Exploratory Study on the Growing Bicycle Community in Minneapolis, Minnesota

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Abstract

Minneapolis is one of the most welcoming bicycle communities in the United States. A progressive city, Minneapolis is constantly on the lookout for new ways to improve its environmental standards. The city has incorporated a large variety of bike routes, bicycle boulevards, trails and paths both on and off road to provide residents with a safe and enjoyable ride throughout the metropolitan area. Little research has been done to discover where the majority of bicycling is taking place, what types of facilities bikers are using and why these facilities are either successful or unsuccessful. This study explores the reasons behind the Minneapolis large biking community by examining facility type, location, age of rider, and average income of rider.

Introduction

Minneapolis is a top rated city in the United States for bicycle enthusiasts. Bicycling Magazine has ranked Minneapolis as the second most biker friendly city in the United States, only behind Portland, Oregon (Dille, 2012). The City of Minneapolis has incorporated 85 miles of off-street bikeways and 92 miles of on-street bikeways. These range from non-buffered bike lanes to off-street paved bicycle-only routes. According to Krisberg (2013), in Minneapolis the number of city bicyclists increased by 174 percent between 2003 and 2008.

The need for bike paths and routes throughout the metro is of growing importance. "Increasing concern over vehicle congestion and pollution in urban areas has led to an interest in promoting bicycle use for nonrecreation (utilitarian) purposes (Dill and Carr, 2003)."

Cities like Minneapolis can benefit from a healthy bicycle network. While increased biking among the populace is hardly a social panacea, biking does relieve some of our most critical transportation, environmental, and public health problems, according to Hanson and Young (2008). Using bicycling as a means of transportation in a large metropolitan area can influence traffic densities, support a healthy lifestyle which in turn combats obesity, reduces road maintenance costs and in turn saves the monies for tax payers. A 22 pound bicycle has much less impact on the city streets then a one or two ton car or truck. Environmentally, using a bicycle as opposed to driving lowers greenhouse gas emissions thus leaving behind less of a carbon footprint. Bicycles, unlike motorized vehicles emit almost no form of pollution while in use. Bicycling can also provide members who work and live in the community a safe and low cost mode of transportation. Also, owning a bicycle instead of a second car can save owners the cost of storing and maintaining their vehicles.

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For these reasons this is a valuable study for Minneapolis and other large cities. Not only is it valuable from a research standpoint but also for anyone that is aiming to promote bicycling.

Study Area

The data provided by the Minneapolis Department of Public Works shows four distinct areas of Minneapolis with the highest EDT (estimated daily traffic) bicycle counts (Figure 1).

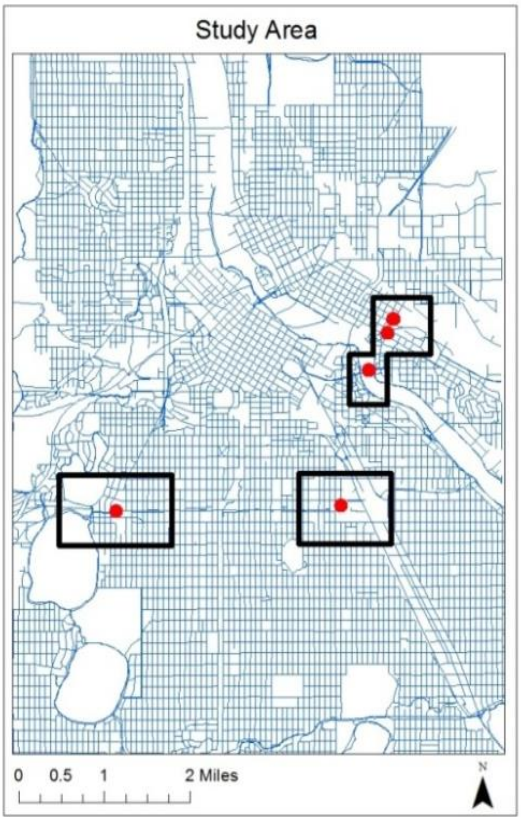

Figure 1. The four study areas (black boxes) outlining the five Estimated Traffic Bicycle count locations (red circles) with the highest recordings in 2012/2013. Hennepin Greenway (left), Cedar Avenue Greenway (bottom right), University of Minnesota (top right).

