



APPENDIX A

Greater Kansas City Bikeways Plan

Public Involvement

WIKIMAP RESULTS

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MEMORANDUM

Date: June 9, 2014
To: Aaron Bartlett, MARC
From: Kevin Luecke & Tom Huber
Project: MARC Regional Bikeway Plan
Re: Task 5: WikiMap Public Input Results

WikiMap is an online interactive public involvement platform that allows participants to identify and comment on specific challenge areas and opportunities to improve bicycling. This memo provides an overview of the data that was collected through the MARC WikiMap. The memo does not describe detailed entries on the map, but rather the results of the survey that accompanied the WikiMap and generalized map comments. The detailed data collected from the WikiMap will help inform the final recommendations for the MARC Regional Bikeway Plan. The full results from the WikiMap will be provided to MARC for internal use and for distribution to local municipalities.

The MARC Regional Bikeway Plan WikiMap was advertised by MARC through various channels and was open for participation from April 7 through May 23, 2014. During this time, 380 people logged into the WikiMap site and created accounts. The majority of participants (370 of 380) completed the Intro Survey (see below), but only 172 people provided input on the map itself. Those 172 people entered 1,759 comments into the map. This rate of participation in the map by registered users is consistent with other WikiMap projects we have used, while the total number of comments far exceeds other projects we have completed. Map input includes identifying specific locations (points) that are barriers to bicycling or bicycling destinations, as well as routes (lines) that people currently use for bicycling or routes that they would like to use.

Intro Survey

When participants registered, each was asked to complete an Intro Survey describing themselves and their biking/walking habits. This section provides an overview of the Intro Survey questions and participants' responses.

How would you describe your biking habits and comfort level?

A number of research studies have shown a bicyclist's perception of their personal safety riding on a roadway is greatly influenced by their proximity to and interaction with motorized traffic. At low traffic volumes and speeds, many people feel safe and comfortable sharing the roadway with traffic. As traffic speed and volume increase, their perception of safety degrades resulting in a feeling of increased stress and discomfort on the roadway.

In 2004, Roger Geller, Portland, Oregon's Bicycle Coordinator, developed a classification scheme for bicyclists based on the level of comfort interacting with motor vehicle traffic. It included four categories of bicyclists:

- **Strong and fearless:** High tolerance for traffic stress. Experienced riders who are comfortable sharing lanes on higher speed and volume arterials. These riders are less interested in protected bike lanes and paths than the general population.
- **Enthusied and confident:** Some tolerance for traffic stress. Confident riders who will share lanes with cars, especially on rural roads, but prefer separated bike lanes, paths, or paved shoulders on roads with higher traffic levels.
- **Interested but concerned:** Little tolerance for traffic stress with major concerns for safety. Strongly prefer separation from traffic on arterials by way of protected bike lanes and paths.
- **No way, no how:** Not interested in bicycling.

We take issue with Gellar’s title of “strong and fearless” for people who are confident bicycling under most circumstances. Rather than being strong and fearless, many of these bicyclists are experienced and confident – they have experience bicycling with mixed traffic and are confident in their abilities on a bicycle to safely ride in many conditions. These bicyclists are not fearless, and many are not strong, rather they have healthy respect for the risks they may encounter on the street and have the knowledge to mitigate most of these risks. However, for better or worse, Gellar’s title of “strong and fearless” has stuck and will be used in this memo.

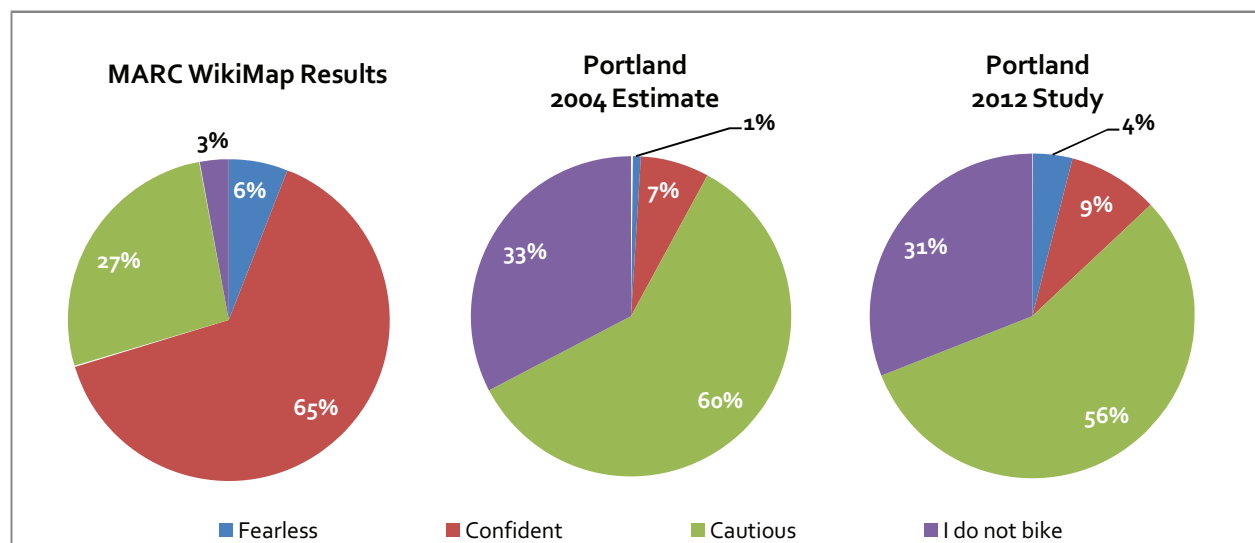
Gellar estimated (based on his professional experience) that roughly 1%, 7%, 60%, and 33% of Portland’s population falls into each of these four categories, respectively. A 2012 study used empirical evidence (based on 908 survey responses) to more accurately estimate the percentages of Portland’s population falling into each of these four categories.¹ This study identified a distribution similar to Gellar’s estimate: 4%, 9%, 56%, and 31%, respectively. The most statistically-significant difference is that the 2012 study found there are over four times more “strong and fearless” bicyclists in the Portland region than Gellar has estimated in 2004.

Applied to the Kansas City area

The relevance of this discussion is that advocates, transportation departments, and industry professionals across the United States have begun using this classification system in their communities. Many are also using Portland’s estimated population distribution percentages to classify their residents. In other words, they are assuming that 60% of their population is interested in bicycling, but concerned about interacting with motor vehicle traffic. Since that classification represents the largest group of current and potential bicyclists, many communities are focusing their efforts on better accommodating this type of bicyclist.

To better understand the types of bicyclists participating in the MARC WikiMap exercise, participants were asked what type of bicyclist they consider themselves by selecting one of the following options: Fearless, Confident, Cautious, or I do not bicycle. These general categories correspond with Gellar’s categorization of Portland bicyclists. The results, along with Portland’s 2004 and 2012 estimates, are shown in Figure 1.

Figure 1: How would you describe your biking habits and comfort level? (compared to Portland)



¹ Dill, J. and N. McNeil. (2013, January) "Four Types of Cyclists? Examining a Typology to Better Understand Bicycling Behavior and Potential." Paper presented at the Annual Meeting of the Transportation Research Board.

Based on the survey results, it can be assumed that a significant amount of self-selection occurred amongst survey respondents. In other words, avid bicyclists were more likely to participate in the WikiMap exercise, which would explain the fact that 71% of the participants described themselves as “strong and fearless” or “enthused and confident” even though only 8 to 13% were expected (based on the Portland estimates) to choose these options. It is also possible that the WikiMap participants understood the classification descriptions in a different manner than was intended.

It is important to understand that the Portland 2004 estimate and 2012 study are based on that region’s entire population, whereas the MARC WikiMap results are only based on those people (97% of whom described themselves as bicyclists) that chose to participate. Without performing a statistically-valid survey, such as by randomly selected telephone numbers, it is challenging to determine how the Kansas City area population is actually distributed amongst the four categories.

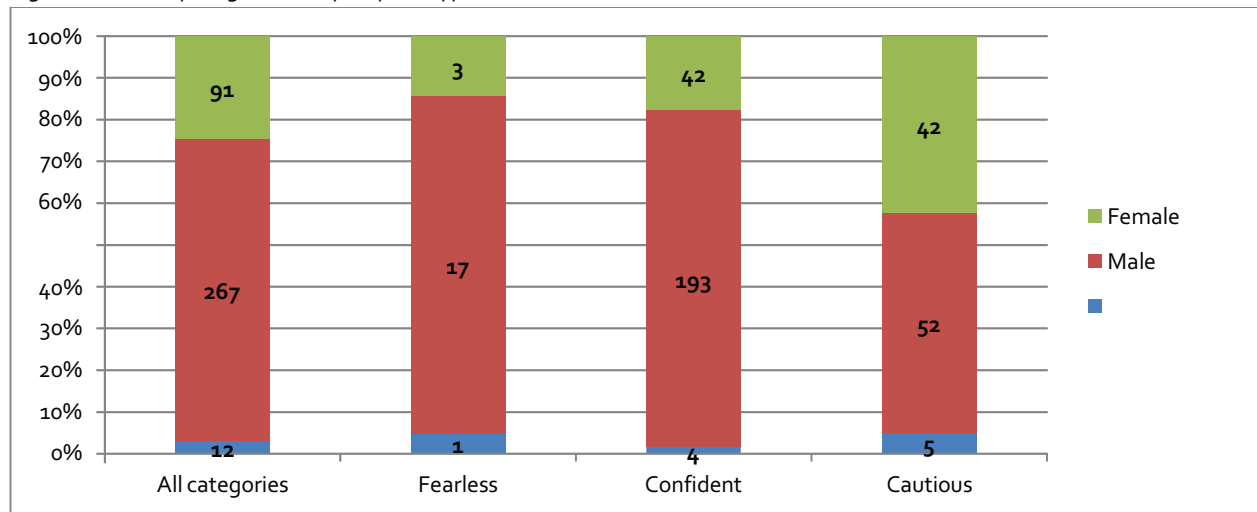
As far as implications for the Regional Bikeway Plan, it is important to acknowledge that the self-described “fearless” and “confident” bicyclists are important stakeholders in this process. In addition, if one assumes that these results reflect the MARC planning area as a whole, a sizeable portion of the community is interested in bicycling but needs improvements to be made in order to feel safe and comfortable moving around the community by bike.

What is your gender?

Across the United States, surveys show that bicyclists—especially avid bicyclists—are predominately male. Figure 2 illustrates that approximately 72% of the WikiMap participants are male and 25% are female (4% did not identify their gender). Most males (78%) described themselves as “fearless” or “confident,” as opposed to only 45% of females that chose one of these two categories. WikiMap participants who do not ride a bicycle were omitted from Figure 2.

The importance of this figure is that females appear to disproportionately feel unsafe bicycling in the Kansas City metro area.

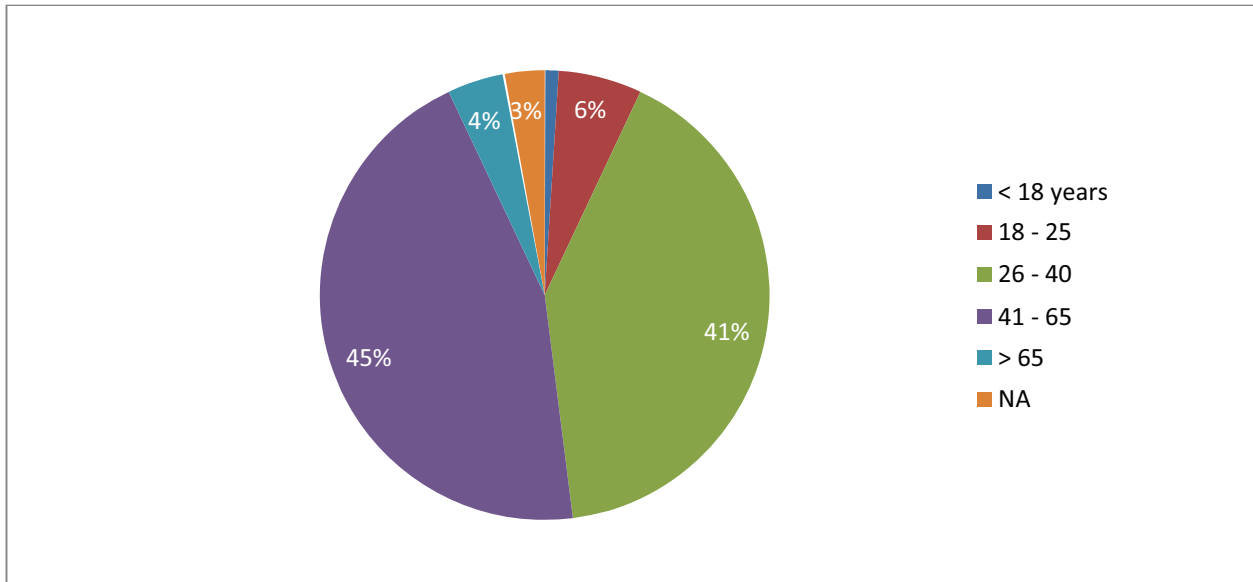
Figure 2: What is your gender? (by bicyclist type)



What is your age?

As shown in Figure 3, the vast majority of the WikiMap respondents were between the ages of 26 and 65 (86%).

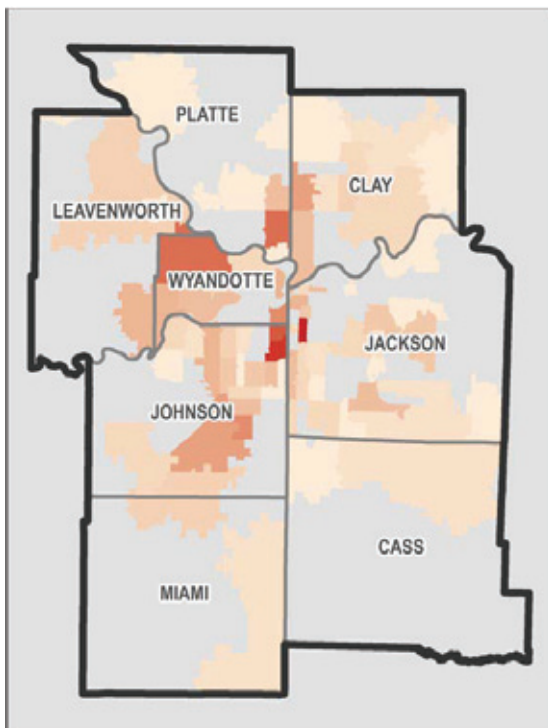
Figure 3: What is your age?



