McDonough County Bike Study

Exploring Opportunities for Alternative Transportation

Prepared by the Western Illinois Regional Council

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Acknowledgements

Thank you to all who responded to the survey and to those who took time out of their busy schedules to attend and participate in the public meeting. The input received was invaluable and this feedback was crucial to this study and assisted the staff in the preparation of this report.

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"The bicycle is the most civilized conveyance known to man. Other forms of transport grow daily more nightmarish. Only the bicycle remains pure heart."

-Iris Murdoch, writer (1919-1999)

Executive Summary

McDonough County is home to many active bicyclists, but has limited bicycle facilities that create a safe and welcoming cycling environment. Bicycling can help reduce our carbon footprint and is a great alternative mode of transportation that is not harmful to the environment. Bicycling is also low in cost, helps alleviate motor vehicle traffic, and encourages a healthy lifestyle. With all the positive benefits of bicycling it is important to promote and provide facilities where McDonough County residents are able to safely bicycle. With the current limited bikeway routes and the need to improve those that do exist, this bike study could be the basis for development of future grant applications for funding to improve the bike-ability of McDonough County and the City of Macomb. One purpose of this study was to determine where residents bicycle so if grant funds do become available, data will already exist that documents the current bicycle needs of the county and the perceptions of both experienced and novice cyclists on what improvements are needed to make the county more bicycle friendly in the future.

An on-line survey and public meeting were used to determine where residents bicycle in McDonough County and the City of Macomb. GIS (Geographical Information System) was used to digitize information concerning current bicycle routes and facilities gathered from the on-line survey and public meeting. The online survey provided information such as demographic data, location of participants (both home and work), transportation modes, biking information (such as types of trips, distance traveled, and how often participants bike), and bike routes utilized. The purpose of the public meeting was to obtain a better understanding where current bicycle traffic occurs,

how cyclists feel about the current road infrastructure, and to ascertain a better understanding of cyclists' motives when choosing biking routes. The main purpose of the public meeting focus group process was to gather more detailed information directly from individuals who have a high interest level in bicycling in McDonough County.

A total of 183 persons completed the McDonough County on-line bicycle survey, 108 of which were males, 74 were females, and one did not respond to the questions. A total of 32 individuals attended the public meeting held on Thursday, November 20, 2014 at 4:30 PM in the Community Room of the Macomb City Hall. Of the 32 attendees, two were facilitators and the remaining 30 were interested county residents. Sixty-four percent of the public meeting attendees were males and 36 percent were females.

Both the on-line survey and public meeting participants revealed a desire and need for additional bike lanes along highways and segregated bike paths throughout the county. The lack of improved shoulders along county highways was determined to be a negative aspect of the McDonough County bicycle environment. Data gathered during the study showed that constructing a network of bicycle friendly roads with wide shoulders that connect towns/villages, parks, and schools would benefit a large portion of the cyclists residing in or visiting the county. However, several of the novice cyclists expressed elevated stress levels when bicycling on highly traveled roadways with wide paved shoulders during the stress test at the focus group meeting. Participants of the online survey also revealed that bicycling on or along roadways with narrow shoulders

Executive Summary (**Continued**)

can be stressful and dangerous. Therefore, a network of segregated bike paths is needed to accommodate novice cyclists who prefer to stay away from vehicular traffic. The *2004 McDonough County Trails and Greenways Comprehensive Plan* should be used as a resource to determine ideal locations for these segregated bike paths. This trails and greenways plan is referenced in the second chapter of this document.

Both the data collecting exercise and reviewing the digitized bicycle routes in GIS have revealed a heavy use of roadways in the southern portion of McDonough County. In addition, many participants expressed interest in cycling to Argyle Lake State Park and to Spring Lake Park, both of which are located in the northwest part of the county. Currently, the rural routes that cyclists use to travel to and from Argyle Lake and Spring Lake are less than ideal due to heavy traffic and lack of shoulders. The same is true with two other highly bicycled roads, East 1200th Street (South Johnson Street) and East 1300th Street (South Candy Lane), which leave Macomb heading south to the WIU Horn Field Campus and the Village of Industry. Both of these roadways are narrow, have

unimproved shoulders, and have heavy traffic, creating a less than ideal bicycling environment. Both the on-line survey and the public meeting focus group revealed that there is an apparent problem with some motorists not willing to properly share roadways with bicyclists. Many of the participants expressed their concerns with motorists' behavior toward cyclists. Several participants stated that motorists have honked their horns and yelled inappropriate comments to them when bicycling on rural roads in the county. Participants expressed the need to have an educational and outreach program that would inform and teach both motorists and bicyclists the Illinois laws governing sharing the road and appropriate roadway safety.

The on-line survey and public meeting focus group process also revealed that participants enjoy and appreciate the biking facilities offered in the City of Macomb (both the bike lanes and multipurpose sidewalks). However, participants stated their concern with motorists parking and driving along the bike lanes.

CHAPTER 1 - Introduction
1.1 Overview

Why plan for bicyclists? First of all, there are many individuals who are part of biking groups in McDonough County, which has limited bike trails and routes. Second, today's economy has people looking for inexpensive and reliable modes of alternative transportation. In fact, bicycling is the most efficient mode of transportation regarding the quantity of energy expended per mile of travel[1]. Third, the number of environmentally conscious individuals is on the rise due to climate change. These individuals are trying to reduce their carbon footprints to improve the wellbeing of the environment.

With these three variables, the increasing need for inexpensive and fun alternative transportation within our cities and rural areas is growing. There are many different kinds of solutions, such as using alternative fuels, carpooling, public transportation (e.g. bus system, taxis, et cetera), mopeds, biking, and walking. However, biking is an alternative mode of transportation that is low in cost, pollutant free, helps alleviate motor vehicle traffic, and encourages a healthy lifestyle. In addition, biking is a great form of transportation for individuals that do not own a personal vehicle or are on a fixed income.

Large numbers of American cities and rural areas are non-friendly towards pedestrians and cyclists. Greenway trails, bike lanes, and shared roadways are excellent ways to increase friendliness and encourage pedestrian and bicycle activity. A greenway trail is a multipurpose trail for non-motorized traffic that is separated from roadways. Greenways typically follow streams, railroads, or are located in floodplains. Bike lanes are essentially an extra built-in travel lane on roadways that are reserved for bicycle use only. These lanes can be segregated from the roadway by constructing buffer zones between bike lanes and vehicular travel lanes, but typically they are located next to motorized vehicle travel lanes or on-street parking. Shared roadways are roadways that are designated for both automobiles and bicyclists. Typically these shared roadways are on low traffic and speed limit roads.

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[1]Berkeley Bike Plan,
http://www.ci.berkeley.ca.us/Public_Works/Transportation/
Bicycle_Plan_Chapter_1_Introduction.aspx

1.2 Purpose

Within McDonough County, there are two large parks that receive high usage during peak seasons: Argyle Lake State Park and Spring Lake Park. Argyle Lake State Park is located approximately nine miles west of Macomb with amenities such as camp grounds, trails, and a lake. Spring Lake Park is owned by the City of Macomb and is located just north of Macomb with amenities such as camp grounds, trails, and a lake. These two parks are destinations that cyclists travel to; however, the rural routes that cyclists use to travel to the two parks are less than ideal due to heavy traffic and lack of shoulders. These two conditions increase the chances for potential auto-cyclist accidents.

In September 2012 a truck/bike accident resulted in the death of a young bicyclist. This accident prompted the discussion by Western Illinois Regional Council (WIRC) staff regarding the need for a study of bicyclists' travel patterns, routes and which roadways in the county are most heavily utilized. In fact, limited bike trails and lanes have been a complaint and a concern primarily due to safety reasons.

With the current limited bikeway routes, this study could lead to opportunities and be the basis for development through future grants. The objectives of this study are to increase safety for motorized and non-motorized users, protect and enhance the environment, and improve the quality of life in McDonough County. The main purpose of this study is to depict the most viable routes for development into bikeways along rural roads in McDonough County. It is expected that this study could be the foundation for preparing grant applications as funding opportunities arise in order to make modifications/establish bike paths along the most utilized routes. The routes selected for improvement and inclusion into the grant applications will be based on those that are most aligned with meeting the objectives of safety, environmental enhancement and improvement in the quality of life in the rural county.

1.3 Study Area

The study area was McDonough County, Illinois and the study examined bicycle patterns within the county boundaries. Therefore, all roadways, bike lanes, and trails were considered. In this subsection the geographical location and demographics of the study area were evaluated. The existing bicycle facilities will be discussed in Chapter 2.

1.3.1 Geographical Location

McDonough County is located in west central Illinois. From the northern border of the county to the Quad Cities is approximately 65 miles. From the eastern border of the county to Peoria is approximately 60 miles. From the southern border to Springfield is approximately 80 miles. From the western border of McDonough County to Quincy is approximately 50 miles. The county is home to Western Illinois University and Spoon River Community College, both are located in Macomb. McDonough County has ten incorporated villages/cities and three unincorporated villages. The incorporated villages/cities are Bardolph, Blandinsville, Bushnell, Colchester, Good Hope, Industry, Macomb, Prairie City, Sciota, and Tennessee. The three unincorporated villages are Adair, Colmar and Fandon. The county seat for McDonough County is Macomb.

1.3.2 Demographics

According to the United States Census Bureau, McDonough County had an estimated population of 32,464 in 2013 and covers 589.41 square miles. The 2008-2012 American Community Survey revealed that 22.3 percent of the McDonough County population is below the poverty level[2]. In addition to the poverty level, the 2008-2012 American Community Survey revealed that out of the 14,486 individuals sampled, a total of 1,146 walked to work and 340 individuals used a taxicab, motorcycle, bicycle, or other means of transportation not listed in the survey.[3]

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[2] "State & County QuickFacts," last modified June 11, 2014, http://quickfacts.census.gov/qfd/states/17/17109.9html
[3] "US Census Table B08130," http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhml?pid=ACS_12_5YR_B08130&prodType=table

1.4 Process

For this bike study, Geographical Information System (GIS) and surveys were the two methods used to gather and analyze data. GIS is a computer software that allows for the visualization, analysis, interpretation, and managing of geographical referenced data. In addition, GIS helps reveal relationships and patterns in geographical data.[4] GIS was used to determine the areas in McDonough County that are suitable for bike travel by calculating the bicycle level of service. The Bicycle Level of Service (BLOS) is a qualitative measurement that calculates the perceived comfort level of cyclists by characterizing different functions of the roadway[5]. To do this, a catalog of bike facilities was collected. Bike facilities are defined as bike lanes, designated paths, shared lanes, and paved shoulders. In addition to collecting a catalog of bike facilities, street attributes were obtained to help determine county roads that are suitable for bike travel. The attributes important for this study were: number of lanes, posted speed limit, shoulder length/pavement, road condition, bike facilities, traffic counts, and name. These attributes were used to help determine the BLOS. For this study, the data was mostly based on the McDonough County road file from the Illinois Department of Transportation (IDOT). Existing bike routes were acquired from participants in the survey and public meeting. This information was used to show if the current bike routes used by residents of McDonough County are bicycle friendly.

In addition to conducting a GIS analysis on the current BLOS in McDonough County, a survey was also completed. In this survey, questions were asked about demographics, location (both home and work), transportation modes, biking information (such as types of trips, distance traveled, and how often participants bike), and routes. A copy of the bicycle study survey can be found in Appendix 1.

A large portion of the survey participants are customers of the local bike shop in Macomb. To inform customers of the bike shop about the survey, 650 postcards were mailed. Additionally the local media was used to announce the survey and solicit responses from bicycle enthusiasts. Twenty-seven of the post cards were sent back due to incorrect addresses. Four of the 27 returned post cards were

forwarded to new addresses. A total of 183 surveys were received, resulting in a 28.2 percent response rate. Appendix 2 shows the post card used to inform individuals about the survey. The purpose of the survey was to determine the habits of both novice and expert cyclists in McDonough County.

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[4] "What is GIS," http://www.esri.com/what-is-gis
[5] "Bike/Ped Level of Service Measures and Calculators, "http://www.bikelib.org/bike-planning/bicycle-level-of-service/and "Why Bicycles Level of Service (BLOS) is Important For Your Community," http://nybc.net/why-bicycle-level-of-service-blos-is-important-for-your-community/

CHAPTER 2 - Bike Facilities
2.1 Existing Bike Facilities

2.1.1 Greenways

Currently, McDonough County has no greenway system in the county. However, the *2004 McDonough County Trails and Greenways Comprehensive Plan* states that there are four existing travel greenways along highway corridors: Route 136 from Tennessee to Adair, Route 67 north from Macomb to Good Hope, Route 41 from Prairie City to Route 136, and Route 9 from Blandinsville to Bushnell. These routes have no segregated trails, and in most cases no paved shoulders that allow bicycle traffic. These types of facilities are known as shared bike lanes for this study. The majority of segregated trails in McDonough County are located in the nature centers or parks, such as Argyle Lake State Park, Spring Lake Park and city parks.

There are some natural features throughout McDonough County that could become a focus area for a greenway/bikeway system. These features will be discussed further in 2.2.1 Greenways section.

2.1.2 Trails

Currently the only areas in McDonough County with trails are Argyle Lake State Park, Spring Lake Park, and several parks in Macomb. Argyle Lake State Park has equestrian and hiking trails around the park grounds. Spring Lake Park has hiking and mountain bike trails throughout the park grounds. Lastly, there are several parks located in the City of Macomb that have short distance trails.

2.1.3 Bike Lanes

There is a lack of actual bike lanes within McDonough County. However, the City of Macomb does have a few one-way streets that have marked bike lanes. Currently, there are only two options for traveling on a bicycle throughout rural McDonough County. These options are riding on the shoulder or using shared roadway routes. Shared roadway routes will be discussed further below. There are numerous county roads throughout McDonough County that do not have shoulders for bike travel. This causes cyclists to travel on narrow lanes with vehicle traffic. The *2004 McDonough County Trails and Greenways Comprehensive Plan* stated there are four existing highway corridors for bicycle traffic: Route 136 from Tennessee to Adair,

Route 67 north from Macomb to Good Hope, Route 41 from Prairie City to Route 136, and Route 9 from Blandinsville to Bushnell. These highway corridors are located on roadways with heavy vehicular traffic and high posted speed limits.

2.1.4 Shared Roadways

The majority of shared roadways are within the cities and towns of McDonough County, Argyle Lake State Park and Spring Lake Park. Shared roadways are designated routes where cars and bicycle traffic share the road. These types of routes have low posted speed limits and sometimes different forms of traffic calming and/or bicycle infrastructure.

2.2 Past Proposed Bike Facilities

2.2.1 Greenways

The *2004 McDonough County Trails and Greenways Comprehensive Plan* called for the construction of numerous greenways throughout the county. This trail and greenways comprehensive plan called for the construction of watershed greenways, recreational greenways, resource conservation greenways, and travel greenways (e.g. rails-to-trails). The construction of these types of greenways throughout the county will help to increase environmental assets and increase pedestrian connectivity in McDonough County.

The purpose of watershed greenways is to help increase water quality and reduce soil erosion through a buffer zone that protects the waterways from pollutants due to run-off. In addition, greenways placed along rivers and streams help mitigate damage caused by floods due to the added buffer zones that are able to absorb excess water when rivers flood[6]. Watershed greenways are placed along drainage basins, such as Troublesome Creek and the Lamoine River. The purpose of recreational greenways is to connect recreational areas together, such as city parks and nature areas. Examples of proposed recreational greenways are pedestrian pathways that connect Macomb to Spring Lake and Macomb to Argyle Lake State Park. The purpose of resource conservation greenways is for ecosystem preservation, habitat development, and recreational hunting and fishing. Resource conservation greenways are more likely to be placed along drainage basins, in natural areas, and hunting and fishing locations. The *2004 McDonough County Trails and Greenways Comprehensive Plan* proposed

resource conservation greenways along the lower Lamoine River valley west of Argyle Lake and the Lamoine River and tributaries south and southwest of Macomb. Travel greenways are greenways that tend to be straight and are along railroads, roadways, or are repurpose travel-ways (e.g. rails-to-trails). The *2004 McDonough County Trails and Greenways Comprehensive Plan* proposed the construction of greenways along the active BNSF railroad from Colmar to Prairie City, BNSF active railroad from Bushnell to Adair, Route 336 west from Tennessee to Macomb, Route 67 south from Macomb to Industry, and the proposed Route 336 east from Macomb towards Bushnell. The plan also called for the repurposing of the Keokuk Junction Railway Co. (KJRY) Railroad from Blandinsville to New Philadelphia.

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[6] "Enhancing the Environment with Trails and Greenways," http://www.railstotrails.org/resources/documents/resource_docs/tgc_conenv.pdf

2.2.2 Trails

In early 2000, Spring Lake Park developed a mountain bike trail system. The *2004 McDonough County Trails and Greenways Comprehensive Plan* indicated that if there is substantial use in the future, the Spring Lake Park trail network could be expanded by public or private entities. The comprehensive plan proposed a lower Lamoine trail extension that would be an unpaved trail that travels seven miles west along the Lamoine River between Argyle Lake State Park and the McDonough County line. This proposed unpaved trail would link Argyle Lake State Park to the Route 136/336 gateway.

2.2.3 Bike Lanes

The *2004 McDonough County Trails and Greenways Comprehensive Plan* does not call for the construction of bike lanes on county roads. The comprehensive plan mainly looked at segregated multiuse paths and trails. However, construction of paved shoulders and separate lanes on rural roads dedicated for bicycle use only should be considered as a viable option in the future.

2.2.4 Shared Roadways

All of the proposed greenways run north, east and west of Macomb creating an absence of proposed greenways that run south of Macomb. To make up for this absence, the *2004 McDonough County Trails and Greenways Comprehensive Plan* called for the designation of specific county roads as shared roadways. These shared roadways connect Blandinsville to Colchester, Colchester to Tennessee, Tennessee to Colmar, Colmar to the Weinberg King State Park, Macomb to Fandon, Macomb to Industry, Fandon to Weinberg King State Park, and Industry to Weinberg King State Park to list a few. These shared roadways would help increase connectivity throughout McDonough County by linking towns and parks together. The proposed shared roadway network would also connect the Weinberg King State Park, which is located just south of McDonough County in Schuyler County, to the proposed county greenway system.

CHAPTER 3 - Methodology
3.1 Online Survey

The first step of this bicycle study was the completion of an online survey of persons interested in the bicycle environment in McDonough County. In this survey, questions were asked concerning demographics; location of respondents; transportation modes; routes; and biking information, such as types of trips, travel distance and how often participants bike. A copy of the bicycle study survey can be found in Appendix One.

A large portion of the survey participants were customers of a local bike shop in Macomb. To inform customers of the bike shop about the survey, 650 postcards were mailed. Additionally, the local media was used to announce the survey and solicit responses from bicycle enthusiasts. Twenty-seven of the post cards were returned by the post office due to incorrect addresses. Four of the 27 post cards were forwarded to new addresses. A total of 183 surveys were returned, resulting in a 28.2 percent response rate. Appendix Two shows the post card used to inform McDonough County residents about the survey. The purpose of the survey was to determine the bicycling habits of both novice and expert cyclists in McDonough County.

3.2 Focus Group Methodology

In addition to a survey and a GIS analysis of the McDonough County road network file, the focus group process was used to get a better understanding of routes, rider characteristics, and behavioral aspects.

The focus group met on Thursday, November 20, 2014 at 4:30 PM in the Community Room of the Macomb City Hall. (See Appendix 3.) Bicyclists and others were notified of the focus group meeting by a public meeting notice in the two newspapers serving the county and by personal invitations via e-mail to all the online survey participants that provided contact information.

The main purpose of the focus group process was to ascertain more detailed information from a smaller sample size than that of the on-line survey. The idea was to get a better understanding where current bicycle traffic occurs, how cyclists feel about the current road infrastructure, and have a better understanding of cyclists' motives when choosing cycling routes.

The focus group process consisted of an icebreaker, multi-voting, mapping exercise, and four different brainstorming/appreciative inquiry sessions. The participants were divided in to smaller more manageable groups. After the multi-voting and mapping exercises, each group started at different sessions and rotated around during the rest of the focus group process. This was done to keep people engaged with the different activities instead of sitting around during the focus group sessions with little involvement.

The focus group process started with an icebreaker session. In this session, participants were divided in four groups and asked to partner with another participant to interview each other. Once the interviews were completed, the partners introduced each other to the entire group. This was done so participants were familiar with other members of the focus group. Examples of information gathered for each of the participants included name, background, and reason for participating in the focus group meeting. The idea was to increase the comfort level to encourage more interaction. During the focus group sessions, the creation of new groups or moving of participants between groups occurred to encourage better engagement if it was noticed that certain participants were dominating the discussions or other participants were not contributing to discussions or activities.

MULTI-VOTING ACTIVITY

The second session was a multi-voting activity and each group participated at the same time. Participants were given a remote control to use to answer the questions. The main purpose of the multi-voting activity was to get a better understanding of who the participants were, their behaviors when cycling, and their views of McDonough County's bike-ability. In addition to multi-voting, each group was provided a road map of McDonough County and was asked to highlight the routes that they use or intend to use when cycling. The purpose of the mapping exercise was to determine the areas most utilized by cyclists so special attention to those routes could be focused on more during the GIS analysis.

Each group participated in all four sessions and, after the completion of the four sessions, had the opportunity to discuss all the activities and any other

CHAPTER 3 - Methodology (Continued)
Multi-Voting Activities

concerns related to bicycling in McDonough County. Once each group rotated through the four sessions, they completed a Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis of McDonough County's bicycle environment; categorized infrastructure needs to increase bike-ability through brainstorming and mental mapping of the county's physical and natural assets (i.e. parks, historic sites, scenic areas, lakes, rivers, major destinations, et cetera); and rated different roadway conditions by "stress level" with the use of videos or pictures.

SWOT ANALYSIS

A SWOT Analysis is a tool used to identify, categorize and analyze factors, both internal and external, that influence a geographical area. Conducting a SWOT helps reveal both positive and negative factors that may impact a project. The SWOT helps to show positive factors that work together and the problems and potential problems that need to be examined and understood. A SWOT does this because the strengths and weaknesses are internal forces that impact a geographical area and the opportunities and threats are external factors that can potentially influence a geographical area. Strengths are internal factors that support and complement a project, whereas weaknesses are internal factors that work against a project. Opportunities are external factors that can be used to capitalize on a project. Conversely, threats are external factors that have the ability to jeopardize a project. Strengths, weaknesses, opportunities and threats do not need to be set in concrete, but can cross-pollinate. For example, a factor listed as a weakness can also be listed as an opportunity.