These areas are among some of the most used by commuters according to the American Community Survey as illustrated in Figure 2 representing Minneapolis outlined in grey.

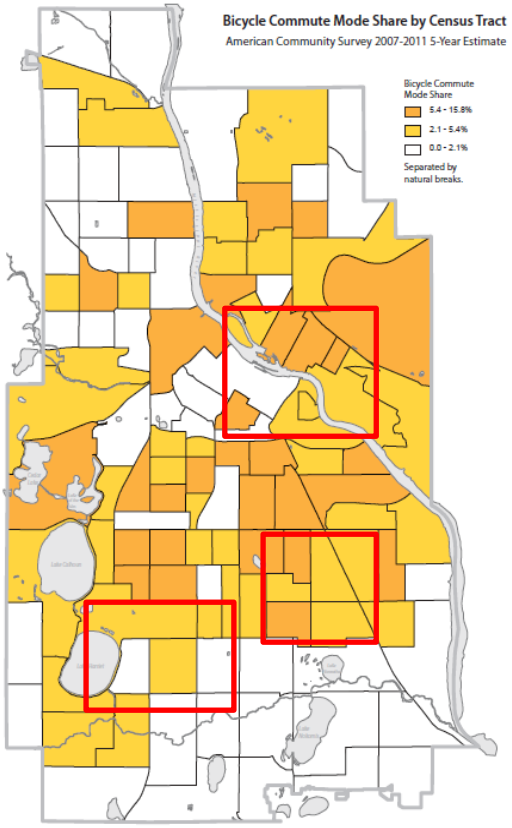

Figure 2. Highest percentage of commuters is shown in dark orange. Areas boxed in red are where the five highest Estimated Daily Bicycle Traffic counts were received. Hennepin Greenway (left), Cedar Avenue Greenway (bottom right), University of Minnesota (top right).

The Washington Avenue Bridge received the most usage in 2012 followed by two areas located within the University of Minnesota along 15th Avenue SE. The Midtown Greenway just West of Cedar Avenue S. came in fourth followed by the Midtown Greenway west of Hennepin Avenue S. Focusing on these four heavily used areas around Minneapolis can help provide insight in where bikers prefer to ride in this growing bicycle community.

Study Area Setting

The four areas this study focuses on vary in location and neighborhood type. The Washington Avenue Bridge along with 15th Avenue SE are both located directly on the University of Minnesota campus. Although these two sites are in close proximity, they differ in both facility type and use. The Washington Avenue Bridge is a walkway/bicycle path crossing the Mississippi River that has no motorized traffic access. The bridge's main purpose is connecting the East and West Bank campuses. This infrastructure combines two large paths on either side of an enclosed walkway with areas for pedestrians and bikers. The enclosed walkway is there to provide shelter from the elements but is for pedestrian use only.

Fifteenth Avenue SE is a very popular street stretching from SE University Avenue to SE Como Avenue. Fifteenth Avenue receives large amounts of motorized traffic on the north side of campus. This section provides bicyclists with designated bike lanes and sidewalks on both sides of the street. Another popular bicycle region is along the Midtown Greenway near Cedar Avenue. This is a popular location because it runs adjacent to the Hiawatha LTR Trail. The LTR Trail receives lots of attention because it connects downtown with the Cedar Riverside neighborhood area which has become a favorite destination for bicycle enthusiasts. Also, many people live along the LTR Trail, making it ideal for commuting.

The final area of interest is the Midtown Greenway west of Hennepin Avenue located in the heart of Uptown approaching the chain of lakes crossing between Lake Calhoun and Lake of the Isles.

Data

There were three main data sets used in this study. Blenski (2013) provided the datasets used in this study.

Data Description

Estimated Daily Traffic Bicycle Counts

The EDT (estimated daily traffic) counts were taken annually from 2007 through the 2013. For each year, all of the counts were logged during the second week in September. Since 2007 the Department of Public Works has conducted 12 hour counts at various locations. Results from longer duration data collection concluded a majority of bicycle traffic occurred during 4 p.m. to 6 p.m. Approximately 20% of all daily bicycle traffic occurred at this time. The Department of Public Works decided to use this time period as their primary data collecting window. Therefore, the majority of counts were recorded between the hours of 4:00 p.m. and 6:00 p.m. From the data collected in these two-hour windows, estimations were extrapolated for the entire 24 hour period. In addition to physical counts, three automated counters were set up along the Midtown Greenway. The EDT counts taken in this two week window are the data used in this study.

