Long-Term Trends in Patron Satisfaction of DC Circulator

MTI Report 12-09

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REPORT 12-09

LONG-TERM TRENDS IN PATRON SATISFACTION OF DC CIRCULATOR

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16. Abstract

The DC Circulator is a local transit system designed to facilitate travel to and within the central business area in the District of Columbia. Since its inception in 2005, the Downtown DC Business Improvement District (DCBID) and the District Department of Transportation (DDOT) have been conducting surveys to assess patron trends and feedback, including their satisfaction with the services provided. The Circulator routes provide access from fringe areas to Metro rail and bus services. The Circulator was formed as a public-private enterprise that involves the DDOT, the Washington Metropolitan Transit Authority (WMATA) and DC Surface Transit, Inc. As part of its performance management program, DCBID conducted surveys of patrons during summers over the seven year period of 2005-2011. Although the data provided snapshots of consumer opinion and feedback, there was no analysis to examine how the observed variables changed over the years. In addition, the scope of the data collection was not intended to provide information for determining whether there were seasonal variations in patron perception of the quality of service. This study provides some of the trends in patron feedback and perception of the quality of service of DC Circulator using survey data compiled over the seven-year period, in addition to data collected by the research team in summer and fall of 2012. This report also presents seasonal variations (over summer and fall) in the perception of quality of service.

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EXECUTIVE SUMMARY

Since 2005, the Downtown Business Improvement District (DCBID) in Washington, DC, has been conducting surveys in the summer months to monitor trends in patronage and customer satisfaction with the services provided by the DC Circulator, a local bus transit system designed to facilitate travel to and within the central business area. The DC Circulator provides a bridge between fringe areas not served by regional transit and Metro rail and bus services. The DC Circulator was created as a public-private partnership in 2003 that involves the District Department of Transportation (DDOT), the Washington Metropolitan Transit Authority (WMATA) and DC Surface Transit, Inc. DC Surface Transit Inc. is a non-profit organization dedicated to promoting travel via the DC Circulator. DCBID conducted annual patron surveys only during summer months as part of its performance management program initiative.

This study examined the survey instrument used for the summer surveys of the DC Circulator, optimized the questions for a more corporative response from patrons, and analyzed the survey data to determine trends in ridership and basic characteristics of riders. This study modified the scope of the DCBID survey by conducting on-board surveys in both summer and fall in 2012, investigated trends in the feedback from patrons during each summer from 2005 through 2012, and compared trends in patron feedback obtained in fall of 2012.

Summary data from 2005 through 2011 were extracted from available raw data and summary reports obtained from DCBID. For year 2012, the Howard University project team conducted summer and fall surveys based on the previous years' summary data. The results were then compiled and compared. The fall survey was conducted in order to gauge differences from the results from the summer survey.

The surveys were conducted by interviewers who rode the DC Circulator and provided patrons with the survey instrument. The willing patrons filled out the questionnaire and handed back the survey results before alighting. The responses were coded, compiled and used in developing the summaries of results. This study focused on feedback to only those questions on the survey that were consistently posed to patrons in all survey years. A sample of 1,227 and 554 riders were surveyed in summer and fall of 2012, respectively.

The results of the survey, over the period from 2005 through 2012, showed that the DC Circulator maintained increasing ridership levels while providing a high level of patron satisfaction. From the results, at least 98% of patrons surveyed in each year said they would always recommend the service to someone else. The majority of the patrons indicated that the frequency of the circulator service is one of the main performance indicators that attracted them to use the service. Approximately 62% of the riders in summer 2012 actually owned vehicles, with 51% of those surveyed in the fall owning a vehicle. Thus, on average, 57% of the patrons surveyed own vehicles. This shows that the Circulator is helping to promote the use of mass transit in the DC metropolitan area.

The majority (on average, 62%) of the riders surveyed in summer and fall of 2012 were found to be in the 18- to 34-year range. It was also found from the survey that approximately

34% of the riders earned less than $20,000 a year. A substantial percentage of the riders (63% on average) were college graduates or completed graduate school. The results of the on-board survey revealed that 99% of riders would recommend the Circulator to others. This has been consistent since 2005. The initial intent of DCBID was to primarily have the Circulator serve visitors who traveled to and from monuments and sites in downtown Washington, DC. The survey found that nearly 80% of the riders lived in the District of Columbia, 50% of the riders used the Circulator for work, and 60% of riders took trips greater than 10 blocks. The high utilization by residents of the city is a favorable indicator of sustainable demand for transit circulator services. The metrics of the 2012 fall survey were compared with those of the 2012 summer surveys. The results did not show any significant differences in the core performance metrics. As a result, it is recommended that the annual summer survey is sufficient in gauging annual trends in patron satisfaction.

The following recommendations could improve the on-board survey process and reduce concern of patrons regarding disclosure of the origination of trips:

- The on-board survey could be conducted without use of survey personnel on a pilot basis, with incentives to riders (e.g., free ride pass). Survey instruments could be placed on the bus for riders to pick up and fill out while riding on the bus. The driver could provide the riders with the incentive after the filled survey instrument is returned.

- To ensure consistency in the survey questionnaire and to reduce concerns about disclosing origination, use of ZIP codes as a source for identifying residency should be changed. A simple use of name of city and state of origin should be considered for future surveys. This could also simplify the analysis of survey data.

- The high level of satisfaction (99%) with the services provided by the Circulator, together with a surprisingly high percentage (81%) of usage by DC residents should be considered in expanding to additional neighborhoods, which are currently inadequately served by the regional transit system.

I. INTRODUCTION

The DC Circulator, which is managed by the Downtown Business Improvement District (DCBID), is the product of a unique public-private partnership between the District Department of Transportation (DDOT), Washington Metropolitan Area Transit Authority (WMATA) and DC Surface Transit, Inc. (DCST). The DC Circulator is a transit service that runs on selected routes in Washington, DC, to facilitate the movement of people between areas not easily assessable by public transportation and the business district. This partnership was established in 2003 to enhance the mobility of residents, workers and visitors. The DCBID employs a small staff to market and promote the Circulator and to advise DDOT, WMATA and DCST on the management of the system.

The service of the DC Circulator was intended to be efficient, inexpensive and accessible to all of the downtown areas and popular attractions in the city (museums, restaurants, retail, work, hotels and entertainment). The DC Circulator had 29 buses on two routes when it was first inaugurated in 2005.[1] The Circulator is distinguished from other surface public transportation by its inexpensive fare of $1.00 and frequent service on a 10-minute headway, distinctive bus design, and the option of accepting transfer cards and smart trip cards from the regional transit system. The initial service was available seven days a week from 7 a.m. to 9 p.m.[2] The routes linked Union Station with the Washington Convention Center and Georgetown via K Street, as well as connected the Convention Center to the SW Waterfront through downtown and past the National Mall in Washington, DC.

The first three routes to be opened focused on the core of downtown, Union Station and Georgetown. In 2009, the DC Circulator system expanded to serve neighborhoods that are more residential in character. In 2012, the DC Circulator operated seven days a week on five routes, based on demand and enthusiastic patronage. Presented in Figure 1 are the Circulator's five color-coded routes.[3]

- The Orange Route (Georgetown to Union Station) operated every day between 7 a.m. and 9 p.m., with late night service between Georgetown and downtown until midnight Sunday through Thursday, and 2 a.m. Friday and Saturday.

- The Green Route served Woodley Park, Adams–Morgan, and the McPherson Square Metro station. That route operated every day between 7 a.m. and midnight, with late-night service until 3:30 a.m. on Friday and Saturday nights.

- The Purple Route (Smithsonian to the National Gallery of Art loop) operated on weekends between 10 a.m. and 6 p.m.

- The Red Route (Convention Center to the Southwest Waterfront) operated every day between 6 a.m. and 7 p.m.

- The Blue Route (Union Station to the Navy Yard via Capitol Hill) operated on weekdays between 6 a.m. and 7 p.m. Additional service was provided for Washington Nationals evening and weekend home games at Nationals Park.
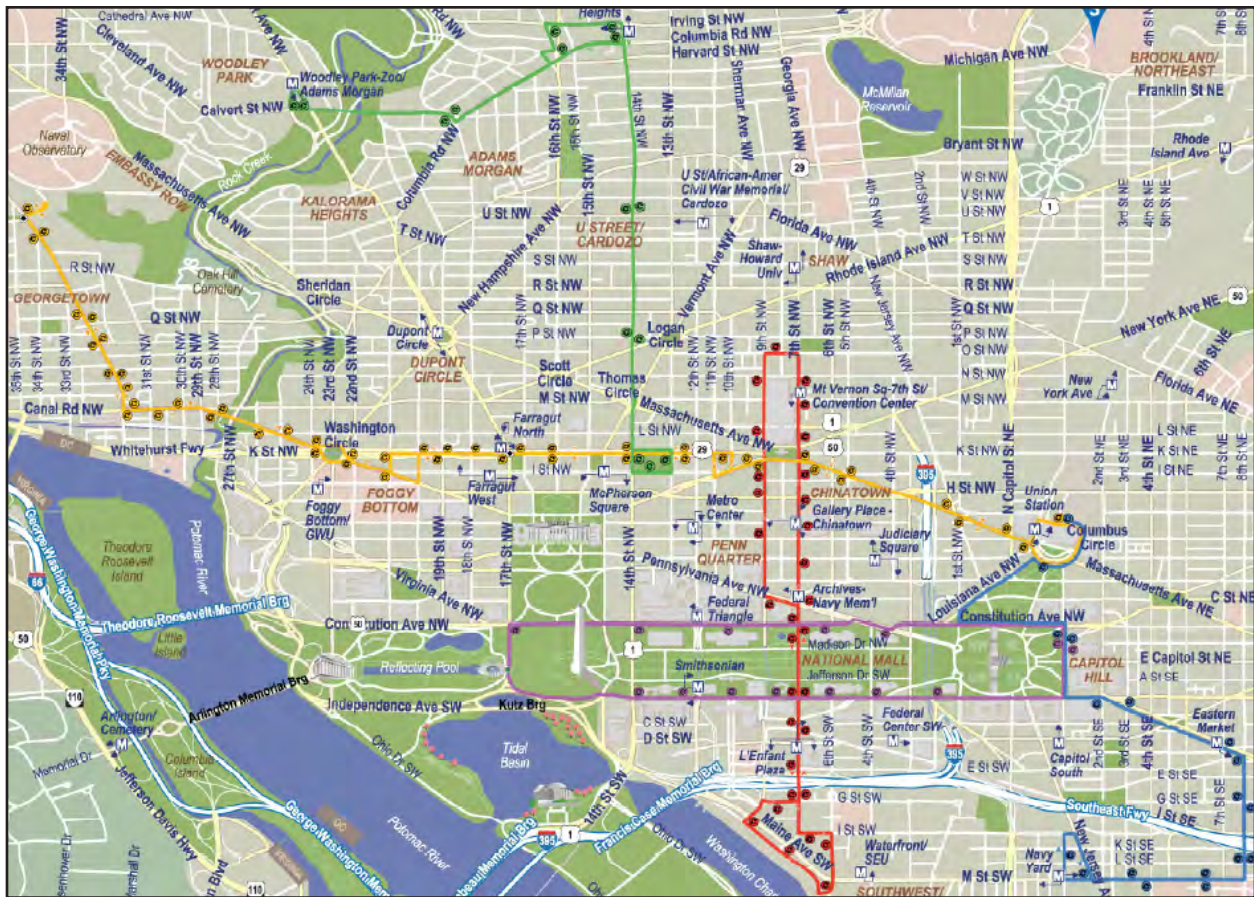
Figure 1.   DC Circulator Routes, 2009

Source: Washington Metropolitan Area Transit Authority, "DC Circulator System Map" [slide 2], *DC Circulator Pre-Bid Conference* [file title: Preconference slide show-Cindy for RFP-RE9210JWW] (September 1, 2009), http://www. wmata.com/business/procurement_and_contracting/solicitations/view.cfm?solicitation_id=2498 (accessed September 18, 2013).

Since the inception of the DC Circulator in 2005, DCBID had been conducting surveys in order to monitor trends in patron usage, and to obtain feedback and evaluate service against several performance metrics. The surveys were conducted as part of a performance management program for improving the Circulator's service in areas of need.

