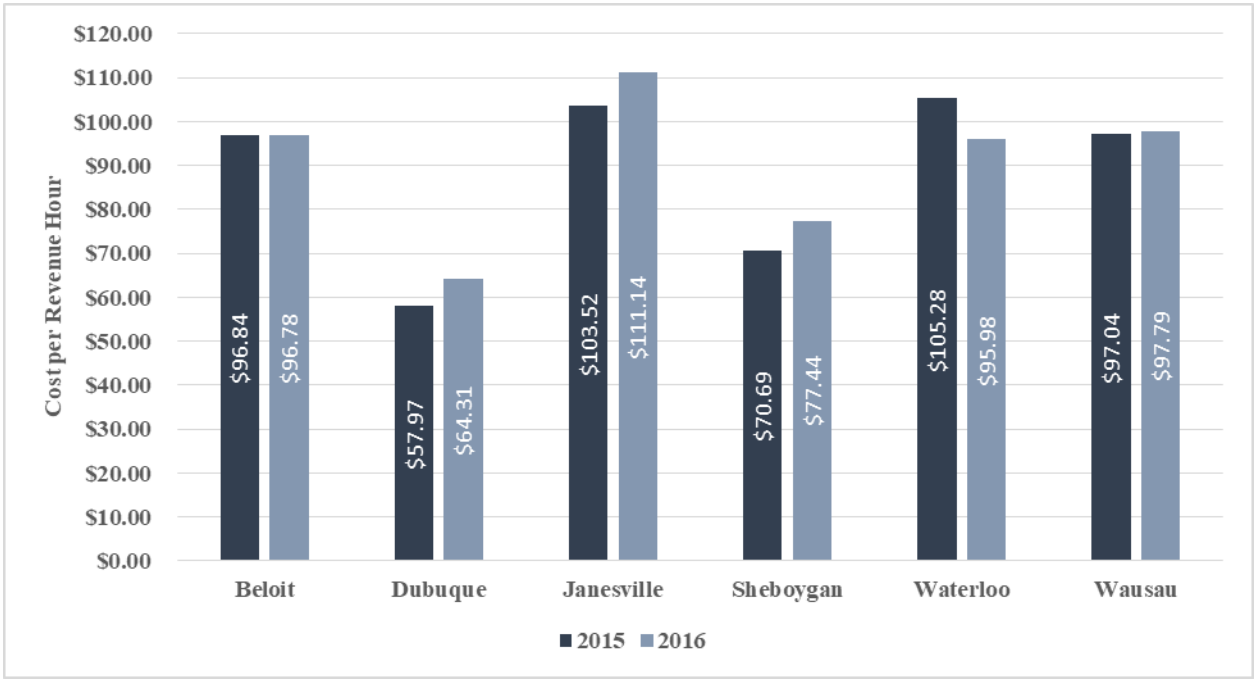


Source: *2015 and 2016 National Transit Database Agency Profiles*, Federal Transit Administration; and Bay-Lake Regional Planning Commission, 2018.

Cost per Revenue Hour

The cost per revenue hour reflecting vehicle operating costs is shown for the various transit systems in Figure 7.3. These data indicate that Shoreline Metro had the fifth highest cost per revenue hour of the six systems in the comparison in both 2015 and 2016. Shoreline Metro saw an increase in its cost per revenue hour of more than 9.5 percent between 2015 and 2016. Three of the remaining five peer systems also saw increases in their cost per revenue hour between 2015 and 2016 (Dubuque, Janesville and Wausau). Beloit saw its cost per revenue hour stay stable between 2015 and 2016, decreasing by less than 0.1 percent. Waterloo saw its cost per revenue hour decrease by about 8.8 percent.