For this study, the purpose of the SWOT Analysis was to get participants thinking about the bicycling assets and needs of McDonough County. The idea of the SWOT Analysis was to see how the participants felt about the current road network conditions and where they felt local government should focus on bikeway improvements by expanding on the strengths/opportunities and threats/obstacles. The SWOT Analysis had each group construct a SWOT quickly in a "data dumping" style. Data dumping is a brainstorming method that has participants throw out ideas rapidly as they come to mind. The data that the participants were asked to consider involved the

bicycle environment in McDonough County. Once this was completed each group collectively decided which factors were the most important in the strengths, weaknesses, opportunities and threats categories. As time permitted, participants were asked to refine their SWOT Analysis and determine if any of their original factors could cross-pollinate between the four categories.

BRAINSTORMING

The main purpose of the brainstorming activity was to help stimulate the development of ideas among the participants. Post-it Notes were utilized to allow each group to categorize its thoughts and to prevent duplicate ideas. At the beginning of the brainstorming exercise participants were asked to write down what and where bikeway improvements were needed. In the first part of the session, which lasted approximately five minutes, the participants were asked to silently brainstorm ideas. Once the silent brainstorming exercise was completed, the group was asked to collectively collaborate on the group's thoughts and concerns. During this collaboration, the participants were asked to categorize the importance of each improvement idea to their group, in the order of least important to most important. This exercise required the group to come to a consensus on what and where these improvements were most needed. The use of Post-it Notes during this process allowed the movement of ideas between categories and levels of importance.

MENTAL MAPPING

Mental mapping of McDonough County's bicycle environment was important to the study because it showed how the participants perceived the county for cycling. In this activity, participants were asked to draw a map of the county's bicycle environment. Participants were asked to do this from memory and to include features that they found to be most important to them relative to bicycling in the county. This included all the facilities and roadways that they used or perceived as usable for bicycling. The participant's maps were not intended to be to scale, but rather they were intended as rough sketches of the bicycle environment. The purposes of the mental mapping exercise were to determine how the different groups perceive the county spatially, to show what they found most important while bicycling, and

CHAPTER 3 - Methodology (Continued)
Mental Mapping

whether there was a pattern in the participant's perceptions of the bicycling environment in the county.

The last part of the brainstorming activity involved the participants watching a video or slideshow of photographs depicting different roadway conditions. Participants were asked to rate their stress levels when bicycling relative to each of the following conditions: existence of shoulders, pavement condition, traffic condition and posted speed limit. When rating each roadway, the participants were asked to write down their thoughts of the roadway in terms of their stress level and to rate their stress level on a Likert scale. A recording option was also available for those participants who felt uncomfortable writing down their thoughts. The main purpose of having participants write down their thoughts was so they could explain what caused their stress and why. The Likert scale was used to compare participants' responses to see how they matched with other responses. The Likert scale is widely used in research as a tool to scale responses from a questionnaire for comparison purposes along a range or rating scale.

Roadways that do not allow bicycling such as interstate highways and freeways were not included in the study. Cyclists considered some roadways as unsuitable for bicycling due to condition and safety factors. Measuring stress levels provided an understanding of the types of roadways the participants tended to steer away from when choosing bicycling routes. This information will help identify types of roadways to avoid when planning for and implementing bikeway improvements.

3.3 Geospatial Analysis

The last method to analyze data was the use of GIS (Geographical Information System). GIS is a computer software that allows for the visualization, analysis, interpretation and management of geographical referenced data. Additionally, GIS helps to reveal relationships and patterns in geographical data.[7] For this study, the data used was primarily based on the McDonough County road file from the Illinois Department of Transportation (IDOT). Existing bike routes were acquired from survey participants and from the public meeting. GIS was used to digitally represent the current routes used by cyclists in order to understand where cycling traffic occurs in the county.

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[7] "What is GIS," http://www.esri.com/what-is-gis

CHAPTER 4 - On-Line Bike Survey Analysis
4.1 Demographics

A total of 183 respondents completed the McDonough County Bicycle Survey. Of the total number of respondents, 108 were male, 74 were female, and one did not respond to the questions. Figure 1 shows the numbers and percentages of respondents by age groupings.

Figure 1
Survey Participants Age Groupings

Age	Number of Response(s)	Response Ratio
18-24 years old	5	2.7%
25-34 years old	38	20.7%
35-44 years old	31	17.0%
45-54 years old	45	24.5%
55-64 years old	42	23.0%
65-74 years old	19	10.4%
75 years and over	2	1.1%
No responses	1	0.6%
Total	183	100.0%
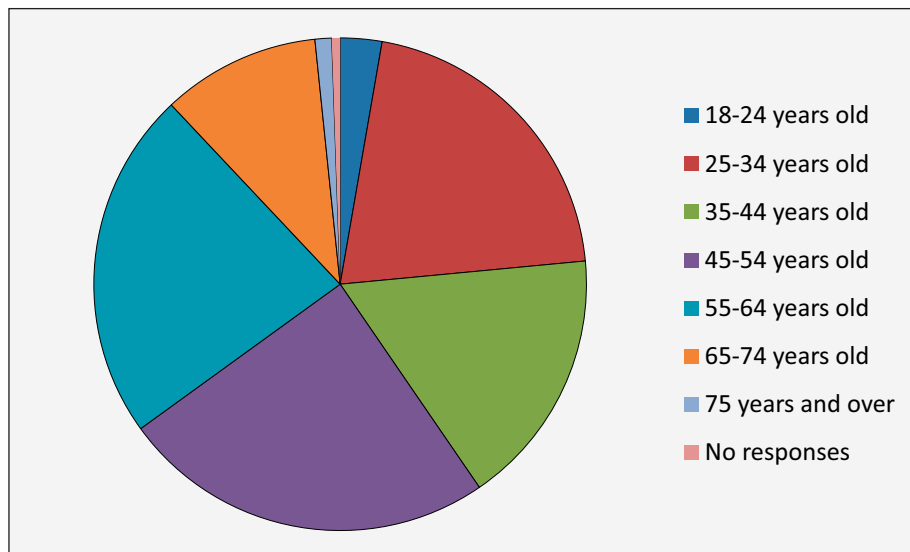
Most respondents, nearly 50 percent, were between the ages of 45 to 64. Figure 2 shows the numbers and percentages of respondents by household income category. The table and pie chart show the largest category of respondents, approximately 45 percent, had incomes over $80,000 per year.

Figure 2
Survey Participants by Income Category

Income	Number of Response(s)	Response Ratio
Under $20,000	23	12.6%
$20,000-$39,999	14	7.7%
$40,000-$59,999	20	10.9%
$60,000-$79,999	39	21.3%
$80,000-$99,999	34	18.6%
$100,000 and over	49	26.8%
No responses	4	2.2%
Total	183	100%
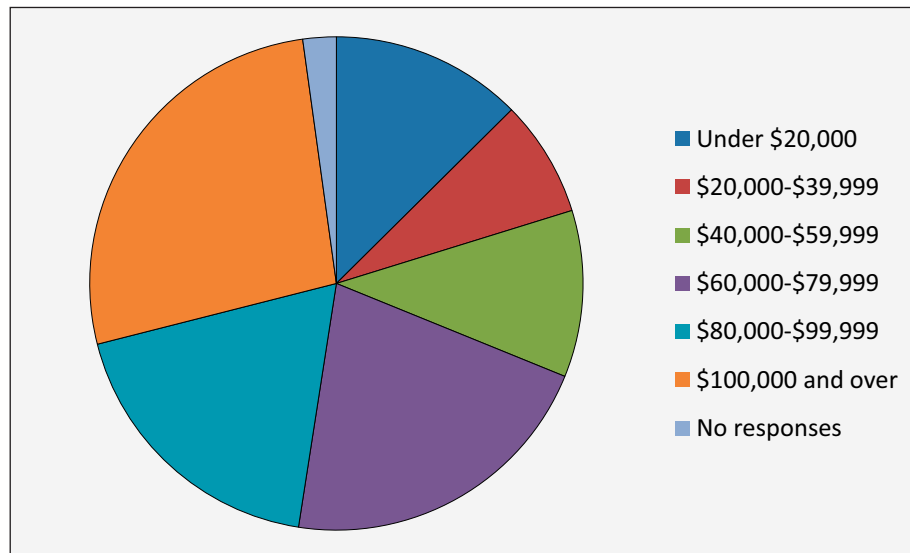
The majority of the survey participants resided and/or worked in the 61455 zip code (Macomb). However, the Macomb zip code is one out of thirteen zip codes listed by participants. Figure 3 shows all the different zip codes listed by the on-line survey participants. Figures 4 and 5 show maps of the zip code locations by place of residence and place of employment.

Figure 3
Place of Residence and Employment by Zip Code

Place of Residence Zip Code	Number of Response(s)	Response Ratio
61455	165	90.2%
61415	1	0.5%
61438	2	1.1%
61420	2	1.1%
62311	1	0.5%
63461	1	0.5%
62374	1	0.5%
61473	1	0.5%
62326	2	1.1%
61416	1	0.5%
61484	1	0.5%
61411	1	0.5%
60014	1	0.5%
No responses	3	1.6%
Total	183	100%

Primary Employment Zip Code	Number of Response(s)	Response Ratio
61455	125	68.3%
61438	2	1.1%
61414	1	0.5%
62455	1	0.5%
60015	1	0.5%
62316	1	0.5%
62326	1	0.5%
63461	1	0.5%
61411	3	1.6%
62374	1	0.5%
61401	3	1.6%
61422	2	1.1%
62301	1	0.5%
61420	1	0.5%
61501	1	0.5%
61462	1	0.5%
60014	1	0.5%
No responses	36	19.7%
Total	183	100%

Figure 4
Map Depicting Zip Codes by Place of Residence of Survey Respondents

Zip Codes of Survey Respondents

N

Counties

McDonough County

Zip Codes

0   25   50   75   100
Miles

Zip Codes of Survey Respondents Primary Employment

N

Counties

McDonough County

Zip Codes

0   25   50   75   100
Miles
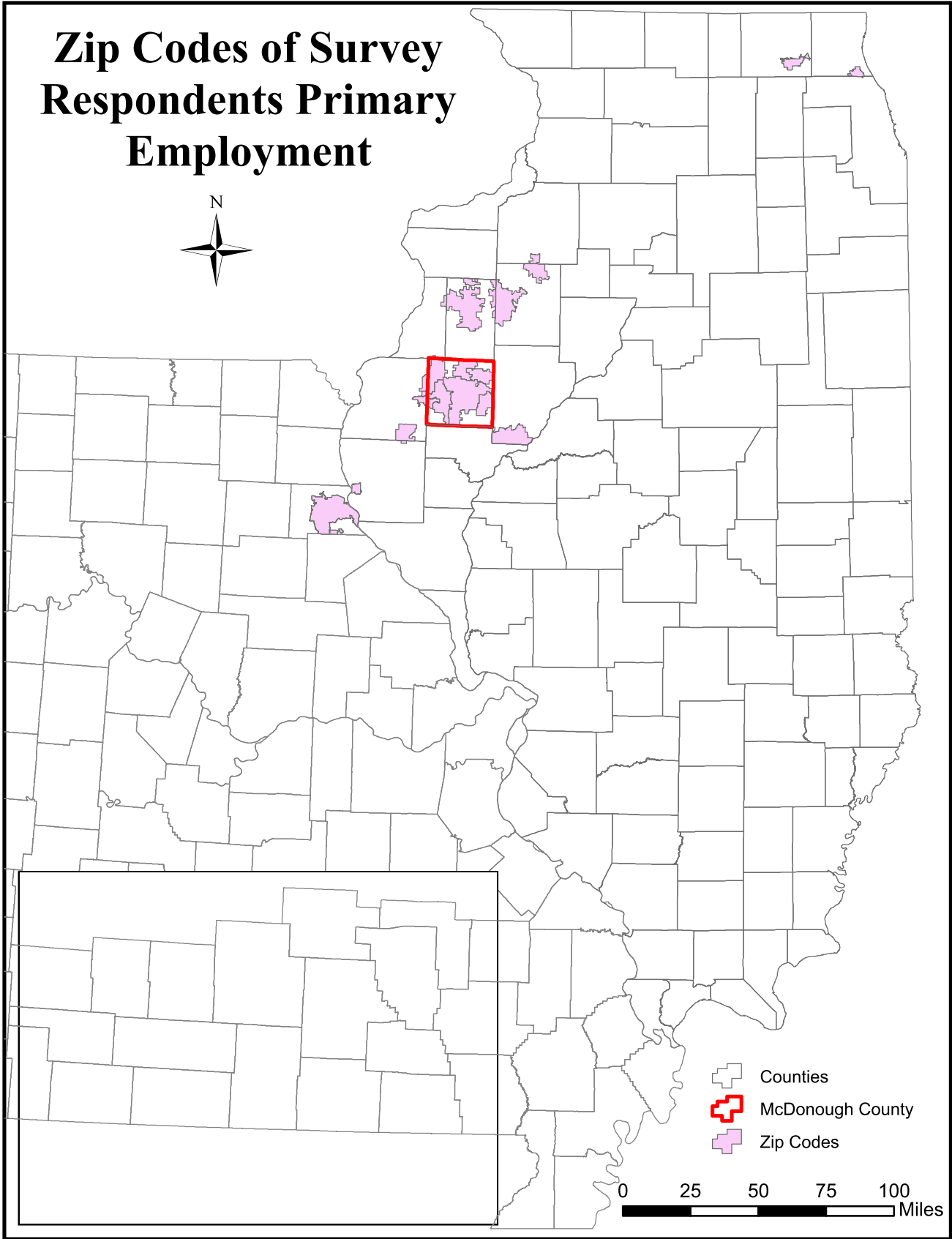
4.2 Transportation Habits

Of the 183 survey participants, 169 or 92 percent stated that their household owns a personal motor vehicle. Of the remaining 14 participants, nine (4.9 percent) stated their household does not own a personal motor vehicle and five (2.7 percent) did not respond to the question. To get a better idea of how participants travel, they were asked to select the different modes of transportation they had used in the last month. Not surprisingly, the largest number of participants selected the automobile as their primary mode of transportation, with 178 participants or 97 percent selecting this transportation option. The second and third highest modes of transportation selected were bicycling and walking, with 158 participants or 86.3 percent selecting bicycling and 154 participants or 84.2 percent selecting walking.   Four participants listed 'Other' and specified Amtrak, airplane, kayaking, and boating as other modes of transportation.   Figure 6 shows survey results by transportation modes used by the participants.

Figure 6
Modes of Transportation Used by Survey Respondents

Transportation	Number of Response(s)	Response Ratio
Automobile - drove alone	178	97.3%
Automobile - carpooled	75	41.0%
Motorcycled	14	7.7%
Taxied	5	2.7%
Bicycled	158	86.3%
Walked	154	84.2%
Public transportation	18	9.8%
Other	4	2.2%
No responses	1	0.5%
Total	183	100%
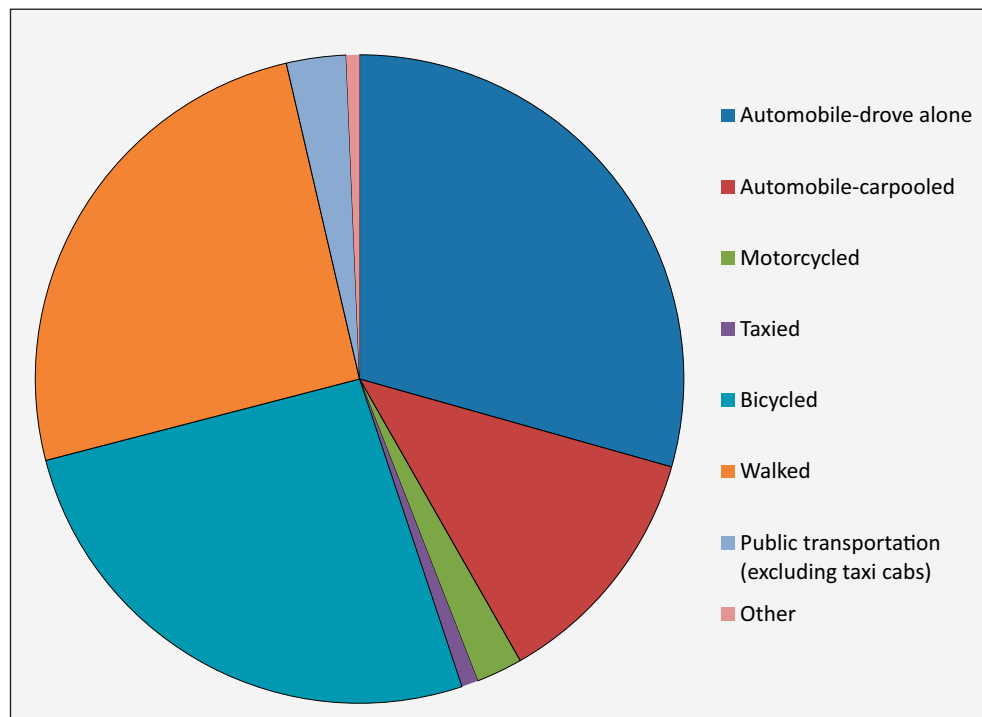
Respondents were also asked the purpose of their bicycle trips. The majority of respondents, 163 or 89.1 percent, stated the purpose was for exercise. The second highest purpose for bicycling was for recreation. A total of 156 respondents or 85.2 percent stated they bicycle for recreation. Six respondents selected 'Other' and specified training for races, rides, and tours; aesthetics and therapy; to get to restaurants; travel to and from work; to get around at work; and for fun. Figure 7 shows the bicycle trip purposes listed by respondents.

Figure 7
Bicycle Trip Purposes

Bicycle Trip Purposes	Number of Response(s)	Response Ratio
For exercise	163	89.1%
For recreation	156	85.2%
For shopping/errands	69	37.7%
To get to work/school	75	41.0%
To get to public transit	5	2.7%
Other	6	3.3%
No responses	11	6.0%
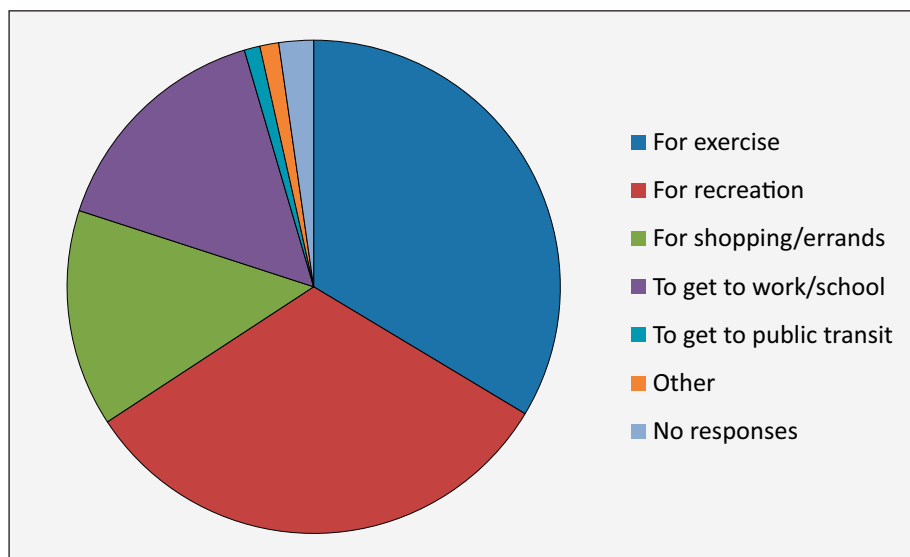
Of the 183 online survey responses, 68 or 37.2 percent of the respondents stated that they bicycle two times a week or more (Figure 8). The second highest response was daily at 38 or 20.8 percent. Figure 9 is a table and pie chart depicting distance survey participants bicycle each week. The highest number of respondents, 51 or 27.9 percent, bicycle five to fourteen miles a week. The second highest number of respondents, 40 or 21.9 percent, bicycle from zero to four miles each week.