Between July and December 2005, ridership of the DC Circulator increased by over 10% per month and was projected to increase to more than 10,000 boardings per day by the end of 2008 (see Figure 2).[4] In 2009, it was ranked one of the 4th largest bus systems in the region, with more than 4 million trips.[5] In 2010, the Circulator served 4.8 million riders, increasing to more than 5.7 million riders in 2011.[6]
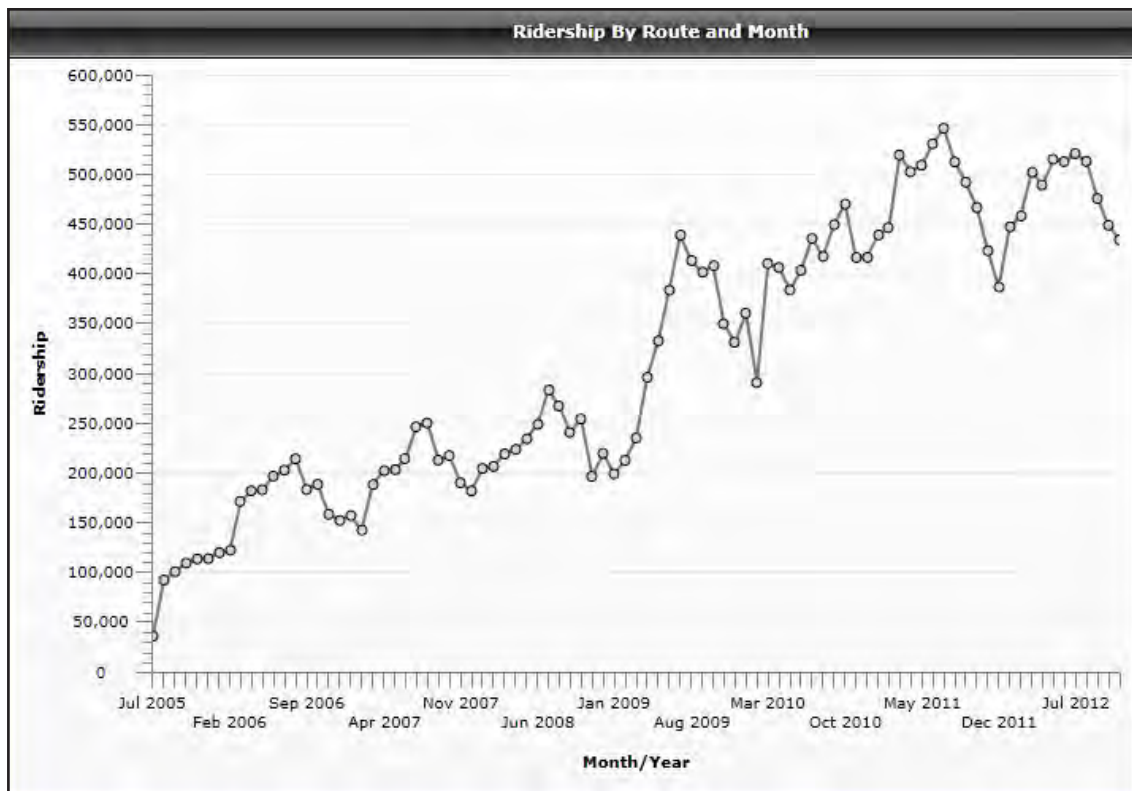
Figure 2.   DC Circulator Ridership Tracking, 2005-2012

Source: DC Circulator, "DC Circulator Dashboard" [performance metrics] (no date), http://circulatordashboard.dc.gov/cirdashboard/#Ridership/StartDate=6/30/2012EndDate=11/30/2012PubDate=11/30/2012 (accessed February 20, 2013).

The DC Circulator routes had fewer stops per mile than a typical regional transit bus service, and provided riders with an average travel time of approximately 10 minutes between their origins and destinations.[7] The DC Circulator operated on a predictable fixed route and schedule, and ran between the city's main attractions and more popular neighborhoods of interest to visitors. The five routes operated on a 10-minute headway and involved a fleet of 49 buses, with fares of $1.00 or less, depending on the origin and destination. Most of the current DC Circulator lines operate between 7:00 a.m. and 12:00 a.m. during the weekdays, and from 7:00 a.m. to 3:30 a.m. during the weekends on selected routes. The hours of operation are usually adjusted for summer and winter hours and to accommodate the Washington Nationals baseball game days.[8] The schedule is shown in Figure 3.

Bus Routes and Schedules

Dupont Circle – Georgetown – Rosslyn

Sunday – Thursday: 7am - Midnight
Friday and Saturday: 7am - 2am

Georgetown – Union Station

Daily: 7am - 9pm
Additional Night Service
Whitehaven - McPherson Square Metro
Sunday – Thursday 9pm - 12am
Friday and Saturday: 9pm - 2am

Potomac Avenue Metro – Skyland via Barracks Row

Winter Hours (October 1-March 31): Weekdays 6am - 7pm
Summer Hours (April 1-September 30): Weekdays 6am - 9pm; Saturdays 7am - 9pm

Union Station – Navy Yard

Winter Hours (October 1-March 31): Weekdays 6am - 7pm Summer Hours (April 1-September 30):
Weekdays 6am - 9pm; Saturdays 7am - 9pm
*Extended service on National game days

Woodley Park – Adams Morgan – McPherson Square

Sunday – Thursday: 7am - Midnight
Friday and Saturday: 7am – 3:30am

Figure 3.   Circulator Bus Routes and Schedules

Source: DC Circulator, "Circulator Bus Routes and Schedules" (2011) http://www.dccirculator.com/Home/
        BusRoutesandSchedules.aspx (accessed September 18, 2013).

II. OBJECTIVE

The objective of this study is to determine the attitudes of passengers who travel on the DC Circulator bus system in the District of Columbia using a survey instrument developed by Downtown Business Improvement District, in addition to providing recommendations for the improvement of the survey instrument.

III. LITERATURE REVIEW

The term circulator could be used to refer to a bus, a shuttle, trolley, street car, water taxi or a combination of these services. Circulator services provide an inexpensive, and in most cases, free service to communities connecting them to parking facilities, other forms of transit, and popular shopping, retail and entertainment venues. These services are intended to augment existing forms of transit. In some smaller communities, such service provides convenience when other transit forms are limited or not available.

In cities that operate a circulator service, there is a need for information about various ridership elements in order to support operations planning, levels of service, and monitoring trends. Such information is needed for budgeting purposes, making decisions on service improvements, and for reporting to oversight agencies. Downtown Business Improvement District (DCBID) uses ridership data for planning service expansion and for deciding route changes based on seasonal demand. The data collected from customer satisfaction surveys are used to develop performance indicators which can be used, in conjunction with other elements, such as dwell time, headway, on-time performance, and ridership surveys, to provide a balanced overview of system performance.

The literature review provided an initial observation that there was not a significant body of research on downtown circulators in refereed transportation journals. Some of the documents examined are general in nature, and provided either a broad overview of trends or an introductory description of a particular circulator without in-depth analysis.

In addition to the DC Circulator services, there are several circulator services in the Baltimore-Washington metropolitan area. The Charm City Circulator in Baltimore, MD, the Annapolis Circulator Trolley in Annapolis, MD, the Bethesda Circulator in Bethesda, MD, and the King Street Trolley in Alexandria, VA, are examples. The literature showed that customer satisfaction or feedback surveys were conducted annually for each circulator. The Annapolis Circulator had only been operating for a year, and had not yet conducted a survey to gauge feedback from patrons. Table 1 provides a summary of public circulator services in the Baltimore-Washington metropolitan area in comparison with the DC Circulator.

Table 1.   Sample of Public Circulator Services in the Baltimore-Washington Metropolitan Area

CIRCULATOR SUMMARY					
Location	Bethesda, MD	Washington, DC	Alexandria, VA	Baltimore , MD	Annapolis, MD
Service	Bethesda Circulator	DC Circulator	King Street Trolley	Charm City Circulator	Annapolis Circulator
Inception	1999	2005	2008	2010	2011
Survey Frequency	Annual	Annual	Annual	Annual	NA
Cost	Free	$1.00	Free	Free	Free w/Parking $.50
Mode	Bus	Bus	Trolley	Bus	Trolley

CIRCULATOR SUMMARY					
Frequency	10 minutes	10 minutes	15 - 20 minutes	15 minutes	10 minutes
Schedule	No Sundays	7 days a week	7 days a week	7 days a week	7 days a week
Survey Methodology	On bus & On-line	On bus	On bus & On-line	On-line	NA

The King Street Trolley developed a fact book for its ridership survey conducted in March and April of 2012.[9] The trolley service began in April 2008 and has transported over 2 million passengers from 2008 through 2011. From the results of that survey, 72% of the respondents stated that the service helped to increase the number of restaurants and businesses they used on a particular day. In addition, about 97% of the patrons indicated that the availability of the trolley made the City of Alexandria a more desirable place to visit.[10]

The Bethesda Circulator operators made their annual survey questionnaire available to riders on the bus and provided access to the same questions on-line. The on-bus survey sheets were placed in boxes on the bus and returned to the bus operator after completion but before they alighted.[11] The survey yielded 272 on- board responses and 19 on-line responses. Approximately 49% of responding patrons indicated that Work was their primary reason for using the Circulator. The other reasons for using the Circulator were fairly evenly distributed, with 17% using it for Dinner/Entertainment, 16% for Shopping and 17% for Other uses. In the morning hours, however, "non-work" trips were minimal. Work trips decreased throughout the day and over the weekends.[12]

The TCRP Synthesis 87 documented the state of practice of transit agencies in the development, deployment and sustainment of downtown circulator systems.[13] A study by Perk et al. in 2005 provided an overview of downtown circulators.[14] That study reviewed three cases of downtown circulators in Florida, as well as five others from around the U.S. A general summary of the findings regarding those circulators were:

- Circulators had unique aspects, making comparisons with other circulators difficult, and they were typically designed and implemented for a variety of localized purposes.

- Most of the circulators provided frequent and reliable services, and good connections with other transit modes. Each service was scaled to match the population and/or employment densities in downtown or urban areas.

- The circulators reviewed had simple routing with ample signage.

- Nominal or no fares were charged to encourage transit ridership.

- Most of the circulators took into account customers' perspectives and a broad objective of improving the efficiency of transportation services.

- Most of the circulators were operated by local partnerships, including local departments of transportation. Thus, a mixture of funding sources was used to launch, operate and maintain downtown circulator systems.

Two articles were prepared by White and Malloy in 2008 on the LINK downtown circulator in Ann Arbor, MI. One article examined the design, implementation, and evaluation of the LINK service and the efforts of the Ann Arbor Transportation Authority (AATA) in planning and operating the route.[15] The article also provided a description of the planning process and the marketing campaign that launched the circulator. Finally, the authors provided a synopsis of the survey conducted on the basis of which additional services were implemented in line with riders' needs.[16] A 3.2-mile LINK route was introduced by AATA in 2003, connecting the University of Michigan campus with downtown districts. During the first year of operation, ridership was low and peaked to 282 riders per weekday and nine passengers per service hour. Based on two onboard surveys conducted by AATA, several service changes were introduced in June and August 2004, leading to almost a doubling in ridership. Ridership continued to increase in 2005, with 821 average weekday riders and 23 passengers per service hour. Due to that success, funding for the LINK (from the AATA, University of Michigan, and Ann Arbor Downtown Development Authority) for the modified route was continued.

The Margate circulator was operated as part of the Broward County Transit (BCT) Community Bus Program, in Florida. The service covered four routes that improved the access of local residents to employment, shopping, and linkage between selections of residential sites. The Margate circulator had connections to the Coconut Creek circulator at the Margate Terminal and carried approximately 14 passengers per revenue hour.[17]

Miramar, another Broward County circulator, operated two routes that provided service to residents, giving them ample access to shopping centers, the civic center, a senior center, and a hospital. A fare of $0.25 was charged and ridership was approximately 5.5 passengers per revenue hour.[18]

In Pembroke Pines, also in Florida, the circulator provided access to shopping centers and medical facilities, serving the second largest city in Broward County. Two routes were operated on 45-minute headways. A fare of $0.50 was charged for service that provided linkage to BCT and the Miramar circulator. The total operational cost was $200,000 for the year 2000, which included a $60,000 (30%) contribution from the BCT Community Bus Program. The remaining operating funds came from fare collection and the city government.[19]

IV. RESEARCH METHODOLOGY

During the summer of 2012, Downtown Business Improvement District (DCBID) collaborated with the Howard University Transportation Research and Data Center (HUTRC) to perform the annual customer satisfaction survey of DC Circulator riders. The Howard University students went through two days of training at the offices of DCBID prior to the commencement of the on-board survey. The training involved teaching the interviewers how to engage potential respondents and how to explain the use of the survey instrument. Surveyors were provided a sheet with the targeted numbers of survey instruments by route, date and time of day, and the number of the completed questionnaires required. Riders of the Circulator who returned their surveys were given a free bus pass as an incentive. All the riders who boarded the Circulator were handed the survey questionnaire. The circulator customer satisfaction surveys conducted since 2005 covered four categories: trip purpose, frequency, level of satisfaction and demographics. Initially, the survey questions included both structured response and open-ended response formats.

HUTRC collaborated with DCBID in the conduct of the 2012 surveys, taking into consideration observed inconsistencies in the variables used in earlier surveys and the relatively high cost of on-board surveys. The Circulator buses were not equipped with automatic vehicle location (AVL) systems. To resolve the cost concern and to enable a robust response from patrons, the number of questions was reduced over time in order to enable passengers on short trips to complete surveys.

The sample size needed for this survey was computed based on a 5% level of significance with three confidence units, based on annual ridership data.[20] The summer on-board bus survey commenced in May 2012 and was completed in early July 2012, during which a total of 1,227 responses were obtained. The survey was conducted on five routes from Monday through Sunday:

- GUS: Georgetown – Union Station

- AMMS: Woodley Park – Adams Morgan – McPherson Square Metro

- DGR: Dupont Circle – Georgetown – Rosslyn

- USNY: Union Station – Navy Yard Metro

- PSK: Potomac Ave Metro – Skyland via Barracks

The fall 2012 survey commenced in October 2012 and was completed in December 2012, from which 554 responses were obtained. The survey was conducted along the same routes as in the summer survey. The research team reviewed, compiled and entered the data obtained from the survey into Microsoft Excel. Prior to data entry, the research team reviewed each survey response for quality assurance, after which the data were entered in an Excel database for analysis. The database was also checked to ensure that entries were consistent with the survey responses obtained from the field. Additional

surveys were conducted on some of the routes to ensure that a sufficient sample size was obtained. Outputs from the Excel analysis produced the frequencies in responses for various questions and were used to produce pie and bar charts. This was done for both the summer and fall 2012 surveys. The summaries of the 2012 surveys were compared to previous responses and feedback from patrons surveyed during the 2005-2011 period.

Based on the data provided by DCBID, it was determined that the survey questions evolved over the seven-year period of 2005-2011. The number of survey questions and the questions themselves evolved with the growth of the system, while recognizing the need to minimize the time for complete responses from on-board patrons. Table 2 provides a summary of the 2006-2012 agency-based surveys conducted. Inconsistencies in the historical records posed a challenge for tracking all variables over the six-year period of 2006-2011. The "/" (slash) indicates that the actual survey instrument used was not available; the "✓" (check) denotes questions included in that year's survey; and the "x" denotes questions that were not posed in that year.