Figure 7.3: Cost per Revenue Hour

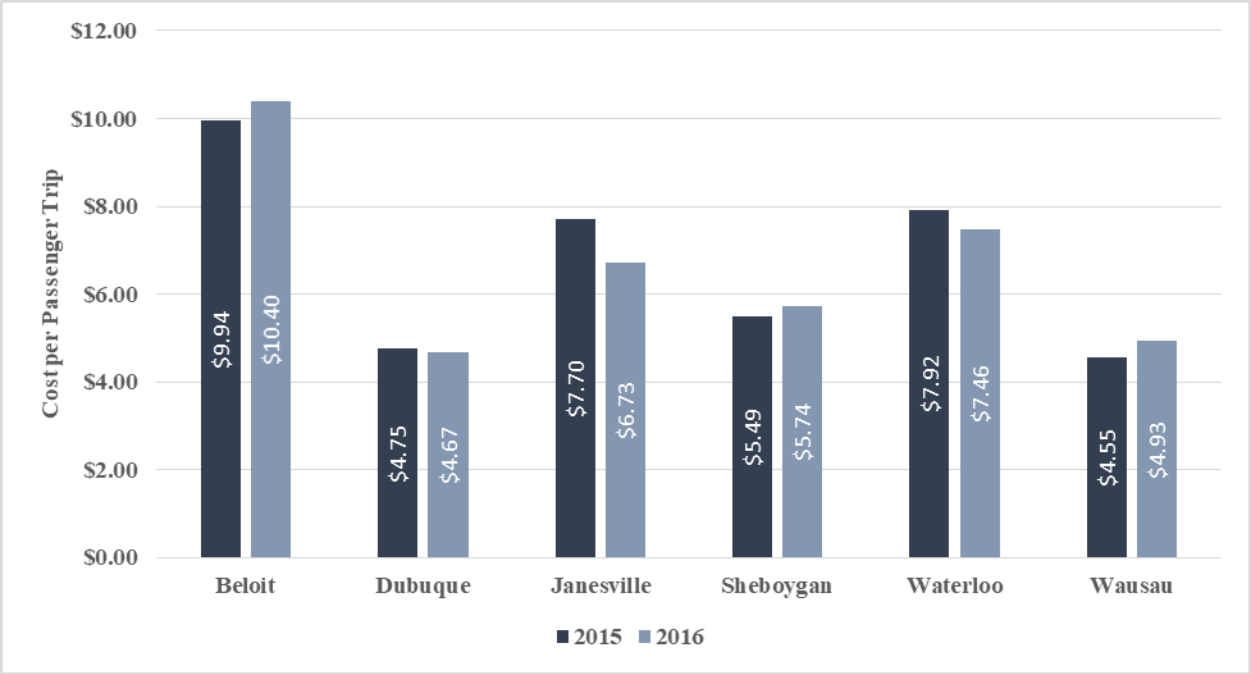


Source: *2015 and 2016 National Transit Database Agency Profiles*, Federal Transit Administration; and Bay-Lake Regional Planning Commission, 2018.

Cost per Passenger Trip

The cost per unlinked passenger trip is compared in Figure 7.4. Shoreline Metro was the fourth highest of the six transit systems in the comparison in both 2015 and 2016. The cost per passenger trip for Shoreline Metro increased to $5.74 in 2016, an increase of 4.6 percent from 2015. Dubuque, Janesville, and Waterloo saw decreases in their cost per passenger trip between 2015 and 2016. Beloit and Wausau respectively saw 4.6 and 8.4 percent increases in their cost per passenger trip between 2015 and 2016.

Figure 7.4: Cost per Passenger Trip



Source: *2015 and 2016 National Transit Database Agency Profiles*, Federal Transit Administration; and Bay-Lake Regional Planning Commission, 2018.

COST ALLOCATION MODEL

Cost information from 2017 was used to develop a three factor cost allocation model of current Shoreline Metro operations. Such a model is useful in estimating the costs of various individual routes, as well as in estimating the cost ramifications of any proposed service alternatives. In order to develop such a model, each estimate of cost is allocated to one of two service variables. The two service variables used to allocate costs are the number of revenue hours and the number of revenue miles. In addition, fixed costs are identified as being constant. This is a valid assumption for the short-term future, although fixed costs could change over the long-term future.

Examples of the cost allocation methodology include: allocating fuel costs to revenue miles; allocating operator wages to revenue hours; and allocating training and liability insurance expenses to fixed costs. Total costs allocated to each variable are then divided by the total route services quantity (i.e.: total revenue hours or total revenue miles in 2017) to determine a cost rate for each variable.