What is your home ZIP code?

WikiMap participants hailed from across the MARC region. Figure 4 displays the number of participants by ZIP code in the MARC planning area.

Figure 4: WikiMap participation by zip code - darker colors indicate larger numbers of participants

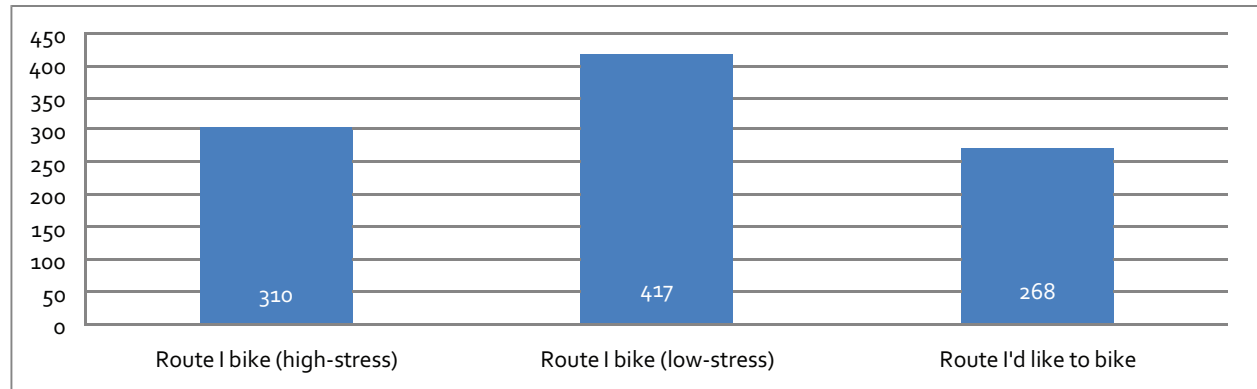


Map Comments

Line Comments

Participants drew 995 lines to indicate routes that they currently bike and routes that they would like to bike. Figure 5 displays the number of the different types of lines that participants entered in the map.

Figure 5: Line Comments by Type



Maps 1 – 3, included at the end of this memo, display the line data that was entered into the WikiMap. Each map series displays the MARC planning area as well as a more detailed view of areas roughly inside the I-435 beltline. The value of the WikiMap data comes not in individual comments that are entered into the map, but in aggregating all of the data to look for patterns. As such, the maps have been intentionally generalized. Each individual line is displayed, such that the more lines that overlap in a location, the darker the lines become. The full WikiMap data will be made available to MARC at a later date.

Map 1 displays routes that people currently ride that they consider to be stressful. Not surprisingly, most of these routes are concentrated in the urbanized area, and most are along arterials or other busy streets. It is important to note that even though people find these routes stressful to bike on, they are still doing so. This is likely to reach destinations that are located on the street such as shops or employment centers, or as a connection across a barrier such as a freeway or bridge.

Map 2 displays routes that people currently ride that they consider to be low stress. While these routes are again concentrated in the urban area, there are also many routes located in the rural parts of the planning area, particularly in the Kansas counties.

Map 3 displays the routes that people would like to bicycle, but do not now, either because they are not comfortable with the routes that are available or there is no direct route. For example, someone may know that they want to bicycle to their office, but if access is only available on a busy street, they may not be willing to bicycle there. This map also has a number of comments that are clearly meant to indicate that people would like to bicycle from Point A to Point B without choosing specific streets – these appear as long straight lines cutting across the map. It should be noted that corridor comments from a public meeting in Miami County are all represented on this map.

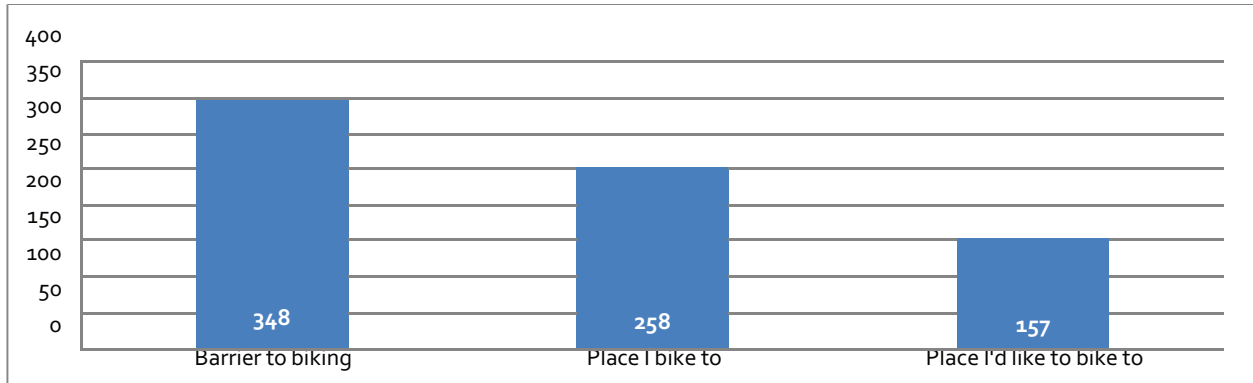
It is interesting to note the significant overlap of many streets on each of the three WikiMap line maps. For example, Southwest Boulevard and Merriam Lane were both commented on repeatedly on all three maps. This demonstrates that different people have different ideas about what makes an acceptable street for bicycling. For

some WikiMap users, these two streets are currently “low stress” routes, for other users they are “high stress” routes, and still other map users would like to bicycle on these streets, but will not do so under current conditions.

Point Comments

In total, 764 point comments were contributed to the WikiMap. The predominant point type placed by participants was the “barrier to biking” point (see Figure 6).

Figure 6: Point Comments by Type



Maps 4 – 6 at the end of this memo display the point data that was entered into the WikiMap. Each map series displays the MARC planning area as well as a more detailed view of areas roughly inside the I-435 beltline. Unlike the Maps 1 – 3, these maps have not been generalized; instead, each map displays the actual points placed in the WikiMap.

Map 4 displays points that WikiMap users identified as barriers to bicycling. These points may represent intersections that are difficult to navigate on a bicycle, freeway and river crossings, and other areas that limit people’s bicycling. The vast majority of these barrier points are located at arterial street intersections that carry high volumes of motor vehicle traffic.

Map 5 displays destinations that people currently bicycle to. The majority of these points are located within I-435, and many are located on or near major arterials.

Map 6 displays destinations that people would like to bicycle to, but do not currently do so for a variety of reasons.

It should be noted that comments from public meetings in Miami County are only represented on Map 4 and Map 5, although some of the comments may actually be desired destinations that should appear on Map 6.

Conclusion

The WikiMap allows participants from any background and any skill level to provide input on conditions for bicycling from the comfort of their home or mobile device. The primary benefit of this is that a greater level of public participation can be achieved than by soliciting input at public meetings. The WikiMap allows input from participants at times that are convenient for them, and when they have time to think about the comments they would like to make. Additionally, the ability to aggregate all input data and display areas with large number of comments eases the analysis of large amounts of public comment.

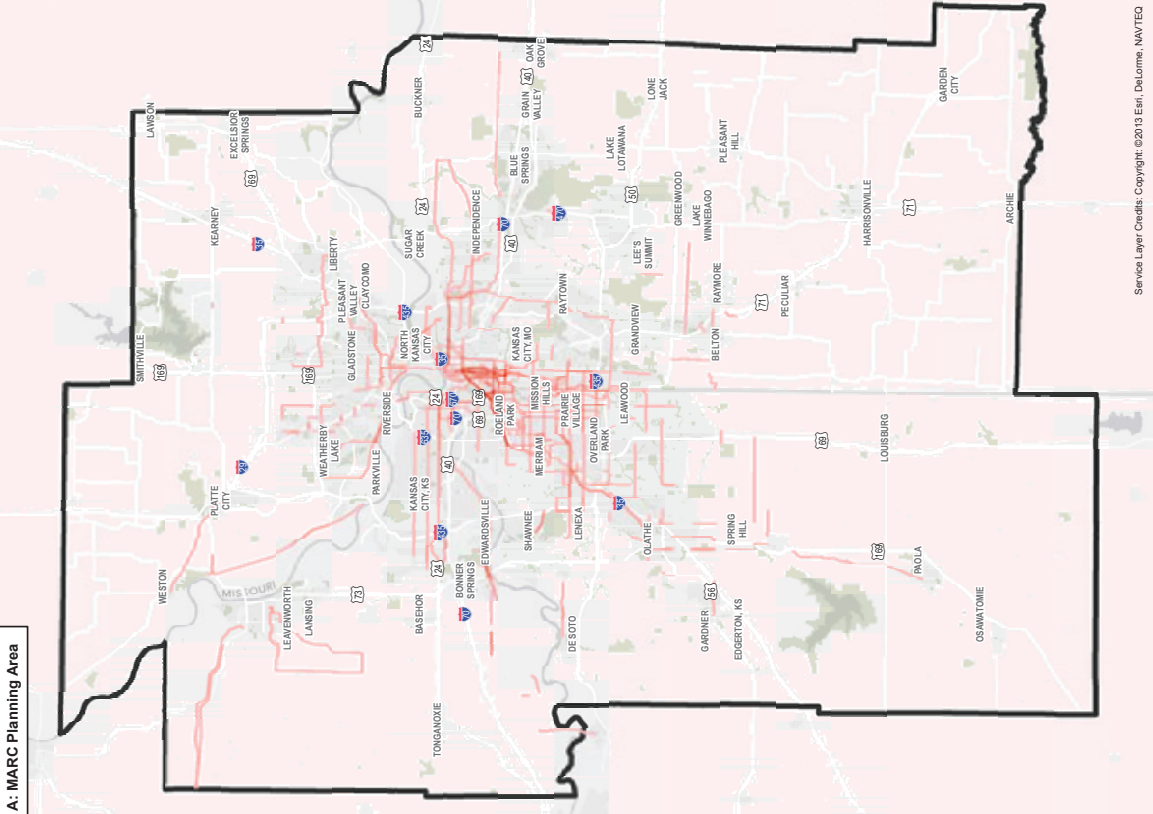
MARC REGIONAL BIKEWAYS PLAN: Map Series 1 - WikiMap High Stress Routes

A: MARC Planning Area

Description
 These maps display user input from the MARC Regional Bike Plan WikiMap. WikiMaps are online interactive maps that allow users to enter routes or points on a map and submit comments about the route or point they entered. Rather than displaying all of the individual data points that were entered into the WikiMap, these maps display a generalized view of specific types of comments.

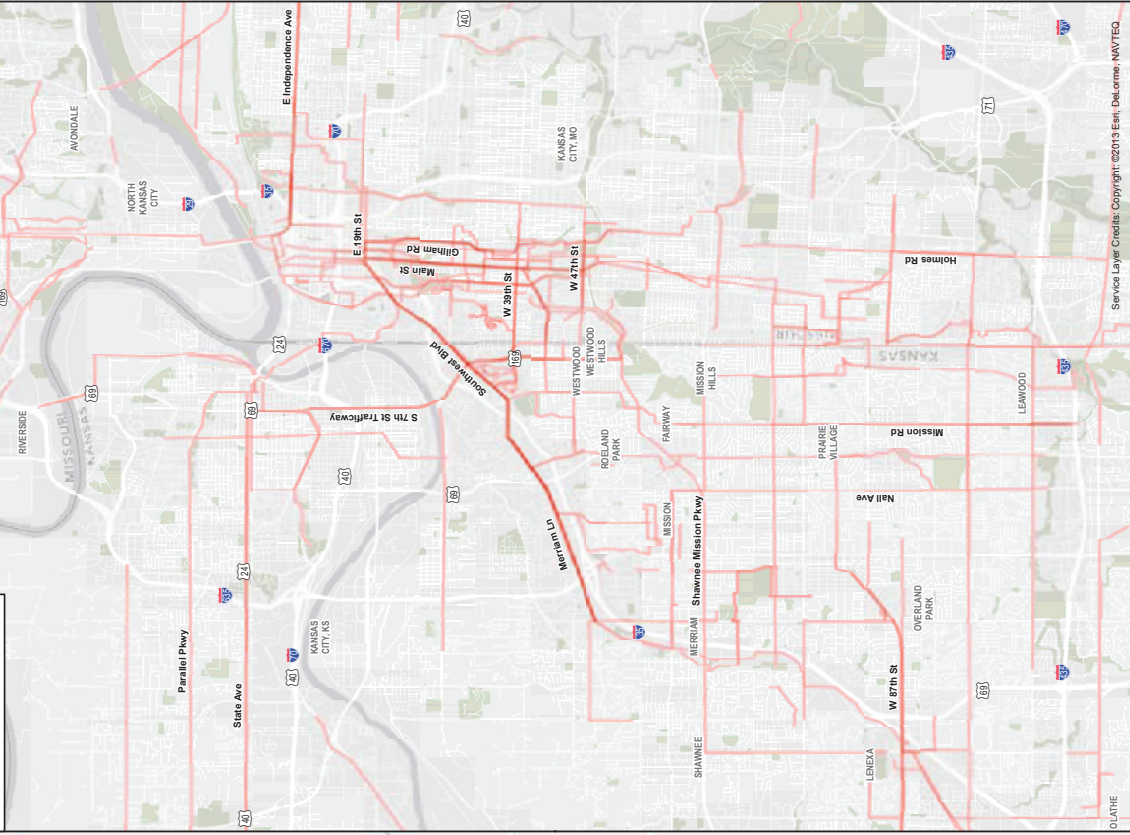
The map on the left displays the full MARC planning area and the map on the right displays the central portion of the planning area in more detail.

The colored lines indicate where comments were entered on the WikiMap. The darker the line, the greater number of comments that were received in that corridor.



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B: Central MARC Planning Area



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 P01 date: 6/22/14.