In 2006, a total of 536 surveys were completed and returned for analysis on two routes:

- Union Station – Georgetown

- Convention Center – Waterfront

The survey contained 31 questions, including six questions that were open-ended/fill-in type questions. Questions regarding the bus and bus driver, marketing awareness and the desire for more routes and later schedules, were posed.[21]

In 2007, a total of 1,071 surveys were completed and returned for analysis on six routes:

- Convention Center – Waterfront

- Smithsonian – National Gallery of Art

- Georgetown – Union Station

Table 2.   DC Circulator Customer Satisfaction Survey Summary

DC CIRCULATOR CUSTOMER SATISFACTION SURVEY SUMMARY							
#	Topics	2006	2007	2008	2010	2011	2012-S	2012 - F
1	Number of routes used	2	3	3	5	5	5	5
2	Number of survey responses	524	1,071	1,067	1,064	1,130	1,227	554
3	Number of questions posed	31	14	14	14	15	15	15
4	Number open-ended/fill in	6	4	4	3	1	1	1
5	Frequency of ridership	√	√	√	√	√	√	√
6	Blocks riding	√	√	√	√	√	√	√
7	Wait time	√	√	√	X	X	X	X
8	Weekend use	√	√	√		√-not directly	√-not directly	√-not directly
9	Use Other public transportation use	√	√	√	√	√	√	√
10	First time rider	√	√	√	X	√	√	√
11	How far to walk to Circulator	X	√	/	X	X	X	X
12	How arrived at Circulator	X	X	X	√	√	√	√
13	How arriving to destination	X	X	X	√	√	√	√
14	Questions about bus & river	13	9	√	8	8	8	8
15	Zipcode	√, address	√, Home & Work	√	√	√, Top	√,Top	√, Top
16	Resident vs tourist	√	√	√ / Choices	√	X	X	X
17	Purpose or use	√	√	√	√	√	√	√
18	Demographics of patrons	√	√	√	√	√	√	√
19	Own or Use a car	X	X	√	√	√	√	√
20	Would recommend to others	√	√	√	√	√	√	√
21	Source of information	√	√	√	X	X	X	X
22	Additional routes needed?	√	√	/	X	X	X	X
23	Which routes have you taken	√	√	/	X	X	X	X
24	Use of Circulator ticket machine	√	√	/	X	X	X	X
25	Visited the Circulator website	√	√	/	X	X	X	X
26	Recommendations for new routes	√	√	/	X	X	X	X
27	Schedule preference	√	√	/	X	X	X	X
28	Survey distribution	June	June	June	June	June	June	November

Key: √ Yes.
   X No.
   / No original survey instrument.

The survey contained 14 questions and four open-ended/fill-in questions. Questions related to the bus and bus driver were eliminated while the number of open-ended/fill-in questions was reduced.

In 2008, in total 1,067 survey responses were completed and returned for analysis on the same three routes as in 2007. The survey contained 14 questions and four open-ended/fill-in questions with minor modifications from the 2007 version.

No survey was conducted in 2009. However, two new routes were added that year:

- Adams Morgan – U Street

- Union Station – Navy Yard Metrorail Station[22]

In 2010, a total of 1,064 survey responses were completed and returned for analysis on five routes:

- Georgetown – Union Station

- Woodley Park – Adams Morgan – McPherson Square Metro

- DuPont Circle – Georgetown – Rosslyn

- Union Station – Navy Yard Metro

- Convention Center – SW Waterfront

In addition to the 2010 on-board survey, an on-line survey was added. District of Columbia Department of Transportation (DDOT) also held two focus groups to identify ways to improve the DC Circulator system and to increase ridership and rider satisfaction. The outcome of these combined efforts was documented in the DC Circulator Transit Development Plan, March 2011.[23] In addition, DDOT conducted an on-line survey in 2010, the results of which were not incorporated into this report.

V. RESULTS

SURVEYS AND RESULTS OF THE PERIOD FROM 2006-2011

The results of the previous annual on-board surveys (2006-2011) revealed that 99% of riders would recommend the Circulator to others. The results of the surveys showed that nearly 80% of the riders lived in the District of Columbia. Also, approximately 50% of the riders surveyed indicated that they used the Circulator to travel to work. About 60% of the riders used the Circulator for travel greater than 10 blocks.[24]

The on-line survey conducted by DDOT asked respondents to suggest future changes for the Circulator. The results showed that riders were interested in extending the hours of evening service and weekends for all buses, boarding and alighting at Columbus Circle, adherence to the 10-minute headway, and affordable fares and limited-stop service.[25] Other recommendations included additional routes in the northwest quadrant of the District, new routes and upgrades in southeast and southwest areas.

DDOT held two focus groups in 2010 to identify ways to improve the system, increase ridership and rider satisfaction. The outcome of the focus groups indicated that riders had an overall positive impression of the Circulator, used a variety of modes to get to the District, few had a car, and most found the buses to be clean and drivers to be friendly. Riders suggested fewer stops, adherence to advertised schedules and improving marketing. The findings also showed the lack of awareness about the DC Circulator appeared to be a barrier in informing non-riders about the service and about the value of riding the Circulator.

In 2011 and 2012, the surveys were conducted in person using the same survey instrument. In 2011, a total of 1,130 survey responses were completed and returned for analysis on the following five routes:

- Georgetown – Union Station

- Woodley Park – Adams Morgan – McPherson Square Metro

- Convention Center – Waterfront

- Union Station – Navy Yard via Capitol Hill

- Rosslyn – Georgetown – Dupont Circle

In summer 2012, a total of 1,227 survey responses were completed and returned for analysis, while 544 returns were received for fall 2012. The on-board surveys were conducted on five routes:

- Georgetown – Union Station

- Woodley Park – Adams Morgan – McPherson Square Metro

- Union Station – Navy Yard Metro

- Dupont Circle – Georgetown – Rosslyn

- Potomac Ave Metro – Skyland via Barracks

The 2007 survey contained views of riders' potential to recommend the Circulator to others (see Table 3 and Figure 4) and the average wait time at the Circulator bus stops (see Figure 5). It was assumed that the most prevalent indicator of customer satisfaction was the willingness to recommend the service to someone else. This question provided the option for a scaled response as shown in the extract in Table 3. A high majority (91.9% strongly agree or agree) of patrons surveyed would recommend the service to others. For later-year surveys, the responses for this question were changed to a "yes" or "no." The historical trending in Figure 4 shows a consistently high level of customer satisfaction over the surveyed years. The results in Figure 5 show that the average wait time for the transit service ranged predominantly from 5 to 8 minutes.

Table 3.   Would Recommend Circulator to Others; Scaled Responses, 2007

	Frequency	Percent	Valid Percent
Strongly agree	448	41.8	42.9
Agree	512	47.8	49.0
Neither agree nor disagree	48	4.5	4.6
Disagree	12	1.1	1.1
Strongly disagree	4	0.4	0.4
No opinion	20	1.9	1.9
Total	1,044	97.5	100.0

Source: Customer Satisfaction Survey 2007, page 14.
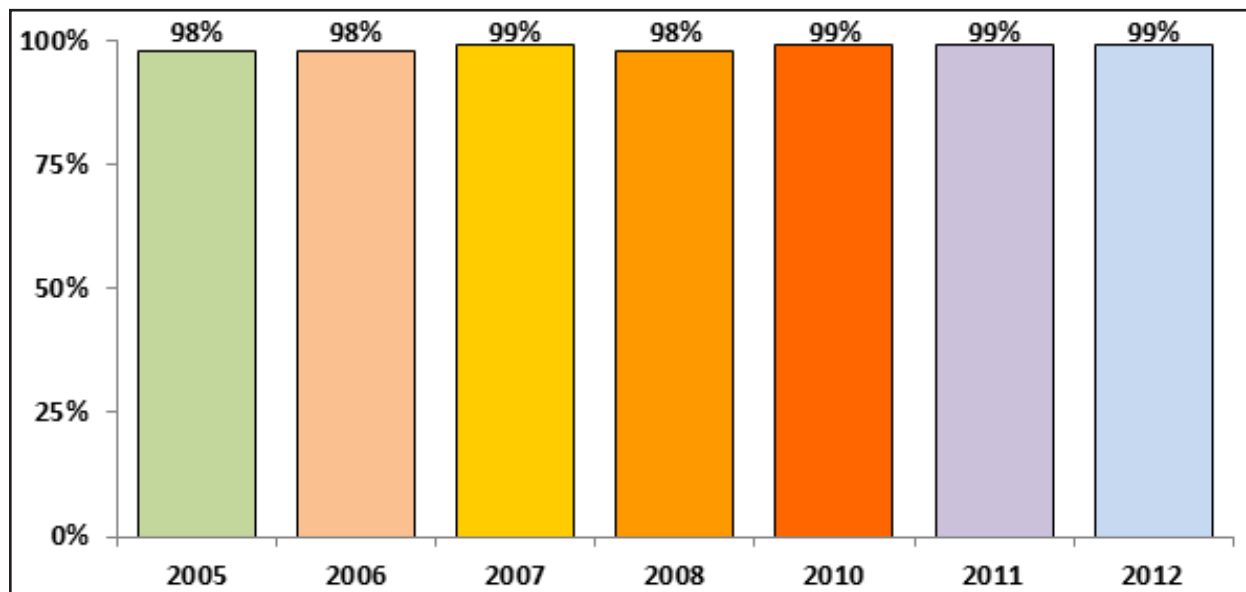
Figure 4.   Customer Satisfaction – Would Recommend to Others, 2005-2012

In earlier surveys, the residency question provided the opportunity for respondents to identify trip origin, ethnicity/race and nationality. The respondents were able to select from a list of cities, or other. Table 4 shows how the residency question was posed in 2007 and that the survey distinguished responses DC area residents from visitors. In the current survey instrument, the primary residency question posed is the ZIP code.

Other notable observations in the previous survey questions include:

- The survey instruments in 2005-2007 contained questions related to the expansion of service routes and operating hours, including open-ended questions about what riders like the most and least about the Circulator. Those questions were removed from the 2008 and subsequent surveys.

- In 2007, the riders were asked to cite all the Circulator routes they used. The 2012 survey required the riders to record only the route ridden that day.

- In 2008, approximately 20% of survey respondents were first-time riders. The question for first-time riders was not posed in the 2010 survey, but was posed in the 2011 survey.

- Since 2007, there have been a group of questions that have always been posed: demographic, income and ethnicity.
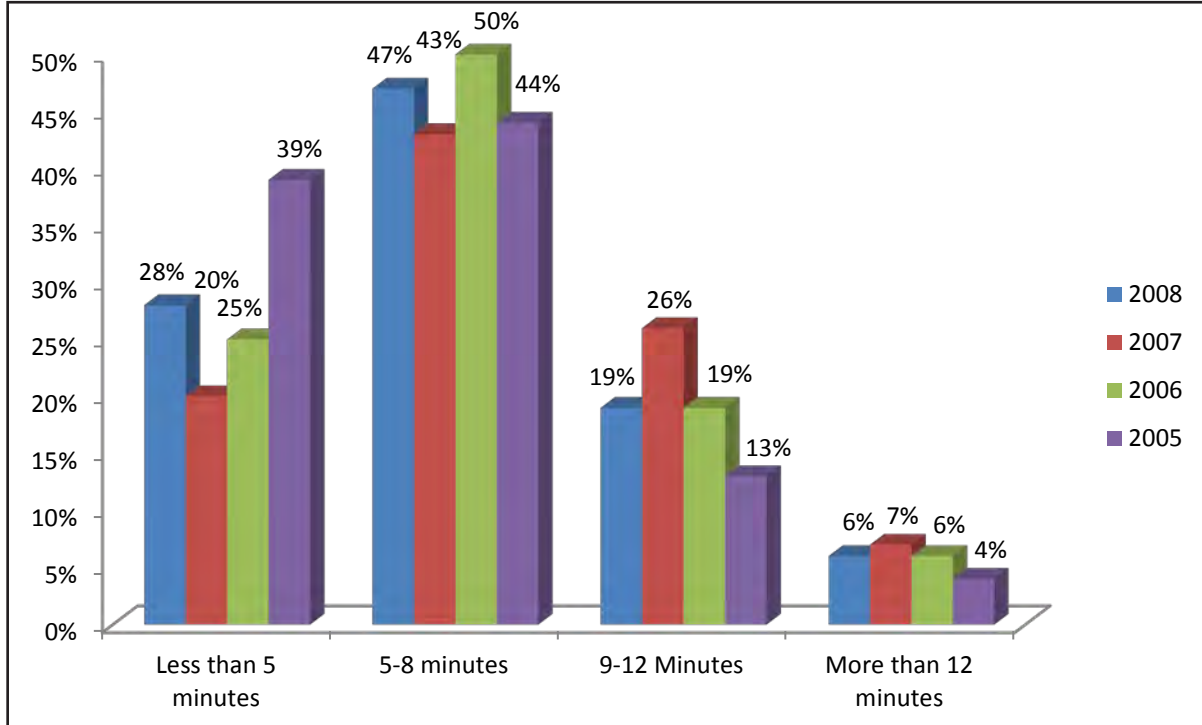
Figure 5.   Average Wait Time, 2005-2008

Source: Circulator 2008 Results. General Wait times across the years, page 9.

Table 4.   Residency Question, 2007

<u>DC AREA RESIDENT</u>
(CONTINUE)

10. On Average…			
A. I take the Circulator:	DAILY	SEVERAL TIMES A WEEK WEEKLY	LESS OFTEN
B. On days I ride the Circulator, I take:	ONE TRIP	TWO TRIPS (ROUND-TRIP)	MORE THAN TWO TRIPS
C. I use the Circulator:	WEEKENDS ONLY	WEEKENDS ONLY	BOTH
D. I usually ride the Circulator:	LESS THAN 5 BLOCKS	5-10 BLOCKS	MORE THAN 10 BLOCKS
E. I own a car:	YES	NO	

<u>VISITORS</u>
(CONTINUE)

11. During the visit…					
A. I've taken the Circulator:	1 TIME	2 TIME	3 TIME	4 TIME	5 TIME
B. I am staying overnight:	YES		NO		
C. I am staying in DC:	YES		NO		
D. I'm staying at:	HOTEL		RESIDDENCE	OTHER	
E. I got to DC by:	CAR		BUS	PLANE	RAIL

Source: *Fact Book, 2007*, page 7.