The allocation of cost for the 2017 Shoreline Metro operation is presented in Table 7.1. This cost allocation has been applied to fixed-route services only. Paratransit services provided by the Metro Connection division of Shoreline Metro have been excluded from the cost allocation methodology in order to focus on the productivity of Shoreline Metro's fixed-route service. The cost allocation shown in Table 7.1 yields the following cost equation for fixed-route services:

Total Cost = ($35.53 X Revenue Hours) + ($2.14 X Revenue Miles) + $941,750

Table 7.1: Shoreline Metro Cost Allocation Model, 2017

Annual Expenses		Cost Factor		
		Revenue Hours	Revenue Miles	Fixed Cost
Expenses - Operations				
Salaries and Wages	$1,046,006	$1,046,006		
Employer Paid Benefits	$399,822	$399,822		
Uniforms	$8,747	$8,747		
Total Expenses - Operations	$1,454,576	$1,454,576	$0	$0
Expenses - Maintenance				
Salaries and Wages	$333,985		$333,985	
Employer Paid Benefits	$163,117		$163,117	
Tires and Tubes	$48,425		$48,425	
Vehicle Maintenance	$12,927		$12,927	
Facilities Maintenance	$36,333		$36,333	
Fuel, Oils and Lubricants	$234,050		$234,050	
Tools and Small Equipment	$24,752		$24,752	
Parts	$310,473		$310,473	
Total Expenses - Maintenance	$1,164,062	$0	$1,164,062	$0
Expenses - Administration				
Salaries and Wages	$326,604			$326,604
Employer Paid Benefits	$315,960			$315,960
Financial Services Fees	$4,000			$4,000
Advertising and Marketing	$36,624			$36,624
Medical Services	$4,695			$4,695
Security Services	$1,311			$1,311
Contracted Services	$12,754			$12,754
Building and Equipment Maintenance	$35,460			$35,460
Utilities	$40,487			$40,487
Publications and Professional Organizations	$4,991			$4,991
Training and Education	$10,056			$10,056
Travel	$4,892			$4,892
Equipment and Supplies	$20,139			$20,139
Liability Insurance	$123,778			$123,778
Total Expenses - Administration	$941,750	$0	$0	$941,750
TOTAL EXPENSES	$3,560,387	$1,454,576	$1,164,062	$941,750
Service Variable Quantities	---	40,940	543,561	1
Cost Equation Factor	---	$35.53	$2.14	$941,750

Source: Shoreline Metro, 2017; and Bay-Lake Regional Planning Commission, 2018.