MARC REGIONAL BIKEWAYS PLAN: Map Series 2 - Wikimap Low Stress Routes

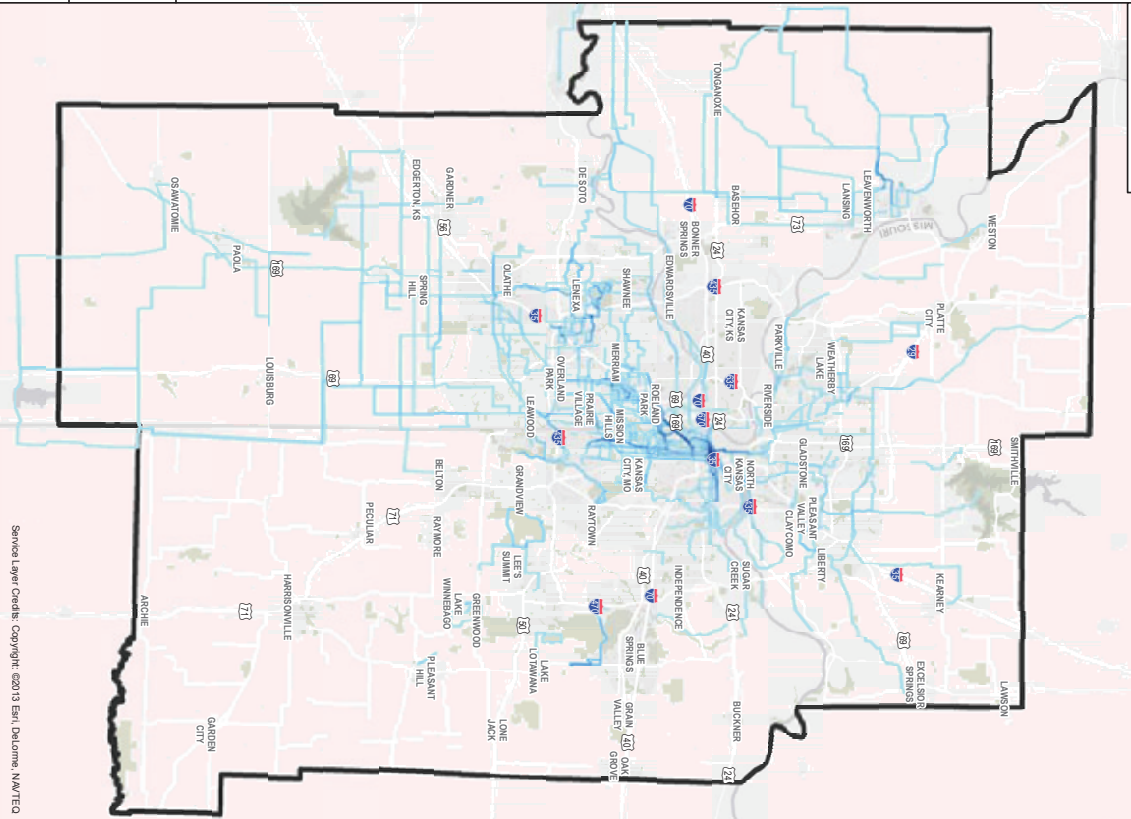
Description

These maps display user input from the MARC Regional Bike Plan Wikimap. Wikimaps are online interactive maps that allow users to enter routes or points on a map and submit comments about the route or point they entered. Rather than displaying all of the individual data points that were entered into the Wikimap, these maps display a generalized view of specific types of comments.

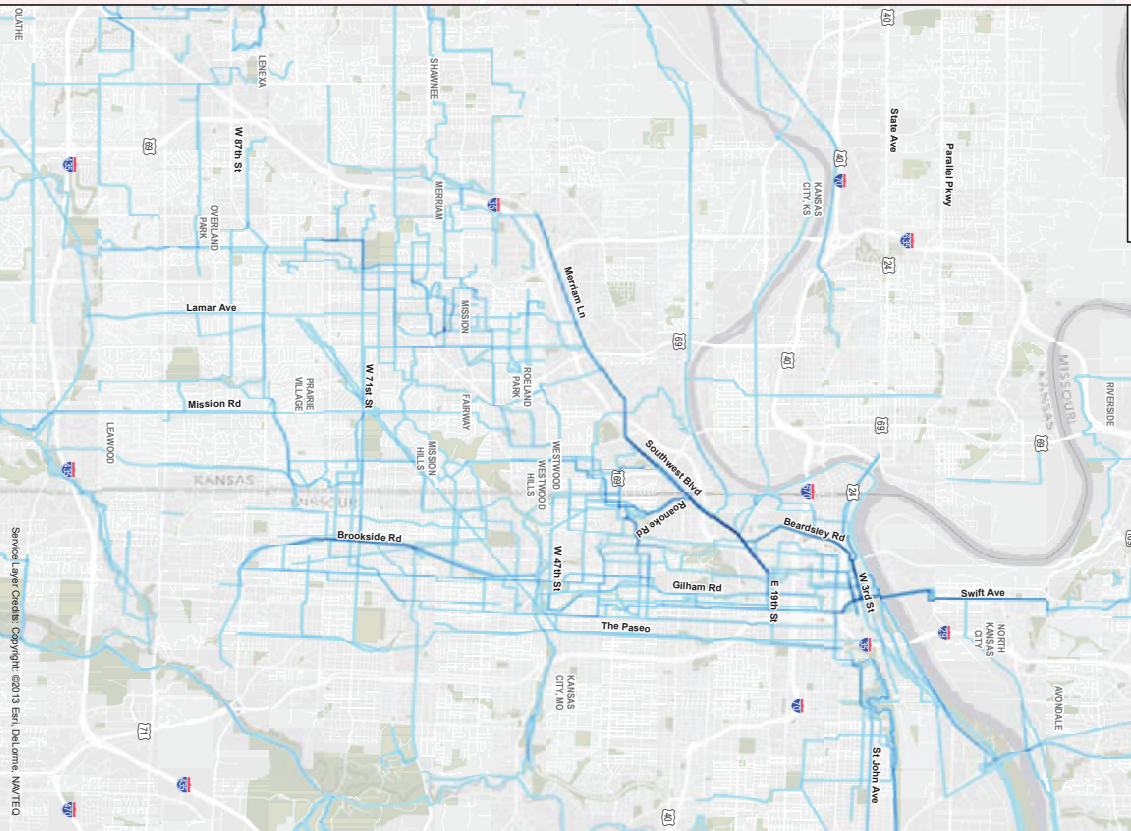
The map on the left displays the full MARC planning area map with the map on the right displaying the central portion of the planning area in more detail.

The colored lines indicate where comments were entered on the Wikimap. The darker the line, the greater number of comments that were received in that corridor.

A: MARC Planning Area



B: Central MARC Planning Area



The map is provided for informational purposes and no guarantee is made as to the accuracy of the information. The map was last updated on 6/9/2014.

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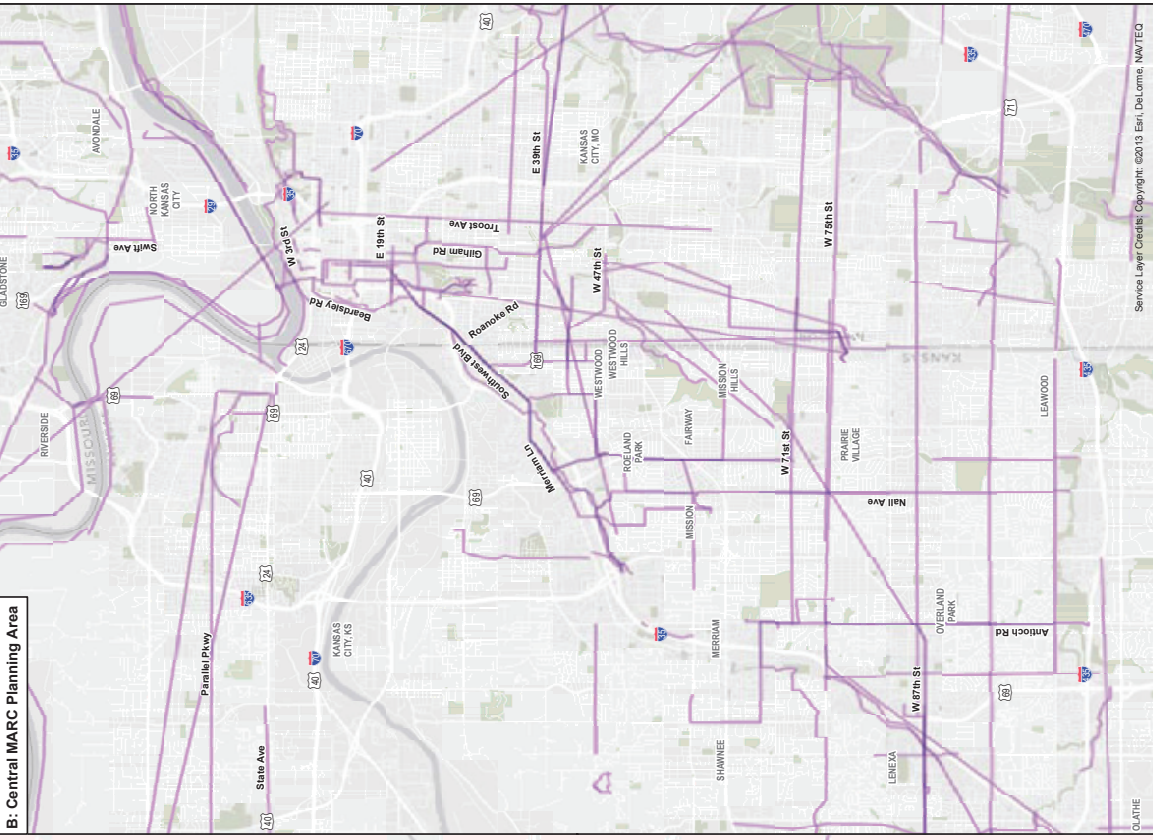
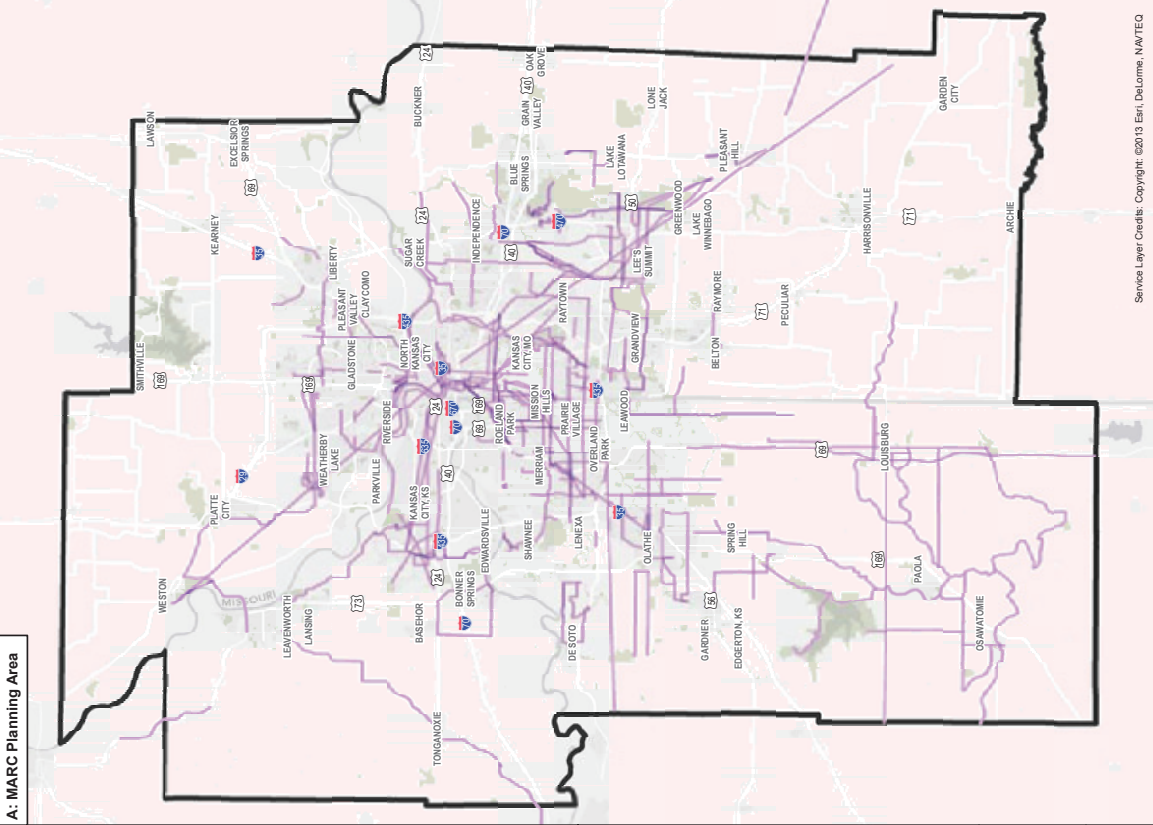
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MARC REGIONAL BIKEWAYS PLAN: Map Series 3 - WikiMap Desired Routes

Description
 These maps display user input from the MARC Regional Bike Plan WikiMap. WikiMaps are online interactive maps that allow users to enter routes or points on a map and submit comments about the route or point they entered. Rather than displaying all of the individual data points that were entered into the WikiMap, these maps display a generalized view of specific types of comments.