Figure 8
Time Dedicated for Bicycling

Amount of Time Dedicated for Biking	Number of Response(s)	Response Ratio
Daily	38	20.8%
Two times a week or more	68	37.2%
Weekly	20	10.9%
Biweekly	6	3.3%
Monthly	5	2.7%
Whenever the mood strikes me	37	20.2%
No responses	9	4.9%
Total	183	100%
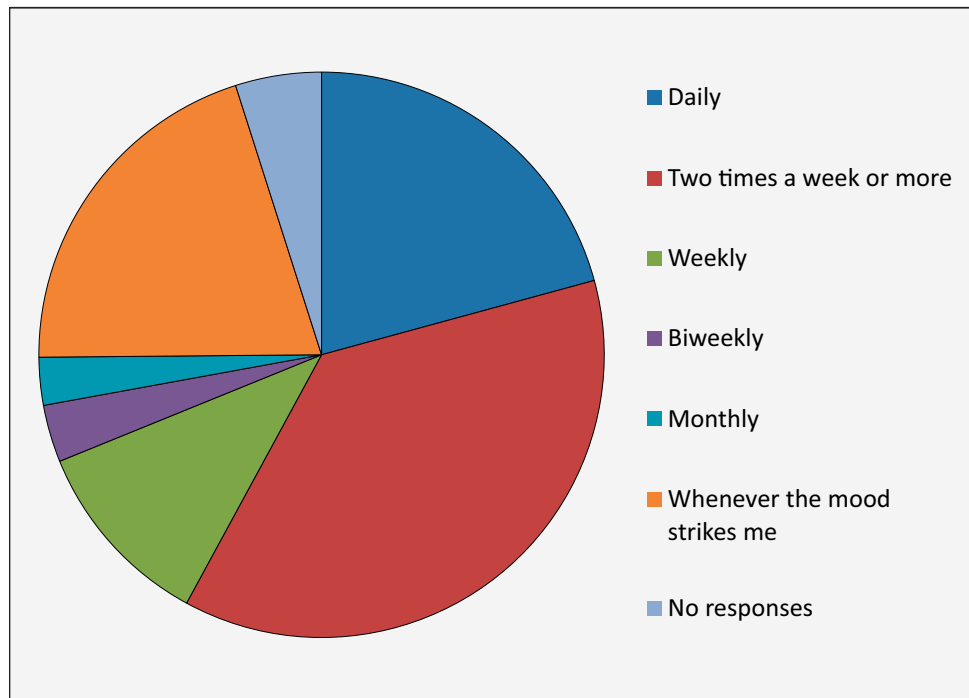
Figure 9
Average Distance Biked Per Week

Average Distance Biked Per Week	Number of Response(s)	Response Ratio
0-4 miles	40	21.9%
5-14 miles	51	27.9%
15-24 miles	31	16.9%
25-50 miles	33	18.0%
More than 50 miles	18	9.8%
No responses	10	5.5%
Total	183	100%
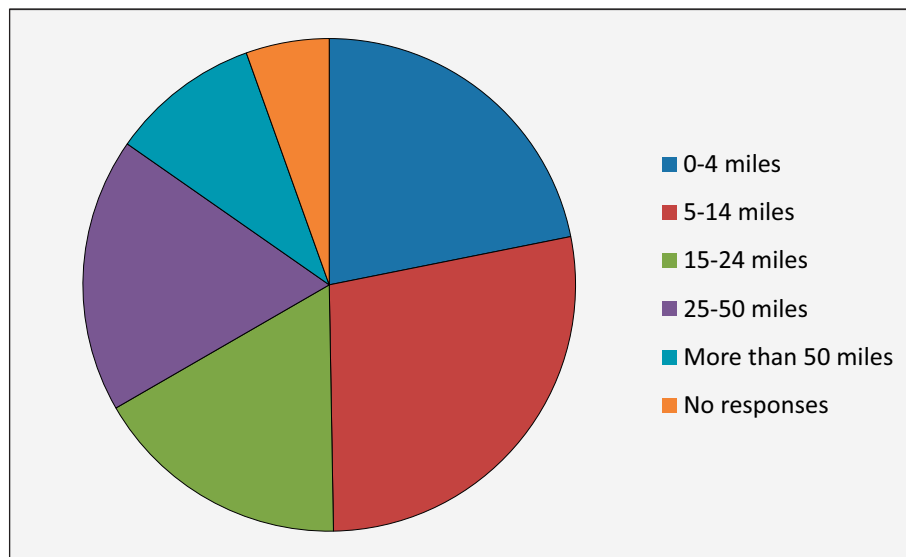
4.3 Safety Habits

Of the 183 participants in the online survey, only 68 or 37.2 percent indicated that they have been involved in a bicycling accident. Ten survey participants did not respond to this question. Most respondents indicated that they wear a helmet when cycling, 126 or 68.9 percent, and a majority also said that they wear high visible clothing when cycling, 96 or 52.5 percent. Ten survey participants did not answer the question concerning wearing a helmet and eleven participants did not answer the high visibility clothing question. This data would indicate that cyclists in McDonough County tend to be safety conscious.

4.4 Bicycle Routes and Destinations

Participants in the online survey were asked their favorite place or route for bicycling. Thirty-two percent of the participants indicated that they prefer to bicycle in western McDonough County. The location/destination category receiving the second highest response rate (21 percent) was southern McDonough County. Below is a pie chart (Figure 10) that illustrates the response rate levels for the different areas of the county. A few participants selected locations/destinations outside of McDonough County, including Table Grove, LaHarpe, Plymouth, and Little Swan Lake. (See Appendix 4 for McDonough County areas bicycled.)

Figure 10
Favorite Areas for Bicycling in McDonough County

Legend:
- Different Cnty
- N McDonough
- NE McDonough
- NW McDonough
- E McDonough
- SE McDonough
- S McDonough
- SW McDonough
- W McDonough
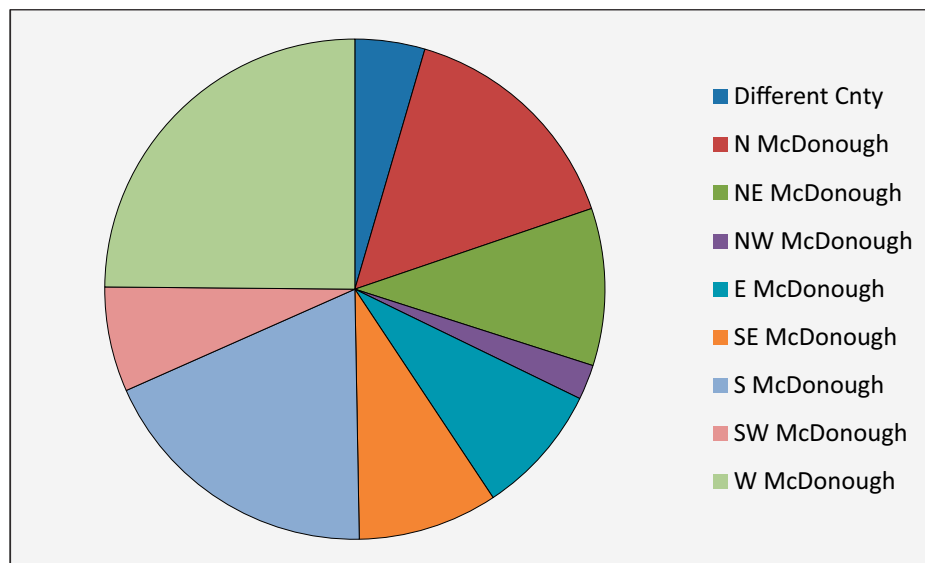
Survey participants were also asked other locations/destinations where they would ride if they could and what prevents them from riding to those locations. The top three areas were the City of Macomb, Spring Lake, and Argyle Lake. The highest response (40.5 percent) on what prevents participants from cycling to desired locations was lack of bike paths. The second highest response (18.3 percent) was poor roadway conditions. Appendix 5 includes a pie chart illustrating different reasons listed by survey participants for not bicycling to desired destinations.

The on-line survey participants were asked what are the determining factors used to select bicycling locations/destinations. Most respondents indicated that the amount of vehicular traffic on the roadway was the primary determining factor. Other reasons listed by participants were the existence of bicycle lanes or share the road markings, wide roadways/shoulders and most direct route. The survey found that cyclists are more apt to bicycle in traffic when facilities such as segregated bike lanes, wide shoulders and share the road markings are present. Table 11 shows participant answers on factors used to determine a bicycle route/destination.

Figure 11
Reasons for Selecting a Route or Destination

Bicycle Routing	Number of Response(s)	Response Ratio
Most direct routes	16	8.7%
Bicycle lanes or share the road markings	51	27.9%
Road width	21	11.5%
Low posted speed limits	0	0.0%
Amount of traffic	89	48.6%
Cycling groups/partners	3	1.6%
No responses	3	1.6%
Total	183	100%

4.5 McDonough County Bicycle Environment

The majority (87.4 percent) of the on-line survey participants found McDonough County only somewhat bicycle friendly or not bicycle friendly at all. A total of 42.6 percent felt that McDonough County is not bicycle friendly what-so-ever. By contrast, only 12 percent of the 183 participants felt the county is friendly or very friendly for bicyclists. Figure 12 shows the survey results concerning respondent's feelings about McDonough County's bicycle friendliness.

Figure 12
McDonough County's Bicycle Friendliness Results

Bicycle Friendliness	Number of Response(s)	Response Ratio
Very friendly	3	1.6%
Friendly	19	10.4%
Somewhat friendly	82	44.8%
Not friendly	78	42.6%
No responses	1	0.5%
Total	183	100%

In order to gauge how survey participants felt about the overall bicycle environment in McDonough County, they were asked what prevents them from cycling more often. Participants were able to select all that applied and elaborate if their reason was not listed in the survey as an available answer (see Figure 13). Slightly more than 65 percent of the 183 survey participants stated that the non-existence of proper and safe bicycle facilities is the reason for not cycling as often as they would like. Nearly 50 percent of the respondents stated that the poor condition of county roadways is a major reason for not bicycling more often. Another major reason (46.4 percent of respondents) was drivers not properly or safely sharing the road with cyclists. Nearly ten percent of participants selected 'Other' and specified the following reasons: lack of enforcement of speed limits, lack of bike racks, tar and gravel pavement and fear of driver harassment.

Figure 13
Bicycling Preventions

Bicycling Preventions	Number of Response(s)	Response Ratio
Bikeways/roads in poor condition	91	49.7%
No bicycle facilities	120	65.6%
High posted speed limit	28	15.3%
Insufficient lighting	27	14.8%
Too many cars	73	39.9%
Drivers do not share the road	85	46.4%
Destinations are too far away	14	7.7%
Not enough time	38	20.8%
Weather	45	24.6%
Other	20	10.9%
No responses	5	2.7%
Total	183	100%

4.6 Bikeway Safety Improvements

Survey participants were asked what bicycle safety improvements are needed in McDonough County. Once again, the largest number of respondents indicated that segregated bike paths are needed, followed closely by the construction of bike lanes along roadways. Figure 14 shows a complete list of all the bikeway improvements suggested by the survey participants.

Figure 14
Bikeway Improvements

Bicycle Safety Improvements	Number of Response(s)	Response Ratio
Segregated bike paths	73	49.0%
Bike lanes	60	40.3%
Bike lane barriers	2	1.3%
Bike routes	11	7.4%
Rails to trails	11	7.4%
Wider/paved shoulder	13	8.7%
Roadway widths	16	10.7%
Pedestrian bridge	2	1.3%
Signage	19	12.8%
Bike parking	3	2.0%
Lighting	2	1.3%
Better railroad crossing	2	1.3%
Road quality	16	10.7%
Maintenance	4	2.7%
Law enforcement	22	14.8%
Helmet law	2	1.3%
Visible clothing	1	0.7%
Leash/loose pet laws	1	0.7%
Bicycle publicity/education	35	23.5%
Local bicycle ride event	8	5.4%
Map	5	3.4%

CHAPTER 5 - Public Meeting
5.1 Multi-Voting Results

During the multi-voting exercise some participants arrived late and did not answer the first few questions or did not participate in the exercise at all. A total of 32 individuals attended the public meeting, and of the 32 attendees, a total of 27 participated in the multi-voting exercise. The multi-voting exercise consisted of 22 questions, with the first two questions being bicycle trivia practice questions. Twenty-five participants answered questions one through five, 26 participants answered questions six through eleven and all 27 participants answered questions 12 through 22.

Question three was a demographic question about gender. Of the individuals that participated in the multi-voting exercise, 64 percent were males and the remaining 36 percent were females. The fourth question was also a demographic question that asked about age. Out of the 25 participants answering this question, the majority (56 percent) were 55 years of age or older.

Questions five and six dealt with transportation access. Question five asked participants if their households have available working motor vehicles. Of the 25 participants answering this question, only one household did not have a working motor vehicle. Question six asked participants about bicycle access. Of the 26 participants answering this question, only one did not own or have access to a bicycle for their personal use.

Questions seven through ten were related to questions five and six concerning transportation habits. Question seven asked the participants how often they commuted to work and/or school by bicycle. Forty two percent of the participants never commuted to work and/or school by bicycle and 31 percent rarely commuted to work and/or school by bicycle, resulting in a total of 73 percent of participants rarely or never commuting to work and/or school by bicycle. Question 8 asked the participants how often they bicycle to access services such as shops and restaurants. Of the 26 participants answering this question, 19 percent responded that they frequently cycled to services, 27 percent responded they rarely cycled to services and another 27 percent responded

they never cycled to services, resulting in a total of 54 percent of participants who rarely or never cycle to access services in McDonough County. Question 9 asked the participants what their primary mode of transportation was in the last year. Of the 26 participants answering this question, 65 percent stated that their primary mode of transportation is driving alone in an automobile and 12 percent stated that they primarily carpool with friends or family members, resulting in a total of 77 percent of the participants using an automobile as their primary mode of transportation. Question 10 asked the participants how often they cycle for leisure or fitness. Of 26 participants responding to this question, 52 percent said that they often or frequently cycle for leisure or fitness.

Questions 11 through 16 dealt with the participants' bicycling habits. Question 11 asks participants how often they bicycle. Of the 26 responses received for this question, 38 percent answered they bicycle two times a week or more and 23 percent answered they bicycle daily, resulting in a total of 61 percent of participants stating that they bicycle at least twice a week. Question 12 asked participants their primary purpose for cycling. Of the 27 respondents, 59 percent answered for exercise, 15 percent answered for leisure, and 15 percent answered for errands. The majority of participants indicated that their primary purpose for cycling is for exercise. Question 13 asked the participants the number of months during the year that they typically do not bicycle. Of the 27 participants answering this question, 30 percent revealed that they bicycle year-around and an additional 30 percent answered they typically do not bicycle for one to three months during the year. A total of 56 percent reported that they typically do not bicycle for one to six months during the year. Question 14 asked the participants the average number of miles they cycle per week. The majority, 26 percent, reported that they cycle one mile or less a week on average. The second and third largest groups of participants, 22 percent each, indicated they cycle 25-50 miles and more than 50 miles per week. Question 15 asked how often participants wear high visibility clothing when cycling. The highest response percentage, 30 percent, was always and the second highest response percentage, 26 percent, was never. Another 26 percent of participants said that they usually wear high visibility clothing, resulting in a

5.1 Multi-Voting Results (Continued)

majority, 52 percent, of the participants indicating that they always or usually wear high visibility clothing. Question 16 asked participants how often they wear helmets while cycling. The majority of participants, 78 percent, indicated frequently. Only 15 percent revealed they never wear a helmet when cycling.

The remaining questions, 17 through 22, dealt with the bicycle environment of McDonough County. Question 17 asked participants what most often prevents them from bicycling. The highest chosen answer was not enough time in their daily schedule. Other responses included no bicycle paths, lanes or bicycle routes and drivers not sharing the road, both with response rates of 19 percent. Question 18 asked whether McDonough County is bicycle friendly. The largest percentage of participants answering this question stated that McDonough County is not bicycle friendly. A total of 62 percent of the participants stated that the McDonough County bicycle environment is either unfriendly or very unfriendly. Question 19 asked participants what makes it difficult to bicycle in McDonough County. The majority of participants, 56 percent, answered lack of bike lanes, trails and paths.

Question 20 asked participants to select one bicycle infrastructure improvement that they believe will make it easier to bicycle in McDonough County. Participants were asked to select from the following list of improvements: 1) improve existing bikeways/facilities; 2) improve shoulders along roadways; 3) construct bike lanes; 4) increase share the road routes; 5) change bicycling laws and laws affecting bicyclists; 6) enforce laws governing motorist behavior; and 7) initiating bicycle safety education. Of the seven choices, construct bike lanes was selected most often by the participants, with 48 percent indicating it to be the most needed bicycle improvement in the county. Question 21 asked the participants to select a feature they find most important when determining a bicycle route. The participants were given the following six features to select from: 1) more direct routes; 2) bicycle lanes or share the road markings; 3) road width; 4) low posted speed limits; 5) amount of traffic; and 6) cycling groups/partners. Of the six features, the amount of vehicle traffic along the bicycle route was selected by

52 percent of the participants. Question 22 asked participants to select a feature they find most important when a local government is selecting or designating a new bicycle route. Participants were given the following six features to select from: 1) signage; 2) route is continuous; 3) wide paths/cycling lanes; 4) hard surface; 5) reduced vehicle speed/traffic; and 6) maintenance. Of the six features, hard surface was selected most often by the participants (26 percent). The second highest response rate was 22 percent for reduced vehicle speed/traffic and the third highest response rate was 19 percent for wide paths/cycling lanes. Bar graphs showing responses for all 22 questions of the multi-voting exercise are located in Appendix Six.

Both the multi-voting exercise and the online survey that was conducted during the summer of 2014 revealed that the primary motive for cycling for the majority of the participants is physical exercise. Additionally, both the online survey and the multi-voting exercise showed that the majority of participants are safety conscious and wear visible clothing and helmets when cycling.

A large portion of participants from both the online survey and the multi-voting exercise revealed that McDonough County overall is unfriendly for bicyclists. The multi-voting exercise revealed that the three main reasons preventing participants from cycling more often are not enough time, drivers do not share the road, and lack of bicycle paths, lanes and routes. The online survey revealed that the three predominate reasons for not cycling were lack of bicycle paths and routes, bikeways/roads are in poor condition, and drivers do not share the road.

The majority of respondents for the on-line survey stated that the amount of vehicle traffic, existence of bicycle lanes and share the road markings are determining factors when selecting a route for bicycling. The multi-voting exercise revealed that the majority feel that the amount of vehicle traffic helps them determine a route for bicycling.

Comparing the results from the online survey with the results from the multi-voting exercise revealed similar responses for all questions. Comparing the two revealed that the participants of the multi-voting exercise evenly represented the entire online survey participants.

5.2 Mapping Exercises

For the mapping exercise, participants were asked to highlight their bicycle routes on four large maps depicting federal and state highways, county roads, cities and villages, unincorporated settlements, state parks, rivers, and lakes. The four maps depicted the northeast, southeast, southwest and northwest quadrants of McDonough County. Figure 15 illustrates one of the McDonough County road maps that participants used to highlight their most frequent cycling routes. Results of the mapping exercise will be discussed further in Chapter Six, Geospatial Analysis.

Figure 15: Mapping Exercise Example

5.3 SWOT Analysis

During the focus group session 30 individuals were divided into four groups and rotated around four different activities as described in the methodology section. One of the four activities was a Strengths (S), Weaknesses (W), Opportunities (O) and Threats (T) Analysis. However, an entire group had to leave early due to a local school event. Because of this only three out of the four groups participated in the SWOT Analysis. A complete list of all the strengths, weaknesses, opportunities, and threats is located in Appendix Seven.

Figure 16: Strengths Word Cloud

Figure 16 shows a word cloud of the strengths from the SWOT Analysis. The words were generalized to help show the amount of time thoughts where repeated. The word cloud was created by using tagxedo.com. The larger words are the ones repeated the most often. There was a three way tie for the most common strengths: flat, cafes, and new bicycle

infrastructure. All three of the focus groups stated in some way that McDonough County is flat. Flat topography is great for cycling because it makes riding bicycles easier and potentially encourages people to get out of their vehicles and ride bicycles to and from destinations. All three of the groups talked about local restaurants as cycling destinations. Through conversations with focus group members, it was learned that there are cyclists that participate in breakfast rides to cafes in several of the small villages in the county. Two of the focus groups mentioned current bicycle facilities as strengths. In fact one group mentioned current facilities twice. The facilities mentioned were continuous bike routes, trails at Argyle and Spring Lake parks, and new bike paths. Some other strengths mentioned were low traffic, Route 336 shoulder, paved roads, good repair shop (i.e. The Bike Shop), civic minded riders, and unity within the county.

Only one focus group mentioned scenic as a determining strength when selecting a route; therefore, it appears that a good destination such as a small town café or restaurant is more important than natural and scenic areas such as Argyle Lake State Park and Spring Lake Park. Two of the three groups stated low traffic as a strength. This strength coincides with both the online survey and the multi-voting activity results. The local bike shop was mentioned twice, which indicates that an available repair and retail shop dedicated to bicycling is a needed service for McDonough County cyclists.

Figure 17: Weaknesses Word Cloud

Figure 17 illustrates the different words that participants used to describe the bicycling weaknesses of McDonough County in the SWOT Analysis activity. The words were generalized to help show the amount of time thoughts where repeated. The one weakness that was mentioned most often was the lack of bike trails, routes, and greenways. Lack of wide and improved shoulders was mentioned twice, cars parking in designated bike lanes along Washington Street in Macomb and hostile drivers were each mentiond twice. Other weaknesses mentioned were lack of bike parking, lack of curb access, potholes, deep ditches, and narrow pavement.

The weaknesses section of the SWOT Analysis revealed that the participants of the focus groups want more bike lanes and designated bike-only paths. This weakness coincides with question 17 of the multi-voting exercise. Question 17 asked participants what prevented them from bicycling more often. Nineteen percent of the participants stated that the lack of bicycle paths, lanes or bicycle routes is the reason they do not bicycle more often. Question 19 in the multi-voting exercise asked participants what makes it difficult to bicycle in McDonough County and 56 percent answered the lack of bike lanes, trails and paths. Question 20 in the multi-voting exercise asked which of these changes would make it easier to bicycle in McDonough County and 48 percent selected construct bike lanes. In the online survey, Question 22 asked participants what would help determine a route for bicycling. Twenty-seven percent of participants answered bicycle lanes or share the road markings. In the online survey, Question 23 asked participants what prevents them from cycling more often and 67 percent selected no bicycle paths, lanes, or bicycle routes. The results of the on-line survey, multi-voting exercise and the weakness section of the SWOT Analysis support each other, with participants wanting more bike lanes, paths and routes constructed in McDonough County.