In summary, the survey instrument used annually evolved over the eight-year period (from 2005 through 2012). The questions and the wording have seen several iterations of revisions leading to the current survey instrument used in 2011 and 2012. The variation in the questions over time limited the ability of the team to track several variables over several years. This observation makes the case for a careful determination of variables for monitoring patron satisfaction over the long-term and conducting analyses on collected data as soon as possible.

RESULTS OF 2012 SUMMER AND FALL DC CIRCULATOR SURVEY

In 2012, the research team validated 1,227 surveys for the summer and 544 surveys for the fall. The validation process involved the review of each survey response to ensure that all the questions were answered. The same five routes were used:

- GUS: Georgetown – Union Station

- AMMS: Woodley Park – Adams Morgan – McPherson Square Metro

- DGR: Dupont Circle – Georgetown – Rosslyn

- USNY: Union Station – Navy Yard Metro

- PSK: Potomac Ave Metro – Skyland via Barracks

Both surveys did include a question for first-time riders. The survey contained 15 multiple choice questions, with two open-ended questions. Figure 6 through Figure 29 present the percentages of on-board patrons who responded to various questions on the summer and fall surveys.

Would Recommend Circulator to Others

The results in Figure 6 show that the respondents in summer (99%) and fall (98%) would highly recommend the Circulator to others. This is consistent with results from previous studies (as shown in Figure 4).
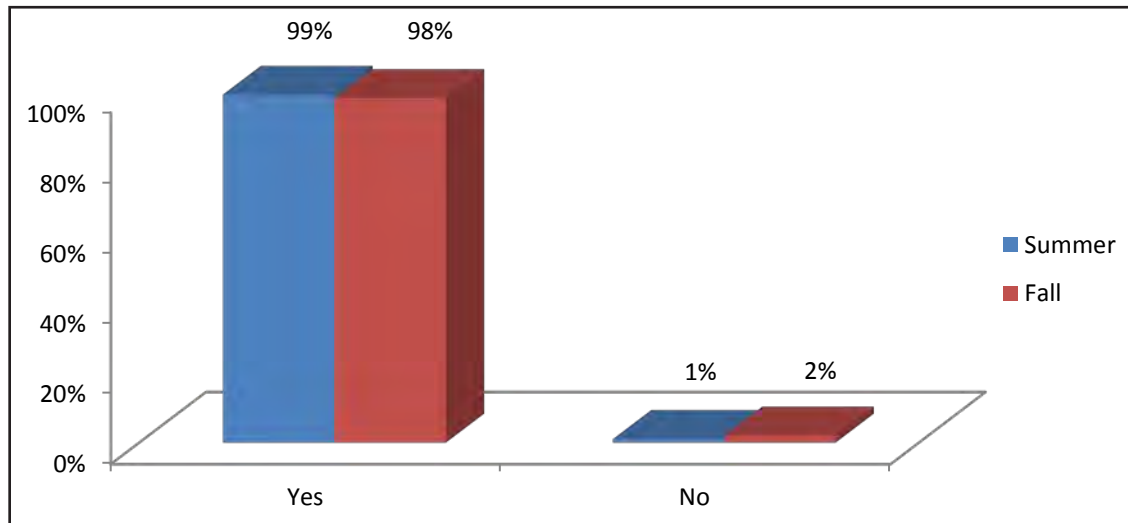
Figure 6.   Would Recommend to Others, 2012

Overall Bus Service Satisfaction

The results in Figure 7 show that riders continue to be more satisfied than dissatisfied with the Circulator service. In both summer and fall, 89% of riders surveyed said they were either "very satisfied" or "somewhat satisfied."
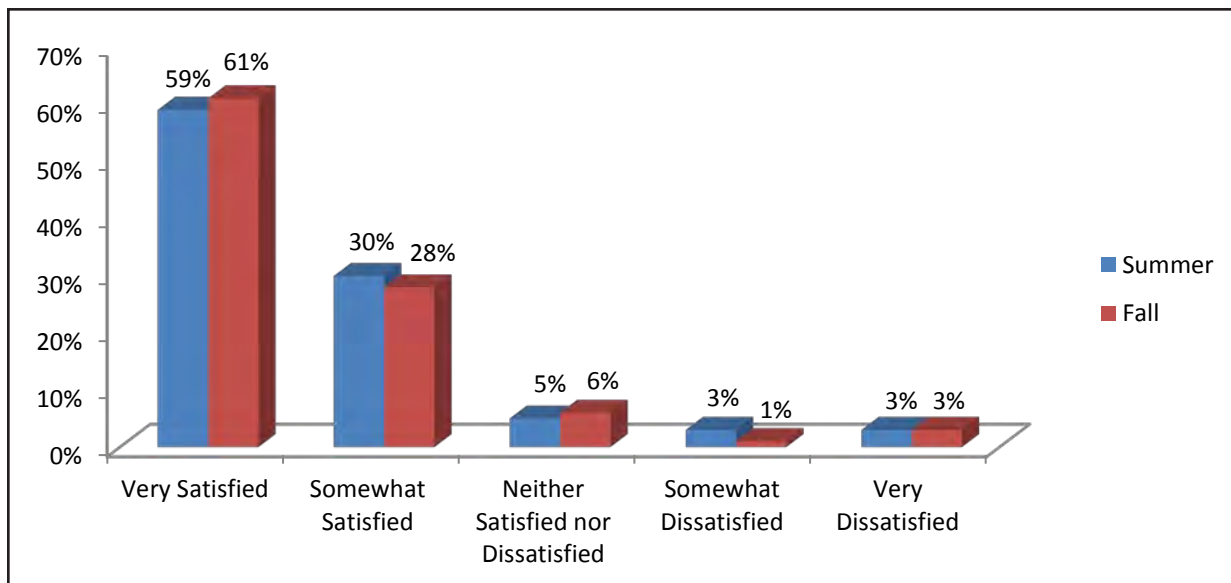
Figure 7.   Overall Bus Service Satisfaction, 2012

Circulator Ridership by Residency

From the summary of results of the analysis shown in Figure 8, the following conclusions can be drawn:

- The results show that the breakdown of ridership by residency District of Columbia, Maryland and Virginia (DC, MD and VA) was almost the same for both seasons.

- The majority of riders surveyed (80% for summer and 82% for fall) were from Washington, DC.

- The percentage of patrons who reside in Maryland and Virginia remained the same for both summer and fall: 6% for Maryland and 7% for Virginia.

- The percentage of riders from outside of the metropolitan area reduced from 7% to 4%.

- The percentage of visitors (those who live outside of the DC, MD and VA ZIP codes) utilizing the DC Circulator is minimal, even during the summer months.
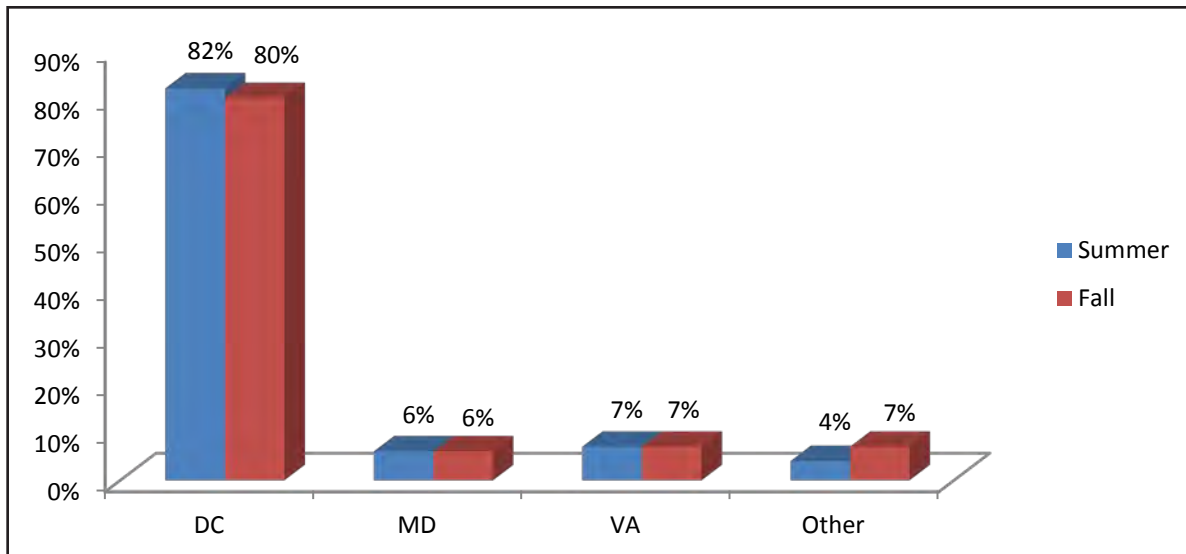
Figure 8.   Circulator Ridership by Residency, 2012

Circulator Ridership by Route

The results of ridership by route are presented in Figure 9. With the exception of the DGR and USNY routes, the percentages of riders on the remaining routes were higher in summer than in fall.
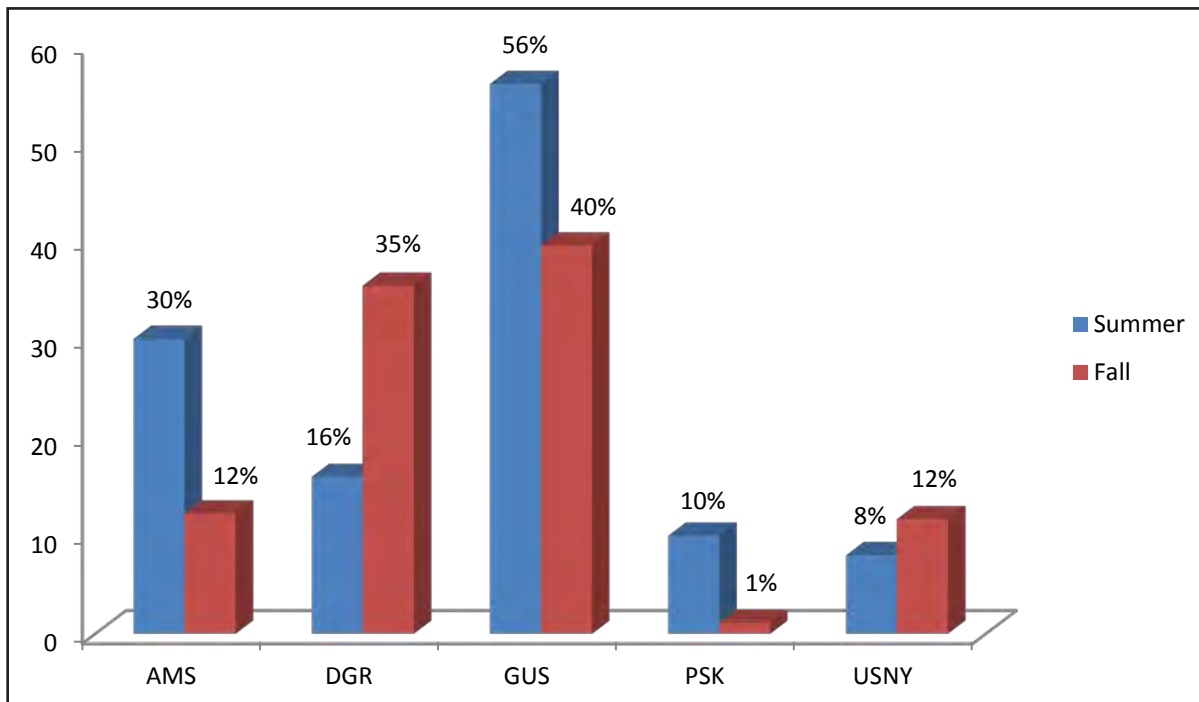
Figure 9.   Circulator Ridership by Route, 2012

Survey Participation by Ethnicity

From the summary shown in Figure 10, more Asian and Latino/Hispanic riders participated in the summer survey than in the fall. In the fall survey, more Black/African-American and White/Caucasian riders participated in the survey.
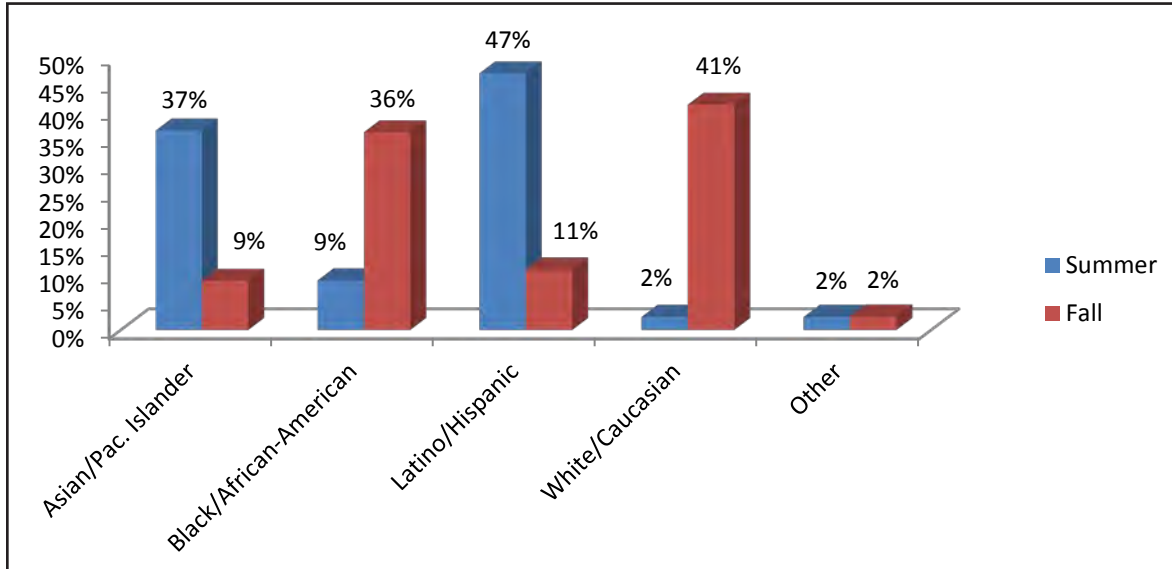
Figure 10. Survey Participation by Ethnicity, 2012