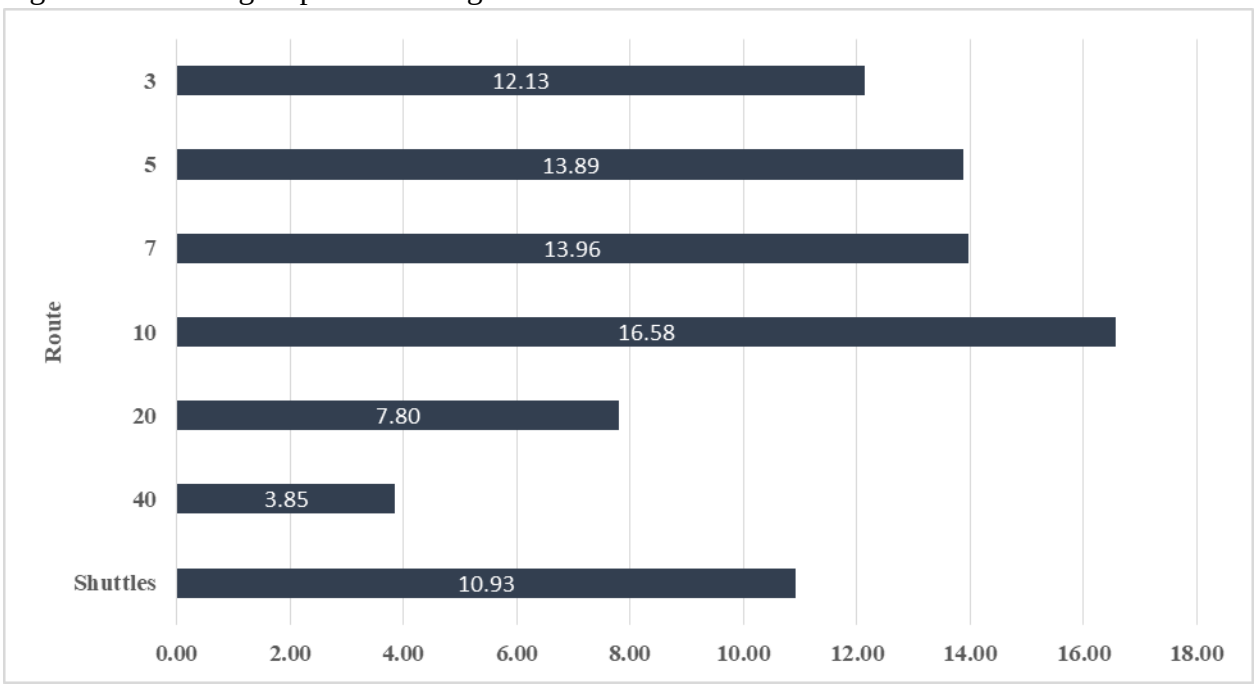
ROUTE PRODUCTIVITY

Each individual route has been evaluated to determine its productivity in terms of passengers per hour, passengers per mile, and cost per passenger. Individual route productivity is shown in Table 7.2. Table 7.2 and its accompanying narrative measure productivity for each route for all periods of operation for that route in 2017, including Saturdays for all regular routes.

Passengers per Hour – Regular Routes

The route productivity in passengers per hour for regular routes is shown in Figure 7.5. There was significant variation in the number of passengers per hour, ranging from over 3.8 passengers per hour to nearly 16.6 passengers per hour. Route 10 had the highest productivity using this measure among regular routes, followed by Route 7 and Route 5. The route which exhibited the lowest productivity using this measure was Route 40 (a seasonal route catering to tourism). Route 3 and the North and South Shuttles also had robust passenger per hour ratios, while Route 20 had a lower passenger per hour ratio in comparison to other routes. The passenger per hour ratio for regular routes was calculated for all days of service operation in 2017. It should be noted that weekday productivity would be higher than Saturday productivity for most regular routes.

Figure 7.5: Passengers per Hour: Regular Routes



Source: Shoreline Metro, 2017; and Bay-Lake Regional Planning Commission, 2018.

Table 7.2: Route Productivity

Route	Passengers per Day	Annual Passengers	Trips per Weekday	Trips per Saturday	Trip Hours	Miles per Trip	Passengers per Hour	Passengers per Mile	Cost per Passenger	Annual Cost per Route
3	330	101,365	54	20	0.50	6.9	12.13	1.07	$6.71	$680,055
5	378	116,036	54	20	0.50	7.4	13.89	1.14	$6.03	$700,087
7	380	116,610	54	20	0.50	8.5	13.96	1.00	$6.38	$744,157
10	451	138,540	54	20	0.50	8.1	16.58	1.24	$5.26	$728,131
20	73	22,482	9	5	1.00	21.4	7.80	0.44	$12.77	$287,173
40[1]	42	3,482	20	16	0.50	4.6	3.85	0.14	$33.75	$117,530
Tripper #101[2]	8	1,345	1	0	2.00	24.6	3.39	0.23	$26.88	$36,156
Tripper #102[2]	10	1,747	1	0	2.00	21.7	4.40	0.34	$19.55	$34,155
Tripper #201[2]	14	2,495	1	0	2.00	19.3	6.28	0.55	$13.03	$32,500
Tripper #202[2]	13	2,208	1	0	2.00	15.9	5.56	0.59	$13.66	$30,154
North and South Shuttles	76	23,415	10	24	0.50	6.5	10.93	1.02	$7.27	$170,289
Annual Total Cost										$3,560,387

[1]Route 40 is a seasonal route that begins operating the day after Memorial Day and runs through the Saturday before Labor Day. Route 40 serves several attractions in downtown Sheboygan, the Riverfront, the Lakefront, and South Pier. Route 3 serves the South Pier area when Route 40 is not in operation.