In the weaknesses section of the SWOT Analysis, two groups mentioned that it is difficult to cross both Jackson Street and Lafayette Street in Macomb. North Lafayette Street is U.S. Highway 67, which is a major five-lane thoroughfare through the north-central section of Macomb that connects McDonough County to cities to the north such as Galesburg and the Quad Cities. The majority of the land use along the North Lafayette Street corridor is residential; however, there are some commercial uses such as a bank, laundromat, gas station, quilt shop, and a music

store. This section of North Lafayette Street only has three stoplights making it difficult and unsafe for pedestrians and cyclists to cross the street. East and West Jackson Street is divided by a five-lane by-pass around downtown Macomb. East Jackson Street (US Highways 67 and 136) has four traffic lanes and one turn lane for the entire section from downtown Macomb to the east corporate boundary.   East Jackson Street has very high vehicle traffic counts, with a majority of commercial land use along both sides of the street, including several big-box department stores and large supermarkets. Additionally, two large manufacturing facilities employing nearly 1,000 workers are located along the corridor.   East Jackson Street has five stoplights along its entire length, which has created an unsafe environment for pedestrians and cyclists wishing to cross the street. According to data retrieved from the Illinois Department of Transportation, there have been seven auto-pedestrian/cyclist traffic accidents that have occurred along this corridor from 2005 to 2012. West Jackson Street (US Highway 136), a four lane highway with a turn lane, runs from downtown Macomb to the west corporate boundary.   West Jackson Street has heavy volumes of traffic with only three stop lights. This creates a difficult and unsafe environment for pedestrians and cyclists that need to cross the street. The West Jackson Street corridor is a commercial district that offers a variety of shops, eateries, and offices.

than once by the participants, probably because the Lamoine River was listed in the *McDonough County Trails and Greenways Comprehensive Plan* as an area for potential trail development.   This plan highlighted numerous possible greenways and trail options along or near the Lamoine River.   Other opportunities listed included connecting parks, connecting small towns, rails to trails, bike rodeo, bike safety education, and IDOT grant programs.
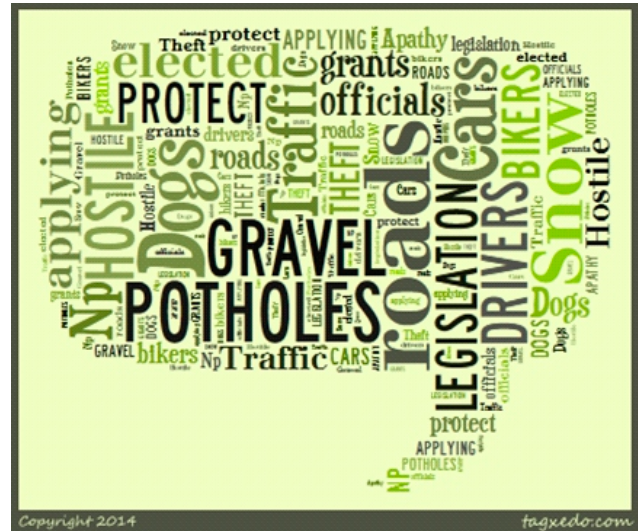
Figure 19: Threats Word Cloud

Figure 19 illustrates the different words that participants used to describe the threats in the SWOT Analysis activity.   Two of the three focus groups included threats in their SWOT Analysis. The threats mentioned by the two groups were dogs, cars, potholes, gravel on roads, snow on roads, traffic, hostile drivers, no legislation to protect bikers, apathy, and theft. Cars, potholes, traffic, and hostile drivers were also mentioned as weaknesses. One of the positive benefits of SWOT Analysis is that different ideas can cross-pollinate between categories. Several ideas were listed as both weaknesses and threats or as both strengths and opportunities.

Figure 18: Opportunities Word Cloud

Figure 18 shows a word cloud for the opportunities section of the SWOT Analysis.   Creating Lamoine River trails was the only opportunity mentioned more

5.4 Stress Testing

Focus group members also participated in a stress testing activity. In this activity participants viewed five videos that were approximately one minute in length showing different road conditions in McDonough County. Figure 20 shows the locations of each of the road condition sites. The participants were not told the location of the sites prior to viewing the videos. This was done so that responses from the participants were not influenced by knowledge of the site locations. Site One (Figure 21) was located on N 450th Rd. near Industry between E 1400th St. and E 1450th St. Site Two (Figure 22) was located on E 1200th St. at the intersection of N 950th Rd. Site Three (Figure 23) was located on Illinois Route 336 at the intersection of E 750th St. Site Four (Figure 24) was located on E 900th St. near the intersection of N 1350th Rd. Site Five (Figure 25) was located on N 1600th Rd between Emerson Rd and E 1100th St.

Unfortunately, a group had to leave early due to a public school function so not all 30 participants completed this activity. The work sheet used by participants to rate the sites is located in Appendix Eight. Appendix Nine shows how participants ranked each roadway by a Likert scale and description. Appendix Ten shows how many times each description was used to describe the five sites.

Stress Level Sites

Prairie City

41

Sciota

Blandinsville

Good Hope

Bushnell

41

95

Site 5

67

Bardolph

Site 4

Macomb

136

136

Colchester

Site 3

Tennessee

Site 2

61

Site 1

9

Industry

67

● Stress Level Sites   ⬒ Townships

／＼／ Road   ▨ Towns

〜 US

〜 State

0 1 2 3 4

Miles

N
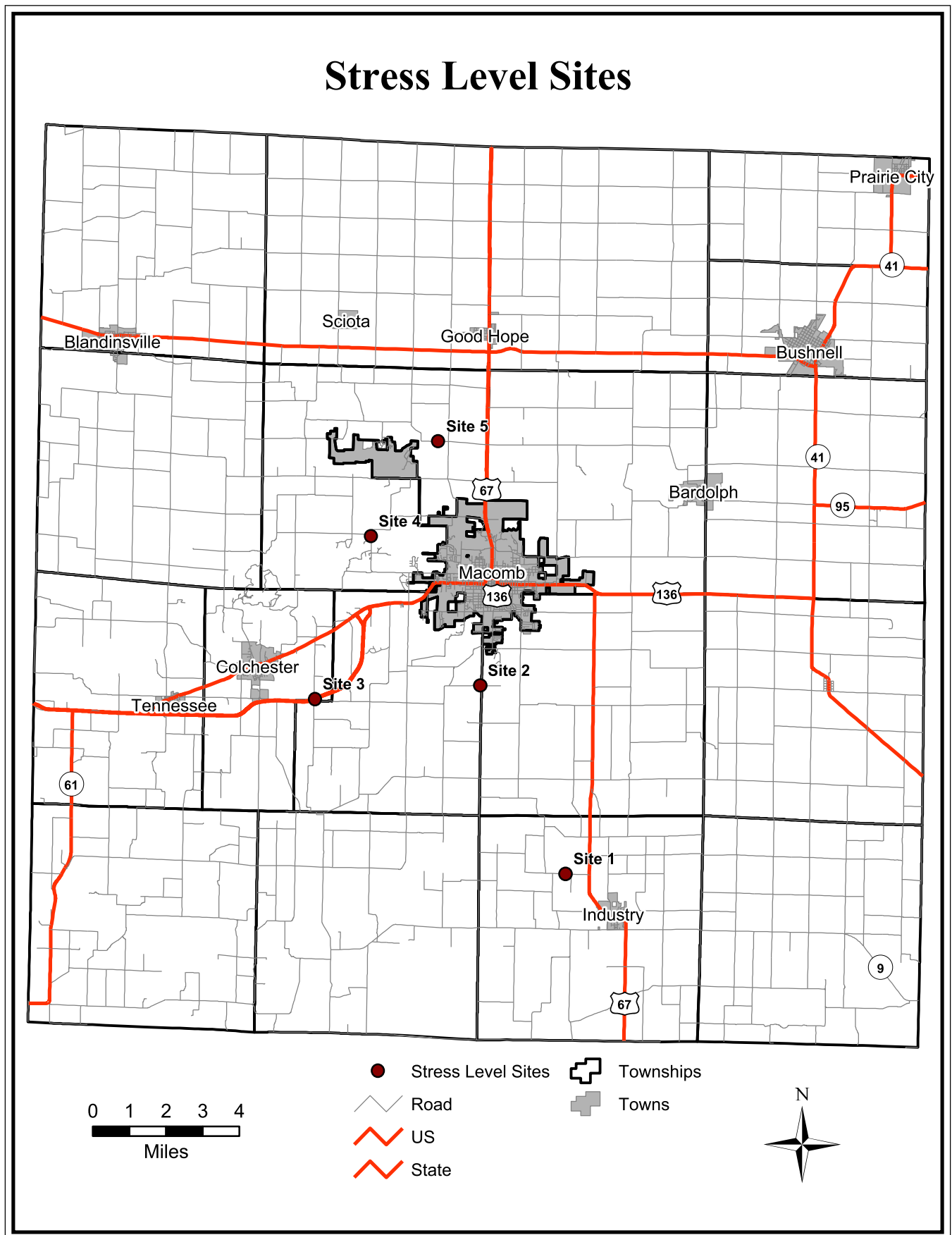
SITE ONE: N 450TH RD.

Figure 21: Site 1 on N 450th Rd.

For this road segment, most participants ranked their stress as very low, which resulted in a stress level of 1.70 on the Likert scale.   This means that the majority of participants (82 percent) found Site One as not at all stressful or somewhat stressful.   The most common descriptions listed for Site One were "no shoulders" and "no or low traffic". The second and third most common descriptions were "narrow roadway" and "a rural route", respectively. Most participants indicated that this road segment generated a low stress level even though the roadway was narrow and had no or very narrow shoulders.   Most likely, the participants indicated a low stress level because the rural nature of the roadway and the low traffic volume outweighed the stress that may have been caused by the narrow road surface and lack of shoulders.

SITE TWO: E 1200TH ST.

Figure 22: Site 2 on E 1200th St.

For Site Two, participants indicated a moderate stress level. Thirty-nine percent of the participants stated that this road segment inflicted moderate stress and 35 percent indicated a somewhat stressful level, which resulted in an overall stress level of 2.26 on the Likert scale. The majority of participants (74 percent) found Site Two moderately stressful or somewhat stressful.   The most common description for this road segment was "gravel on the shoulder". The second most common description was "a high traffic road". There was a tie for the third most common descriptions for this roadway ("no shoulder" and "poor shoulder").   The majority of the participants had something

negative to say about the condition of the shoulder along the roadway. It would appear from the comments made by the participants that an improved shoulder condition would reduce the stress level and make this roadway segment more appealing for bicyclists.

SITE THREE: ILLINOIS ROUTE 336

Figure 23: Site 3 on Illinois 336

For Site Three, the participants indicated a somewhat stressful level for the roadway segment.   Thirty-nine percent of participants felt that Site Three was a somewhat stressful bicycling environment, which resulted in a Likert scale of 2.26.   The second most common stress level indicated by the participants was moderately stressed at 30 percent, which resulted in 69 percent of the participants indicating that Illinois Route 336 to be a somewhat to moderately stressful roadway for bicycling. However, 22 percent of participants stated that they were not stressed at all by the roadway segment.

The participants most often described Illinois Route 336 as "a high traffic road". The second most common description was a "high speed limit road". The third most common description was "good shoulder" and the fourth was "smooth surface". The participants seemed to like the roadway shoulder and pavement for bicycling, but the high posted speed limit and the high traffic volume caused the majority of the focus group members to feel somewhat to moderately stressed.

SITE FOUR: E 900TH ST

Figure 24: Site 4 on E 900th St.

Thirty-five percent of the focus group participants indicated a moderate stress level for Site Four, with a mean stress level of 3.04 on the Likert scale. Additionally, 30 percent of the participants felt the roadway segment was very stressful and 26 percent felt the segment was somewhat stressful. Only four percent of participants felt the area was extremely stressful and another four percent felt the roadway segment was not stressful at all.

The most common description of this site was "no shoulders". The second most common description of this roadway was "narrow". The third and fourth most common descriptions were "rough surface" and "uneven surface". Most focus group participants found this roadway segment to be bicycle unfriendly due to the lack of shoulder and the condition of the roadway surface. This roadway segments registered the highest stress level with the participants.

SITE FIVE: N 1600TH RD.

Figure 25: Site 5 on N 1600th Rd.

The stress level percentages for Site Five were equal for both not stressed at all and somewhat stressed. Forty-three percent ranked the roadway segment as not at all stressful and 43 percent also ranked the roadway segment as somewhat stressful. This was somewhat surprising because the roadway segment was nearly identical to the first site. The only notable differences between the sites were the road surface width and the amount of traffic. The road segment is the main route from US Highway 67 to Springview Hills and Melrose Estate subdivisions north of Macomb.

The most common description for Site Five was "no shoulders". This was also the most common description for Site One. The second most common description for Site Five was "narrow road" and this was also the second most common description for Site One. The third most common description was "low to no traffic", which was also one of the two most common descriptions for Site One. It was surprising that the participants described both sites similarly given the fact that they were rated quite differently. The participants seemed to get more descriptive as they proceeded through the stress level activity.

5.5 Mental Mapping

Focus group members also participated in a mental mapping activity during the public meeting. Each focus group was asked to draw a map of the bicycle environment in McDonough County. Group participants were asked to do this from memory and were told to include features that they find to be most important to them in terms of the bicycle environment, including all the bicycle facilities and roads that they use or perceive as usable for bicycling. This section discusses each of the mental maps drawn by the focus groups.

GROUP ONE MENTAL MAP

Figure 26: Group 1 Mental Map

Group One (Figure 26) participants placed all the incorporated towns and villages in McDonough County on their map. Other features shown on the map were major roads that link the majority of municipalities to the two lakes located within the county. Highways placed on Group One's mental map were US Highway 67 north from Macomb to Good Hope, US Highway 136 east from Macomb to Illinois Route 41, US Highway 136 west from Macomb to Tennessee, east University Drive (also known as N 1300th Rd) through Bardolph to Illinois Route 41, Illinois Route 336 from Macomb to Tennessee, South Johnson St (also known as E 1200th St.) to Horn Field Campus, China Road and Horn Field Campus to Tennessee via N 900th Rd, Spring Lake to Blandinsville via County Highways 20 and 11, and Blandinsville to La Harpe by Illinois Route 9.

Focus group members indicated three bike routes on the mental map. The first bike route used state and county highways from Macomb to Blandinsville.

The bike route shown was as follows: US Highway 67 north to County Highway 20 west, passing the Spring Lake Park entrance and continuing to County Highway 11 north to Blandinsville.

The second bike route was from Macomb to Bardolph and Bushnell, utilizing the following roads: East University Drive to County Highway 17 north to Bardolph and County Highway 2 east to State Route 41 north to Bushnell.

Bike route three was Macomb to Horn Field Campus, Colchester, and Tennessee, using the following roads: County Highway 16 (South Johnson Street) to China Road to the Horn Field Campus entrance road and China Road to N 950th Road south to E 1100th Street west to N 900th Road south to E 600th Street to Colchester. From Colchester to Tennessee the bike route continued on N 900th Road from E 600th Street.

From Group One's mental map it appears that major destinations for cyclists in McDonough County are small communities west and northwest of Macomb and two parks: Spring Lake and Horn Field Campus. It would appear from the map that members of Group One do not cycle often in southern McDonough County.

GROUP TWO MENTAL MAP

Figure 27: Group 2 Mental Map

Group Two's mental map is displayed in Figure 27. Group Two did not include any roads on its mental map so no bike routes could be determined; nonetheless, the group's mental map did contain some valuable information. Group Two members listed some regularly scheduled bike rides in Macomb and

around McDonough County, including the Sunday morning bikers/runners gathering, the Tuesday and Thursday morning breakfast ride and the Bike Shop Ride. The majority of the biking destinations had either a small town café or other points of interests, such as Argyle Lake State Park and Spring Lake Park. Most of Group Two's destinations were small towns scattered throughout the county.
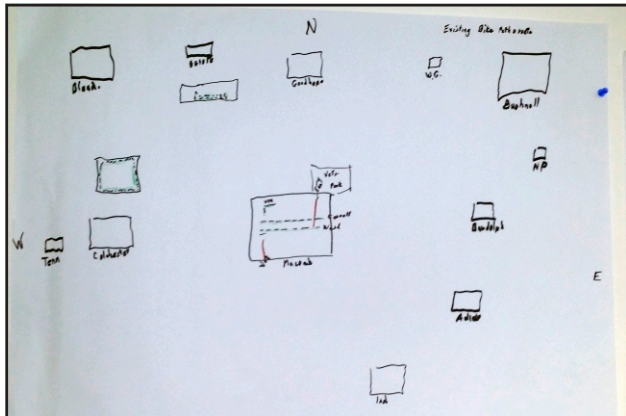
GROUP THREE MENTAL MAP

Figure 28: Group 3 Mental Map

Group Three's mental map is shown in Figure 28. Group Three did not include any roads on their mental map and only included a few of the incorporated towns and villages in the county. For the City of Macomb, Group Three included several bicycle facilities, such as the bike paths along West Carroll Street and West Washington Street, the multipurpose sidewalk on South Ward Street and the new multipurpose sidewalk along East Street from East Wheeler Street to Veteran's Park. As was the case for Group Two, Group Three listed several bicycling destinations on the map, including New Philadelphia and Colmar. Existing or perceived bike routes in the county were not evident from examining Group Three's map.

Figure 29 shows the mental map completed by Group Four. Group Four primarily included bicycle facilities within or around the City of Macomb. However, Argyle Lake State Park, Spring Lake Park, Good Hope, Adair, and Colchester were included on the map. The only roads included on the map were US Highway 67 north, US Highway 136, US Highway 67 south, Grant

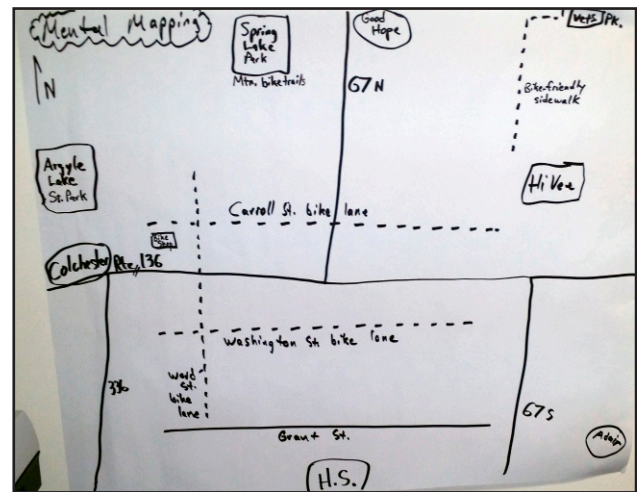**GROUP FOUR MENTAL MAP**

Figure 29: Group 4 Mental Map

Street, and Illinois Route 336. Other features shown on the map were the West Carroll Street bike lane, the bike-friendly sidewalk along East Street, West Washington Street bike lane, and the Ward Street bike path. The Bike Shop, Hy-Vee, and the Macomb High School were included on the map because they are starting points for several of the organized and regularly scheduled county bike rides. Existing or perceived bike routes in the county were not evident from examining Group Four's map.

5.6 Brainstorming

For the brainstorming activity, participants were asked to use Post-it Notes to write down what and where bikeway improvements are needed. The group members were asked to collectively collaborate on their thoughts and concerns by ranking the importance of each bikeway improvement. However, upon review of the data it seems only two groups ranked the improvements.

This section of the report is organized into seven subsections. Each group was individually examined in order to completely analyze the data collected during this activity. This section will also look at three categories of improvements.

5.6.1 Group One

Figure 30: Group 1 Improvements Word Cloud

Group One was one of two groups to rank their improvements by importance. Figure 30 shows a word cloud of all Group One improvements. The larger words are the ones that were repeated most often by group members. The following is Group One's list of improvements ranked from most important to least important:

1. Road width;
2. Signage to indicate bike trail, path, or lane;
3. Designated lanes for bikes;
4. Develop a network of bike paths;
5. Road maintenance;
6. Hard surface bike trail;
7. Bicycle safety through education and laws;
8. Isolated bike lanes;
9. More bike racks; and
10. Bike share program.

Group One also specified the location of a few hard surface bike trails, including a trail from Macomb to Horn Field Campus, trails to link Macomb schools, and a trail that connects Macomb to Argyle Lake State Park.

By examining Group One's list of improvements by importance, it is apparent that the construction of bike lanes and paths is a recurring improvement mentioned by the participants. This can be seen from those improvements listed above including: signage to indicate bike trails, paths, or lanes; designated lanes for

bikes; develop a network of bike lanes; hard surface bike trails; and isolated bikes lanes. The desire for more bike lanes, paths and trails coincides with information from the online survey conducted during the summer of 2014.
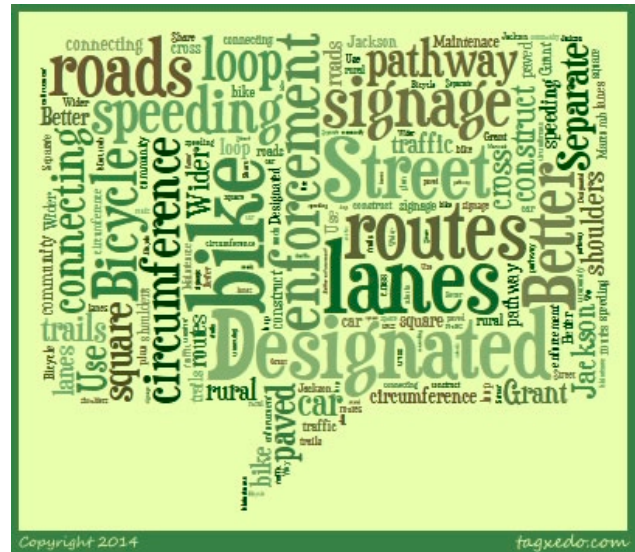
5.6.2 Group Two

Figure 31: Group 2 Improvements Word Cloud

Above, Figure 31 illustrates a word cloud that distinguishes the most common words in Group Two's brainstorming activity. Group Two was also one of the two groups that ranked their improvements by importance to the group members. The following is a list of Group Two's improvements from most important to least important:

1. Separated bike lanes from traveling lanes;
2. Designated bike-only paved routes;
3. Purchase small-width right-of-way for bike loop around Macomb;
4. Designate pathways connecting community schools and facilities (e.g. YMCA);
5. Posting of share the road signs; and
6. Construction of wider shoulders on rural highways.

Other improvements listed at least once by Group Two participants were: bike lanes along streets; designated bike lanes to cross East and West Jackson Street; a bike storage facility on the Macomb downtown square; bike lanes along East Grant Street; better enforcement of speed limits on city and rural roads; wider shoulders on rural roads; better road maintenance; and using the *2004 McDonough County*

Sidewalks

Trails and Greenways Comprehensive Plan to determine locations of future bike lanes and paths. Analyzing Group Two's list of improvements from most important to least important, bike paths and lanes seem to be most important to the participants. Four out of the six most often mentioned improvements related to bike lanes or pathways.

5.6.3 Group Three

Below, Figure 32 shows a word cloud that depicts the common words that Group Three used to describe needed bicycle improvements in McDonough County. Unfortunately, this group did not display the participant's Post-it Notes in any order that represented level of importance. Nonetheless, Group Three provided valuable information to be analyzed. For instance, one Post-it Note read as follows: "We live on Candy Lane and I'm really afraid for myself and my eleven year old son. If we could get into town more safely, we would ride much more often." Another Post-it Note read as follows: "It would be helpful to have convenient places to park and lock our bicycles near downtown, library, stores, etc."

Figure 32: Group 3 Improvements Word Cloud

The online survey conducted in the summer of 2014 revealed the same issues as the two statements above. Responses from the online survey indicated similar concerns about the lack of a safe bike path along Candy Lane south of Grant Street. The online survey also indicated similar concerns about safe and secure bicycle parking throughout the City of Macomb.