First-Time Circulator Ridership

The results of the analysis (see Figure 11) showed that there was a modest increase in first-time riders, from 10% to 12%. The majority of first time riders were on the Georgetown – Union Station (GUS) Route.
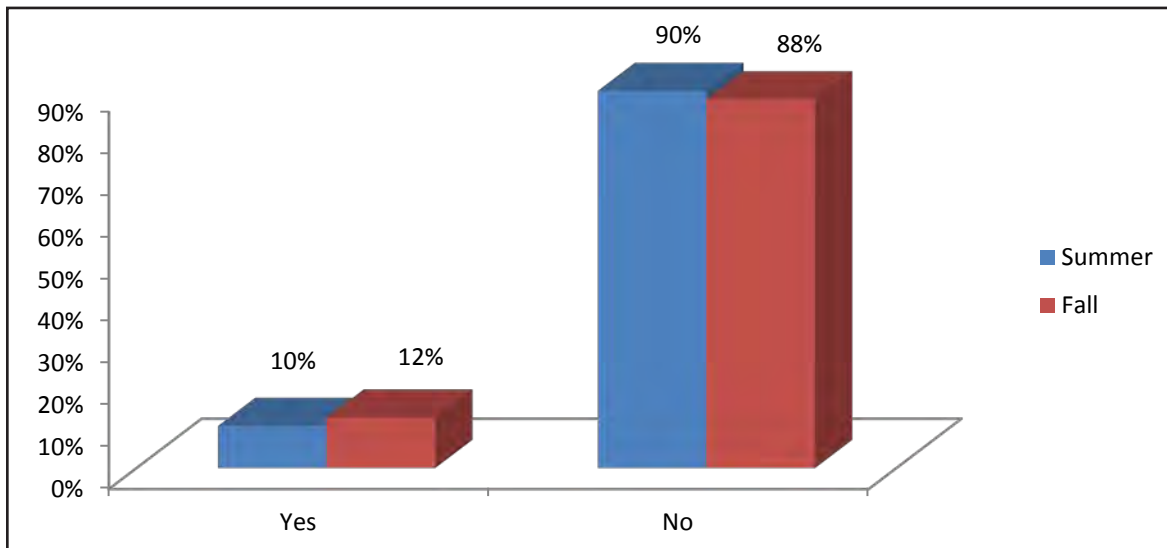
Figure 11. First-Time Circulator Ridership Percentage, 2012

Purpose of Riding the Circulator

The results in Figure 12 show that the majority of riders in the summer (59%) and fall (56%) rode the Circulator for business or work purposes. More people (11%) took the Circulator for leisure in summer, compared to the 6% in fall. There was an increase in the number of patrons for school in fall over that in summer.
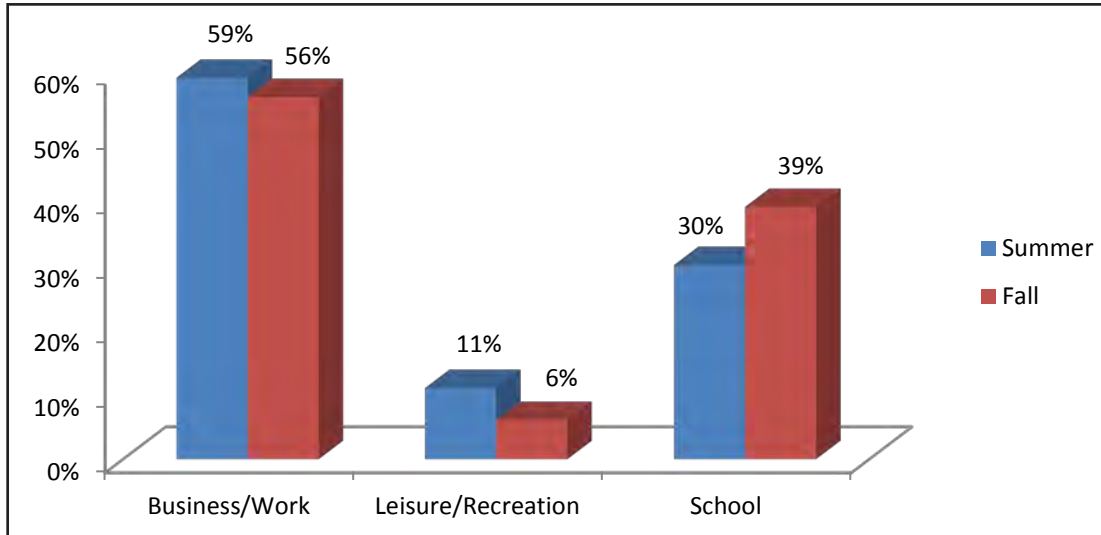
Figure 12. Purpose of Circulator Trip Today, 2012

Reasons for Taking the Circulator

Figure 13 shows the reasons patrons use the Circulator. Approximately 53% of surveyed summer riders said they ride the bus between home and work, compared to 49% of those surveyed in fall. The percentage of riders taking the Circulator for recreation decreased to 25% in fall from 45% in summer.
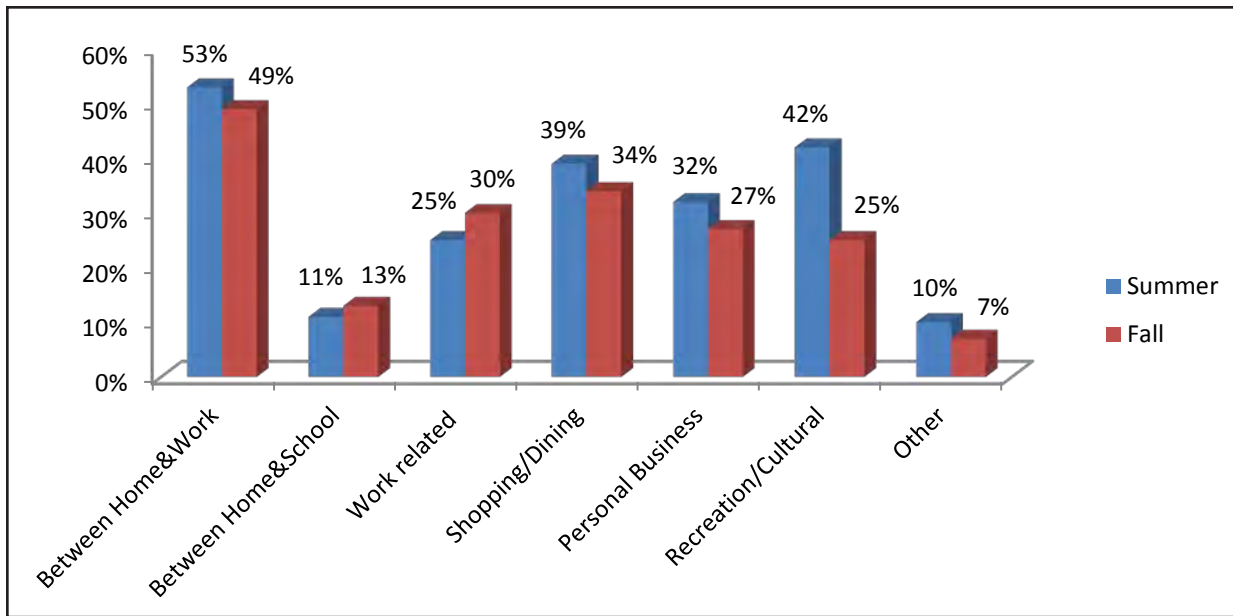
Figure 13. Reasons for Taking the Circulator, 2012

Ride Frequency

The results in Figure 14 show that the percentage of surveyed riders taking the Circulator every day, decreased from 31% in summer to 23% in fall. The majority of respondents surveyed in the fall and summer said they took the Circulator several times a week. The number of riders taking the Circulator weekly, increased from 14% in summer to 24% in fall. An almost equal percentage of riders said they took the Circulator less often.
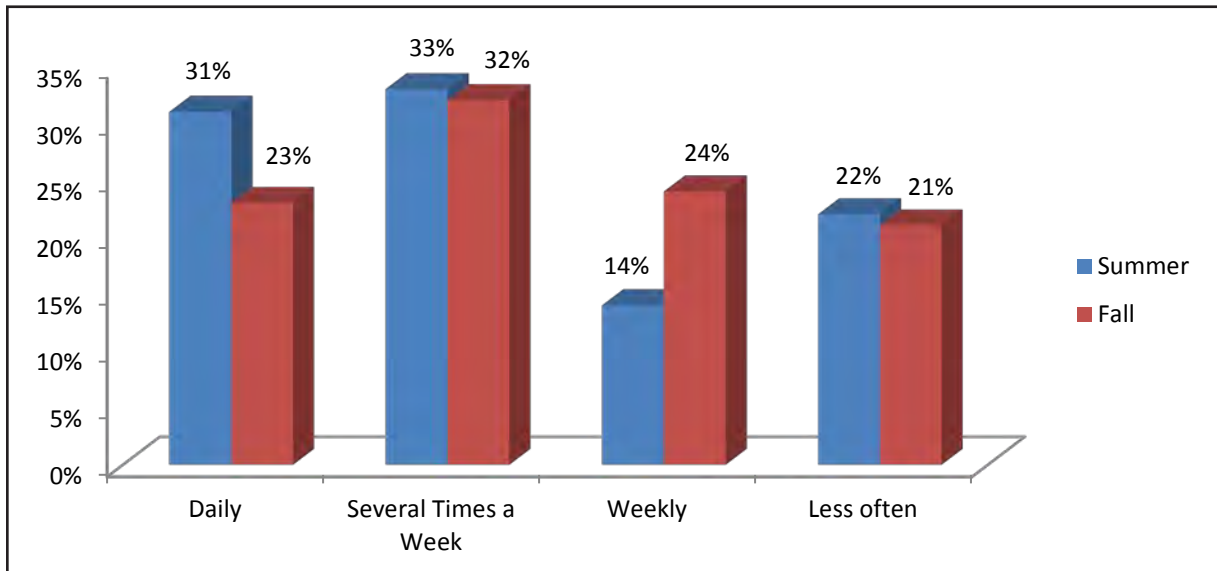
Figure 14. Ride Frequency, 2012

Weekday versus Weekend

The results in Figure 15 show that there was only a one to two percentage point change in the percentage of riders taking the Circulator on the weekend versus weekdays for both seasons. Most riders said they took the Circulator, either daily or several times a week (64% in summer, and 66% in fall).
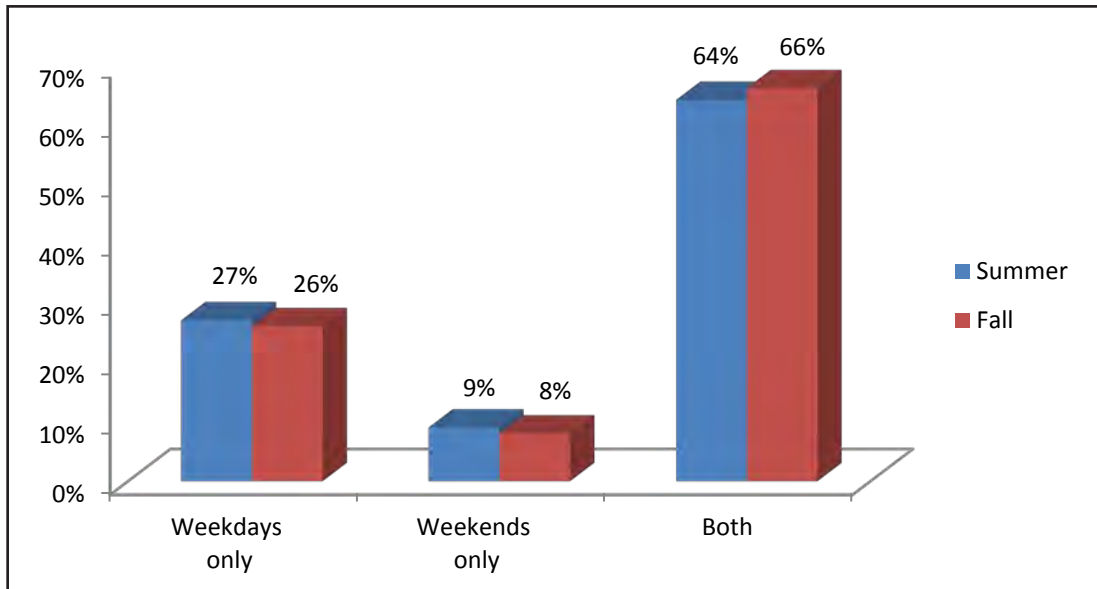
Figure 15. Weekday versus Weekend, 2012