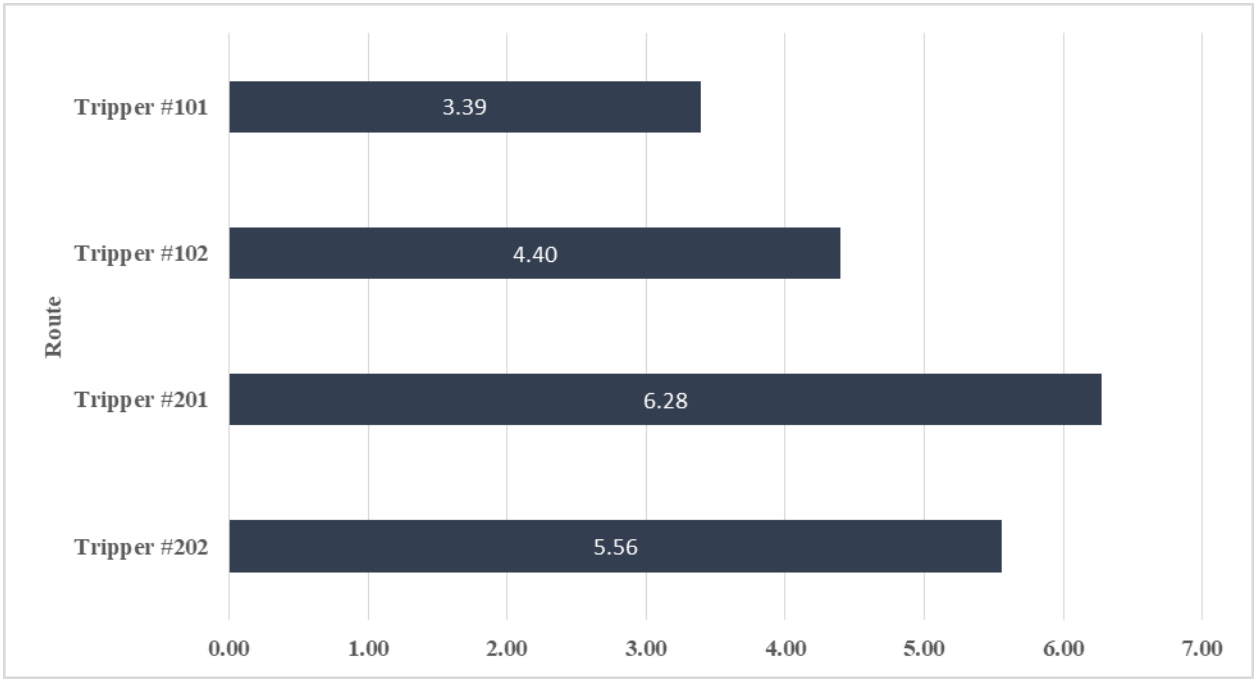
[2]The tripper routes primarily serve students traveling to and from school. Routes 101 through 102 were morning routes, while Routes 201 through 202 were afternoon routes. All routes were in operation throughout the spring semester of the 2016-2017 school year (January - June), and in the fall semester of the 2017-2018 school year (September - December).

Source: Shoreline Metro, 2017; and Bay-Lake Regional Planning Commission, 2018.

Passengers per Hour – School Tripper Routes

The route productivity in passengers per hour for school tripper routes is shown in Figure 7.6. There was less variation in the number of passengers per hour among school tripper routes, ranging from nearly 3.4 passengers per hour to nearly 6.3 passengers per hour. Tripper 201 had the highest productivity using this measure among school tripper routes, followed by Tripper 202. It should be noted that these are both afternoon routes. School tripper routes which exhibited the lowest productivity using this measure included Trippers 101 and 102. All trippers in this analysis operated all year (176 days) in 2017.