Other improvements mentioned by Group Three were: resurfacing roads; widening roadways; dedicated bike paths in Macomb; and creating a route from Spring Lake to Lake Argyle. Thus far, all three groups have emphasized the need to construct dedicated bike lanes or pathways throughout the City of Macomb and McDonough County.

5.6.4 Group Four

Figure 33: Group 4 Improvements Word Cloud

Figure 33 depicts a word cloud that shows the most common words used by Group Four during its brainstorming activity. Group Four members also did not rank their proposed improvements. Group Four improvements were similar to those selected by the other three groups. Improvements listed by Group Four that were not mentioned by the other groups included: dedicated bike lanes; wider/paved shoulders; Lamoine River bike trail; eliminating the use of inexpensive seal on roads; and providing more places to store bicycles.

5.6.5 Bicycle Facilities Improvements

Figure 34: Bicycle Facilities Improvement Word Cloud

All four of the groups listed constructing bike lanes as a way to improve the bicycling environment in McDonough County. (Figure 34) Three of the four groups listed establishing a safe way for crossing major roadways, including East and West Jackson Street in Macomb and Illinois Route 336. Three of the four groups also mentioned the need for more bicycle parking. One group mentioned that three feet is the optimum buffer needed to separate motor vehicles and cyclists. The fact that one group listed a distance between vehicles and cyclists indicated that stress levels rise when there is not adequate separation between vehicles and bicyclists. The fact that all groups mentioned bike lanes and three of the four groups mentioned crossing major highways and providing more bike parking seems to show their relative importance to cyclists.

5.6.6 Roadway Improvements

Figure 35: Roadway Improvements Word Cloud

In Figure 35 all four of the groups mention the need for wider roads. Three of the four groups wanted some sort of improvements to the shoulders. Other suggested improvements were: better maintenance, improved road surface, no chip and seal, and sidewalks. There seemed to be agreement amongst all the groups that roads in McDonough County need to be wider with improved shoulders. This corresponds with one of the groups stating that there needs to be at least a three feet buffer between vehicles and cyclists. Making wider roadways and shoulders provide cyclists more room when vehicles are passing them.

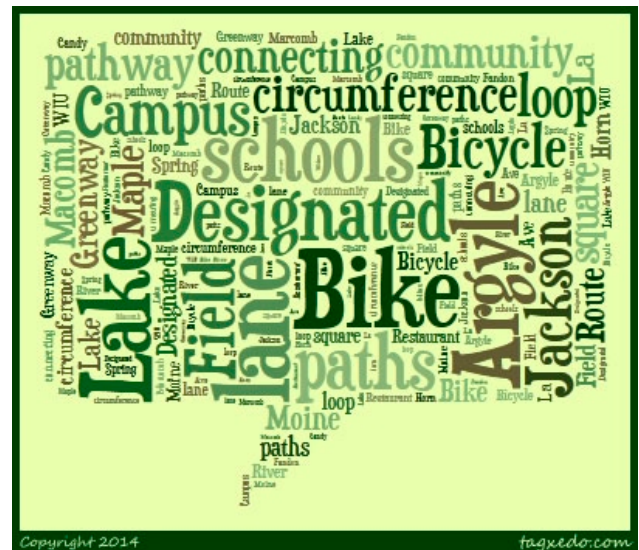## 5.6.7 Routes and Destination Improvements

Figure 36: Routes and Destinations Word Cloud

Above in Figure 36 each of the four groups listed recommendations where bike paths should be constructed and other possible destinations for bike paths or trails. Constructing a bike path to Lake Argyle from Macomb was mentioned twice, as was constructing bike paths connecting all schools in Macomb. Other routes that were mentioned included Horn Field Campus from Macomb, a greenway along the Lamoine River, a bike path between Spring Lake and Lake Argyle, and a bike path around Macomb. Constructing or designating bike paths and lanes was the main improvement mentioned by participants of all four groups.

CHAPTER 6 - Geospatial Analysis

The bicycle routes collected from the online survey and public meeting were digitized using GIS. Digitizing the routes allowed a visual inspection to see where the majority of bicycle routes were located. Figures 37 through 40 show by quadrant the different routes cyclists use in McDonough County.

Analysis of routes depicted on the four maps showed that southeast McDonough County is cycled most often. The second most traveled portion of the county is the southwest quadrant. There are potentially two major destinations in terms of natural areas in McDonough County: Spring Lake Park and Argyle Lake State Park, both of which are located in northern McDonough County. However, based on the mapping exercise, there appears to be more bicycle traffic in the southern portion of the county than in the northern portion. Roads in the southern sections of the county most often used by cyclists appear to have fewer elevation changes, which may be a determining factor on why those sections are more often used by cyclists.

The online survey conducted during the summer of 2014 asked participants the location of their favorite places or routes to bicycle. The data collected from this question was categorized by location. The on-line survey data revealed that a large portion of the participants bicycle in the southeast quadrant of McDonough County even though the focus group at the public meeting revealed that the southwest quadrant is more often cycled than the southeast quadrant.

By examining the McDonough County maps, conclusions can be drawn as to why participants bicycle more often in the southern portion of the county. Most of the larger cities and villages are located in the northern portion of the county, resulting in less traffic in the southern portion, even more so in the southwestern portion, where there are few municipalities. Figure 41 shows the location of incorporated cities and villages in McDonough County. Figure 42 shows the population of McDonough County by US Census block groups.

Block Group 3 in Census Tract 110 is located in the southeast corner of McDonough County. The Village of Industry is located in this block group and its total population, according the 2010 Census, is 1,201. Block Group 4 in Census Tract 111 is located in the southwest corner of McDonough County. No municipalities are located in this block group and according to the 2010 Census, the block group has a population of 951 individuals. These low population numbers in large geographical areas may help explain why more cyclists tend to bicycle in the southern portion of the county.
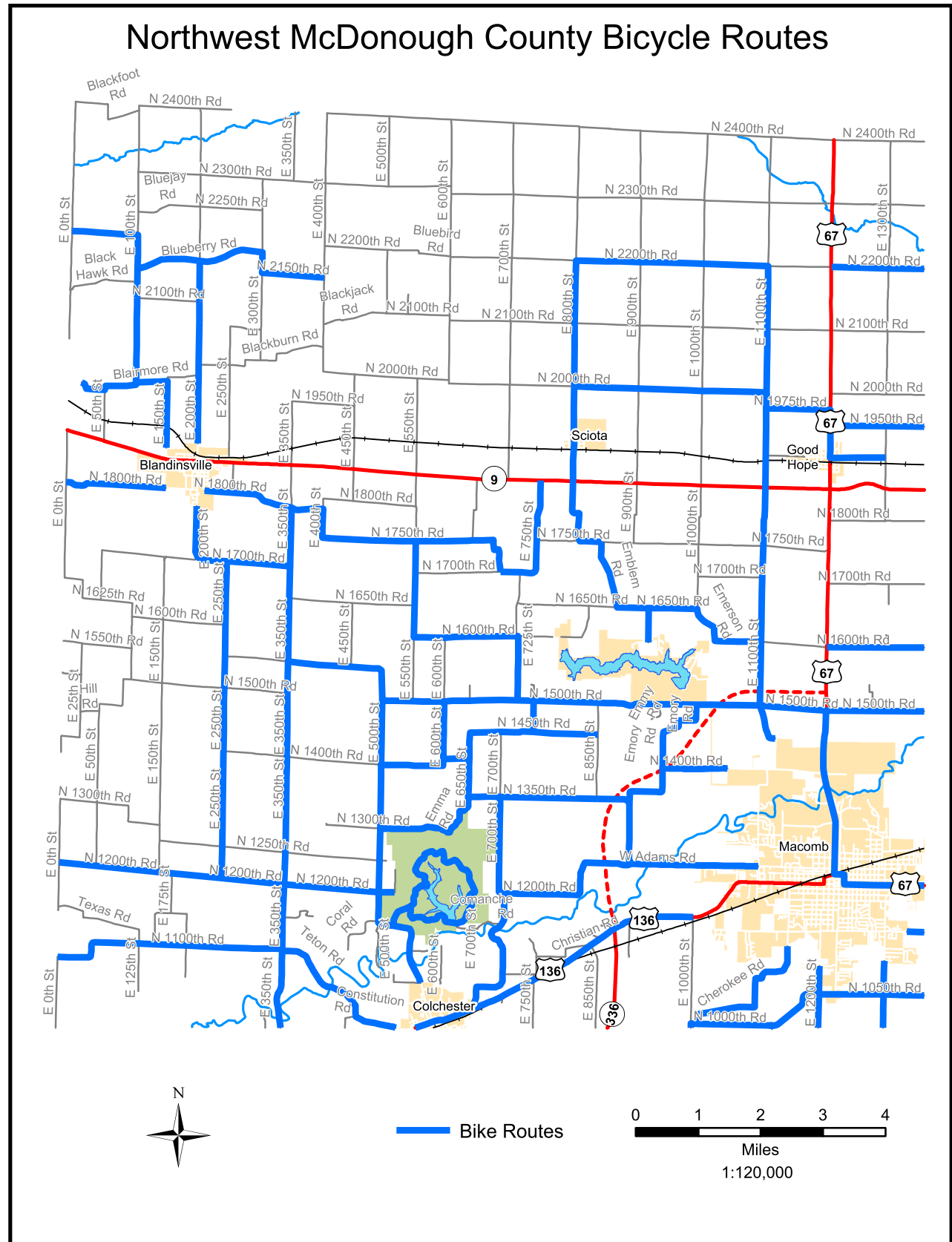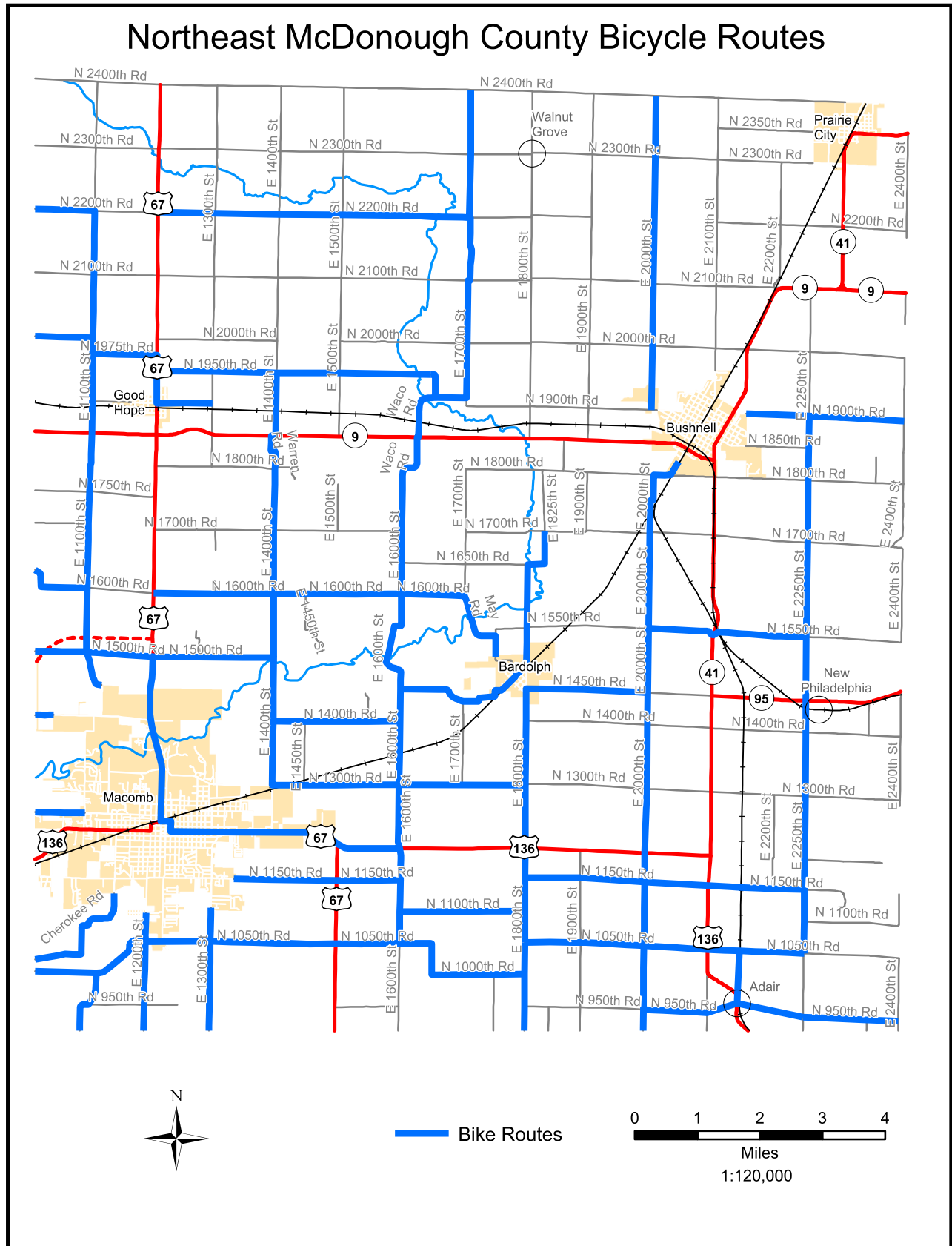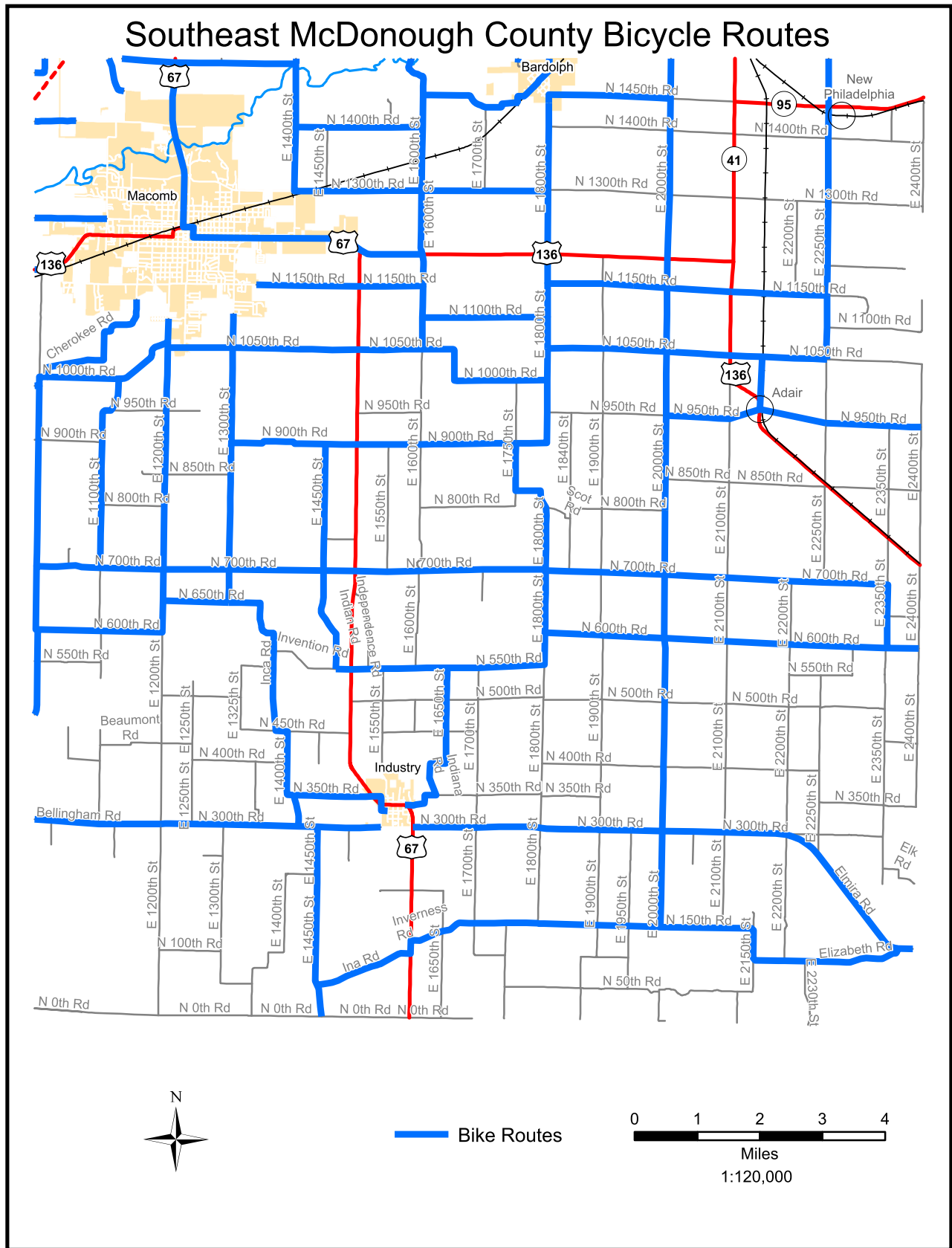
Figure 37

Northwest McDonough County Bicycle Routes

Bike Routes

0 1 2 3 4
Miles
1:120,000

Figure 38

Northeast McDonough County Bicycle Routes

Figure 39

Southeast McDonough County Bicycle Routes

Figure 40

Southwest McDonough County Bicycle Routes

Bike Routes

0   1   2   3   4
Miles
1:120,000

Figure 41

McDonough County Cities and Villages

Prairie City

41

Sciota

Good Hope

Blandinsville

Bushnell

41

95

67

Bardolph

Macomb

136

136

Colchester

Tennessee

61

Industry

9

67

Road | Townships
US | Towns
State

0 1 2 3 4
Miles

N

Figure 42

McDonough County Population by Block Group

	19		660		837		1015		1244
	522		668		852		1028		1360
	589		675		870		1039		1687
	591		679		922		1091		2438
	611		692		930		1114		2759
	629		722		941		1201		
	633		781		951		1229		

0 1 2 3 4
Miles

N

Source: US Census, 2010

CHAPTER 7 - City of Macomb

Throughout the online survey and the public meeting processes, participants did not just referenced McDonough County as a whole, but also talked about the City of Macomb. Participants commented, both positively and negatively, about the City of Macomb's bike-ability.

Concerning the positives, participants commented on how they like the bike lanes along Carroll and Washington streets. Additionally, participants were also praising the South Ward Street multipurpose sidewalk and the new East Street multipurpose sidewalk. Both of these multipurpose sidewalks are wider than normal sidewalks and can accommodate both pedestrians and bicyclists. However, not all comments were positive. There were also numerous comments about how motorists park in the bike lanes near downtown. Participants have also stated their concerns about how some motorists tend to drive in the bike lanes. Participants also commented on the difficulty of crossing both Jackson Street and North Lafayette Street. East and West Jackson Street and North Lafayette Street both create a barrier for bicyclists and pedestrians alike because of the lack of

safe crossing locations with traffic control devices. Another concern mentioned was the lack of bicycle parking at destinations such as retail stores, restaurants, and community centers (e.g. library, YMCA, et cetera).

Participants expressed interest in constructing a network of bike paths/lanes around Macomb that would connect parks and schools. Some participants also expressed interest in constructing bike lanes along Jackson Street to create better access to shops and restaurants along this main highway corridor. Participants stated that Washington Street and Carroll Street are streets that they typically use as bikeways. Other streets widely used by cyclists are Ward Street, Grant Street, Compton Park area, South Johnson Street, Candy Lane, Bower Road, and University Drive.

The City of Macomb has developed a map of planned bike lane improvements. The map was updated by the Western Illinois Regional Council to include information obtained in the process of completing this bike study. Figure 43 is a map of current and planned bicycle improvements in the City of Macomb.

Figure 43

City of Macomb Bike Map Phases

45
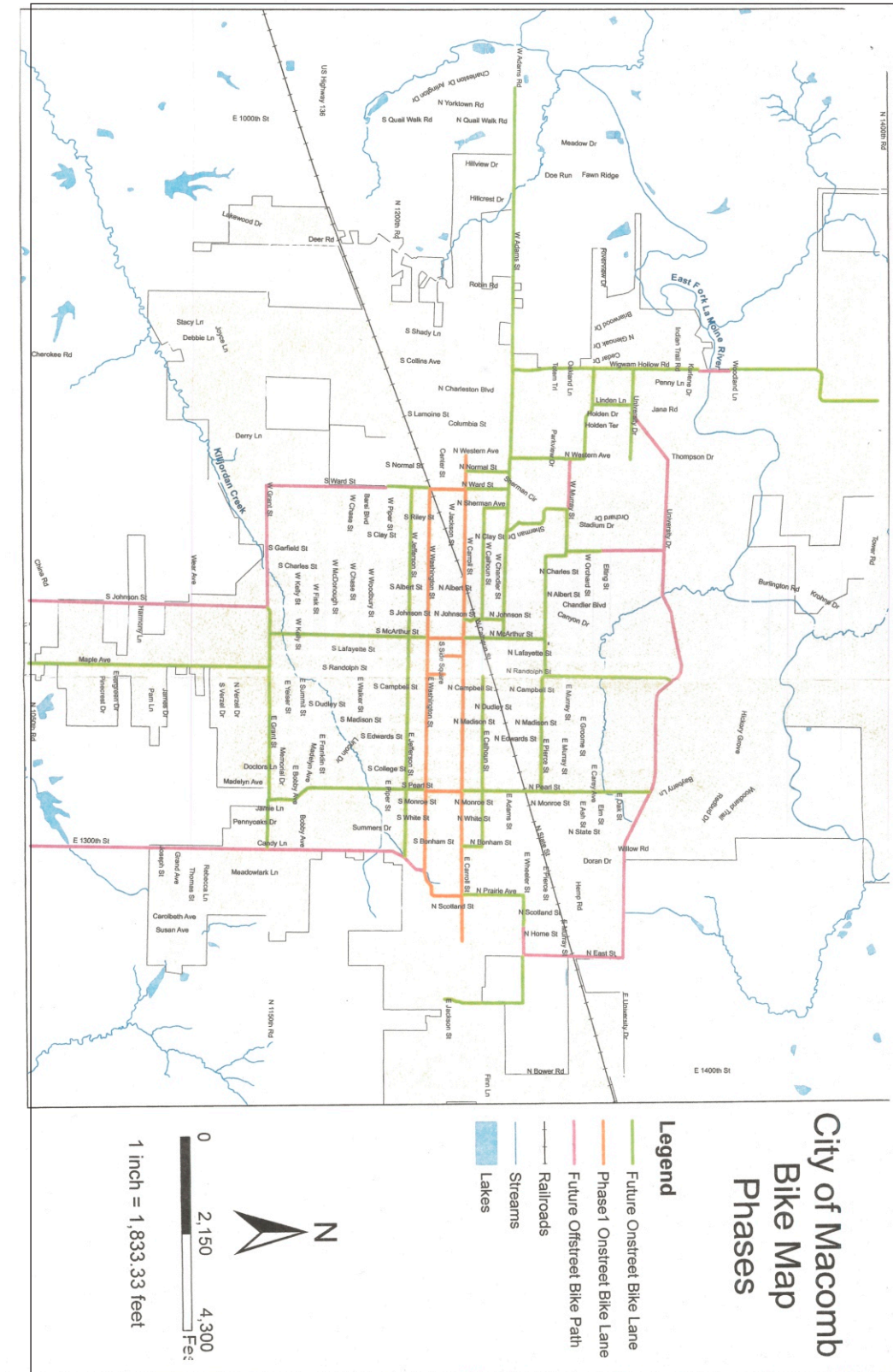
CHAPTER 8 - Conclusion

As a result of the online survey and focus group processes, McDonough County bicyclists have revealed their desires for improved bike lanes and segregated bike paths. The bike study participants indicated a need for the construction of a network of both bike paths and lanes throughout the county. A relatively inexpensive method to construct bike lanes is by improving the current shoulders. Many participants of both the online survey and focus group revealed the need to have paved shoulders that give cyclists ample room to create a gap between themselves and traffic. Creating and repairing paved shoulders on county highways and roads will better increase the bike-ability of McDonough County for the more experienced riders.   However, many of the novice cyclists expressed stress during the stress testing portion of the focus group process even with roadways with wide paved shoulders. Participants of the online survey also revealed that bicycling on roadways or alongside roadways may be stressful and dangerous. To accommodate novice cyclists who prefer to stay away from traffic, a network of segregated bike paths/trails is needed. The *2004 McDonough County Trails and Greenways Comprehensive Plan* should be used as a resource to determine location of these segregated bike paths/trails. This trails and greenways plan was referenced in the second chapter of this document.