Distance Traveled

Figure 16 shows that most riders took the Circulator for more than 10 blocks in summer (62%) and fall (54%). In fall, 34% took the Circulator 5 to 10 blocks compared to 38% in summer.
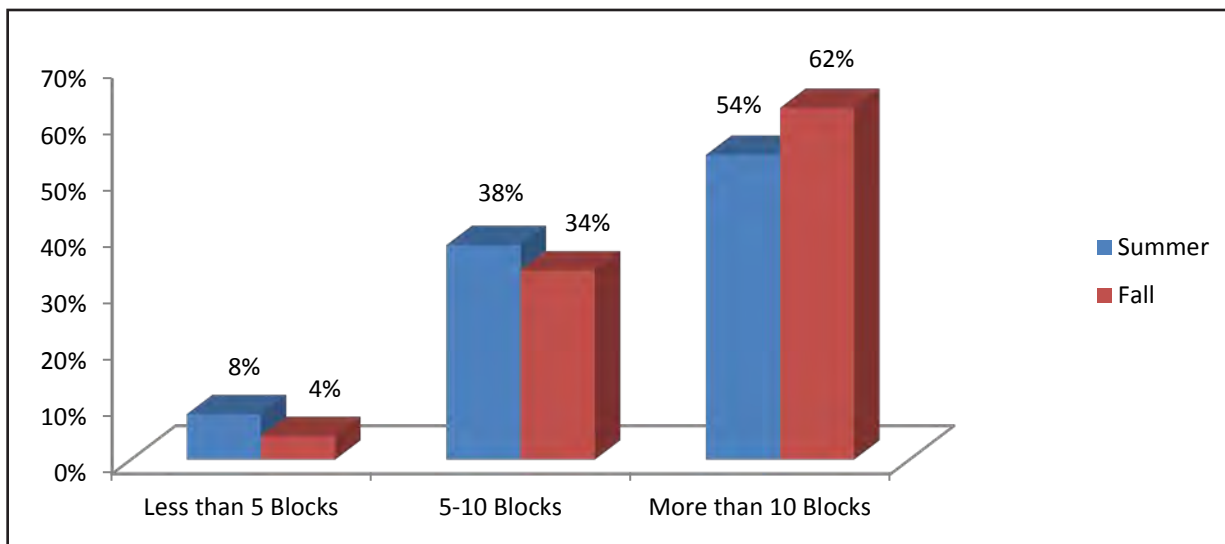
Figure 16. Distance Traveled, 2012

Number of Trips

The results presented in Figure 17 show that the majority of the riders took a roundtrip on the Circulator (61% in summer and 66% in fall). The percentage taking only one trip decreased from 30% in summer to 21% in fall.
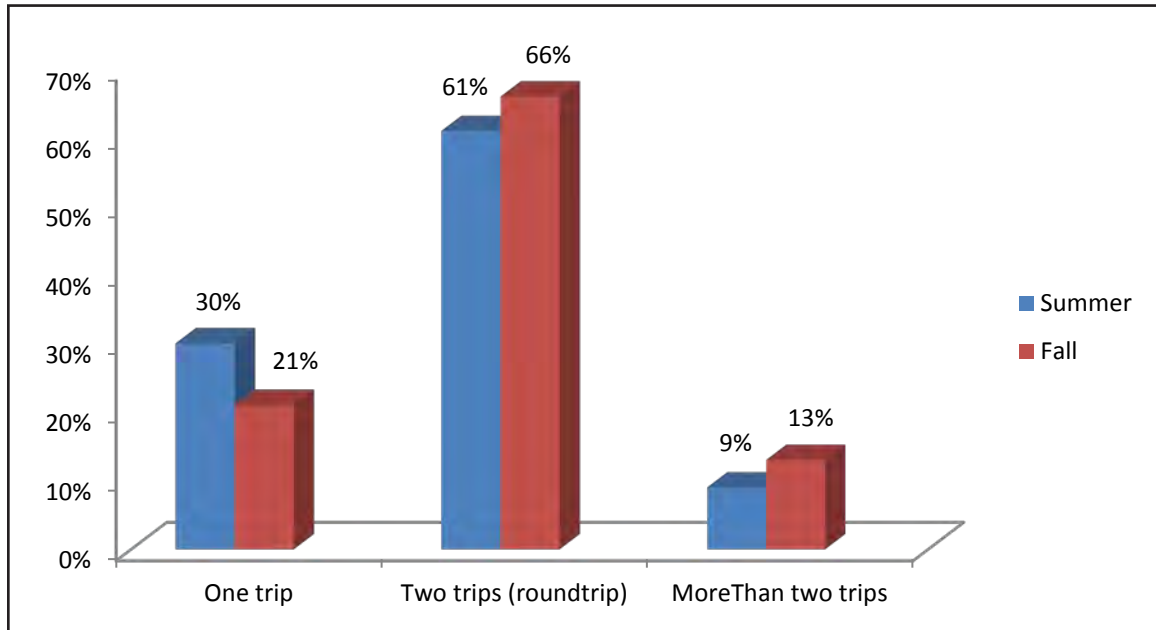
Figure 17. Number of Trips, 2012

Goes Where Patrons Want to Go

The results in Figure 18 show that 87% of surveyed summer patrons strongly agreed or agreed that the Circulator "goes where I want it to go," while 89% responded the same in the fall survey.
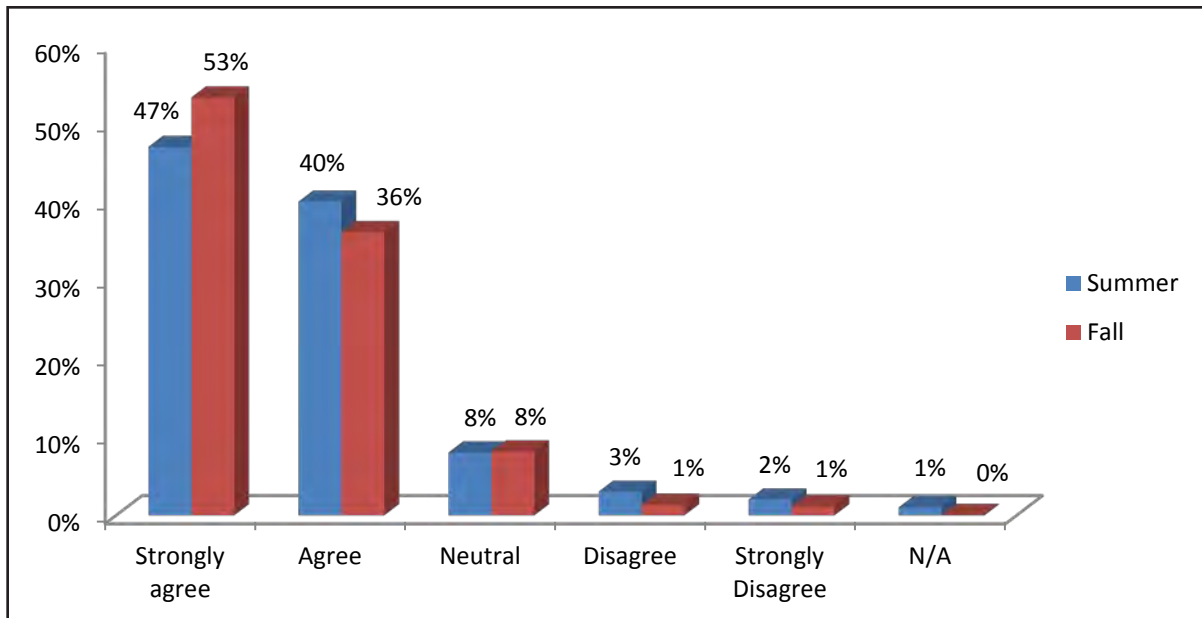
Figure 18. "Goes where I want it to go," 2012

Prefer the Circulator to Other Transit

From the results in Figure 19, a total of 76% of surveyed riders in summer and 79% of fall riders said they strongly agree or agree that they prefer the Circulator to other transit modes.
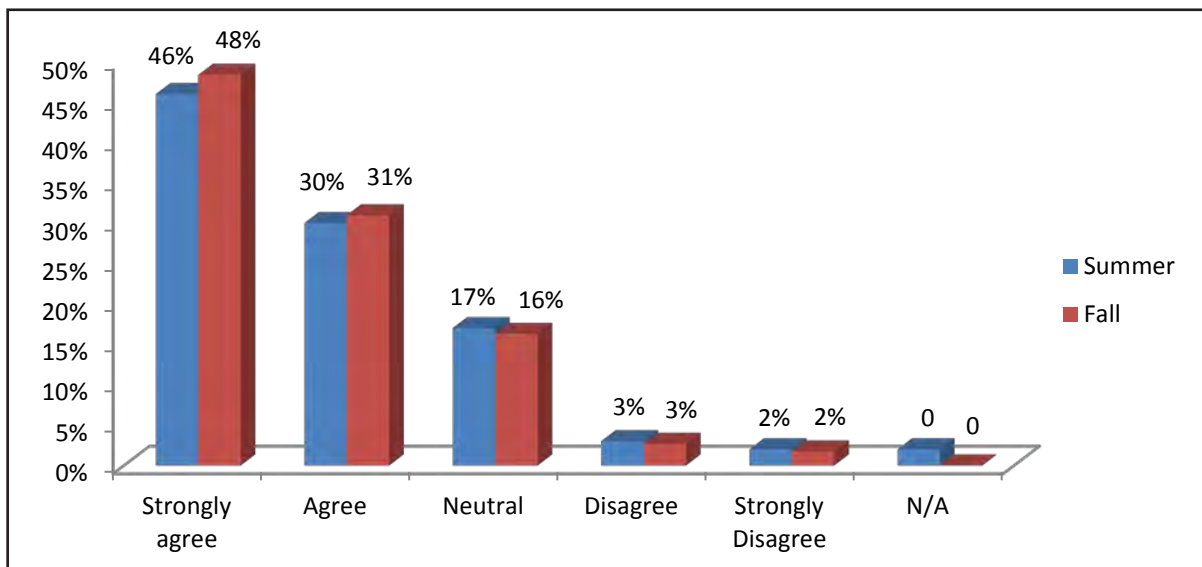
Figure 19. Prefer the Circulator to Other Transit, 2012

Drivers Are Helpful

The patrons were asked whether the Circulator drivers are generally helpful. The results presented in Figure 20 show that the majority of riders (85% in summer and 87% in fall) strongly agreed or agreed that the drivers are generally helpful.
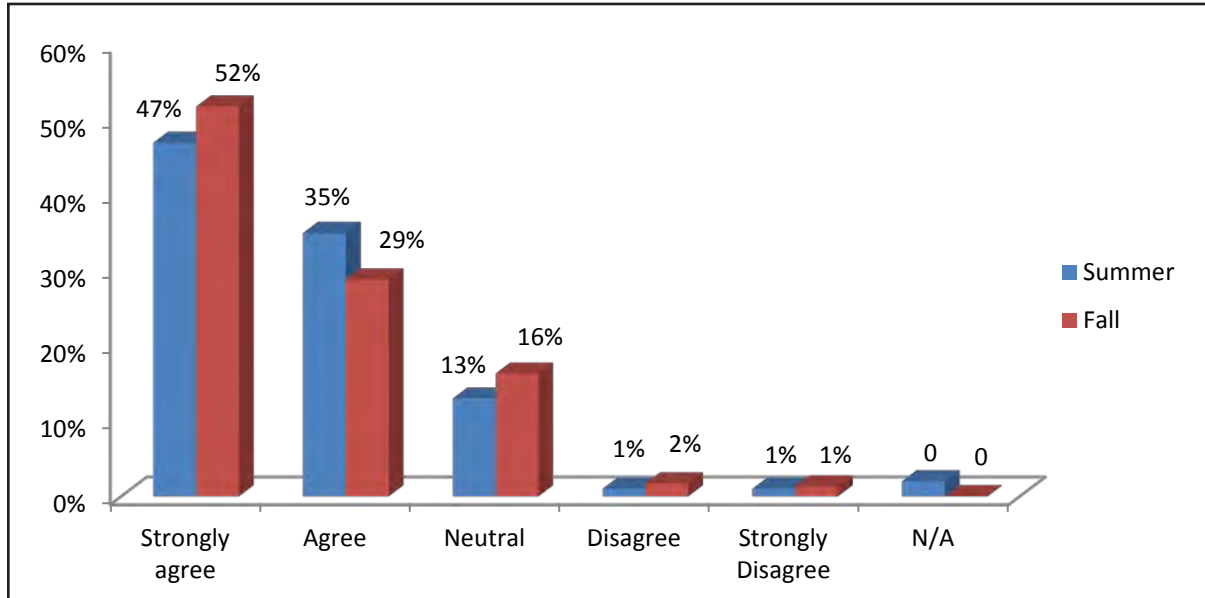
Figure 20. Drivers Are Helpful, 2012

Less Costly to Use the Circulator

Patrons were also asked their opinion on the lower cost of riding the Circulator.