Figure 7.6: Passengers per Hour: School Tripper Routes



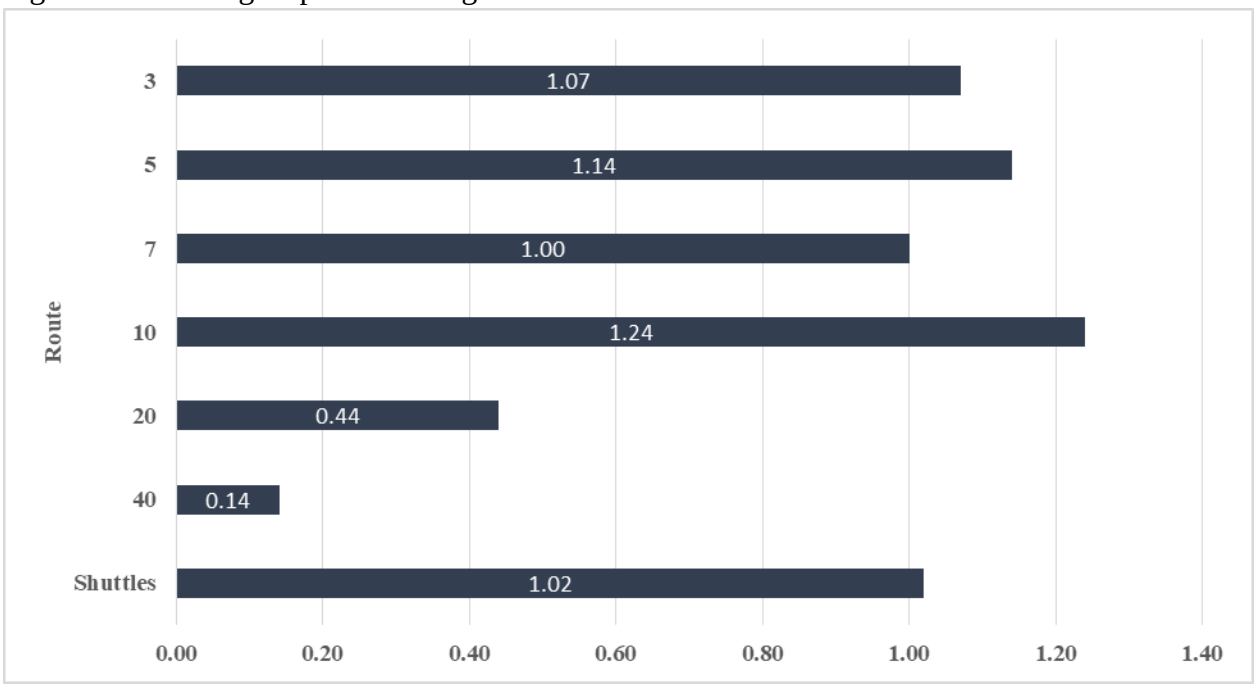
Source: Shoreline Metro, 2017; and Bay-Lake Regional Planning Commission, 2018.

Passengers per Mile – Regular Routes

The route productivity in passengers per mile for regular routes is shown in Figure 7.7. As is evident in Figure 7.7, there was significant variation in the number of passengers per mile, ranging from 0.14 passengers per mile to 1.24 passengers per mile. Route 10 had the highest productivity using this measure among regular routes. Other high productivity routes using this measure (in order of the most productivity) include Routes 5 and 3, the North and South Shuttles, and Route 7. Route 40 had the lowest productivity using this measure among regular routes, followed by Route 20.

With the exception Route 40 (which is a seasonal route), the passenger per mile ratio for regular routes was calculated for all days of service operation in 2017. It should be noted that weekday productivity would be higher than Saturday productivity for most regular routes.