Count Locations

Count locations were spread out over the entire City of Minneapolis. There were two main categories of bicycle counts used in this study: 1) annual benchmark counts, and 2) three year interval counts. The first were annual benchmark counts collected every year from 2007 through 2013. These annual counts were taken from 30 different locations around the city (Figure 3).

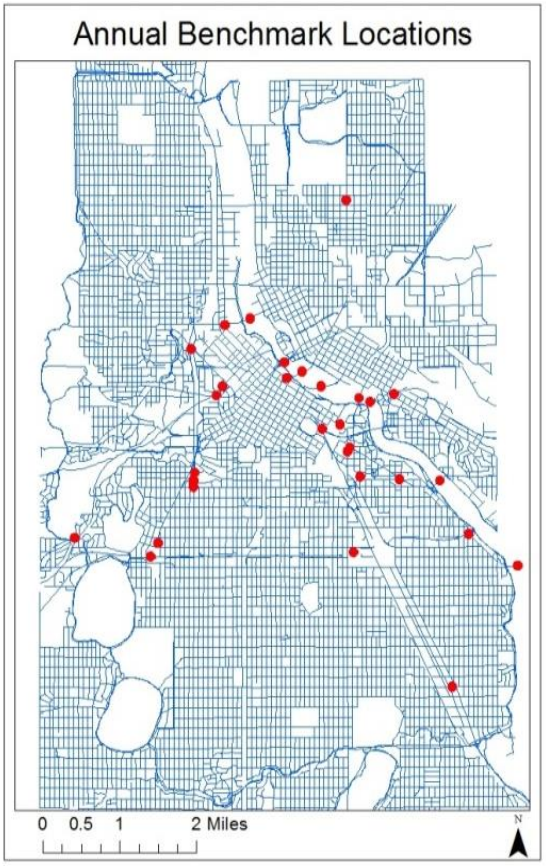

Figure 3. Thirty annual benchmark recording stations (30 red circles) gathered once a year used to record Estimated Daily Traffic Bicycle counts starting in 2007. The area shown represents the City of Minneapolis covering approximately 54 square miles. The most recent counts were taken in 2013.

An additional 300 locations were taken in a three year interval starting in 2006 until 2012 (Figure 4). Out of the five main study areas for this research, three are benchmark locations. These are located at 15th Avenue SE, Midtown Greenway east of Cedar Avenue S. and Midtown Greenway west of Hennepin Avenue S. Two count locations fell in the three-year category. The remaining two count locations at Washington Avenue and 15th Avenue N. were part of the three year count.

Bicycle Infrastructure

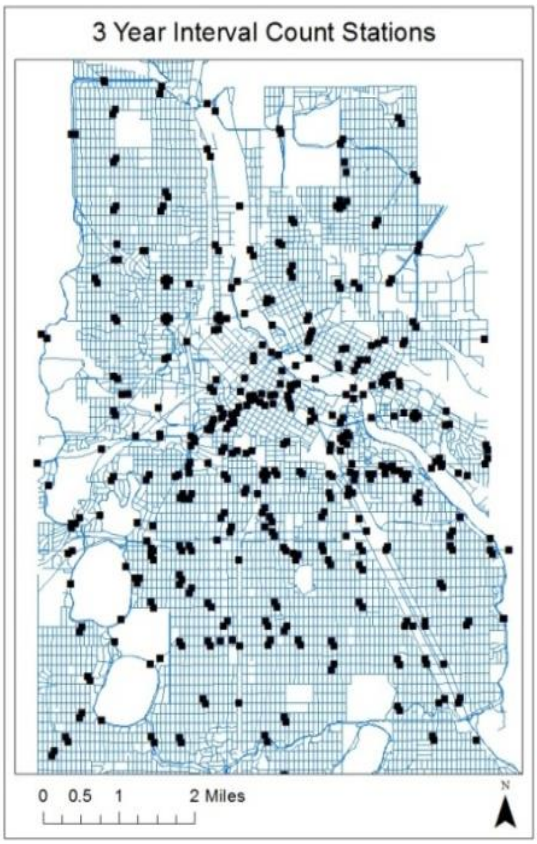

Figure 4. Three hundred Estimated Daily Traffic Bicycle count stations in various locations around the City of Minneapolis recorded once every three years starting in 2006. The most recent counts were taken in 2012.