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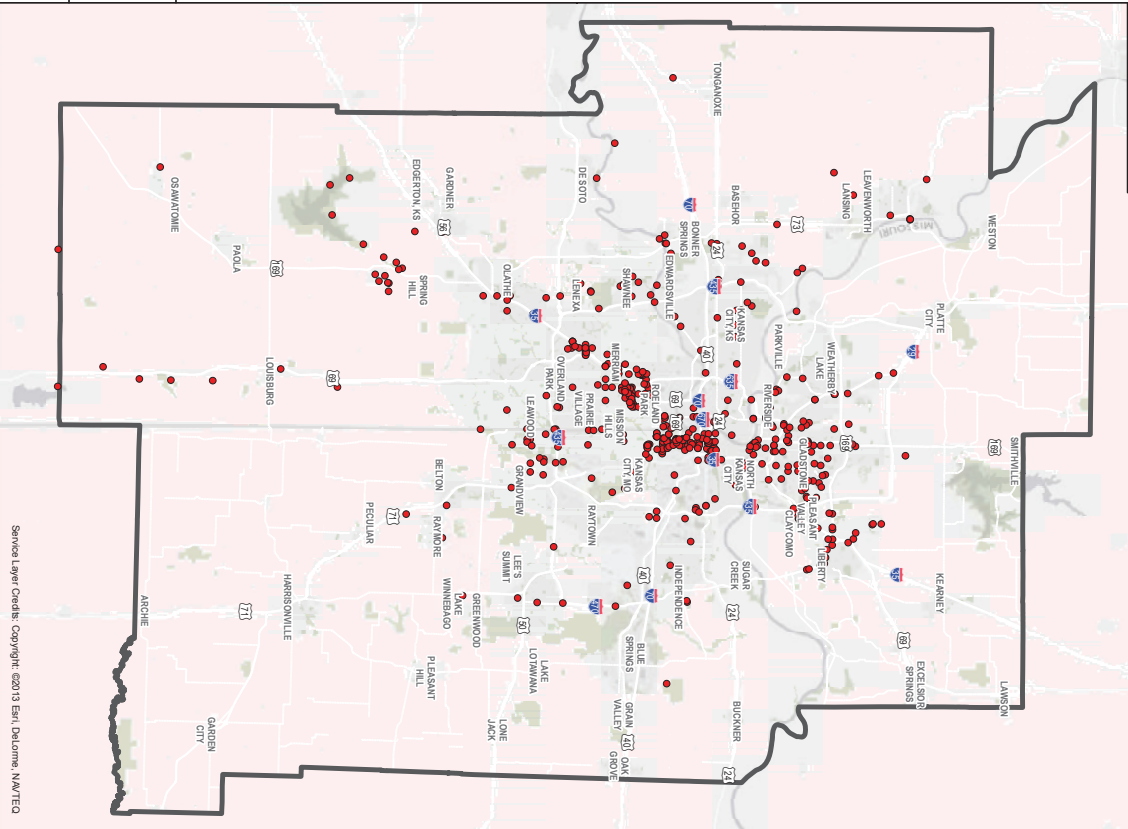
MARC REGIONAL BIKEWAYS PLAN: Map Series 4 - Wikimap Barrier Points

A: MARC Planning Area

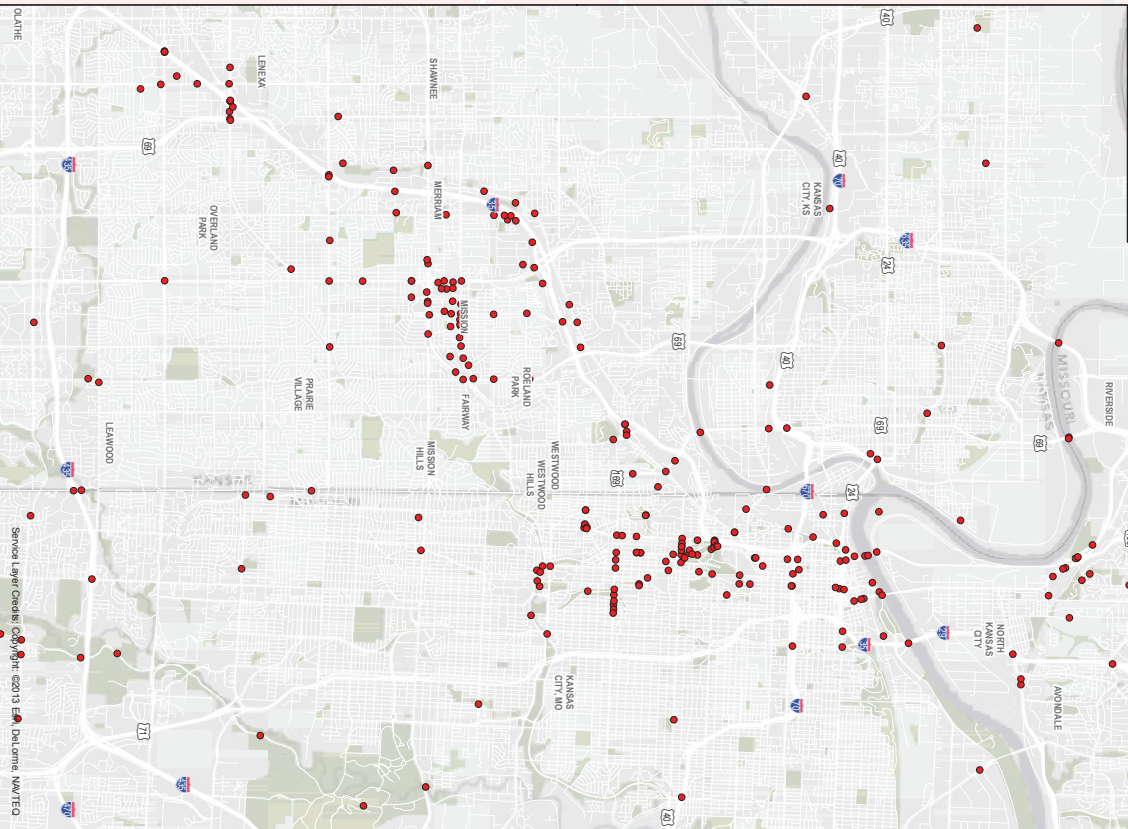
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B: Central MARC Planning Area



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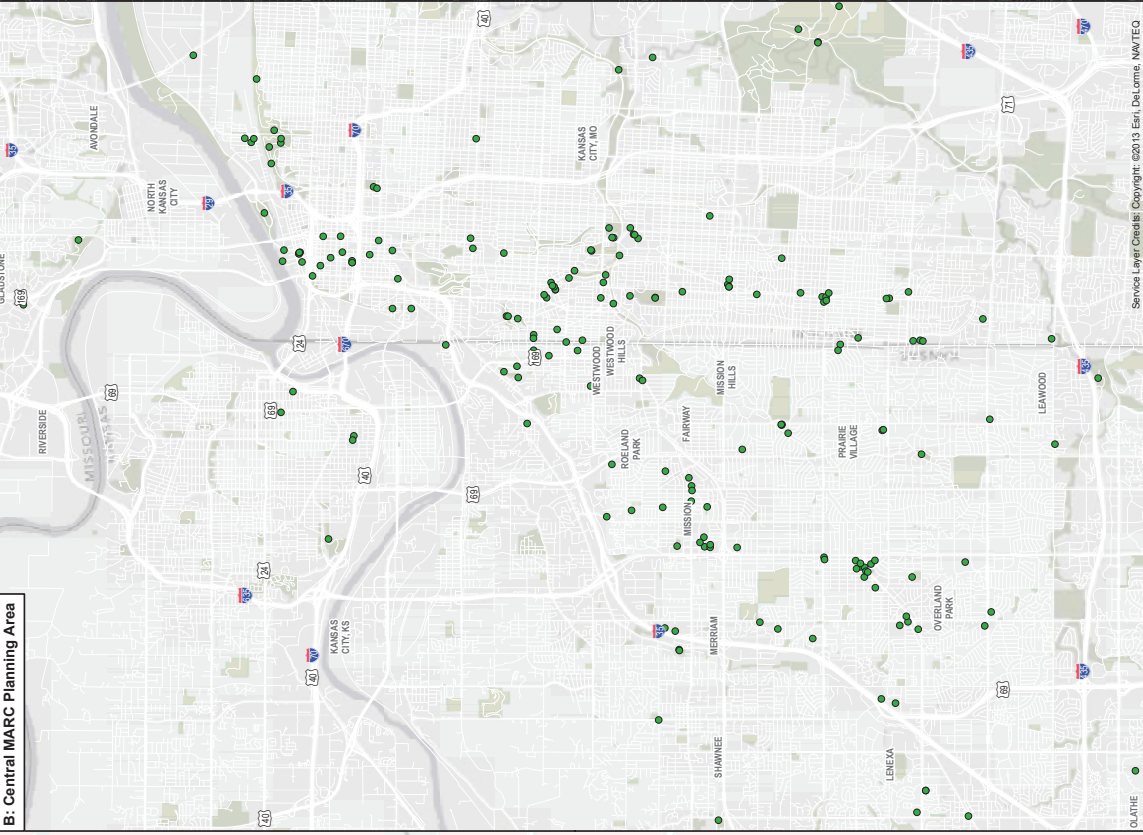
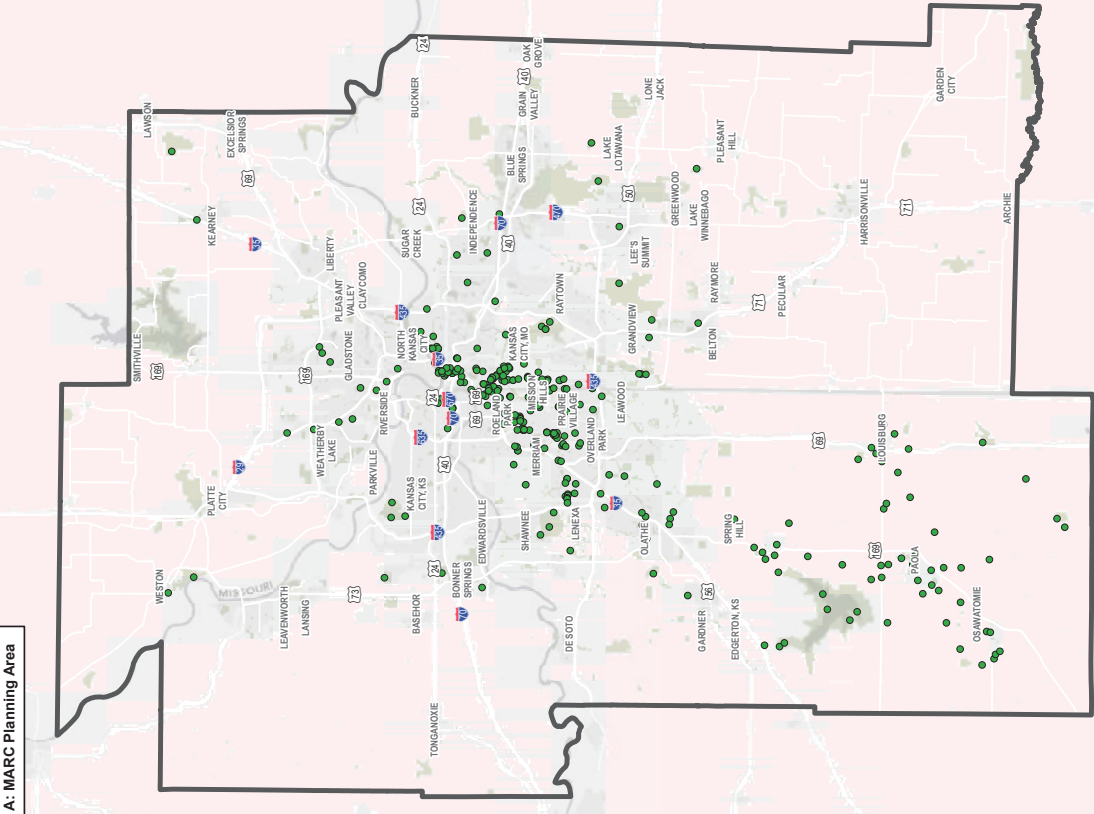
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MARC REGIONAL BIKEWAYS PLAN: Map Series 5 - WikiMap Bicycle Destination Points

Description
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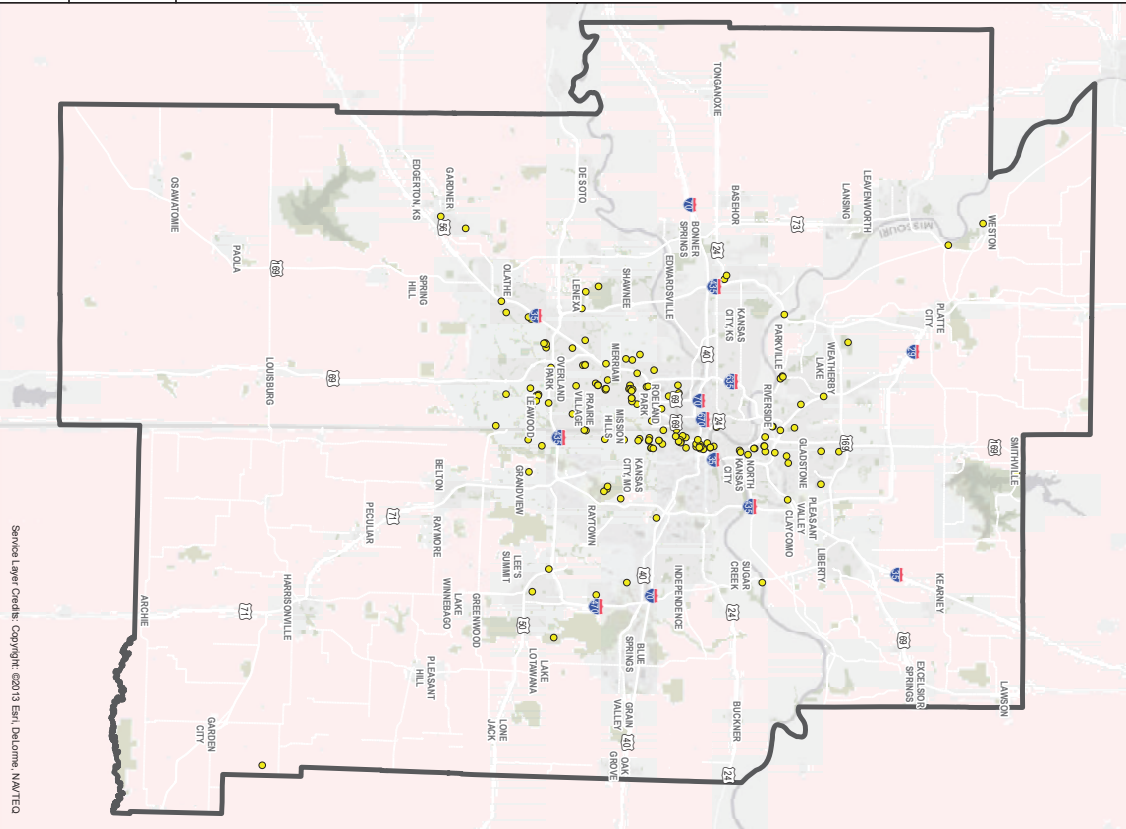
MARC REGIONAL BIKEWAYS PLAN: Map Series 6 - Wikimap Desired Bicycle Destination Points