Figure 7.7: Passengers per Mile: Regular Routes

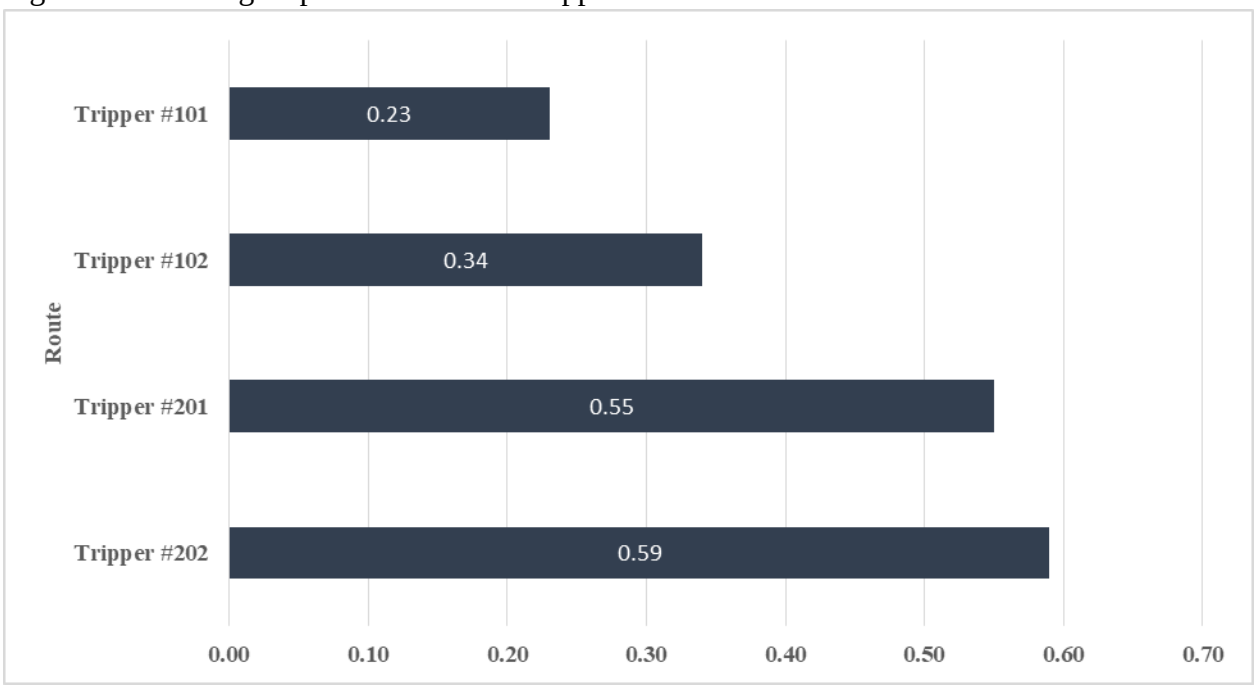


Source: Shoreline Metro, 2017; and Bay-Lake Regional Planning Commission, 2018.

Passengers per Mile – School Tripper Routes

The route productivity in passengers per mile for school tripper routes is shown in Figure 7.8. In comparison to regular routes, there was less significant variation in the number of passengers per mile among trippers, ranging from 0.23 passengers per mile to 0.59 passengers per mile. Tripper 202 had the highest productivity using this measure among school tripper routes. Another high productivity school tripper route was Tripper 201. It should be noted that both of these high productivity routes run in the afternoon. The school tripper route which exhibited the lowest productivity using this measure was Tripper 101. All trippers operated throughout 2017 (176 days).