There are a number of different types of bicycle facilities found throughout the city of Minneapolis. These are defined as bicycle path, lane, boulevard, trail (on and off-street), greenway and wide shoulder. This study focuses on three of these: bicycle path, greenway path, and bike lane. Bicycle paths are usually found off-street, are designated specifically for bike use, and are surfaced with an acceptable material and are maintained. This study explores bike paths over the Washington Ave. Bridge and the Midtown Greenway.

Bicycle lanes are most commonly found on city streets and are established by pavement markings (Figure 5). These lanes are typically running with traffic; however, two-way bicycle lanes exist.

Figure 5. A typical bicycle lane in the City of Minneapolis will be clearly marked by a pavement symbol illustrated above. These lanes are commonly flowing in the same direction as traffic.

Results

University of Minnesota

Value of studying the University of Minnesota campus as it relates to bicycle counts lies in understanding that college campuses see an extraordinary number of bicyclists. On average people living around college campuses are younger (according to the census block for the University of Minnesota the average age is 22.2), and cycling appeals to college students on many reasons resulting in this being a valuable study location.

Of the top five study areas the University of Minnesota had three of the highest EDT counts. The area crossing the Washington Bridge (Figure 6) recorded the highest number of bikers in 2012. Because this site fell in the three year interval instead of the annual benchmark, the latest counts obtained were from 2012. In 2009 the Washington Bridge EDT saw 6858 users compared to 7370 in 2012, a 7% increase (Table 1).

Figure 6. The Washington Avenue Bridge, connecting the East Bank and West Bank buildings of the University of Minnesota, has two wide outdoor bicycle and pedestrian paths separated by an enclosed pedestrian only walkway.

Table 1. Washington Avenue Bridge Estimated Daily Traffic Bicycle count and demographic results provided by American Fact Finder (2011), showing the starting year counts and the ending year counts along with percentage increase.

Washington Avenue Bridge	
2007 EDT Bicycle Counts	6,858
2012 EDT Bicycle Counts	7,370
Percentage Increase	***7%***
Average Age	22.2

Fifteenth Avenue SE just north of University Avenue SE had the highest counts in 2013 at 4330 (this trailed only the 2012 counts from the Washington Bridge which does not have 2013 data). This location is categorized as a benchmark location and therefore receives counts once a year. From 2007 to 2013, 15th Avenue showed a 46% increase in the number of bicyclist it saw (Table 2).

Table 2. 15th Avenue SE North of University Avenue SE Estimated Daily Traffic Bicycle counts 2007 through 2013 showing percentage increase from the first and last data collection years.

15th Avenue SE North of University Avenue SE	
2007 EDT Bicycle Counts	2,950
2008 EDT Bicycle Counts	2,730
2009 EDT Bicycle Counts	3,080
2010 EDT Bicycle Counts	3,030
2011 EDT Bicycle Counts	3,810
2012 EDT Bicycle Counts	4,310
2013 EDT Bicycle Counts	4,330
Percentage Increase through 2007-2013	***46%***
Average Age	**22.2**

It should be noted that more than 95% of the bikers on 15th Avenue used the on-street bicycle lane. This high usage suggests when provided with appropriate bicycle infrastructure, cyclist will utilize them. This is useful information for anyone promoting bicycling in a metropolitan area such as city planners or bicycle enthusiasts with implications to get more riders on the streets.

Fifteenth Avenue SE north of 5th Street SE was the third busiest count location of the University of Minnesota section. Once again this segment fell in the three year interval count. There was a 7% increase from 2008 to 2012 (Table 3) in bikers using this stretch of street, with only 3% of the bikers using the sidewalk. This low percentage could be attributed to the fact that a bike lane is provided. An inference can be made that even with a high volume of motorized traffic, riders prefer to use adjacent on-street bike lanes. Figure 7 illustrates bicycle counts around the University of Minnesota Campus.