The results are presented in Figure 21. From the results, a majority of riders strongly agreed or agreed (72% in summer and 81% in fall) that they rode the Circulator because of the lower cost.
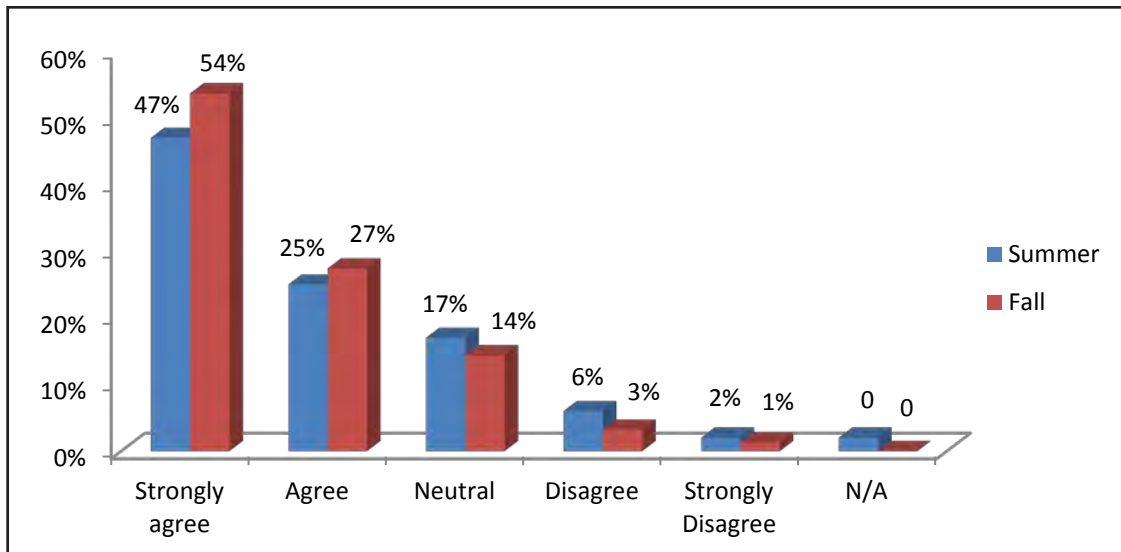
Figure 21. Less Costly to Use the Circulator, 2012

Provides High Quality Bus Service

The respondents were asked about the quality of the Circulator service, which is summarized in Figure 22. The majority of the surveyed riders in summer and fall (87% and 85%, respectively) strongly agreed or agreed that the Circulator provides a high quality of bus service.
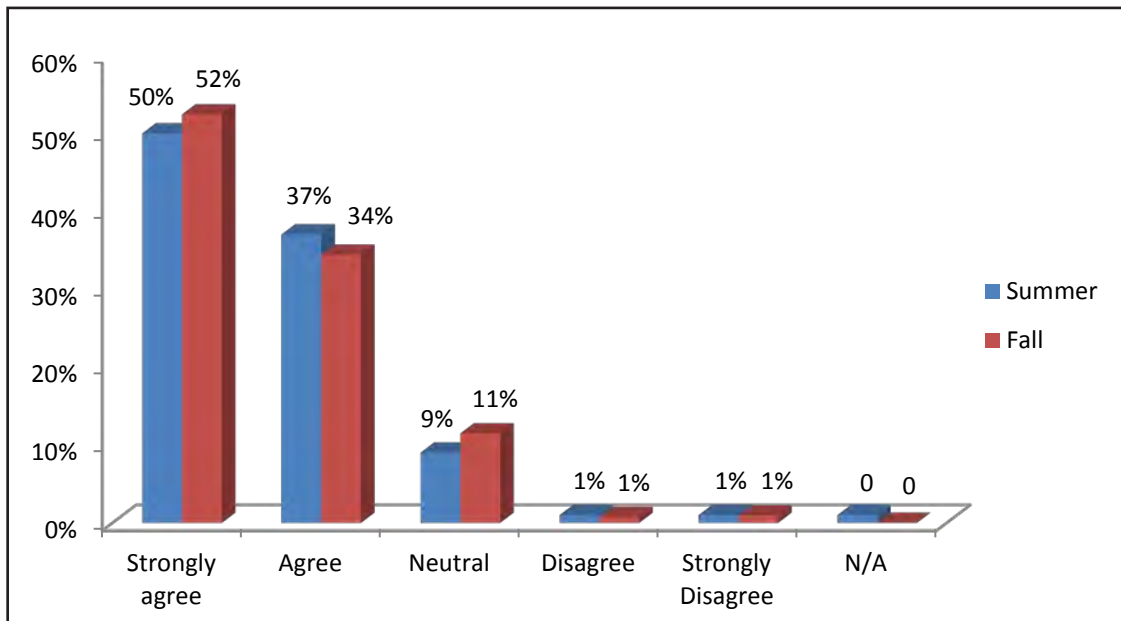

Figure 22. Provides High Quality Bus Service, 2012

Provides Frequent Bus Service

Similarly, the results in Figure 23 show that the majority of surveyed riders in summer (82%) and fall (84%) strongly agreed and agreed that the Circulator provides sufficiently frequent bus service.
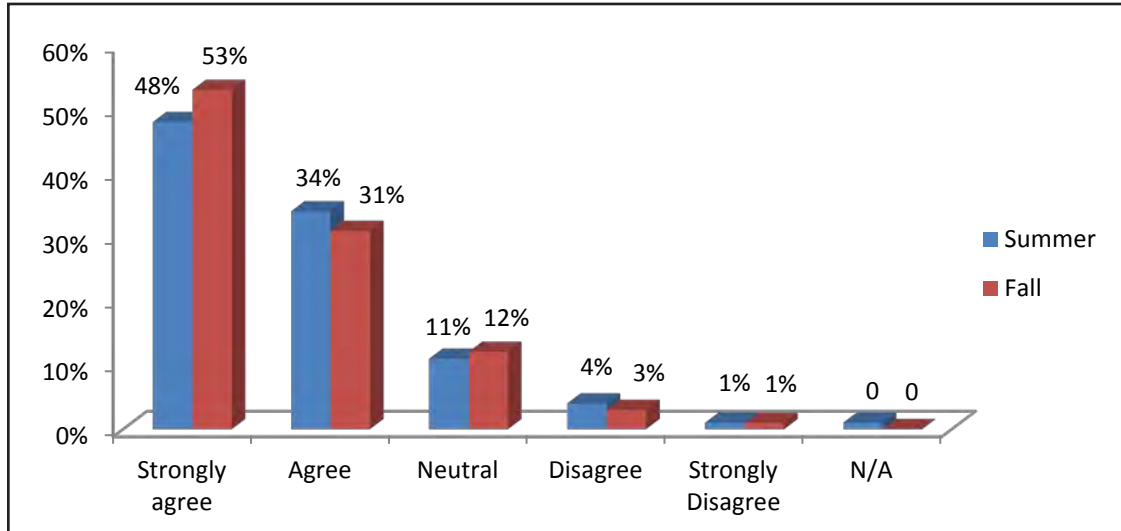
Figure 23. Provides Frequent Bus Service, 2012

Bus Comfort

The patrons were also asked how comfortable the Circulator buses are. The results in Figure 24 show that surveyed riders in summer and fall strongly agreed (respective percentages of 86% and 83%) that the buses are comfortable.
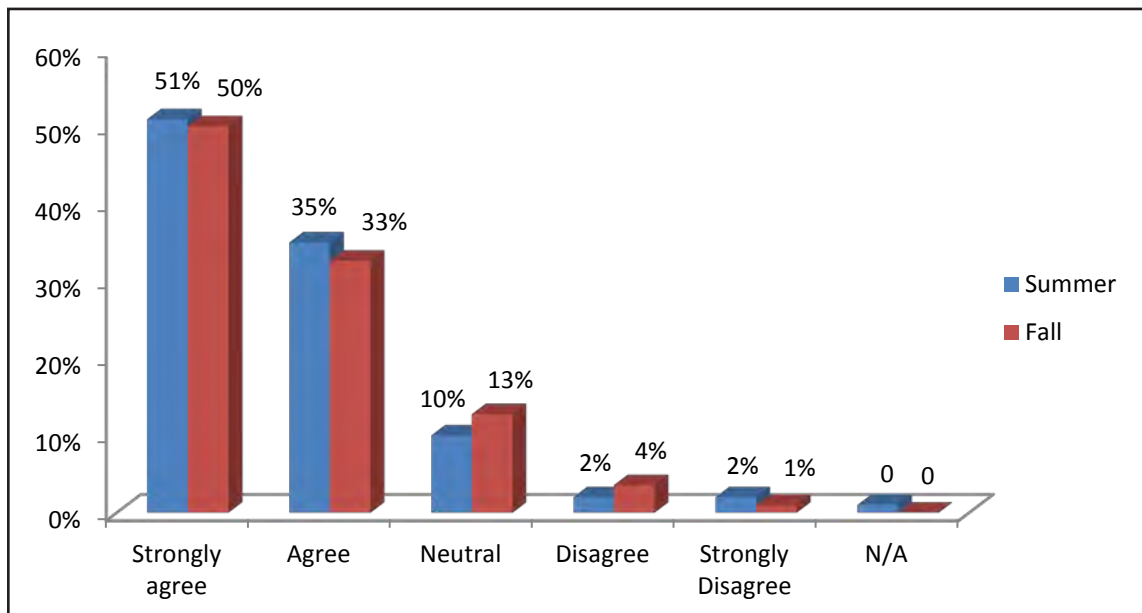
Figure 24. Bus Comfort, 2012

Easy to Use

In addition, patrons were asked if the Circulator was easy to use. The results in Figure 25 show that the majority of the surveyed riders strongly agreed or agreed (93% in summer and 91% in fall) that the Circulator was easy to use.
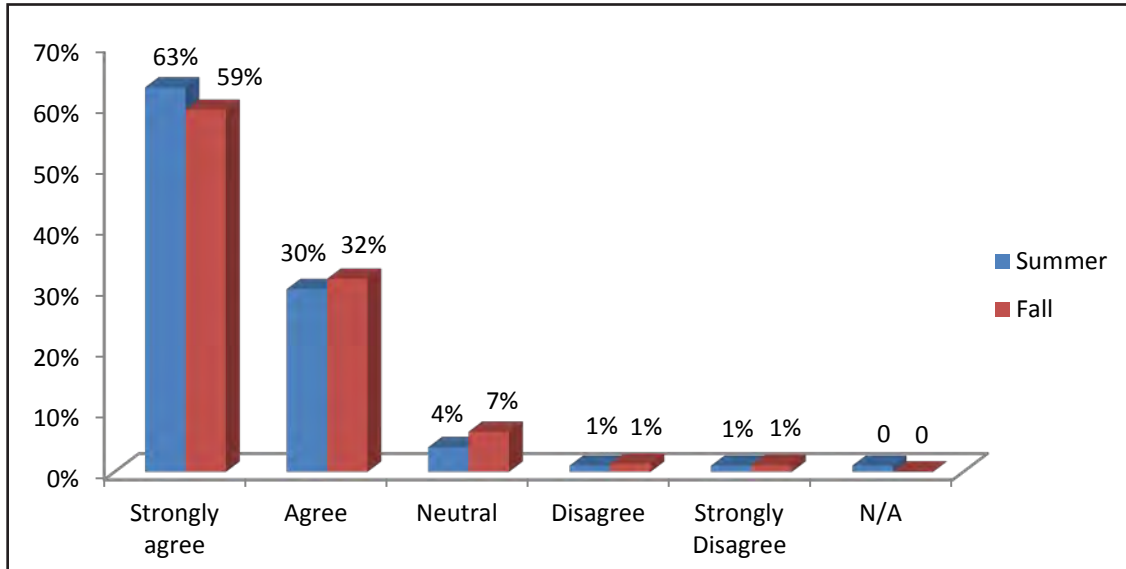

Figure 25. Easy to Use, 2012

Vehicle Ownership

The survey sought to determine the percentage of patrons who actually own vehicles. Sixty two percent (62%) of those surveyed in summer owned vehicle(s), while 51% in the fall survey owned vehicle(s). The results of those responses are shown in Figure 26.
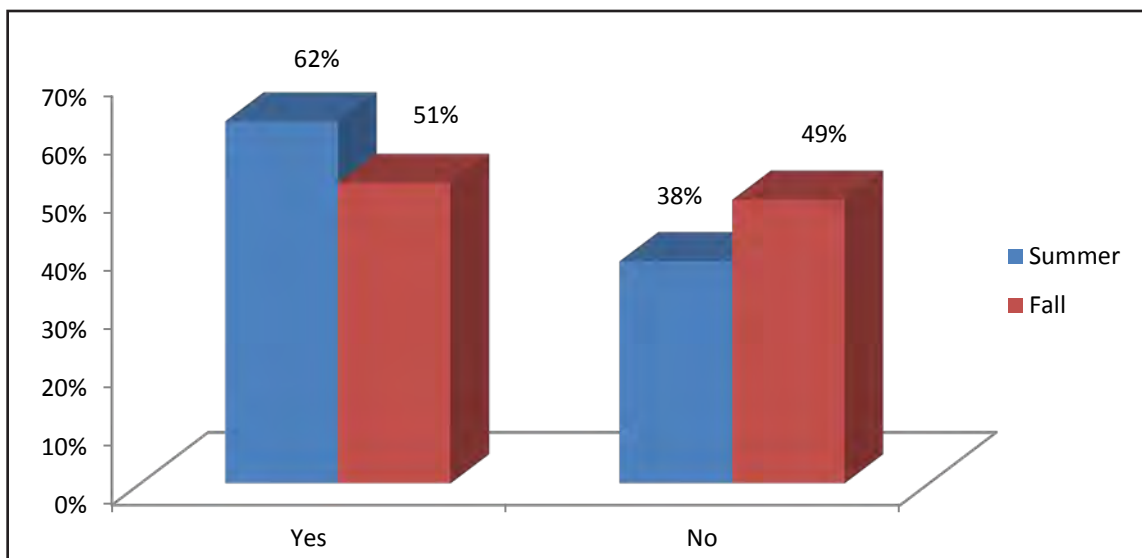

Figure 26. Vehicle Ownership, 2012

Age Range of Respondents

The results in Figure 27 show that the largest group of surveyed riders is the 25- to 34-year-old group. In the summer survey, 35% of the riders were found in this group while 40% of the riders were in this group for the fall survey. The next largest age group is 18 to 24 years, with 25% of the riders in summer and 24% in fall in this range.
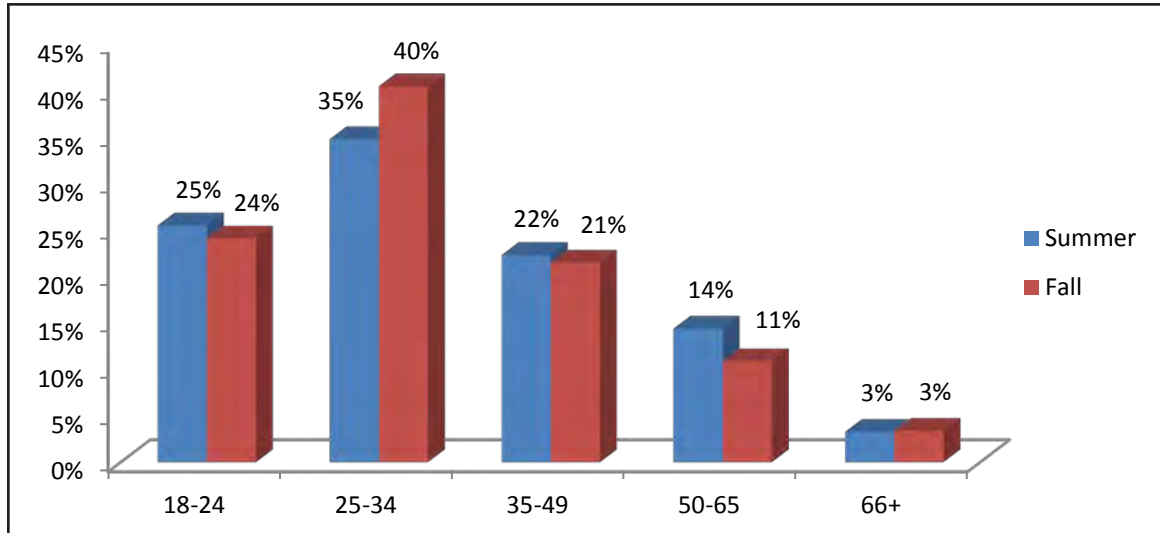