Figure 7.8: Passengers per Mile: School Tripper Routes



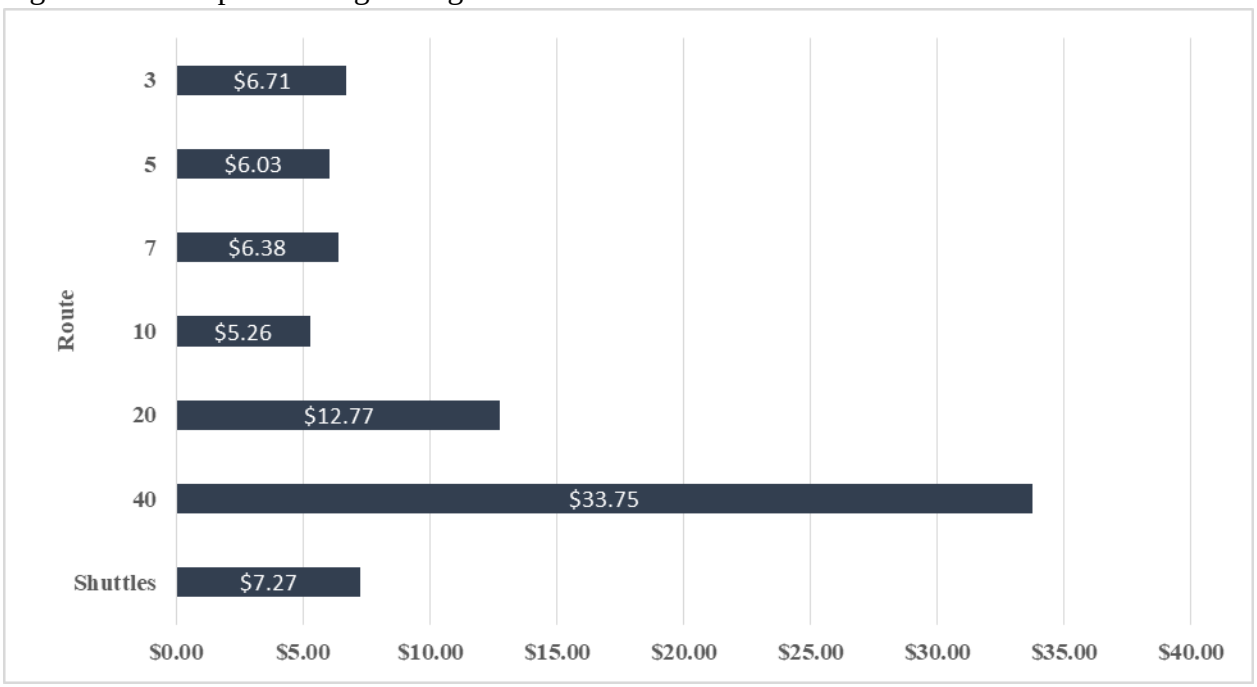
Source: Shoreline Metro, 2017; and Bay-Lake Regional Planning Commission, 2018.

Cost per Passenger – Regular Routes

The route productivity in terms of cost per passenger for regular routes is shown in Figure 7.9. There was significant variation in the cost per passenger among the regular routes, ranging from $5.26 to $33.75. A majority of the regular routes were operating in the range of a $5.25 to $6.75 cost per passenger trip. At $5.26 per passenger, Route 10 had the highest productivity using this measure among regular routes, followed by Route 5 ($6.03). Regular routes which exhibited lowest productivity using this measure included Route 40 ($33.75), followed by Route 20 ($12.77).

Again, with the exception of Route 40 (which is a seasonal route), the cost per passenger ratio for regular routes was calculated for all days of service operation in 2017. It should be noted that weekday productivity would be higher than Saturday productivity for most regular routes.

Figure 7.9: Cost per Passenger: Regular Routes



Source: Shoreline Metro, 2017; and Bay-Lake Regional Planning Commission, 2018.

Cost per Passenger – School Tripper Routes

The route productivity in terms of cost per passenger for school tripper routes is shown in Figure 7.10. There was significant variation in the cost per passenger, ranging from $13.03 to $26.88. At $13.03 per passenger, Tripper 201 had the highest productivity using this measure among school tripper routes, with Tripper 202 not far behind at a cost of $13.66 per passenger. At the other end of the spectrum, at $26.88 per passenger, Tripper 101 had the lowest productivity using this measure among school tripper routes. Again, all tripper routes operated all year (176 days) in 2017.

Figure 7.10: Cost per Passenger: School Tripper Routes

Source: Shoreline Metro, 2017; and Bay-Lake Regional Planning Commission, 2018.

OVERALL SYSTEM PERFORMANCE BY DAY OF THE WEEK

Weekdays

There were a total of 498,479 weekday trips made in 2017, or an average of nearly 1,955 trips per weekday of service. On an "average" weekday in 2017, there were 1.05 passengers per revenue mile, 13.35 passengers per revenue hour, and 8.04 passengers per route run. "Average" weekday statistics are higher than "average" Saturday statistics to a great extent because of school tripper route activity and large numbers of passengers traveling to and from work or other activities that occur primarily on weekdays.

Saturdays

There were a total of 31,247 Saturday trips made in 2017, or an average of nearly 601 trips per Saturday of service. On an "average" Saturday in 2017, there were 0.72 passengers per revenue mile, 9.00 passengers per revenue hour, and 5.30 passengers per route run.