A: MARC Planning Area

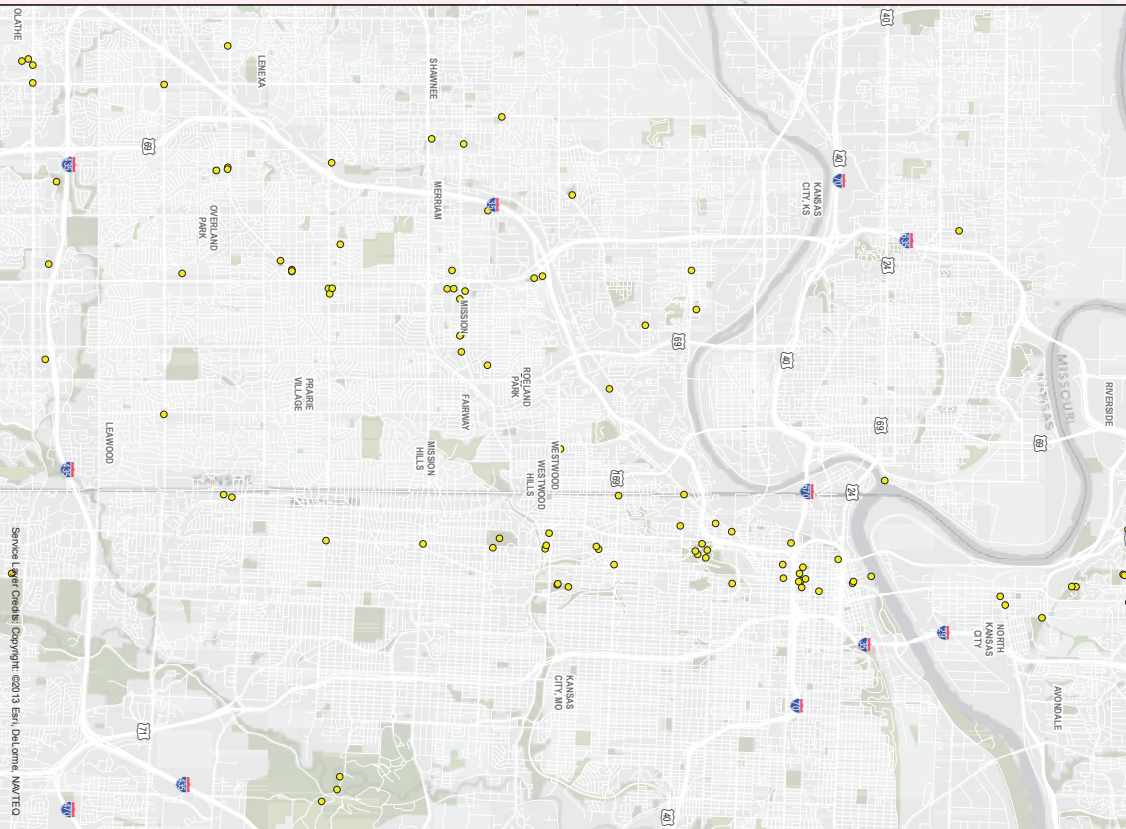
Description
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B: Central MARC Planning Area



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APPENDIX B

Greater Kansas City Bikeways Plan

Existing Conditions

Barriers and Gaps Analysis

Crash Data Analysis

**Local government Survey and
Report Card**

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MEMORANDUM

Date: April 29, 2014
To: Aaron Bartlett, MARC
From: Kevin Luecke & Tom Huber
Project: MARC Regional Bikeway Plan
Re: Task 2: Bicycle Barrier & Network Gaps Assessments

This memo and the attached maps are intended to provide an overview of physical barriers to bicycling in the Mid-America Regional Council (MARC) planning area as well as gaps in the existing and planned bikeway network. This memo has been updated from the original memo (4/11/2014) to include assessments of the bikeway crossings of U.S. Highway 69 and highways K-7 and K-10 in Kansas.

Barrier Assessment

Physical barriers can make or break a bicycle trip for a variety of reasons. Physical barriers such as challenging bridge crossings can deter bicyclists from making a trip to a specific destination because they are intimidated by the traffic they encounter. Barriers such as rivers can add unreasonable distance to trips if safe and comfortable crossings are not provided at regular intervals. For the purposes of this project, physical barriers to bicycling are divided into three primary categories: topographical barriers (hills), water barriers (rivers), and roadway barriers (freeway crossings); each barrier type is examined in more detail below. Assessing barriers at the regional level often presents a different picture than done at the local level. At the regional level, a much larger area is examined and the likelihood for barriers increases. Bicyclists traveling longer distances on regional routes will be more apt to encounter major barriers and will plan their routes with these barriers in mind. Map 1 displays the existing and proposed bikeways within the MARC planning area.

Bridge Ratings

The MARC planning area contains nearly 3,500 bridges, of which 600 carry or pass over existing, planned, or proposed bikeways. The National Bridge Inventory (NBI) provides data about these bridges, but unfortunately not in a manner that can easily be used to rate each bridge's bikeability. The NBI does not contain information about the presence of bicycle facilities or the width of shoulders or lanes on bridges, primary pieces of data for assessing bicycling conditions. The NBI does contain sidewalk data, but not in an easily usable format. Additionally, the NBI does not present any information about streets *under* each bridge; for example, if a bikeway runs under a freeway bridge, the NBI only provides information about the freeway bridge, and not the conditions of the underpass. Given this, the NBI data cannot be used to construct a Bicycle Level of Service (BLOS) rating formula for bridges in the planning area within the limits of the project scope.

Because data from the NBI cannot be used to easily create a BLOS for these bridges, each bridge must be manually inspected using aerial photography. Since this is a time consuming process, bridge analysis for this project will be limited to all bridge crossings of the Missouri and Kansas Rivers and bikeway bridge or underpass crossing of limited access freeways. These bridges are rated using the scale shown in Table 1. The rating scale is somewhat objective, but provides a good idea of how "bikeable" a bridge is.

Table 1: Bridge "bikeability" rating criteria

Rating	Criteria
A	Separated path on both sides of the bridge or as standalone span
B	Separated path on one side of the bridge or sidewalks on both sides
C	6' wide or wider shoulder or bike lane
D	4' to 6' wide shoulder or bike lane and/or sidewalk on one side of bridge
E	Wide outside travel lane and/or shoulder less than 4' wide
F	No accommodations, no room for bikes

Additional considerations for bridge ratings:

- A bridge that contains freeway interchange ramps will have its rating reduced at least one category
- A bridge with high traffic volumes for the number of lanes may have its rating decreased one or more categories
- A bridge with low traffic volumes for the number of lanes may have its rating increased one or more categories

Topographical Barriers

Topographical barriers to bicycling are primarily steep or lengthy hills, with the most extreme conditions being a combination of the two. Every bicyclist has their own threshold for hills and that threshold will vary widely. Hills can be overcome with multiple gears, but exertion by the bicyclist is still necessary. Generally, any grade of more than five percent can deter bicycling, especially if the hill continues for more than a city block (500'). Even grades of less than five percent can cause problems if the grade continues for more than a quarter mile. Although most people react most negatively to the exertion required by the uphill grade, some bicyclists are also unnerved about steep downhill segments and the hard braking often required.

The Kansas City metro area has gently rolling terrain with moderate hills throughout the region. However, there are some significant hills rising up from the Missouri River flood plain. Because the geography of the region is relatively consistent, with rolling hills throughout the eight-county area, topography is not considered a major barrier to bicycling and is not a significant factor in regional bikeway route selection for this plan.

Water Barriers

Water barriers in the Kansas City metro region are primarily rivers and streams. A number of large lakes exist within the planning area, but they are not in the heavily urbanized areas and tend to serve as destinations for bicyclists rather than barriers. The region also has a large network of streams; these minor waterways are frequently bridged, and do not typically serve as major barriers to bicycling. Additionally, many of these minor waterways have had shared use paths constructed within their corridors, thereby serving to increase bikeway connectivity throughout the region. Only bridge crossings of the Missouri and Kansas Rivers were considered for the purposes of this analysis; all crossings of those rivers were examined, regardless of the occurrence of an existing or planned bikeway on them. The water crossings that were examined are displayed on Map 2.

The metro area is divided by two major rivers. The larger of the two rivers is the Missouri River, which runs roughly west to east across the northern one third of the developed area. The Missouri River and its floodplain serve as a very significant barrier to bicycling: the river has relatively few crossings, and most of those crossings carry high volumes of motor vehicle traffic. Additionally, the river's floodplain is quite wide, which results in lengthy bridge spans. Crossings of the Missouri River from the western edge to the eastern edge of the planning area are briefly described in Table 2.

Table 2: Bridge crossings of the Missouri River within the MARC planning area from west to east

Map ID	Name	2010 ADT ¹	Total Lanes	Bike Lanes or Shoulder	Sidewalk or Path	Bridge Rating	Comments
1	Metropolitan Avenue	15,700	2	No	No	F	No bicycle accommodations; narrow lanes
2	I-435 (West)	20,100	6	Shoulder	No	NA	Bicycles not permitted; wide shoulders provided
3	I-635	43,200	4	Shoulder	No	NA	Bicycles not permitted; wide shoulders provided
4	U.S. Highway 69	21,000	4	No	No	F	Narrow lanes; bicycle travel technically permitted
5	U.S. Highway 169	62,500	4	No	No	F	Narrow lanes; bicycle travel technically permitted
6	Heart of America Bridge	11,900	5	No	Yes	B	10' wide, two-way shared use path on east side of bridge
7	I-29 / I-35	105,200	7	Shoulder	No	NA	Bicycles not permitted; narrow shoulders
8	N. Chouteau Trafficway	13,300	4	Shoulder	Yes	A	8' shared use path on each side of the bridge
9	I-435 (East)	45,601	6	Shoulder	No	NA	Bicycles not permitted; narrow shoulders
10	Missouri Highway 291	36,200	4	Shoulder	No	F	Wide shoulder exists on the western (southbound) span; bicycle travel technically permitted

The Missouri River is approximately 88 miles long within the MARC planning area. As noted in Table 1, there are only 10 crossings of the river in this area (not including a number of railroad bridges), four of which do not permit bicycles. This limits bicyclists to only six crossings of the Missouri over 88 miles:

- **Metropolitan Avenue at Leavenworth:** The bridge has only two lanes (one in each direction) and no shoulders; conditions for bicyclists are extremely poor and not considered suitable based on the roadway configuration and volume of traffic.
- **U.S. Highway 69:** Although the bridge is technically open to bicycle traffic, the volume of traffic combined with narrow travel lanes and long spans make it not feasible for bicycle use.
- **U.S. Highway 169:** Although the bridge is technically open to bicycle traffic, the volume of traffic combined with narrow travel lanes and long spans make it not feasible for bicycle use.
- **Heart of America Bridge in Kansas City, Missouri:** The bridge has a two-way, 10 foot wide shared use path on the east side of the bridge. Connections to the path are from surface streets on both ends of the bridge. Conditions on the bridge itself are very good for bicyclists, and connections to the path are reasonably good for a large portion of the bicycling population.
- **North Chouteau Trafficway Bridge from Kansas City, Missouri, to North Kansas City:** The bridge has an 8 foot wide sidewalk or shared use path on each side of the bridge. Connections to the sidewalks/paths are from surface streets on both ends of the bridge. Conditions on the bridge itself are very good for bicyclists, and connections to the sidewalk/paths are reasonably good for a large portion of the bicycling population.

¹ 2010 ADT refers to the Average Daily Traffic volume (the total number of vehicles) and is based on the MARC Travel Demand Model. Figures have been rounded to the nearest hundred. These figures should be considered as estimates and should be calibrated against known traffic counts to provide for a higher level of accuracy.

- **Missouri Highway 291 in Sugar Creek:** The bridge has a 10 foot wide shoulder on the southbound span, but no shoulder on the northbound span. Conditions on the southbound span are reasonably good for experienced road bicyclists, with connections to the rural road network on either side of the span. There is no bicycle accommodation for northbound bicyclists.

Given the paucity of crossing opportunities of the Missouri River for bicyclists, additional crossings will likely be recommended in the final plan.

The Kansas River also cuts west to east across the planning area, merging with the Missouri River at the Kansas-Missouri state line. The Kansas River and its floodplain are not as wide and have more frequent crossings than the Missouri River. Crossings of the Kansas River from the western of the planning area to the Missouri River are briefly described in Table 3.

Table 3: Bridge crossings of the Kansas River within the MARC planning area from west to east

Map ID	Name	2010 ADT ²	Total Lanes	Bike Lanes or Shoulder	Sidewalk or Path	Bridge Rating	Comments
11	Wyandotte Street	12,700	2	No	No	F	Narrow lanes
12	North K-7 Highway	26,800	4	Shoulder	No	C	8'+ shoulder on each side of the bridge
13	I-435	45,100	6	Shoulder	No	NA	Bicycles not permitted; wide shoulders provided
14	K-32 Highway (West)	26,600	5	No	No	F	Very narrow shoulders
15	I-635	54,600	7	Shoulder	No	NA	Bicycles not permitted; wide shoulders provided
16	K-32 Highway (East)	6,500	4	No	No		
17	U.S. Highway 69	28,700	4	Shoulder	No	E	Narrow shoulder exist on each side of the bridge
18	South 12 th Street	820	2	No	Sidewalk	D	5' sidewalk on west side of bridge
19	U.S. Highway 169	15,700	4	No	Sidewalk	D	5' sidewalk on east side of bridge
20	Kansas Avenue	2,000 ³	4	No	No	E	Narrow lanes, no shoulders
21	I-670	72,100	4+	Shoulder	No	NA	Bicycles not permitted; wide shoulders provided
22	Central Avenue	500 ⁴	4	No	No	E	Narrow lanes, no shoulders
23	North James Street	5,900 ⁵	2	No	No	D	Wide lanes (15'+)
24	I-70	56,500	7+	Shoulder	Path	A	Shared use path is carried on lower level of the eastbound bridge span

The following bridges listed in Table 2 allow bicycle access:

- **Wyandotte Street in Desoto:** The bridge has two lanes (one in each direction), with essentially no shoulders on either side; conditions for bicyclists are acceptable for experienced road cyclists, and poor for most general bicyclists given the lane configurations and the length of the bridge.

² 2010 ADT refers to the Average Daily Traffic volume (the total number of vehicles) and is based on the MARC Travel Demand Model. Figures have been rounded to the nearest hundred. These figures should be considered as estimates and should be calibrated against known traffic counts to provide for a higher level of accuracy.

³ ADT based on National Bridge Inventory data due to uncertainty in MARC Travel Demand Model figures.

⁴ ADT based on National Bridge Inventory data due to uncertainty in MARC Travel Demand Model figures.

⁵ ADT based on National Bridge Inventory data due to uncertainty in MARC Travel Demand Model figures.