Figure 27. Age Range (in Years) of Respondents, 2012

Annual Income Range of Respondents

Respondents indicated their annual income brackets. The results are presented in Figure 28. The percentage of riders making more than $100,000 was about the same in summer (11%) as in fall (12%). The largest percentage of riders indicated their income to be less than $20,000 per year. Their group share decreased from 26% in summer to 21% in fall. The largest groups of riders in the fall were in two ranges: 21% made less than $20,000 and 21% made between $60,000 and $80,000 annually.
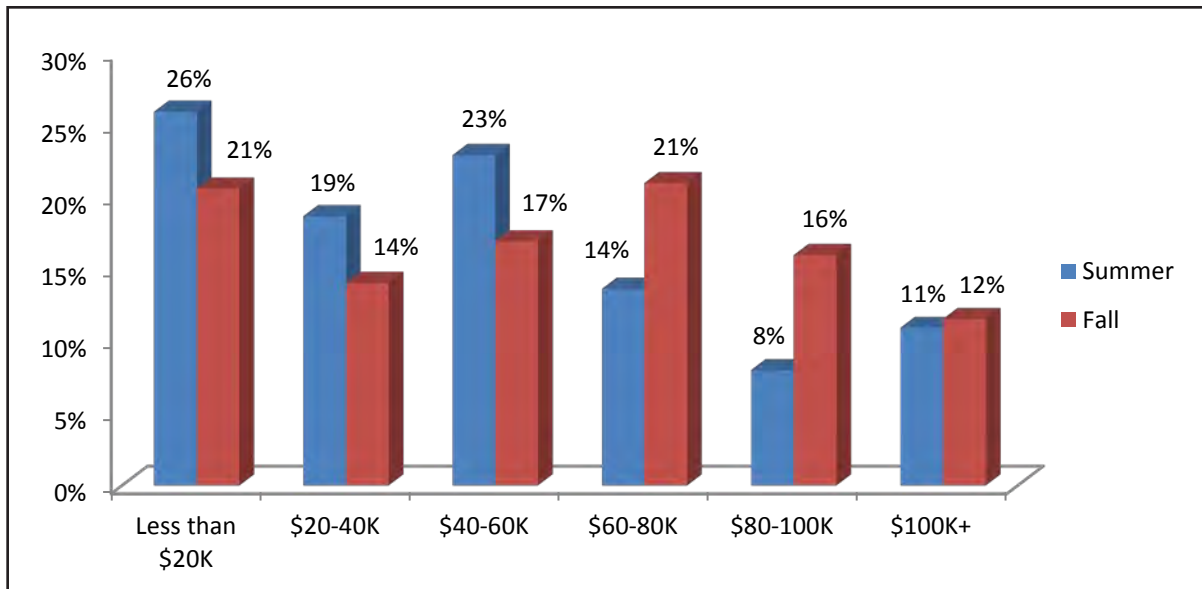
Figure 28. Annual Income Ranges of Respondents, 2012

Education Level of Respondents

The results presented in Figure 29 show that 61% of surveyed summer riders had a college degree. In fall, 65% of riders reported they had a college degree. Only a small percentage of riders, (3% in summer and 4% in fall) did not have a high school diploma.
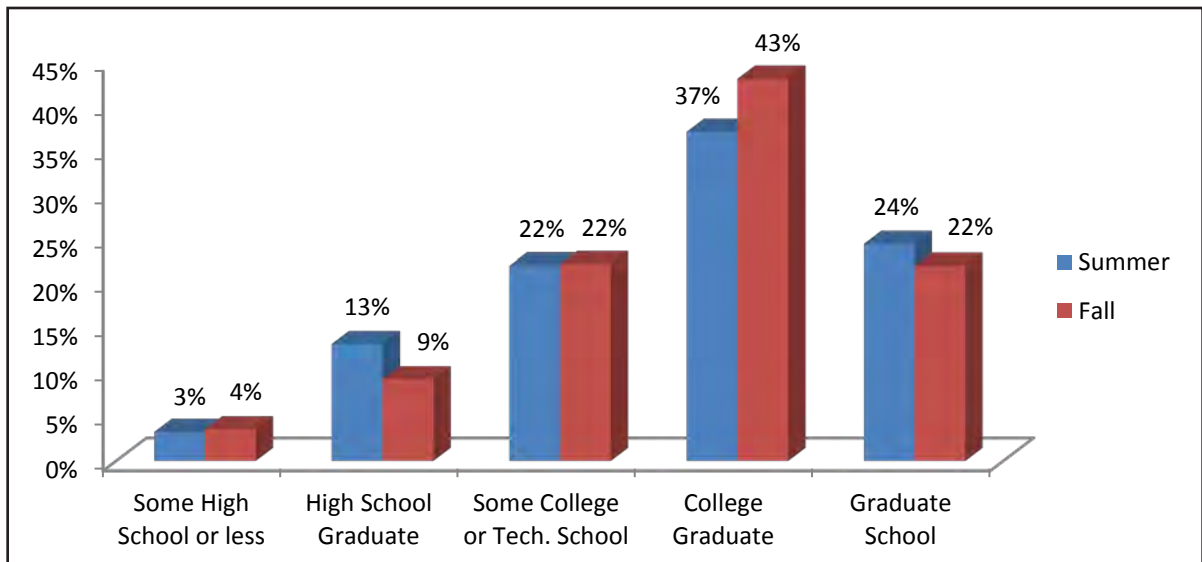

Figure 29. Education Level of Respondents, 2012

VI. DISCUSSION OF RESULTS

Generally, the results of the annual survey are used to make critical operational and planning decisions in order to make adjustments to routes, hours of operation, marketing and frequency of service to satisfy the patrons of the DC Circulator. The survey instrument used annually has, however, evolved over the eight-year period (from 2005 through 2012). The questions and the wording have seen several iterations of revisions leading to the current survey instrument used in 2011 and 2012. This has resulted in the inability to consistently provide annual trends in survey responses across the 2005-2012 period, with the exception of a few measures. Since 2006, the number of questions has been reduced from 31 questions, with six open-ended questions, to 15 questions (in 2011 and 2012), with no open-ended questions. To ensure consistency, this investigation did not re-design the 2012 survey instrument developed by Downtown Business Improvement District (DCBID).

From 2008, the open-ended questions were excluded from the survey, since they required additional time from the respondents and are also difficult to analyze. Instead, the survey used several types of structured response questions. The most common were dichotomous formats that required yes/no, true/false, or agree/disagree responses. Several years did not, however, include questions on first-time riders. There were 15 questions in the survey format for 2010-2012.

The survey conducted on the five routes provided a variation in the responses received, since the Circulator travels through areas or neighborhoods with different ethnic and economic backgrounds. This provides the necessary consistency in the feedback from all the communities served by the Circulator.

The trending in the data from 2005 through 2012 showed that the majority (an average of 99%) of the patrons would definitely recommend the Circulator to others. This indicates that most of the patrons are satisfied with the use of the Circulator. This can also be confirmed from the average percentage of responses of "strongly agree" and "agree" for several of the measures. For example, an average of 89% of the riders in both surveys in 2012 said they "strongly agree" or "agree" that they are satisfied with bus service overall.

From 2005 through 2012, the majority of riders have been DC residents. In 2012 (from both summer and fall surveys), an average of 81% of the riders were found to be DC residents while the remaining were residents in MD, VA or elsewhere. This shows that, in addition to other transit available, DC residents also use the Circulator, which provides transportation to other locations that either the Metrorail or regular transit buses would not provide. The frequency of service provided by the Circulator could also be a deciding factor in this high patronage by DC residents.

The trends in the survey from 2005 through 2012 also show that most of the patrons use the Circulator primarily for business or work purposes. Due to the frequency of service and headways along the routes, patrons potentially find the Circulator a reliable mode of transportation to work or their businesses. In addition, from the survey in 2012 (both summer and fall), a substantial average percentage (63%) of the riders indicated that they use the Circulator as a mode of transportation between home and work or school. This

also confirms the responses from the patrons regarding the frequency with which they use the Circulator on a weekly basis. An average of 61% of the surveyed patrons indicated that they use the Circulator either daily or several times a week. Only 22%, on average, indicated that they use the service less often than weekly, with 65% using the Circulator both on weekdays and weekends. The high patronage of the Circulator could also be attributed to the low cost of using the service. An average of 75% of the surveyed riders in fall and summer of 2012 "strongly agreed" or "agreed" that the cost of using the service is relatively low.

The majority of surveyed riders in both summer and fall 2012 (56%) use the Circulator for traveling more than 10 blocks to their destinations with an average of 64% indicating that the usually travel roundtrips on the Circulator. Most of the patrons "strongly agreed" or "agreed" that the Circulator drivers were generally helpful (average response 82%).

One of the most critical measures that patrons use to gauge the effectiveness and their satisfaction of any transit system is quality of service. As stated earlier, the majority of the patrons possibly use the Circulator due to the quality of service. From the survey in both summer and fall of 2012, an average of 87% of the respondents indicated that they "strongly agree" or "agree" that the Circulator provides high quality service to the community while an average of 83% of them "strongly agree" or "agree" the Circulator provides frequent bus service.

Approximately 62% of the riders in summer 2012 actually owned vehicles, while 51% of those surveyed in the fall reported owning a vehicle. Thus, on average, 57% of the patrons surveyed own vehicles. This shows that the Circulator is helping to promote the use of mass transit in the DC metropolitan area throughout the year.

The majority (on average, 61%) of the riders surveyed in summer and fall in 2012 were found to be in the 18- to 34-year range. It was also found from the survey that approximately 24% of the riders earn less than $20,000 a year. A substantial percentage of the riders (62% on average) were college graduates or attended graduate school. The differences in percentages for age group, income and education between the summer and fall surveys were found to be minimal. Most of the differences ranged between 1% to 5%, on average.

VII. CONCLUSIONS AND RECOMMENDATIONS

The results of the survey showed that the Circulator is highly favored, with a substantial majority of the riders (98%) indicating that they are satisfied with the services and would recommend the service to others. The Circulator promotes the use of mass transit in the region since most of the riders surveyed actually own vehicles. Although the initial idea of the Circulator was focused on facilitating travel of visitors between downtown attractions, 80% of the ridership involved DC residents, indicating a potential for expansion into local communities. From the analysis of the fall 2012 and summer 2012 surveys, the annual survey conducted by DCBID is sufficient, since the response percentage differences between the two surveys for the same year were found to be minimal.

The following recommendations should also be considered for future surveys:

- The on-board survey could be conducted without use of personnel but with incentives to riders (e.g., free ride pass). Survey instruments could be placed on the bus for riders to take one and complete while riding on the bus. The driver could provide the riders with the incentive after the filled survey instrument is returned. This survey method could be explored on a pilot basis to reduce cost.

- Ensure consistency in the survey questions by identifying a set of core questions to be included in all patron surveys and to be used in longitudinal assessments.

ABBREVIATIONS AND ACRONYMS

AATA	Ann Arbor Transportation Authority, Michigan
AMMS	Woodley Park – Adams Morgan – McPherson Square Metro
AVL	Automatic Vehicle Location
BCT	Community Bus Program, Florida
DC	District of Columbia
DCBID	Downtown DC Business Improvement District
DCST	DC Surface Transit, Inc.
DDOT	District Department of Transportation
DGR	Dupont Circle – Georgetown – Rosslyn
GUS	Georgetown – Union Station
HUTRC	Howard University Transportation Research and Data Center
MD	Maryland
MI	Michigan
PSK	Potomac Ave Metro – Skyland via Barracks
SW	Southwest
TCRP	Transit Cooperative Research Program
TRB	Transportation Research Board
USNY	Union Station – Navy Yard Metro
VA	Virginia
WMATA	Washington Metropolitan Transit Authority
ZIP	Zone Improvement Plan (postal area code)

ENDNOTES

1. DC Circulator, "The New DCCirculator.com" [home page] (no date) http://www. dccirculator.com (accessed January 17, 2013).

2. Kittelson & Associates, Inc., *Technical Assistance for the TLC Program, Bethesda Circulator, Bethesda, Maryland*, Project No. 9369.03, (Washington, DC: Metropolitan Washington Council of Governments, October 20, 2008) 1-38; http://www.mwcog.org/ transportation/activities/tlc/pdf/Bethesda_Report.pdf (accessed December 15, 2012).

3. Ibid.

4. Downtown DC Business Improvement District (DCBID), "DC Circulator" [overview] (no date) http://www.downtowndc.org/programs/transportation/circulator (accessed December 18, 2012).

5. District Department of Transportation (DDOT), *Circulator 10 Year Development Plan* [gateway page] (2011), http://www.dccirculator.com/Home/About/ Circulator10YearPlan.aspx (accessed December 15, 2012).

6. DC Circulator, "The New DCCirculator.com."

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