Constructing a network of bike lanes and paths is needed, but participants of the online survey and focus group also revealed that they enjoy cycling to destinations. Examples of destinations are small town restaurants, parks, and schools. Both the online survey and focus group meeting revealed interests in connecting local schools and parks by a network of bike paths and lanes. However, the focus group mental mapping exercise showed that participants that cycle long distances in McDonough County like to bicycle to the local cafés and restaurants in the surrounding small towns and villages. Creating a network of bike lanes and/or paths that connect all the small communities would benefit the cycling population of McDonough County.

The data collecting exercise and the digitized bicycle routes using GIS have revealed a heavy use of roadways in the southern portion of McDonough County. Currently there are two major routes leaving Macomb heading south. The routes are East 1200th Street (South Johnson Street) and East 1300th Street (South Candy Lane). Both of these roadways are narrow with unimproved shoulders, resulting in an unsafe environment for cyclists when entering or exiting Macomb from/to the south. Western Illinois University (WIU) operates the Horn Field Campus south of Macomb, which the online survey data revealed as a popular destination for bicyclists. Bicyclists must use South Johnson Street to get to the Horn Field Campus from Western Illinois University. Widening and improving the shoulders along this street or creating a bike path adjacent to the roadway would greatly improve the bicycling environment for WIU students and others wishing to access the Horn Field Campus facilities.

Many participants revealed their interests in cycling to Argyle Lake State Park and to Spring Lake Park.

CHAPTER 8 - Conclusion (Continued)

However, the construction of the Route 336 bypass around Macomb created another barrier for cyclists to get to these popular destinations. Another issue creating stress for bicyclists is the lack of paved shoulders on roadways to and from both parks. Thirty-five percent of the focus group participants stated that they were moderately stressed when they viewed the one minute video of the intersection of East 900th Street and North 1350th Road. East 900th Street is a major roadway used to travel to and from Spring Lake from the City of Macomb. Improving and widening shoulders along roadways leading to these parks or constructing separate bike paths would greatly reduce the stress level of cyclists visiting these two popular destinations.

Both the online survey and the focus group participants expressed concern about motorists' behavior toward cyclists. Many participants stated that they would like to see some sort of educational and outreach program to inform motorists about the laws regarding shared use of roadways. Many participants encouraged the installation of "share the road" signs throughout the City of Macomb and McDonough County to help alleviate negative interaction between motorists and bicyclists and to create a more safe bicycling environment.

Participants of the focus group stated that they like the designated bike lanes along Washington and Carroll streets in Macomb. However, some of the participants expressed frustration with motor vehicles parking in the bike lanes forcing cyclists to ride out into vehicle traffic lanes. Other concerns mentioned by the focus group participants were motorists driving in the bicycle lanes and poor maintenance by the city of bicycle lane markings on the roadway. Participants of the on-line survey and public meeting focus group stated that the Ward Street and East Street multipurpose sidewalks have greatly improved the bicycling environment in those areas and that additional multipurpose sidewalks and trails are needed throughout the City of Macomb.

Any additional study of the McDonough County

bicycling environment should use GIS to determine areas that are suitable for bike travel by calculating the Bicycle Level of Service (BLOS). The BLOS is a qualitative measurement that calculates the perceived comfort level of cyclists by characterizing different functions of the roadway.[8] To do this, a catalog of bike facilities needs to be collected. Bike facilities are defined as bike lanes, designated paths, shared lanes, and paved shoulders. In addition to collecting a catalog of bike facilities, street attributes must also be obtained to help determine county roads that are suitable for bike travel. The attributes important for this study are number of lanes, posted speed limit, shoulder length/pavement, road condition, bike facilities, traffic counts, and name. These attributes will help determine the BLOS. Determining the BLOS for the entire county will help reveal additional suitable areas that need to be improved to encourage bicycling for both the experienced bicyclist and the novice or recreational rider.

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[8]"Bike/Ped Level of Service Measures and Calculators," http://www.bikelib.org/bike-planning/bicycle-level-of-service/ and "Why Bicycle Levels of Service (BLOS) is Important For Your Community," http://nybc.net/why-bicycle-level-of-service-blos-is-important-for-your-community/

APPENDIX 1: Bicycle Study Survey

The WIRC is conducting a bicycle study to gather information and analyze the perception of cyclists concerning the bicycle environment in and around McDonough County. Cycling destinations such as Spring Lake and Argyle Lake State Park require bicycling on roads with heavy vehicular traffic and lack of shoulders. With your participation, WIRC will be able to determine the routes most utilized by cyclists and your opinions and concerns relative to those routes. This study is being funded by the Illinois Department of Transportation.

1. What is your gender?
    o Male
    o Female
2. What is your age?
    o 18-24 years old
    o 25-34 years old
    o 35-44 years old
    o 45-54 years old
    o 55-64 years old
    o 65-74 years old
    o 75 years and over
3. Does your household have a working motor vehicle?
    o Yes
    o No
4. Do you currently own or have access to a bicycle for your personal use?
    o Yes
    o No
5. In the last year which of the following has been your primary mode of transportation?
    o Automobile-drove alone
    o Automobile-carpooled
    o Rode a Motorcycle
    o Took a Taxi
    o Bicycled
    o Walked
    o Public transportation (excluding taxi cabs)
6. How often do you bicycle to commute to work and/or school?
    o Frequently
    o Often
    o Sometimes
    o Rarely
    o Never
7. How often do you bicycle to access services such as shops and restaurants?
    o Frequently
    o Often
    o Sometimes
    o Rarely
    o Never
8. How often do you bicycle for leisure or fitness?
    o Frequently
    o Often
    o Sometimes
    o Rarely
    o Never

9. How often do you bicycle in general?
    - o Daily
    - o 2 times a week or more
    - o Weekly
    - o Biweekly
    - o Monthly
    - o Whenever the mood strikes me
10. What is your primary purpose for riding bicycles?
    - o Exercise
    - o Leisure
    - o Commuting
    - o Errands
    - o Environmental concerns
    - o Social activity
11. How many months in a year do you typically **NOT** make trips by bicycle or bicycle for recreation purposes?
    - o 1
    - o 2
    - o 3
    - o 4
    - o 5
    - o 6
    - o 7
    - o 8
    - o 9
    - o 10
    - o 11
    - o 12
    - o I bicycle year-around
12. On average, how many miles do you bicycle per week?
    - o 1 mile or less
    - o 2-5 miles
    - o 5-10 miles
    - o 10-15 miles
    - o 15-24 miles
    - o 25-50 miles
    - o More than 50 miles
13. Do you wear high visibility clothing?
    - o Always
    - o Usually
    - o Only at night
    - o Sometimes
    - o Never
14. Do you wear a helmet?
    - o Frequently
    - o Often
    - o Sometimes
    - o Rarely
    - o Never

15. What prevents you from bicycling most often?
    o   Bikeways/roads in poor condition
    o   No bicycle paths, lanes or bicycle routes
    o   High posted speed limit
    o   Insufficient lighting
    o   Too many cars
    o   Drivers do not share the road
    o   Destinations are too far away
    o   Not enough time
    o   Travel with small children
    o   Age/health impairments
    o   Weather
16. How bicycle friendly would you say the roads in McDonough County are?
    o   Very Friendly
    o   Friendly
    o   Accommodating (Neutral)
    o   Unfriendly
    o   Very Unfriendly
17. What makes it difficult to bicycle in McDonough County?
    o   Lack of bike lanes, trials, and paths
    o   Roadway width
    o   Bikeways/roads in poor condition
    o   Insufficient lighting
    o   Amount of traffic
    o   High posted speed limits
    o   Drivers do not share the road
    o   McDonough County is not difficult to ride in
18. Which of these changes would make it easier to bicycle in McDonough County?
    o   Improve existing bikeways/facilities
    o   Improve shoulders on roadways
    o   Construct bike lanes
    o   Increase share the road routes
    o   Change bicycling laws and laws effecting bicyclists
    o   Enforce laws governing motorist behaviors
    o   Initiating bicycle safety education
19. Which of the following features do you find important when you select a bike route?
    o   Most direct routes
    o   Bicycle lanes or share the road markings
    o   Road width
    o   Low posted speed limits
    o   Amount of traffic
    o   Cycling groups/partners
20. Which of the following features do you find important when you are provided a new cycle route?
    o   Signage
    o   Continuous (limited stopping)
    o   Wide paths/cycling lanes
    o   Hard surfaces
    o   Reduced vehicle speed/traffic
    o   Maintenance

TREK Bicycles

Fitness Equipment

Sales & Service

The
BIKE SHOP
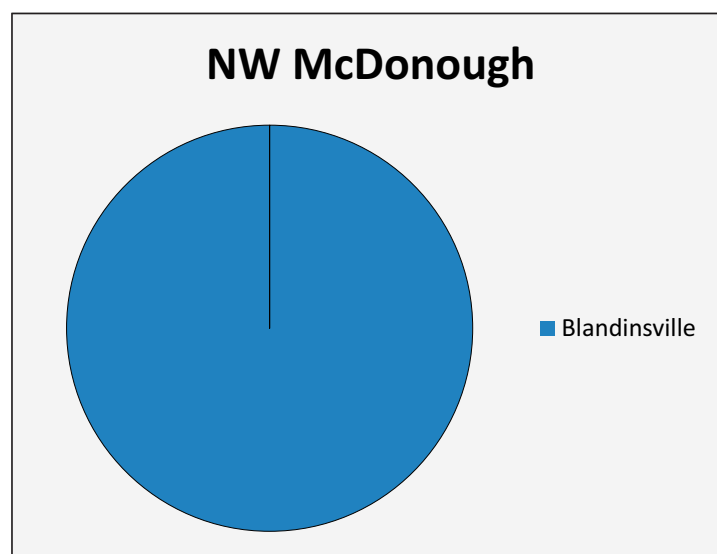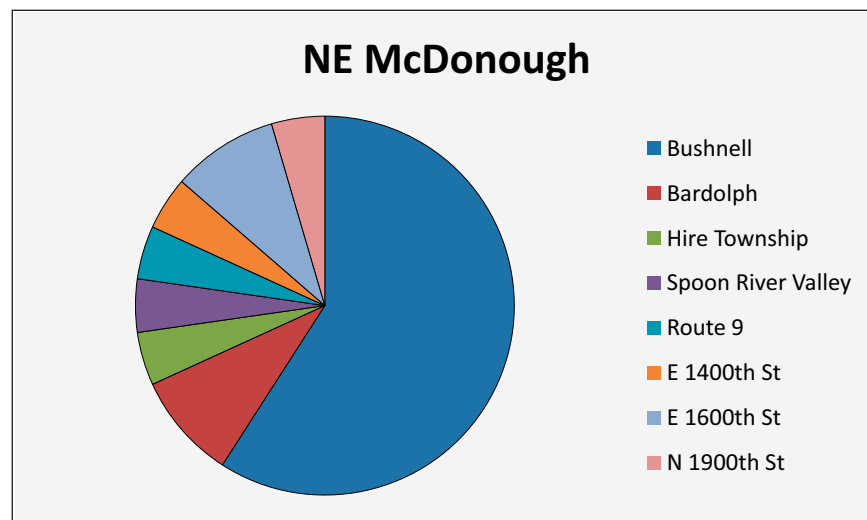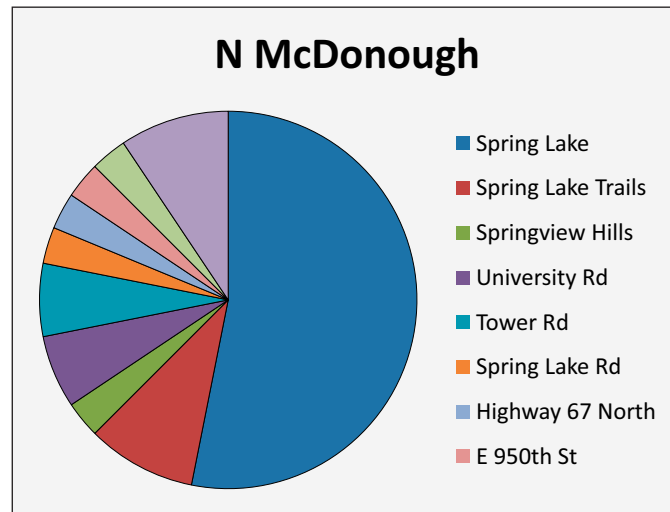137 Columbia St.
Macomb, IL 61455
309-833-5748

The Bike Shop in Macomb, Illinois
invites you to participate in the
<u>Western Illinois Regional Council McDonough County Bicycle Survey.</u>
The survey can be found at the WIRC website
http://www.wirpc.org from
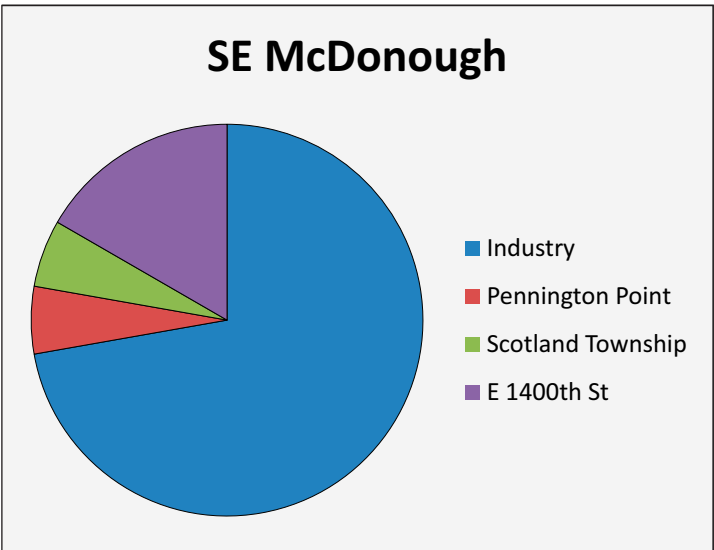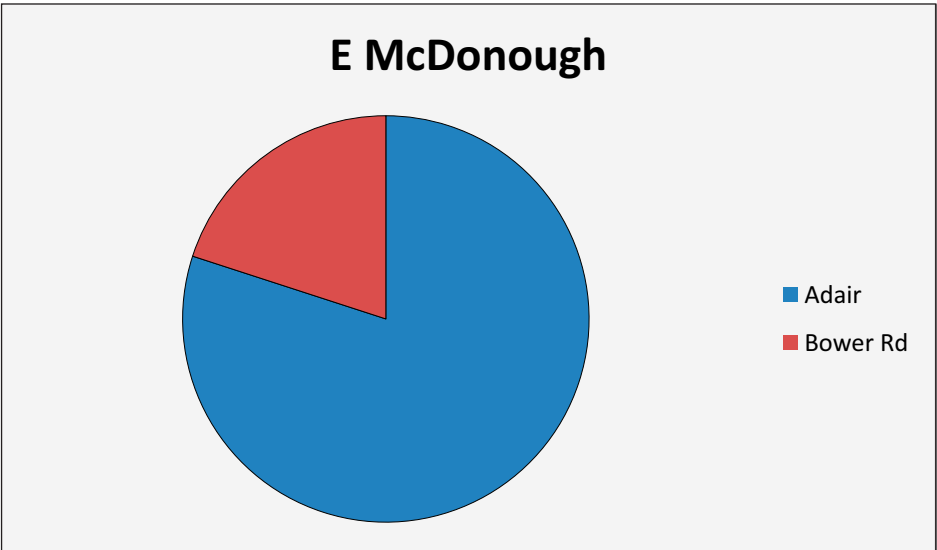July 10 to July 31, 2014

The Western Illinois Regional Council (WIRC) is conducting a bicycle survey to gather information and analyze the perception of cyclists concerning the bicycle environment in and around McDonough County. Cycling destinations such as Spring Lake and Argyle Lake State Park require bicycling on roads with heavy vehicular traffic and lack of shoulders. With your participation, WIRC will be able to determine the routes most utilized by cyclists and your opinions and concerns relative to those routes.
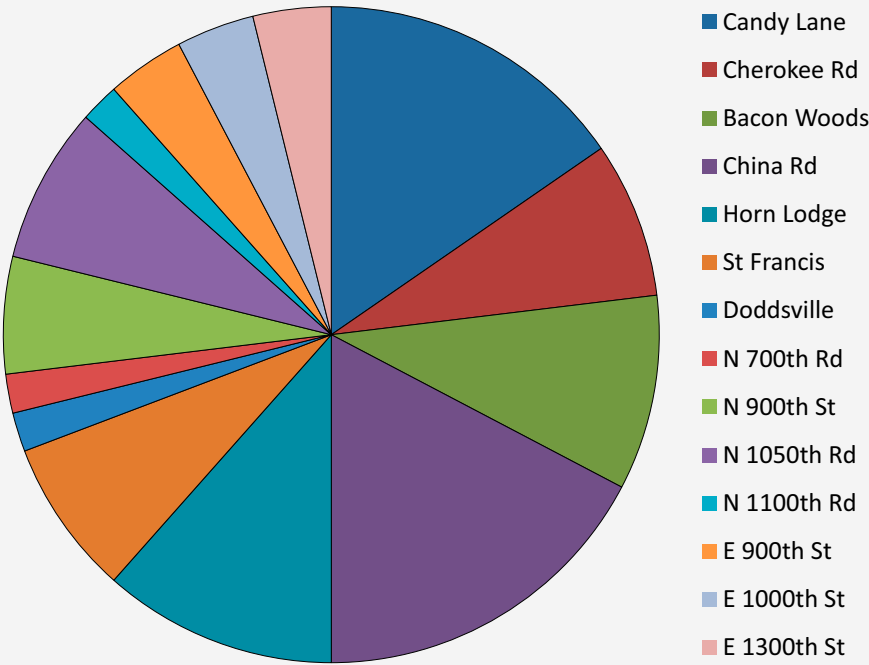
APPENDIX 3: Focus Group Schedule

McDonough County Bicycle Route Study Public Hearing Schedule	
4:30 – 4:40 pm:	Introduction to the focus group and breaking off into groups
4:40 – 4:50 pm:	Getting to Know Each Other
4:50 – 5:10 pm:	Multi-Voting Activity
	Group Activity Rotation
5:10 – 6:15 pm:	SWOT Analysis – 15 to 20 minutes
	Post-it Notes Brainstorming – 15 to 20 minutes
	Mental Mapping – 10 minutes
	Stress Level – 10 to 15 minutes
	Mapping Out Bicycle Routes – During downtime between activities
6:15 – 6:30 pm:	Closing remarks and discussion