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- **North K-7 Highway from Shawnee to Bonner Springs:** The bridge has two spans with two lanes and a wide outside shoulder on each span. Bicyclists must cross entrance/exit ramps on the north side of the bridge that may be challenging. Conditions are generally good for experienced bicyclists who are accustomed to riding with significant traffic.
 - **K-32 Highway (West) in Kansas City, Kansas:** The southbound bridge span has two travel lanes with an extremely narrow shoulder that is unsuitable for bicycling. The northbound bridge span has three travel lanes with an extremely narrow shoulder that is unsuitable for bicycling. Bicycling conditions are extremely poor in both directions. Given traffic volumes, an opportunity may exist to convert the third travel lane on the northbound span to a barrier-separated two way shared use path.
 - **K-32 Highway (East) in Kansas City, Kansas:** The bridge is a single span with four travel lanes. Extremely narrow shoulders exist, but are not suitable for bicycling. Given the traffic levels, confident road cyclists may be comfortable using the bridge, but it is largely unsuitable for most bicyclists. An opportunity may exist to reduce the number of travel lanes and provide bicycle lanes on the bridge.
 - **South 12th Street in Kansas City, Kansas:** The bridge has two travel lanes with relatively low traffic volumes. A five foot wide sidewalk exists on the west side of the bridge. Confident cyclists may feel comfortable using the travel lanes, but the majority of bicyclists will likely utilize the narrow sidewalk.
 - **U.S. Highway 169 in Kansas City, Kansas:** The bridge has two spans with a total of four lanes. Very narrow shoulders exist on each span that are not suitable for bicycling. A five foot wide sidewalk exists on the east side of the bridge and is likely the only suitable accommodation for most bicyclists. The sidewalk connects to surface streets on either end of the bridge.
 - **Kansas Avenue between Kansas City, Kansas, and Kansas City, Missouri:** Four lane bridge with no shoulders or sidewalks. Traffic levels are unknown. Bridge is likely unsuitable for all but the most confident bicyclists.
 - **Central Avenue Viaduct Bridge between Kansas City, Kansas, and Kansas City, Missouri:** Four lane bridge with no shoulders or sidewalks. Traffic levels are low. Given traffic levels, bicycling conditions should be good for most adult bicyclists. An opportunity may exist to stripe bike lanes or buffered bike lanes on the bridge.
 - **North James Street between Kansas City, Kansas, and Kansas City, Missouri:** Two lane bridge with moderate traffic levels. Bridge has wide travel lanes (15'+), but no shoulders or sidewalk.
 - **I-70 Lewis and Clark Viaduct Bridge between Kansas City, Kansas, and Kansas City, Missouri:** A shared use path open to bicycle and pedestrian traffic is carried on the lower level of the eastbound bridge span. Conditions are good for bicyclists on the path.

Approximately 50 miles of the Kansas River flows through the MARC planning area. Although the Kansas River has more crossing opportunities for bicyclists than the Missouri River, most of the crossings provide a low level of service for bicyclists, and, in general, only the most skilled and confident bicyclists will be willing to use the on-street crossings. The sidewalks on the South 12th and South 7th Streets bridges provide crossing opportunities for less confident bicyclists and youths, but are narrow and are not ideal for use as bikeways. The only good crossing of the Kansas River for most bicyclists is the shared use path under the I-70 bridge.

Freeways

Freeways and major highways can present a significant barrier to bicycling where the roadway is grade-separated from the rest of the street network. Grade-separated freeways serve as a barrier in three ways. First, they break up the existing street network and typically have relatively infrequent crossings; these limited crossings may force bicyclists to ride significant distances to access a crossing of the highway. Second, the limited crossings of

freeways often carry high traffic volumes, and may have interchanges that are difficult or hazardous for bicyclists to navigate. Third, the limited crossings of freeways are often bridges or underpasses that were not originally built with bicycle or pedestrian accommodations, and often lack the space to add such accommodations.

Table 4 presents details about each existing, planned, and proposed bikeway crossing of a freeway within the planning area. The following freeways were examined for bikeway crossings:

- I-29
- I-35
- I-435
- I-470
- I-635
- I-70
- US 71
- US 69
- K-7
- K-10

The details in Table 4 include the name of the crossing, the freeway being crossed, the status of the bikeway (existing, planned or proposed), the 2010 traffic volume and number of lanes on the bikeway, the presence of a shoulder, bike lane, sidewalks, or a path, and the rating assigned to each crossing. The basis for the ratings are described in Table 1, although a level of subjectivity was introduced to the ratings when viewing each crossing on aerial photographs. Planned MetroGreen bikeways were not evaluated as it is assumed that they will be grade-separated paths that do not interact with the freeway being crossed. Map 3 displays the crossings in the planning area that were evaluated.

Table 4: Bridge crossings of the freeways within the MARC planning area from west to east

Map ID	Name	Cross	BW	2010 ADT ⁶	Total Lanes	Bike Lanes or Shoulder	Sidewalk or Path	Rating	Comments
25	N Bethel Ave	I-29	P	180	2	Shoulder	No	D	Narrow shoulders; low ADT
26	NW Tiffany Springs Pkwy	I-29	E	25,100	4	Shoulder	No	E	Freeway underpass
27	NW Barry Rd	I-29	E	17,800	10	No	Sidewalk	E	Freeway underpass
28	NW 72 nd St	I-29	E	32,500	5	Shoulder	No	D	Wide shoulders through freeway underpass
29	Southern Platte Pass	I-29	E	45,00	6	Shoulder	Path	C	Path on one side of underpass; lots of ramp crossings
30	SUP	I-29	P	NA	NA	NA	Path	A	Streamway path
31	NW Vivon Rd	I-29	P	4,800	4	No	No	E	Freeway underpass
32	NE Davidson Rd	I-29	E	10,200	4	No	No	E	Freeway underpass
33	Plattsburgh Rd	I-35	P	300	2	Shoulder	No	B	Very low volume underpass
34	N 291 Hwy	I-35	P	39,700	4+	No	No	F	High volume overpass
35	N Flintlock Rd	I-35	E	U	U	U	U	NA	New road; does not appear on aerials
26	I-435	I-35	E	U	U	U	U	NA	Cannot determine where future bikeway might be located

⁶ 2010 ADT refers to the Average Daily Traffic volume (the total number of vehicles) and is based on the MARC Travel Demand Model. Figures have been rounded to the nearest hundred. These figures should be considered as estimates and should be calibrated against known traffic counts to provide for a higher level of accuracy.

Map ID	Name	Cross	BW	2010 ADT	Total Lanes	Bike Lanes or Shoulder	Sidewalk or Path	Rating	Comments
37	N Brighton Ave	I-35	E	18,400	4	No	Sidewalk	C	Sidewalk on both sides, but only on bridge
38	N Chouteau Trafficway	I-35	P	7,700	4	No	No	E	Freeway underpass
39	SUP	I-29/35	P	NA	NA	NA	Path	A	Power line path
40	SUP	I-29/35	P	NA	NA	NA	Path	A	Levee path
41	SUP	I-29/35	E	NA	NA	NA	Path	A	Levee path
42	5 th St	I-29/35	P	U	U	U	U	NA	Cannot determine where future bikeway might be located
43	E Independence Ave	I-29/35	E	8,400	4	No	Sidewalk	C	Sidewalks on both sides of bridge
44	E 11 th St	I-35/70	E	5,300	3	No	Sidewalk	B	Sidewalks on both sides and wide outside lane
45	E 12 th St	I-35/70	E	U	3	No	Sidewalk	B	Sidewalks on both sides and wide outside lane
46	E 19 th St	US 71	E	U	2	No	Sidewalk	B	Wider lanes
47	The Paseo	US 71	E	23,700	4	No	Path	B	Path on one side of bridge
48	Vine St	US 71	E	U	2	No	Sidewalk	B	Lower volume, wide lanes, sidewalks both sides of street
49	E 29 th St	US 71	E	U	2	No	Sidewalk	C	Underpass with ramps
50	E 49 th St	US 71	E	14,200	2	Shoulder	Sidewalk	B	Wide shoulders and sidewalks both sides
51	Emmanuel Cleaver II Blvd	US 71	E	25,000	4	No	Sidewalk	C	Sidewalk both sides; no space on street
52	SUP	US 71	E	NA	NA	NA	Path	A	Streamway path
53	E Meyer Blvd	US 71	E	13,100	6	No	Sidewalk	B	Sidewalks both sides
54	Blue River Rd	US 71	P	U	4	No	No	E	
55	E Bannister Rd	US 71	E	20,000	4	Shoulder	No	D	8' shoulders
56	Bike-Ped Bridge	US 71	E	NA	NA	NA	Path	A	Stand alone bike-ped bridge
57	E Red Bridge Rd	US 71	E	12,000	6	Shoulder	Sidewalk	B	6' shoulders and sidewalks on both sides of street
58	Longview Rd	US 71	E	U	2	No	Sidewalk	B	Wider lanes on bridge and sidewalks on both sides
59	Blue Ridge Rd	US 71	P	U	6	No	No	F	
60	SUP	US 71	P	U	U	U	U	NA	Cannot determine where future bikeway might be located
61	E 150 Hwy	US 71	E	24,600	8	Shoulder	Path	E	Path on one side of underpass; numerous ramp crossings
62	SUP	US 71	P	U	U	U	U	NA	Cannot determine where future bikeway might be located

Map ID	Name	Cross	BW	2010 ADT	Total Lanes	Bike Lanes or Shoulder	Sidewalk or Path	Rating	Comments
63	E 171 st St	US 71	P	28,700	5	Shoulder	No	E	Wider shoulder, but busy with ramps
64	Kaw Dr	I-70	P	2,000	4	No	No	C	Lower traffic volumes
65	Grand Blvd	I-70	P	3,700	5	No	Sidewalk	B	Wide sidewalks on both sides; lower ADT
66	Charlotte St	I-70	E	U	4	No	Sidewalk	B	Sidewalk both sides; appears to have low ADT
67	The Paseo	I-70	E	15,600	6	No	Sidewalk	C	Sidewalk both sides; narrow lanes
68	Woodland Ave	I-70	E	U	2	No	Sidewalk	B	Low traffic surface street
69	Chestnut Ave	I-70	E	11,000	2	No	Sidewalk	C	Busier two lane street
70	SUP	I-70	E	NA	NA	NA	Path	A	Bike-Ped overpass
71	Van Buren Blvd	I-70	P	9,200	6	No	Sidewalk	D	Sidewalk on one side
72	SUP	I-70	P	NA	NA	NA	Path	A	Streamway path
73	Blue Ridge Cutoff	I-70	E	19,500	6	Shoulder	Sidewalk	D	Narrow shoulders on both sides of bridge; sidewalk on one side
74	Blue Ridge Blvd	I-70	E	2,900	3	Shoulder	No	C	6'+ shoulders on both sides of bridge
75	Little Blue Trace Trail	I-70	E	NA	NA	NA	Path	A	Streamway path
76	S Little Blue Pkwy	I-70	E	14,800	6	Shoulder	Path & Sidewalk	B	Shared use path on one side of bridge; sidewalk on other side; shoulders both sides
77	NW Woods Chapel Rd	I-70	E	21,100	6	No	No	F	No shoulder or space for bicycles
78	NW Hwy 7	I-70	E	48,100	6	No	No	F	Very busy
79	NE Adams Dairy Rd	I-70	E	9,500	7	No	Path & Sidewalk	B	Shared use path on one side of underpass; sidewalk on other side
80	E US Hwy 40	I-470	E	11,000	8	No	Path	C	Path on one side of street
81	SUP	I-470	E	NA	NA	NA	Path	A	Streamway path
82	NE Woods Chapel Rd	I-470	P	9,800	6	No	No	F	
83	83 rd St	I-470	E	U	7	No	Path & Sidewalk	B	Path on one side of underpass, sidewalk on other side
84	NE Colbern Rd	I-470	P	20,400	4	Shoulder	No	C	Wide shoulders on both sides of bridge
85	NW Main St	I-470	P	U	2	No	No	B	Very low volume underpass
86	SUP	I-470	E	NA	NA	NA	Path	A	Streamway path
87	SUP	I-470	E	NA	NA	NA	Path		Unable to determine where path may cross
88	View High Dr	I-470	E	10,000	4	No	No	E	