Table 3. Estimated Daily Traffic Bicycle counts for 2007 and 2012 including percentage increase and age demographic information provided by American Fact Finder (2011).

15th Avenue SE North of 5th Street SE	
2007 EDT Bicycle Counts	3,580
2012 EDT Bicycle Counts	3,860
Percentage Increase through 2007-2012	***7%***
Average Age	**22.2**

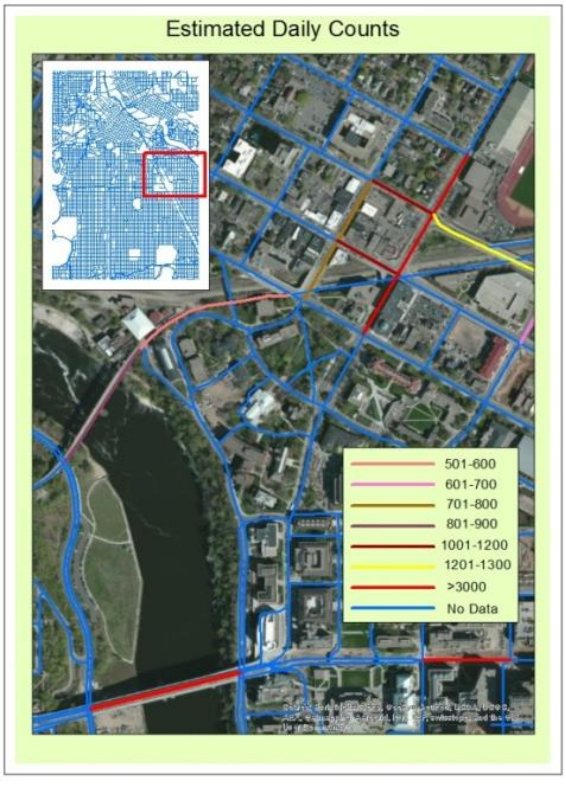

Figure 7. Estimated Daily Traffic Bicycle counts represented in various colors located on the University of Minnesota. The Washington Avenue Bridge is shown above crossing the Mississippi (southern-most bridge).

Midtown Greenway

Background

The Midtown Greenway was recently named the best urban trail in the nation by USA Today (Lebetkin, 2013). This path, designated specifically for both bicyclists and pedestrians, runs east and west connecting the Mississippi River communities and subsequent trail systems to the chain of lakes and into the West Minneapolis suburbs. In full, the Midtown Greenway stretches 5.5 miles. For the majority of that length the Greenway runs a block north of and parallel to Lake Street. This area has no shortage of restaurants, businesses and retailers and includes a wide variety of both ethnically and economically diverse communities. The Greenway is lit all night and has emergency call boxes and bicycle police patrol for safety. Also, the Greenway is plowed during the winter allowing for year-round travel.

Knowledge that bicyclists are using paths all year round has implications for future infrastructure around the City of Minneapolis. This is valuable information for city officials planning future bicycle facilities.

Midtown Greenway West of Cedar Avenue

The Midtown Greenway crossing Cedar Avenue S. recorded 4110 bicyclists in the year 2013. This was a 118% increase from the recorded 1880 bikers in 2007 (Table 4). This area has an average age of 31 with an average income of $46,107. Census data from 2010 shows that this area has a high number of households with two occupants, presumably couples with no children and disposable income.

Table 4. Midtown Greenway West of Cedar Avenue Estimated Daily Traffic Bicycle counts 2007 through 2013 showing percentage increase and demographic information provided by American Fact Finder (2011).

Midtown Greenway West of Cedar Avenue	
2007 EDT Bicycle Counts	1,880
2008 EDT Bicycle Counts	2,710
2009 EDT Bicycle Counts	2,650
2010 EDT Bicycle Counts	2,570
2011 EDT Bicycle Counts	2,700
2012 EDT Bicycle Counts	3,590
2013 EDT Bicycle Counts	4,110
Percentage Increase through 2007-2013	***118%***
Average Age	31
Average Income	$46,107

Figure 8 shows bicycle counts near the Midtown Greenway on and near Cedar Avenue.

Figure 8. Estimated Daily Traffic Bicycle counts around Cedar Avenue area represented in various colors illustrating bicycle usage. All traffic counts represented were taken in 2013.