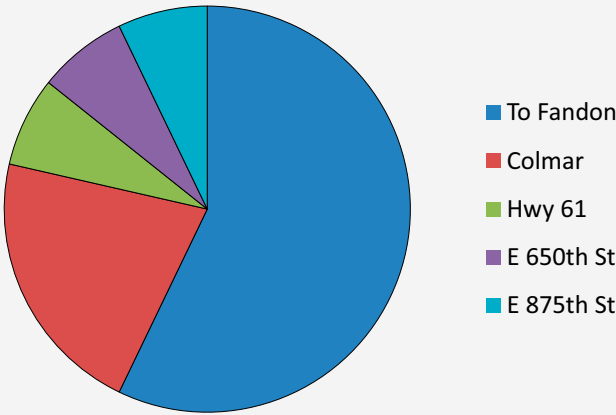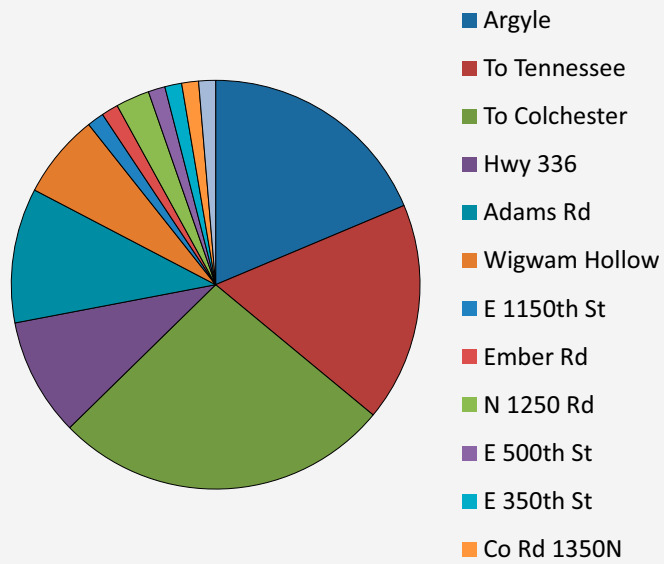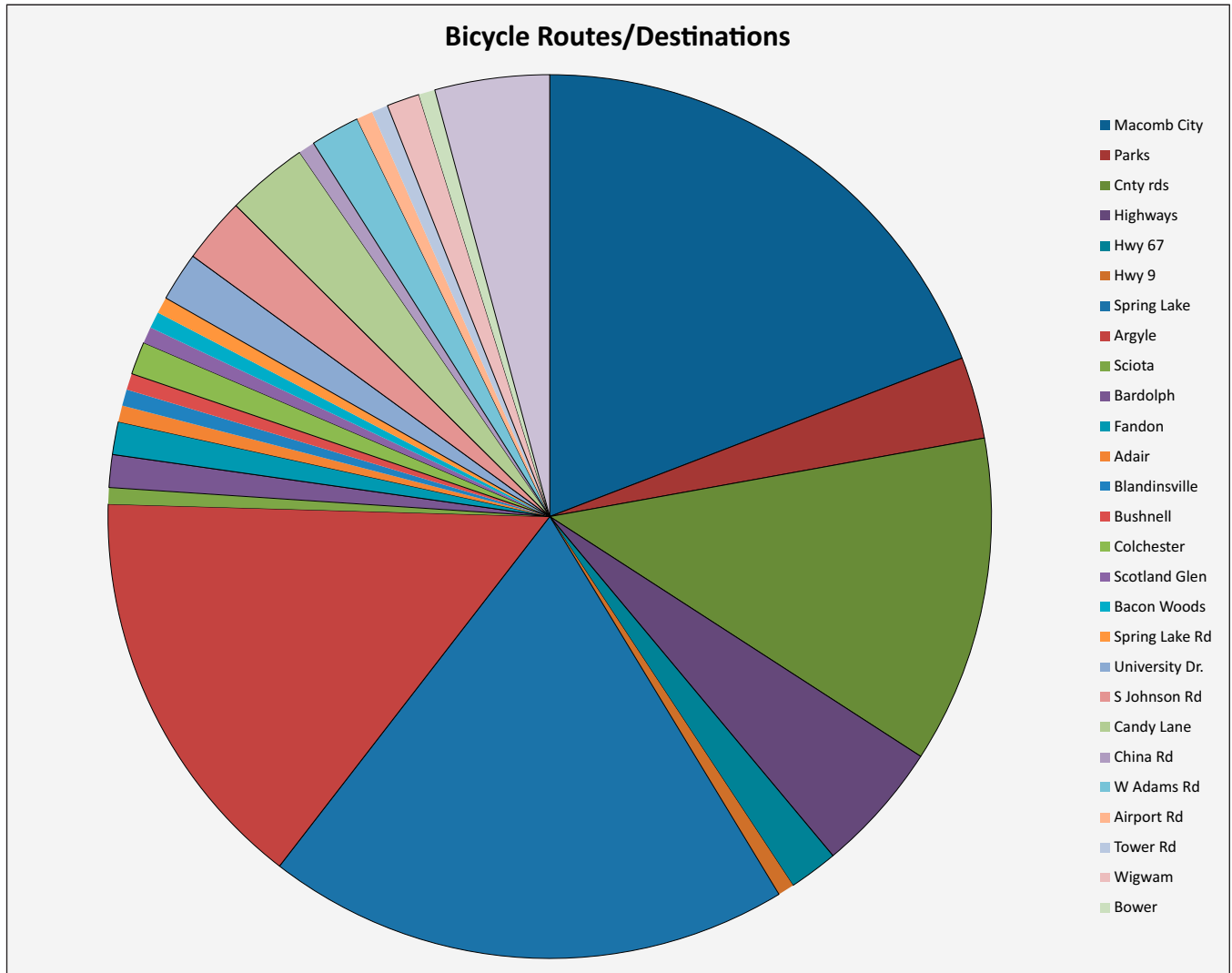# APPENDIX 4: BREAKDOWN OF AREAS BICYCLED IN MCDONOUGH CO.

N McDonough

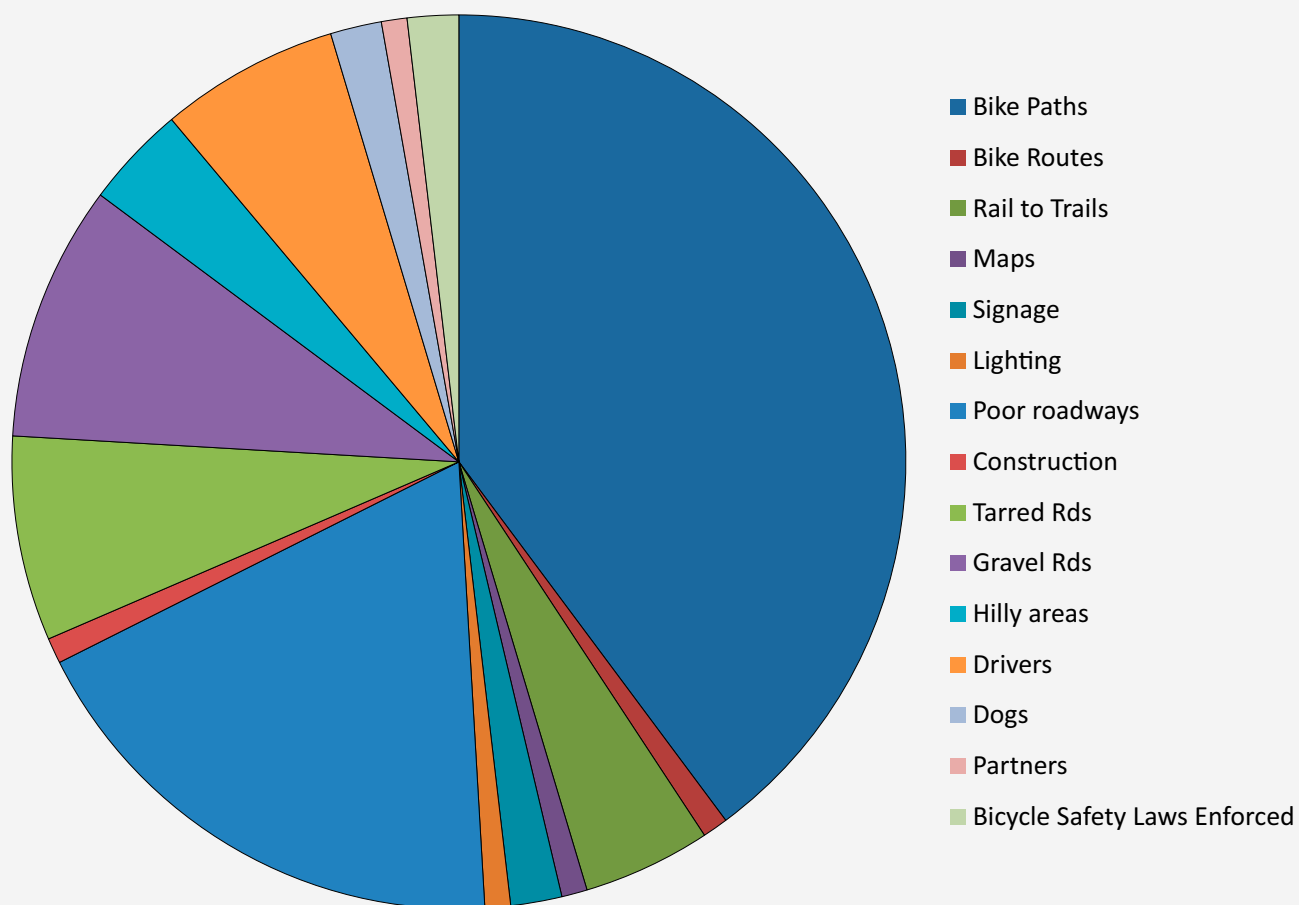- Spring Lake
- Spring Lake Trails
- Springview Hills
- University Rd
- Tower Rd
- Spring Lake Rd
- Highway 67 North
- E 950th St

NE McDonough

- Bushnell
- Bardolph
- Hire Township
- Spoon River Valley
- Route 9
- E 1400th St
- E 1600th St
- N 1900th St

NW McDonough

- Blandinsville

E McDonough

- Adair
- Bower Rd

SE McDonough

- Industry
- Pennington Point
- Scotland Township
- E 1400th St

S McDonough

Legend:
- Candy Lane
- Cherokee Rd
- Bacon Woods
- China Rd
- Horn Lodge
- St Francis
- Doddsville
- N 700th Rd
- N 900th St
- N 1050th Rd
- N 1100th Rd
- E 900th St
- E 1000th St
- E 1300th St

SW McDonough

Legend:
- To Fandon
- Colmar
- Hwy 61
- E 650th St
- E 875th St

W McDonough

- Argyle
- To Tennessee
- To Colchester
- Hwy 336
- Adams Rd
- Wigwam Hollow
- E 1150th St
- Ember Rd
- N 1250 Rd
- E 500th St
- E 350th St
- Co Rd 1350N

APPENDIX 5: BICYCLE DESTINATION PREVENTIONS

Bicycle Routes/Destinations

Legend:
- Macomb City
- Parks
- Cnty rds
- Highways
- Hwy 67
- Hwy 9
- Spring Lake
- Argyle
- Sciota
- Bardolph
- Fandon
- Adair
- Blandinsville
- Bushnell
- Colchester
- Scotland Glen
- Bacon Woods
- Spring Lake Rd
- University Dr.
- S Johnson Rd
- Candy Lane
- China Rd
- W Adams Rd
- Airport Rd
- Tower Rd
- Wigwam
- Bower

Bicycle Destination Preventions

- Bike Paths
- Bike Routes
- Rail to Trails
- Maps
- Signage
- Lighting
- Poor roadways
- Construction
- Tarred Rds
- Gravel Rds
- Hilly areas
- Drivers
- Dogs
- Partners
- Bicycle Safety Laws Enforced

1. What is the fastest speed ever reached on a bicycle?

A bar chart showing percentage responses. The y-axis ranges from 0.00% to 35.00% in 5.00% increments. The x-axis categories and approximate values are:
- 45 miles per hour: ~8%
- 72 miles per hour: ~20%
- 86 miles per hour: ~32%
- 102 miles per hour: ~28%
- 152 miles per hour: ~12%
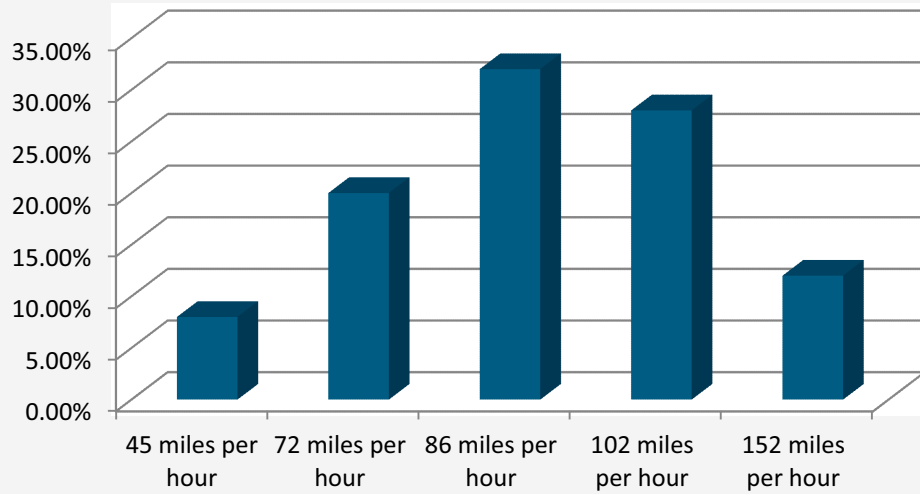
2. The longest recorded tandem bike could seat how many riders?

A bar chart showing percentage responses. The y-axis ranges from 0.00% to 25.00% in 5.00% increments. The x-axis categories and approximate values are:
- 13: ~8%
- 20: ~24%
- 27: ~20%
- 35: ~24%
- 42: ~24%
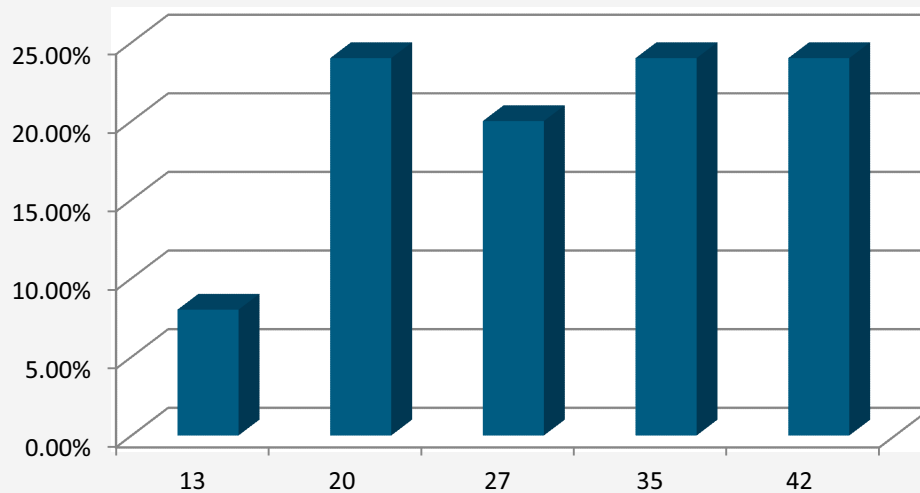
3. What is your gender?
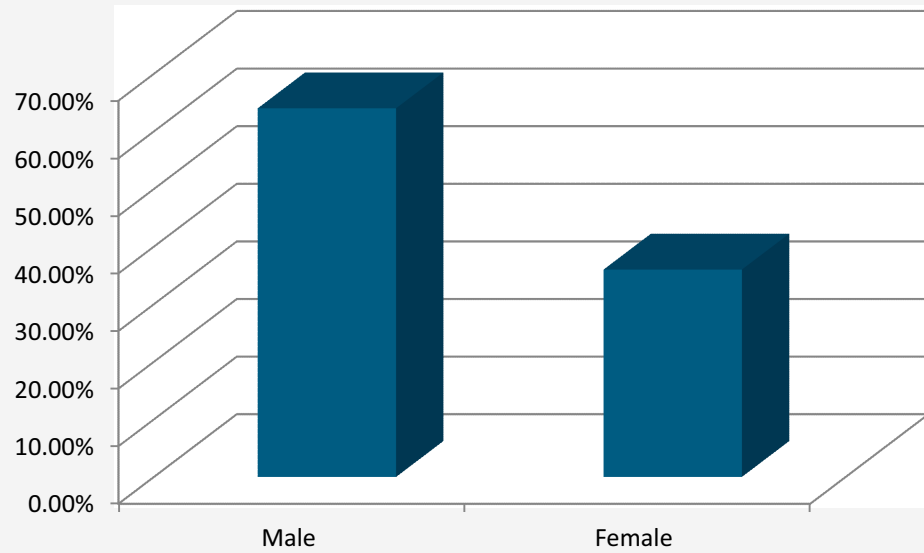
4. What is your age?
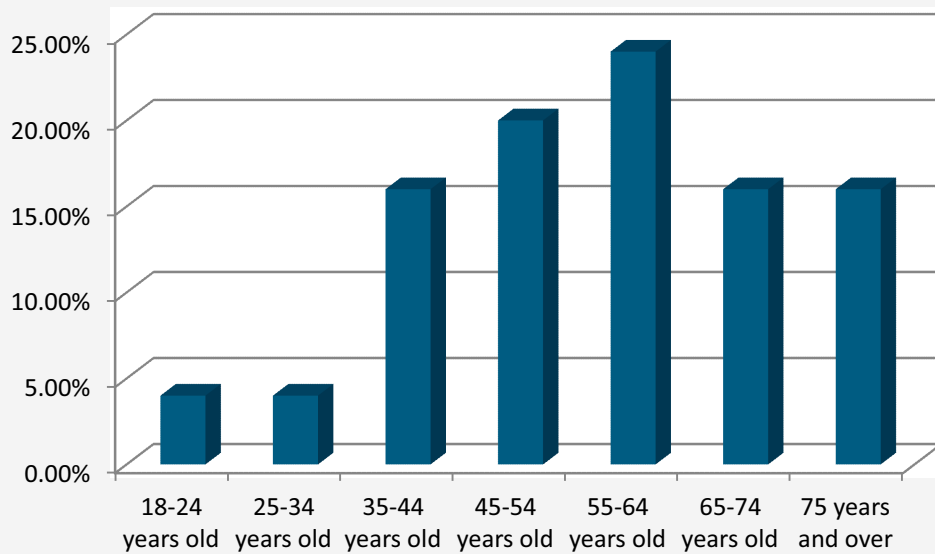
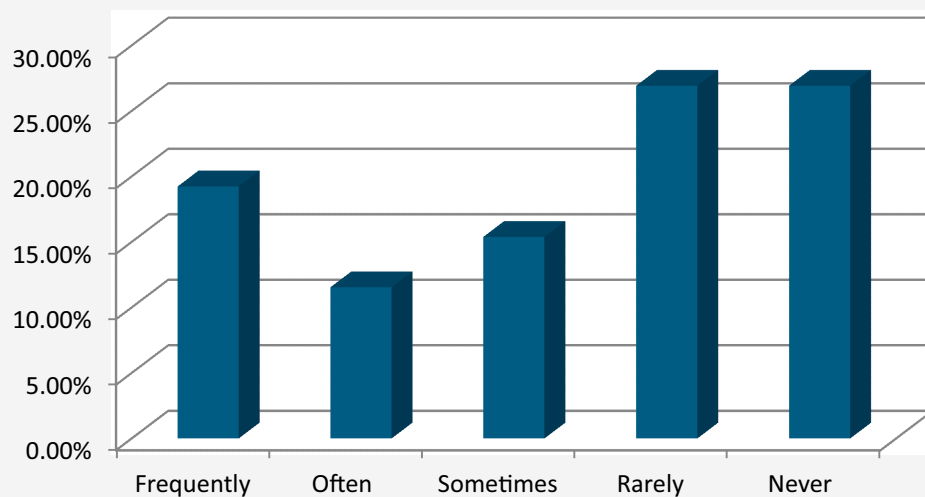## 5. Does your household have a working motor vehicle?
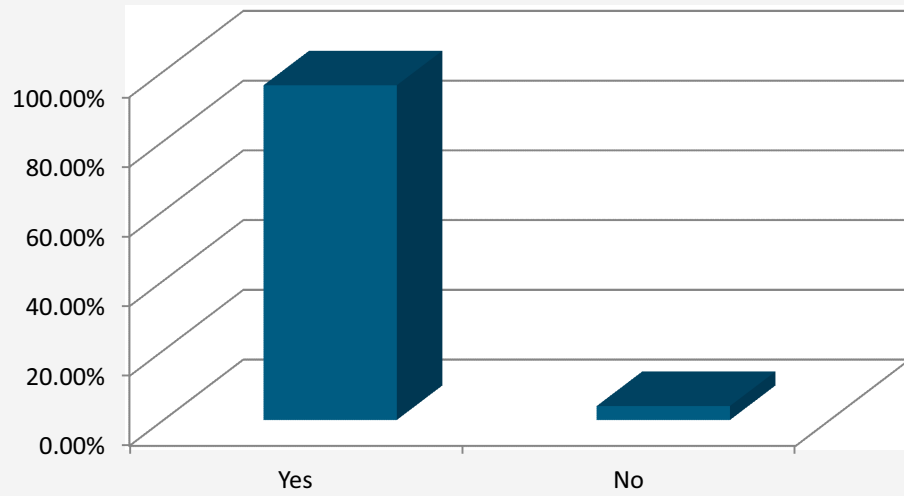
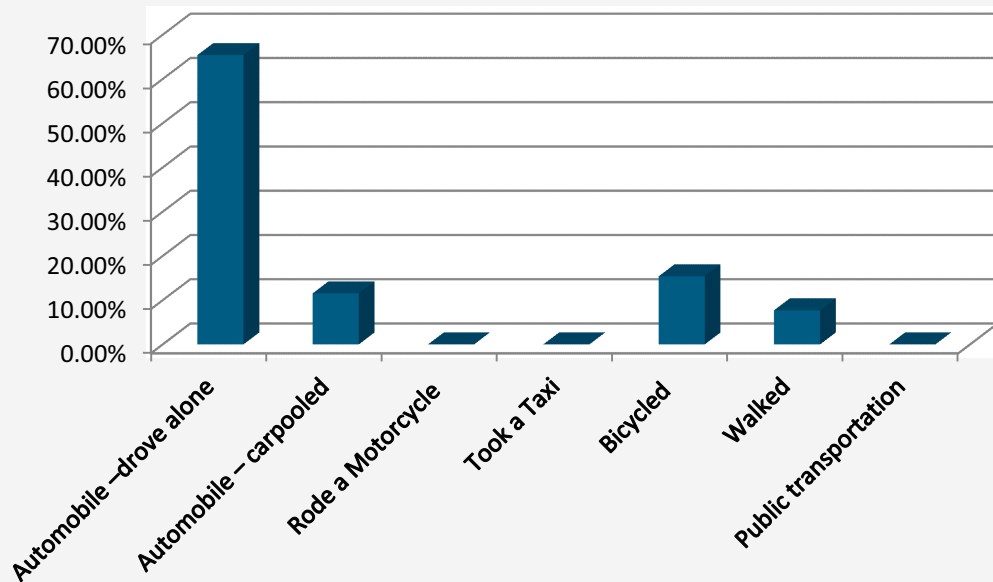## 6. Do you currently own or have access to a bicycle for your personal use?
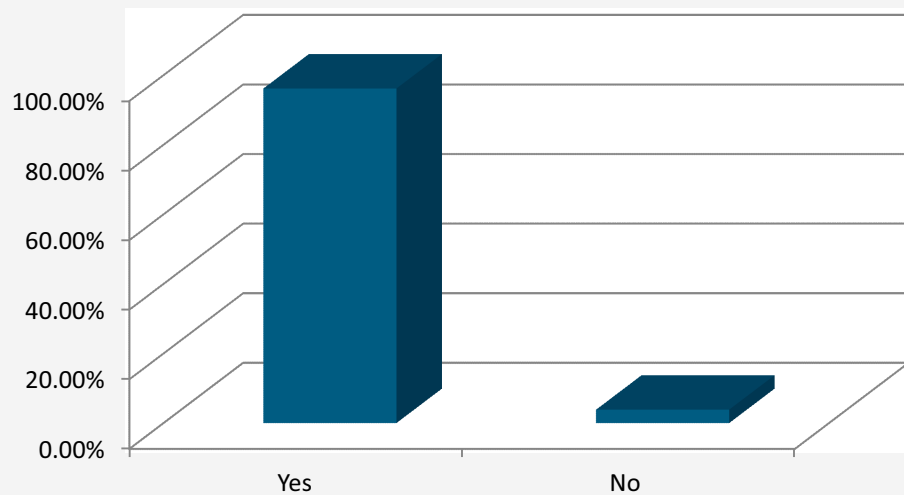
7. How often do you bicycle to commute to work and/or school?
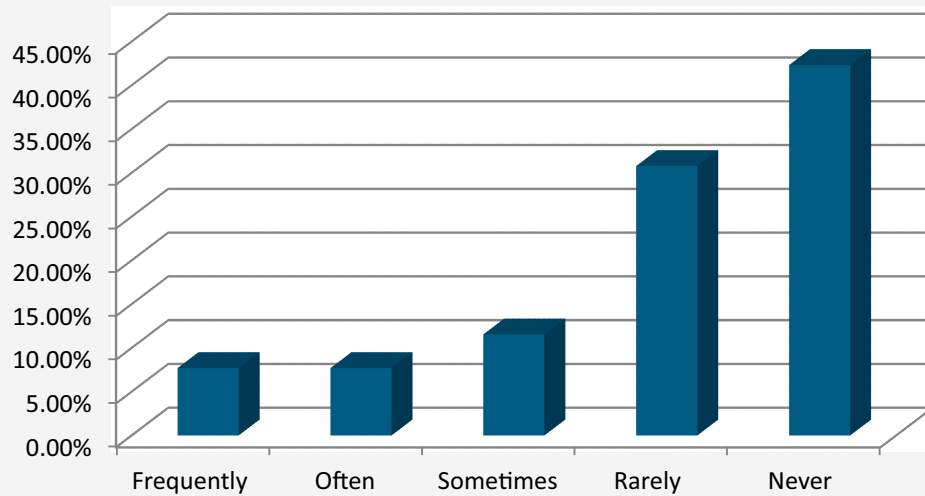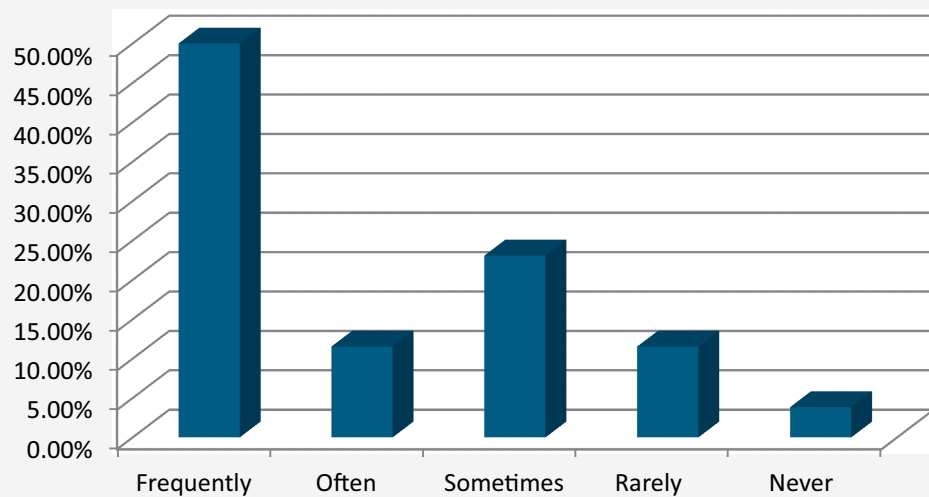