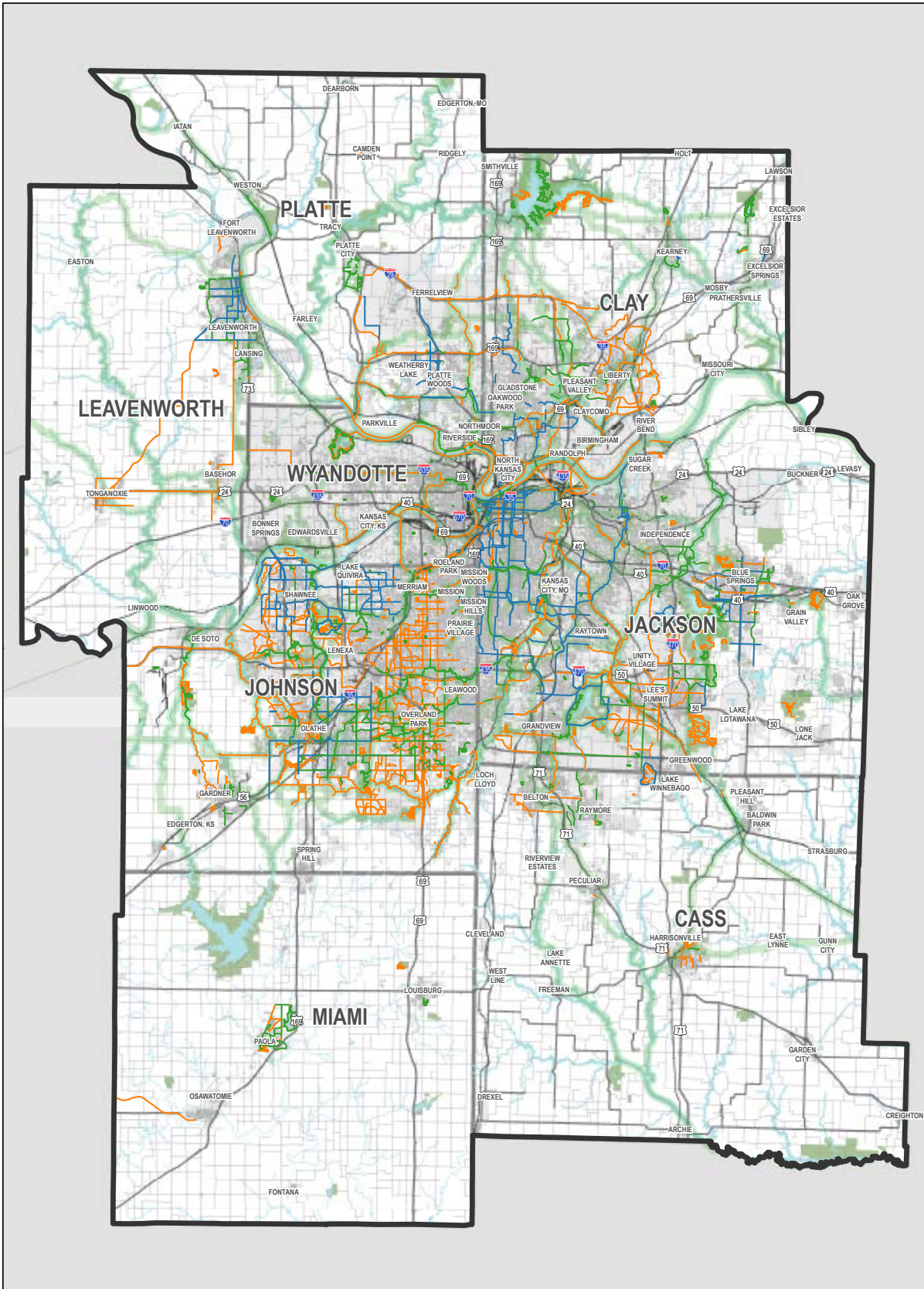
Map ID	Name	Cross	BW	2010 ADT	Total Lanes	Bike Lanes or Shoulder	Sidewalk or Path	Rating	Comments
89	Raytown Rd	I-470	E	5,700	5	Shoulder	No	C	Wide shoulders on bridge
90	James A Reed Rd	I-470	E	2,000	4	No	Sidewalk	B	Sidewalk both sides, low volume
91	Blue Ridge Rd	I-470	E	20,500	4+	No	Sidewalk	E	Sidewalk on one side
92	NE Vivon Rd	I-435	E	U	5	Shoulder	No	D	Wide shoulders on both sides of underpass
93	NE 53 rd Ter	I-435	E	U	2	No	Sidewalk	C	Sidewalk on one side; low volume, wider lanes
94	NE 48 th St	I-435	E	12,900	4	No	No	E	
95	Birmingham Levee Rd	I-435	P	U	2	No	Path	A	Levee path
96	Riverfront Rd Path	I-435	P	U	2	No	Path	A	Riverfront path
97	SUP	I-435	P	NA	NA	NA	Path	A	Riverfront path
98	SUP	I-435	P	NA	NA	NA	Path	A	Rail corridor path
99	SUP	I-435	P	NA	NA	NA	Path	A	Rail corridor path
100	E 67 th St	I-435	E	U	2	No	Sidewalk	B	Sidewalk both sides, low volume, wider lanes
101	E Gregory Blvd	I-435	E	5,300	3	No	No	E	
102	Oldham Rd	I-435	E	600	2	No	No	C	Very low volume
103	E 87 th St	I-435	E	25,800	4	No	Path & Sidewalk	C	Sidewalk on one side, path on the other
104	E Bannister Rd	I-435	P	22,800	8	No	Sidewalk	D	Sidewalk on one side
105	Hickman Mills Dr	I-435	E	U	4	No	Path & Sidewalk	B	Sidewalk on one side, path on other
106	Grandview Dr	I-435	P	7,600	2	Shoulder	No	C	Wide shoulders
107	SUP	I-435	E	NA	NA	NA	Path	A	Streamway Path
108	Holmes Rd	I-435	E	30,000	6+	No	Sidewalk	E	Sidewalk on one side
109	SUP	I-435	E	NA	NA	NA	Path	A	Streamway Path
110	Mission Rd	I-435	E	2,900	4	No	Path & Sidewalk	B	Sidewalk on one side, path on other
111	SUP	I-435	E	NA	NA	NA	Path	A	Streamway Path
112	Roe Ave	I-435	E	13,200	6+	No	Path	B	Path carried on separate structure
113	Nall Ave	I-435	E	31,600	8	No	Sidewalk	D	Sidewalks both sides
114	Lamar Ave	I-435	P	3,800	2	No	Sidewalk	B	Sidewalk on both sides and wide lane
115	Antioch Rd	I-435	P	45,000	9	No	Sidewalk	D	Sidewalks both sides
116	Indian Creek Trail	I-435	E	NA	NA	NA	Path	A	Streamway path
117	Quivira Rd	I-435	P	49,100	9	No	Sidewalk	D	Sidewalks both sides
118	Santa Fe Trail Dr	I-435	P	1,300	2	No	No	D	Lower traffic volumes
119	W 95 th St	I-435	E	2,400	4	Shoulder	Path	B	Wide shoulders and path on one side
120	W 79 th St	I-435	E	18,200	2	No	Path	B	Path on one side
121	Renner Rd	I-435	E	6,800	4	Shoulder	No	D	Narrow shoulders
122	Midland Dr	I-435	E	9,500	4+	Shoulder	No	C	Wide shoulders

Map ID	Name	Cross	BW	2010 ADT	Total Lanes	Bike Lanes or Shoulder	Sidewalk or Path	Rating	Comments
123	Johnson Dr	I-435	E	U	4	Shoulder	No	C	Wide shoulders
124	Holiday Rd	I-435	E	5,500	4	No	No	E	
125	Parallel Pkwy	I-435	E	U	6	No	Sidewalk	D	Poor sidewalks on both sides
126	SUP	I-435	P	NA	NA	NA	Path	A	Riverfront path
127	NW 120 th St	I-435	P	U	2	Shoulder	No	C	Wide shoulders
128	SUP	I-435	P	NA	NA	NA	Path	A	Streamway path
129	N Woodland Ave	I-435	P	1,500	3	Shoulder	No	C	Wide shoulders
130	NE 108 th St	I-435	E	U	2	Shoulder	No	C	Wide shoulders
131	NE Soccer Rd	I-435	E	3,000	2	Shoulder	Sidewalk	B	Sidewalk both sides and shoulders
132	Wyandotte St	I-35/70	E	2,200	3	No	Sidewalk	B	Sidewalk both sides
133	W 14 th St	I-35	E	U	2	No	Sidewalk	D	Sidewalk on one side; narrow lanes
134	Southwest Blvd	I-35	E	1,100	4	No	Sidewalk	C	
135	Summit St	I-35	E	12,000	2	No	No	C	Wide lanes
136	Southwest Blvd	I-35	E	2,200	4	No	No	C	
137	SUP	I-35	P	NA	NA	NA	Path	A	Streamway path
138	Southwest Blvd	I-35	E	5,800	2	No	No	C	
139	SUP	I-35	P	NA	NA	NA	Path	A	Streamway path
140	SUP	I-35	P	NA	NA	NA	Path	A	Streamway path
141	SUP	I-35	P	NA	NA	NA	Path	A	Streamway path
142	Antioch Rd	I-35	P	2,600	5	No	Sidewalk	D	Sidewalk one side
143	W 87 th St Pkwy	I-35	E	53,900	8	No	Path & Sidewalk	C	Path on one side, sidewalk on other
144	W 95 th St	I-35	P	27,100	6	No	No	F	
145	Pflumm Rd	I-35	P	6,300	2	No	Sidewalk	D	Narrow lanes; sidewalk on one side
146	W 119 th St	I-35	E	34,900	8	No	Sidewalk	D	Sidewalks one side, heavy traffic
147	W 127 th St	I-35	E	10,400	6	No	Path & Sidewalk	B	Path on one side, sidewalk on other
148	S Ridgeview Rd	I-35	E	13,100	4	Shoulder	Sidewalk	B	Narrow shoulders and sidewalk both sides
149	E 151 st St	I-35	E	9,000	6	No	Sidewalk	D	Sidewalk on one side
150	S Lone Elm Rd	I-35	E	1,500	6	Bike Lane	Path & Sidewalk	A	Bike lanes, path on one side, sidewalk on other
151	W 159 th St	I-35	E	U	2	Shoulder	Path	B	Shoulders on roadway and path on one side
152	W 167 th St	I-35	P	U	2	No	No	C	Gravel road; very low traffic
153	S Clare Rd	I-35	E	U	2	No	No	D	Very narrow bridge
154	SUP	I-635	E	NA	NA	NA	Path	A	Riverfront path
155	SUP	I-635	P	NA	NA	NA	Path	A	Riverfront path
156	Georgia Ave	I-635	P	2,300	2	No	Sidewalk	C	Sidewalk both sides; wider lanes on bridge
158	Levee Rd	I-635	P	U	NA	No	No	A	Levee path
157	Kaw Dr	I-635	P	U	4	Shoulder	No	C	Wide shoulders

Map ID	Name	Cross	BW	2010 ADT	Total Lanes	Bike Lanes or Shoulder	Sidewalk or Path	Rating	Comments
159	Merriam Dr	I-635	P	1,800	4	No	Sidewalk	D	Sidewalk one side
160	W 87 th Pkwy	US 69	E	44,716	9	No	Path & Sidewalk	D	Path on one side, sidewalk on other
161	W 91 st St	US 69	P	8,265	3	No	Sidewalk	D	Sidewalk one side
162	W 95 th St	US 69	P	29,118					Unable to assess due to outdated imagery
163	W 103 rd St	US 69	P	8,115	6	No	Path & Sidewalk	C	Path on one side, sidewalk on other
164	SUP	US 69	P	NA	NA	NA	Path	A	Streamway path
165	SUP	US 69	E	NA	NA	NA	Path	A	Indian Creek Path
166	W 132 nd St	US 69	E	U	2	No	Path & Sidewalk	B	Path on one side, sidewalk on other
167	SUP	US 69	E	NA	NA	NA	Path	A	Streamway path
168	W 139 th St	US 69	P	U	2	No	No	C	Very narrow underpass, but low traffic
169	W 143 rd St	US 69	P	7,120	4	No	Path & Sidewalk	B	Path on one side, sidewalk on other
170	SUP	US 69	P	NA	NA	NA	Path	A	Streamway path
171	S Hospital Dr	K-7	E	U	2	Shoulder	No	B	Wide shoulders; low traffic
172	Baptiste Dr	K-7	E	U	4	Shoulder	No	C	Wide shoulders
173	SUP	K-7	P	NA	NA	NA	Path	A	Separated path
174	College Blvd	K-7	P	5,063	5	No	Sidewalk	D	Sidewalk one side
175	Unknown	K-7	P	NA	NA	NA	NA	-	Unknown future crossing
176	Prairie Star Pkwy	K-7	E	6,930	3	No	No	D	Bridge may have been reconstructed since imagery updated
177	W 83 rd St	K-7	E	U	5	No	No	E	
178	W 75 th St	K-7	E	3,500	NA	No	No	F	At grade crossing; flex post barriers blocks through movement
179	SUP	K-7	E	NA	NA	NA	Path	A	Streamway path
180	W 55 th St	K-7	E	13,660	4+	No	Sidewalk	E	Large RAB with sidewalk on one side
181	SUP	K-10	E	NA	NA	NA	Path	A	Streamway path
182	Cedar Creek Rd	K-10	P	U	No	No	No	B	Low volume rural road
183	SUP	K-10	P	NA	NA	NA	Path	A	Streamway path
184	Kill Creek Path	K-10	E	NA	NA	NA	Path	A	Streamway path
185	Edgerton Rd	K-10	P	U	2	Shoulder	No	C	Wider shoulders

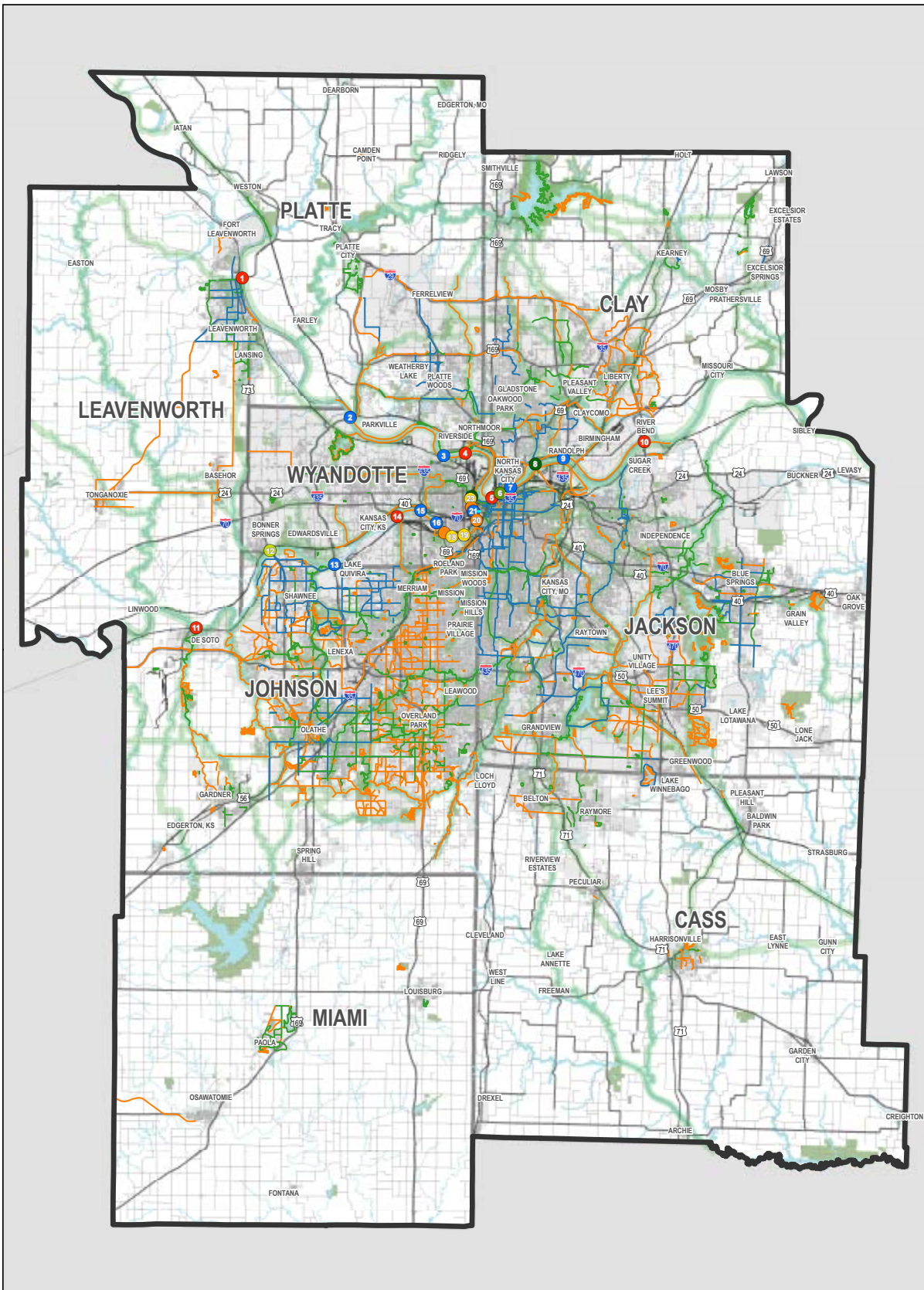
* U = Unknown E = Existing P = Planned/Proposed

In general, bridge and underpass bikeway crossings of freeways in the MARC planning area rate very poorly for bikeability, unless it is a crossing of a grade-separated path and a freeway. Bikeway crossings tend to occur at bridges or underpasses that serve as freeway interchanges, which typically have high traffic volumes and speeds. Additionally, interchange crossings often require crossing multiple ramps, which may not be controlled by a signal. Even if a shared use or bike lanes are provided at these crossings, they will likely provide a poor experience for the majority of bicyclists. When designating future bikeways in the Kansas City area, every effort should be made to utilize non-interchange crossings of freeways rather than crossings that involve an interchange.