Midtown Greenway West of Hennepin Avenue

The Uptown Greenway area receives some of the highest EDT counts of the entire city, more specifically, near the chain of lakes on Hennepin Avenue. Over the past six years this area has seen a 177% increase in bikers (Table 5). In 2007, a recorded 1350 bikers used the Greenway in this location compared to 3750 in the most recent 2013 counts. According to the census block data for this area the average age is 29 with an average income of $41,686. Many of Uptown's residents are recent college graduates just entering the workforce experiencing a bump in income. This could be one reason why there is such a high increase in usage seen from this area.

Table 5. Midtown Greenway West of Hennepin Avenue Estimated Daily Traffic Bicycle counts 2007 through 2013 showing percentage increase and demographic information provided by American Fact Finder (2011) .

Midtown Greenway West of Hennepin Avenue	
2007 EDT Bicycle Counts	1,350
2008 EDT Bicycle Counts	2,860
2009 EDT Bicycle Counts	2,520
2010 EDT Bicycle Counts	2,970
2011 EDT Bicycle Counts	3,470
2012 EDT Bicycle Counts	3,000
2013 EDT Bicycle Counts	3,750
Percentage Increase through 2007-2013	***177%***
Average Age	29
Average Income	$41,686

Discussion

This paper explores the various areas around Minneapolis that have experienced growth in bicycle use. EDT counts are the main source of data that help provide answers to where bikers choose to ride. For this study, however, limitations existed due to the availability of data. Data acquisition is generally made more difficult due to the sheer size and scope of the task of measuring bicycle use in a large metropolitan area such as Minneapolis. Also, better data could be achieved by employing larger count windows during the day. Possible counts in the a.m. along with counts in the p.m. would allow for more accurate daily conclusions. Figure 9 illustrates bicycle counts around the Midtown Greenway located in Uptown just west of Hennepin Avenue.

Figure 9. Estimated Daily Traffic Bicycle counts collected on and around Hennepin Greenway located in Uptown Minneapolis represented with different colors showing bicycle usage. The latest counts were taken in 2013.

Also, because Minneapolis experiences bicycle year round, additional counts in the winter, spring and summer

months in addition to the fall would be beneficial. Interestingly to note, similar demographics in bicycle riders were consistent amongst the study areas. Generally, areas with the highest Estimated Daily Traffic counts were populated with younger residents and in some cases with higher disposable income.

For future research, specific demographic studies could be undertaken to determine more about who rides bikes, what types of bicycle facilities riders prefer, and where riders are presently riding when there are no specified bicycle facilities.

Conclusion

The purpose of this paper was to explore the relationship between bicycle-dedicated infrastructure and bicycle use in the City of Minneapolis. Bicycling in Minneapolis is on the rise (Figure 10) (Blenski, 2013).

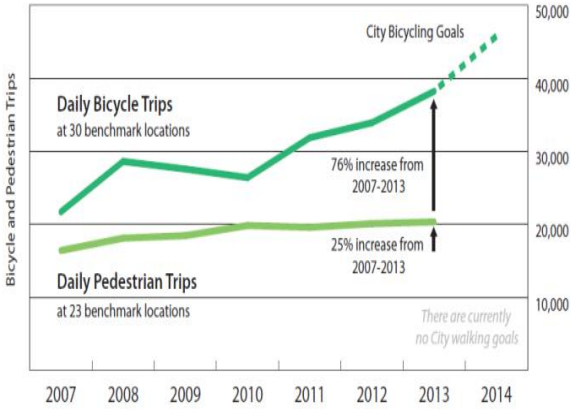

Figure 10. Daily Bicycle Trips in the City of Minneapolis have risen by 76 percent since 2007 with a citywide projected goal reaching approximately 45,000 by the year 2015. Graphic used with permission by (Blenksi, 2013).

Over the five locations studied there was an average increase of 71% bicycle usage during the six year period from 2007 to 2013. Some areas saw as high as 177% usage increase. During this same period the City of Minneapolis continued to add bicycle facilities and improved upon existing infrastructure related to bicycle use. There seems to be a correlation between increase infrastructure and increase in bicycle use in the City of Minneapolis.

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