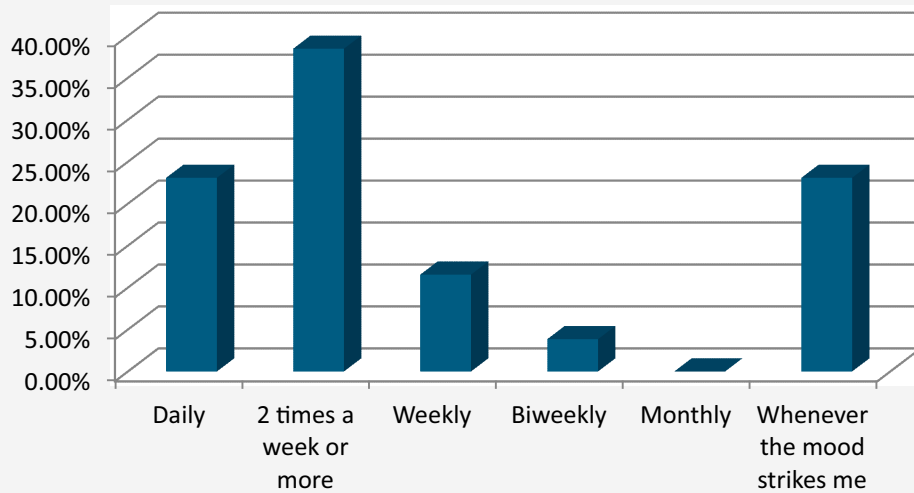## 8. How often do you bicycle to access services such as shops and restaurants?

9. In the last year which of the following has been your primary mode of transportation?
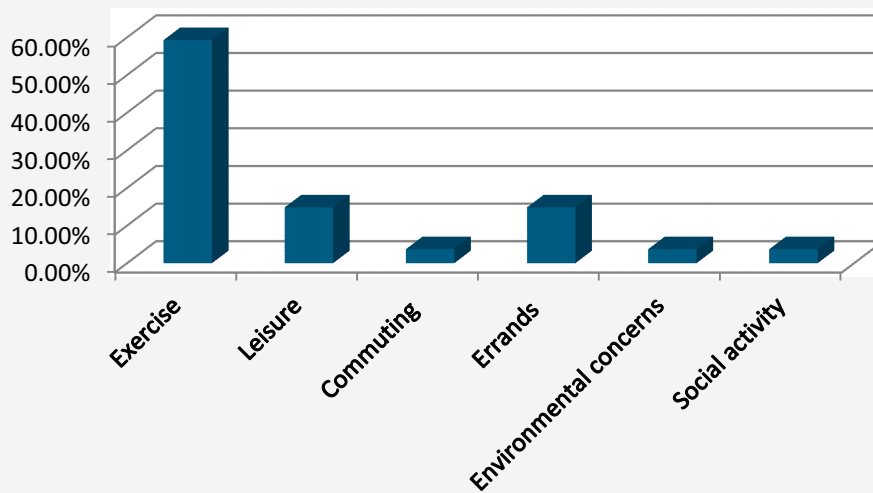

10. How often do you bicycle for leisure or fitness?
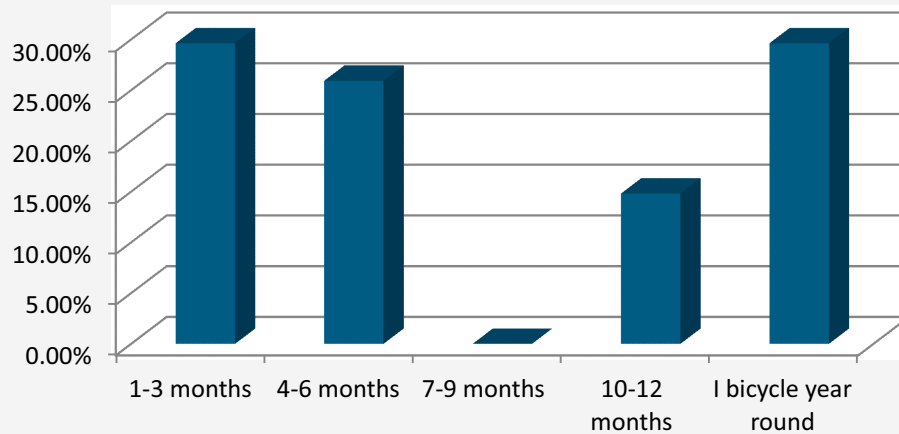
11. How often do you bicycle in general?

12. What is your primary purpose for riding bicycles?

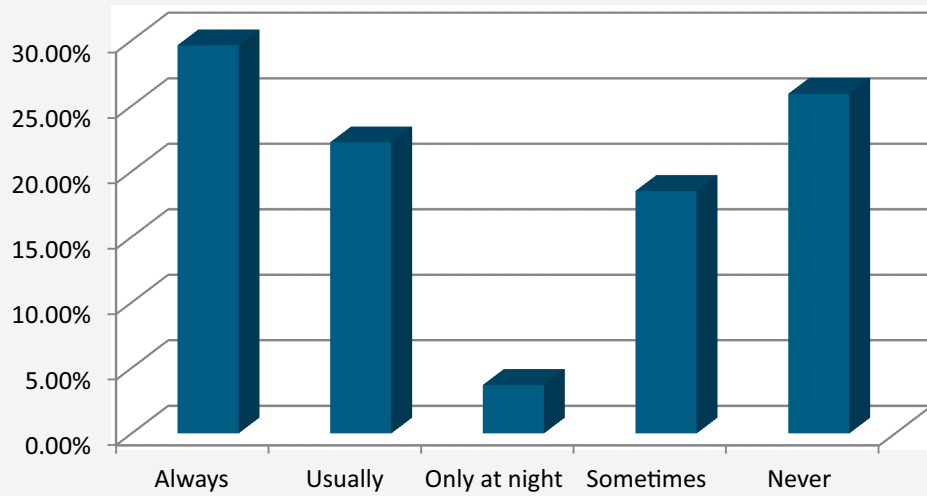## 13. How many months in a year do you typically NOT make trips by bicycle or bicycle for recreation purposes?
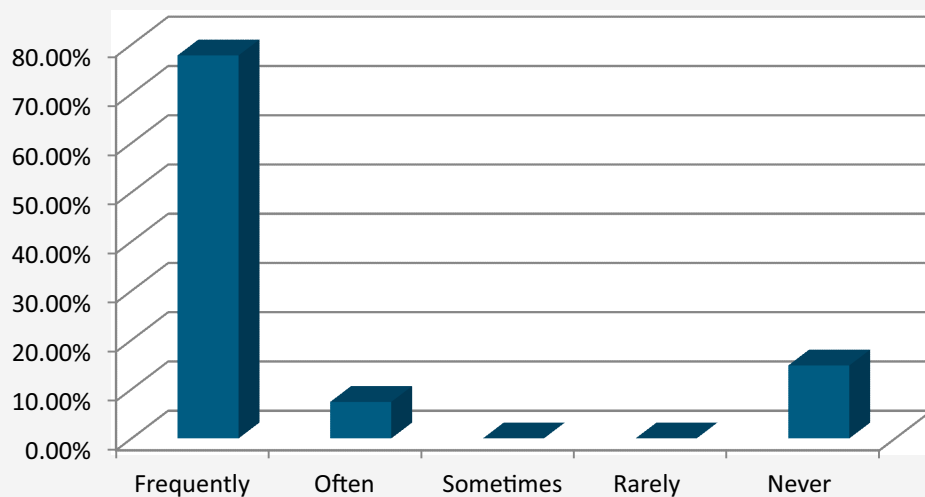

14. On average, how many miles do you bicycle per week?
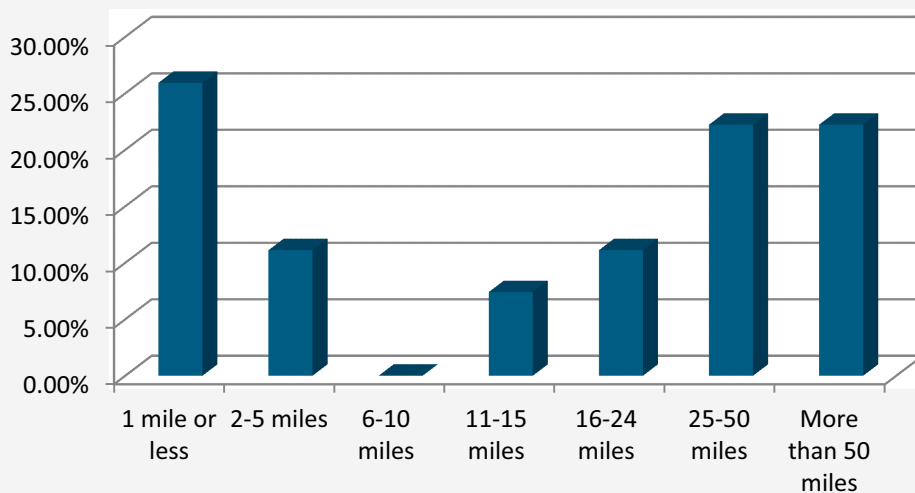
15. Do you wear high visibility clothing while bicycling?

16. Do you wear a helmet while bicycling?

17. What prevents you from bicycling most often?
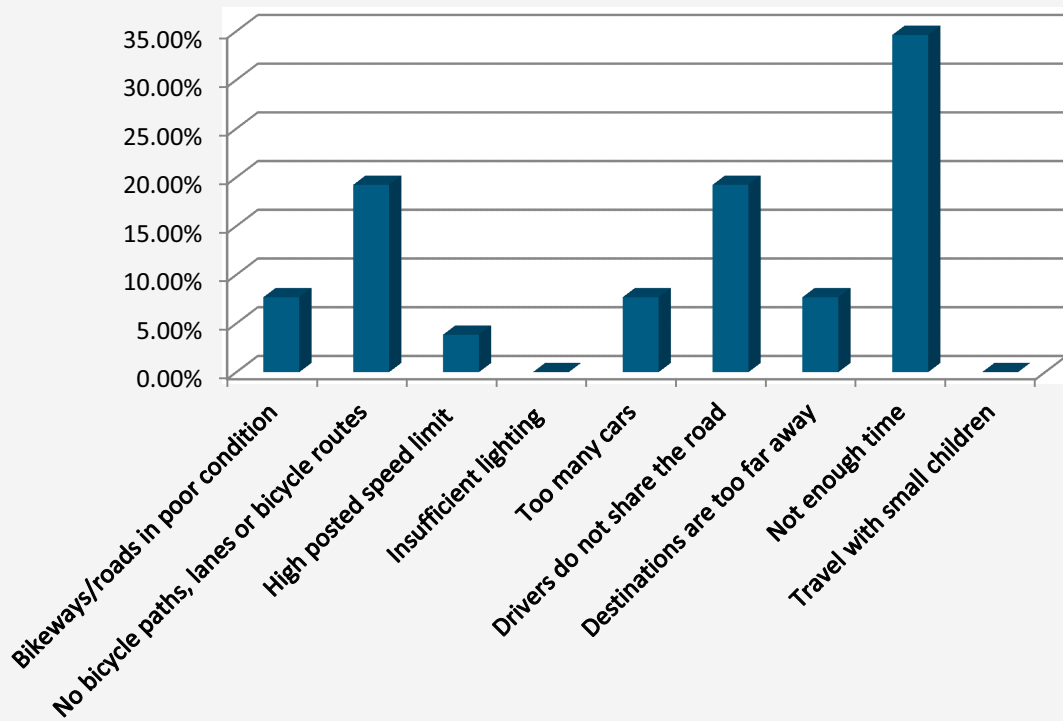
18. How bicycle friendly would you say the roads in McDonough County are?

19. What makes it difficult to bicycle in McDonough County?

Categories (left to right):
Lack of bike lanes, trails and paths; Roadway width; Bikeways/roads in poor condition; Insufficient lighting; Amount of traffic; High posted speed limits; Drivers do not share the road; McDonough County is not difficult to ride...

20. Which of these changes would make it easier to bicycle in McDonough County?

Categories (left to right):
Improve existing bikeways/facilities; Improve shoulders on roadways; Construct bike lanes; Increase share the road routes; Change bicycling laws and laws effecting bicyclists; Enforce laws governing motorist behaviors; Initiating bicycle safety education

21. Which of the following features do you find important when you select a bike route?

Bar chart showing percentages for features when selecting a bike route:
- More direct routes: ~17%
- Bicycle lanes or share the road markings: ~17%
- Road width: ~8%
- Low posted speed limits: ~4%
- Amount of traffic: ~53%
- Cycling groups/partners: ~7%

22. Which of the following features do you find important when you are provided a new cycle route?

Bar chart showing percentages for features when provided a new cycle route:
- Signage: ~11%
- Continuous (limited stopping): ~7.5%
- Wide paths/cycling lanes: ~19%
- Hard surfaces: ~26%
- Reduced vehicle speed/traffic: ~22.5%
- Maintenance: ~15%

APPENDIX 7: SWOT Analysis

	Strengths	Weaknesses	Opportunities	Threats
	Flat paved roads	Lack of shoulders	Lamoine River trails	Dogs
	336 shoulder	Deep ditches	Connect parks	Cars
	Low traffic	Cars parked in bike lanes	Rail trails	Potholes
	Small town eating places	Crossing main highway in Macomb	Connect small towns	Gravel on roads
				Snow on roads
Group 2	Level ground	Narrow pavement	Concerned group	Traffic
	Continuous bike routes	Unfriendly drivers	Trail plan (somewhere)	Hostile drivers
	County roads paved	Lack of trails and routes	Bike race/rally/organized ride	No legislation to protect bikers
	"Few" dogs	Lack of bike only routes	IDOT grant programs	Apathy - elected officials - not applying for grants
	Scenic	Parking in bike routes	Other grants	Theft
	Some hills	Narrow shoulders in county	Rocky bikes - expanding	
	Good repair shop	IL legislation - not bike friendly	Bike rodeo	
	Trails at Argyle and Spring Lake	Potholes	Bike shop	
	Nearby towns - to eat	Lack of curb access	Green space bike route	
	Breakfast biking	Lack of bike racks	Trail along Lamoine River	
Group 3	Bike shop	Hostile drivers	Bike trails	
	County and township roads	Hard to cross Jackson and Lafayette St.	County greenways and trails plan	
	Unity within county	Dogs loose	Bike lanes	
	New bike paths	No defined county trails	Bike easier access to E & W Jackson	
	Flat topography	Resources - $$$	Better spacing of signage in Macomb	
	Square geography	Lack of bike racks	Bike safety education	
	Destinations	Lack of bike culture		
	Low traffic			
	Civic minded riders			
	Good visibility			
	Low theft potential			

APPENDIX 8: Stress Level Activity

Directions: The phrase "stress level" is the stress that cyclists feel when riding on roadways. This stress can come from pavement conditions, state or lack of shoulders, traffic conditions, posted speed limits, et cetera. For this activity we ask you to rate each roadway in terms of your stress level. You will be rating your stress level in two forms: a Likert scale and descriptive writing. For the Likert scale please rate your overall stress. For the descriptive writing please write your overall stress/feeling about the road and describe why you feel the way you do and what caused your stress.

Likert Scale

Not at all stressed	Somewhat stressed	Moderately stressed	Very stressed	Extremely stressed

Descriptive Writing

Please describe your stress level for this particular roadway in terms of bicycling. In addition to your stress level please describe why you feel the way you do and what would make this roadway less stressful for you. Please feel free to add any additional comments related to the site.

APPENDIX 9: Stress Test Rankings

Code Key		
LIKERT SCALE	DESCRIPTION	DESCRIPTION
Not at all stressed 1	Smooth surface 11	Needs repair 27
Somewhat stressed 2	Great biking road 12	Fast driving on back roads 28
Moderately stressed 3	No/low traffic 13	No marked bike lane 29
Very stressed 4	Rural 14	Good space to ride 30
Extremely stressed 5	Peaceful/nice day 15	Uneven surface 31
DESCRIPTION	Good visibility 16	Ditch next to road = bad 32
No shoulders 1	Chip seal 17	4 lanes 33
Narrow road 2	No painted lanes 18	Can't cycle fast 34
Slight drop-off 3	Worn pavement 19	I'd stop and get off bike 35
Poor shoulder 4	Looks like a road 20	Wide surface 36
Good shoulder 5	Gravel shoulder 21	Paved road 37
High speed limit 6	Loose tar 22	Car is coming 38
Rough surface 7	Litter 23	I would not cycle here 39
Blind curves 8	With traffic more stressful 24	I would only cross it 40
High traffic road 9	Road in good condition 25	
Minimal shoulder 10	Main road 26	

Participant	Site 1 Likert Scale	Description				Site 2 Likert Scale	Description			Site 3 Likert Scale	Description				Site 4 Likert Scale	Description			Site 5 Likert Scale	Description		
1	4	1	2			3	3	4		2	5	6			5	1	8	9	4	2	10	
2	3					3				3					4				2			
3	1					3	4	9		4	9				3	2	1	11	1	12		
4	1	13	14	15		1	13	11	15	1	5	11	16		1	11	14	1	1	14	11	13
5	1	13				3	4			3	9				2	2			2	2		
6	1					2				2	11				3				1			
7	2	2	1			3	9	1		2	5	9			4	9	1	7	2	1	17	2
8	3	17	18			2	19			1	20				4	21	22	18	2	18	23	
9	1	2	24			2	1	24		2	5	9	6		2	7	2		2	2		
10	1	13				3	1			3	9	5			3	25	1		2	11	2	
11	2	1				2	26	21		1					3	1	27		2	1	18	
12	5	2	32	28	29	4	28	21	29	2	29	30			4	2	31	29	5	32	28	29
13	1					1				2	6	9			3	1	7		1	1	13	
14	1					3	21			3	29	33	34		4	4	2	35	1	16	1	
15	2					1				1					2				1			
16	1					1				1					4	7	1		2	1		
17	2	1	2			2	9	2	7	4	9	6			2	31	2		2	1		
18	1					3	7			3	9	36			4	7	2		2	18	2	
19	1	12				2	21			2	9	6			3	7	2		1	13		
20	1					2				3					2				1			
21	1	13	37			3	21			2	11	6			3	31	38		3	1	29	
22	2	1				1	21	9		2	6				2	31	4		1	13		
23	1	14	13			2	2	9		3	5	33	39	40	3	1	9	7	1			