MARC REGIONAL BIKEWAYS PLAN: Map 1 - Existing and Proposed Bikeways

Legend	
	Study Area
	County Border
	Incorporated City
	Park
	Water
	Highway
	Street
	Railroad
	Existing On-Street Bikeway
	Existing Off-Street Bikeway
	Proposed Bikeway
	MetroGreen Corridor



MARC REGIONAL BIKEWAYS PLAN: Map 2 - Bikeway Water Crossing Ratings

Legend

- Study Area
- County Border
- Incorporated City
- Park
- Water

Transportation

- Highway
- Street
- Railroad

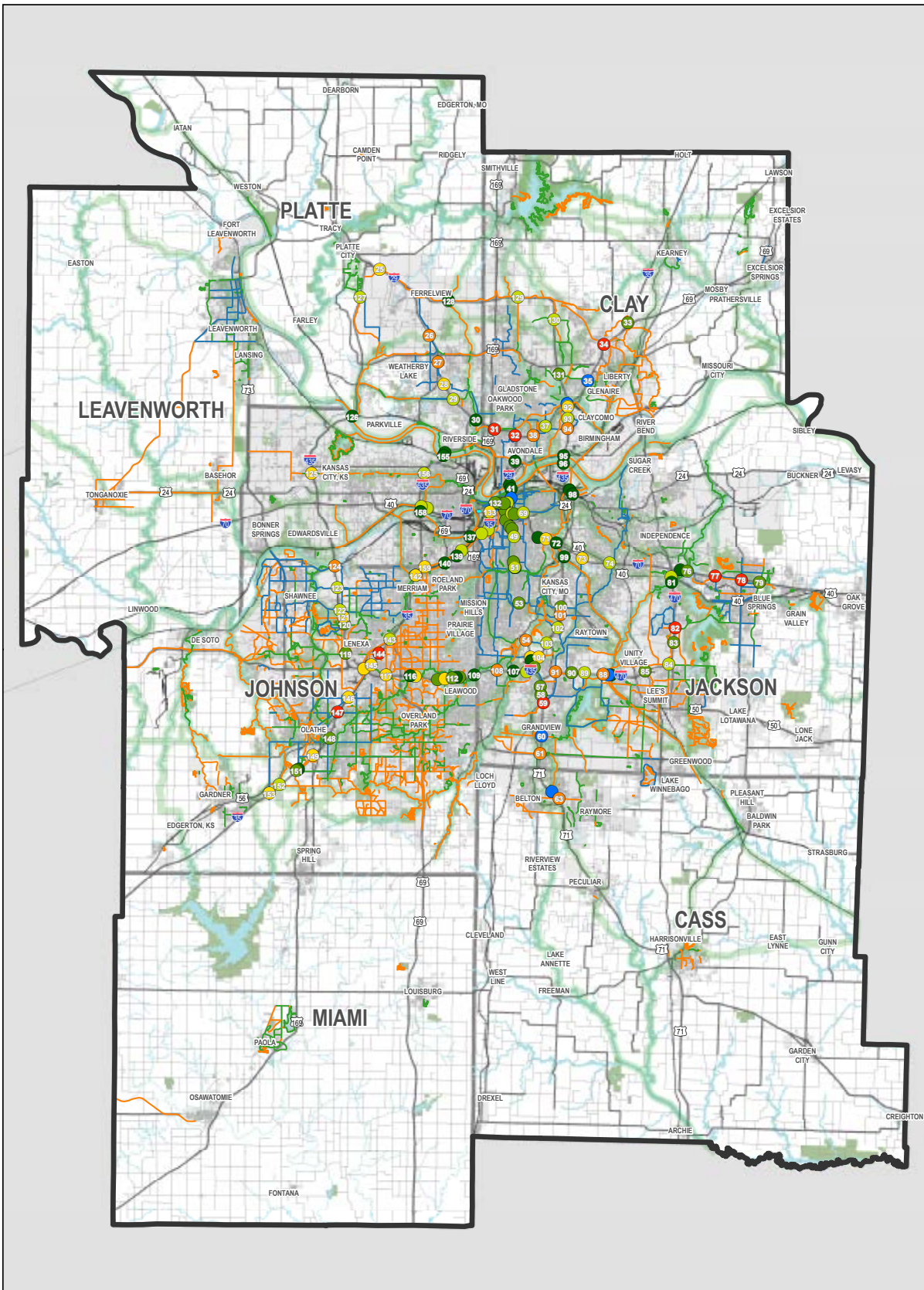
Bikeways

- Existing On-Street Bikeway
- Existing Off-Street Bikeway
- Proposed Bikeway
- MetroGreen Corridor

Barrier Crossing Rating

- A
- B
- C
- D
- E
- F
- Not Rated





MARC REGIONAL BIKEWAYS PLAN: Map 3 - Bikeway Freeway Crossing Ratings

Legend

- Study Area
- County Border
- Incorporated City
- Park
- Water

Transportation

- Highway
- Street
- Railroad

Bikeways

- Existing On-Street Bikeway
- Existing Off-Street Bikeway
- Proposed Bikeway
- MetroGreen Corridor

Barrier Crossing Rating

- A
- B
- C
- D
- E
- F
- Not Rated



This document is exempt under discovery or admission under 23 USC § 409. The collection of safety data in the Kansas City region is encouraged to actively address safety issues on regional, local and site-specific levels. Congress has enacted a law, 23 USC § 409, which prohibits the discovery or admission of crash and safety data from being admitted into evidence in a federal or state court proceeding. This document may contain wording, charts, tables, graphs, lists and diagrams for the purpose of identifying and evaluating safety enhancements in the Kansas City region. These materials are protected under 23 USC § 409. Congress' rationale behind 23 USC § 409 is that safety data is compiled and collected to help prevent future crashes, injuries and deaths on our nation's transportation system.

MARC Regional Bikeways Plan

Crash Data Summary

Bicycle Safety Hot Spots

Four years of bicycle crash data were used to analyze crash trends in the MARC region (including Cass, Clay, Jackson, and Platte counties, MO and Johnson, Leavenworth, Miami, and Wyandotte counties, KS). This bicycle crash analysis presents an overview of regional crash trends identifying temporal and demographic characteristics associated with crashes, as well as a more detailed spatial analysis to identify hot spots where bicycle crash densities are concentrated. The actual identification of hot spots follows this spatial analysis.

The overview of regional crash trends includes such data as injury severity, time of crashes, lighting conditions, and roadway conditions. Additionally demographic information such as age and sex of bicyclists is included. These region wide statistics allow for setting specific crash reduction goals and tracking long term progress toward these goals.

The spatial analysis looks at the location of bicycle crashes with respect to population density, employment density, automobile trips and environmental justice factors. Graphics representing each of these considerations are included in this document.

Bicycle crash *hot spots* represent locations where the number of bicycle crashes is abnormally high for the expected level of bicyclists' exposure. While bicyclists' exposure is difficult to directly measure (in terms of miles of bicycling occurring), some surrogate measures have been used for similar hot spot analyses. For this plan, we propose using the number of bicycle crashes per the number of daily auto trips originating in each Traffic Analysis Zone (TAZ) to identify the hot spots. GIS spatial analysis tools are used to identify bike crash hot spots.

Regional Bicycle Crash Trends

Bicycle crash trends were analyzed for the study counties for the four year period of 2009 – 2012. Crash data were obtained from MARC staff. The dataset is made up of a combination of Missouri data and Kansas data. Data for crashes and individuals were reviewed for each jurisdiction. Not all fields were available for each jurisdiction.

Yearly Bicycle Crashes

Five hundred ninety (590) bicycle crashes occurred in the study region over the study period.

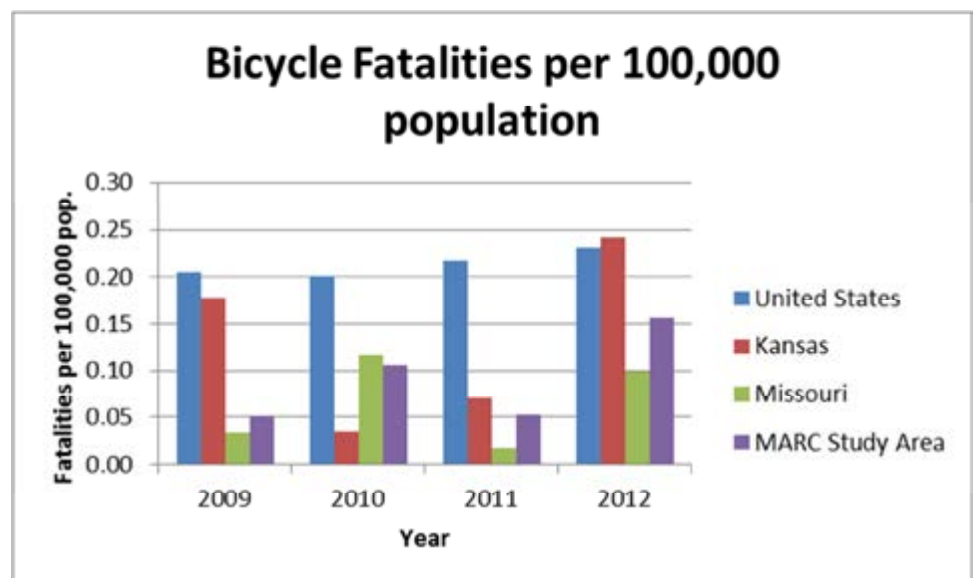
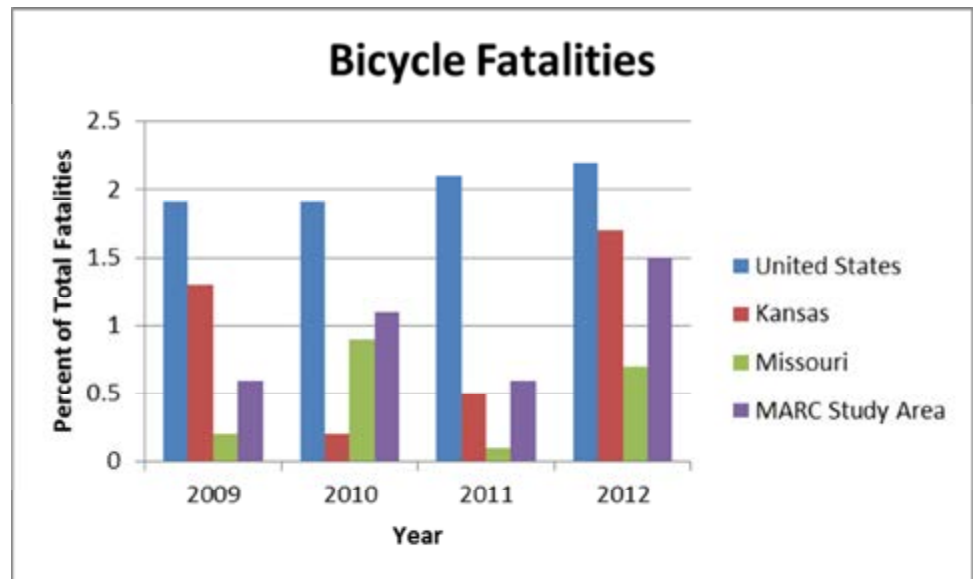
Year	2009	2010	2011	2012	Total	4-Year Average
Bicycle Crashes	139	136	148	167	590	148

Findings

When comparing bicycle fatality data in Kansas, Missouri, and the MARC study area, it is clear that each has a lower percent of total fatalities compared to the national average with no distinguishable trend from year to year.

In examining bicycle fatalities compared to population data, rates are also generally lower than the national average with no distinguishable trend from year to year.

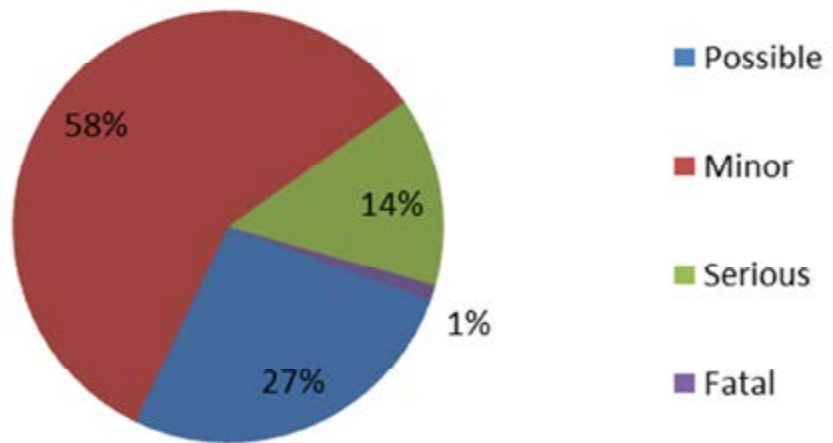
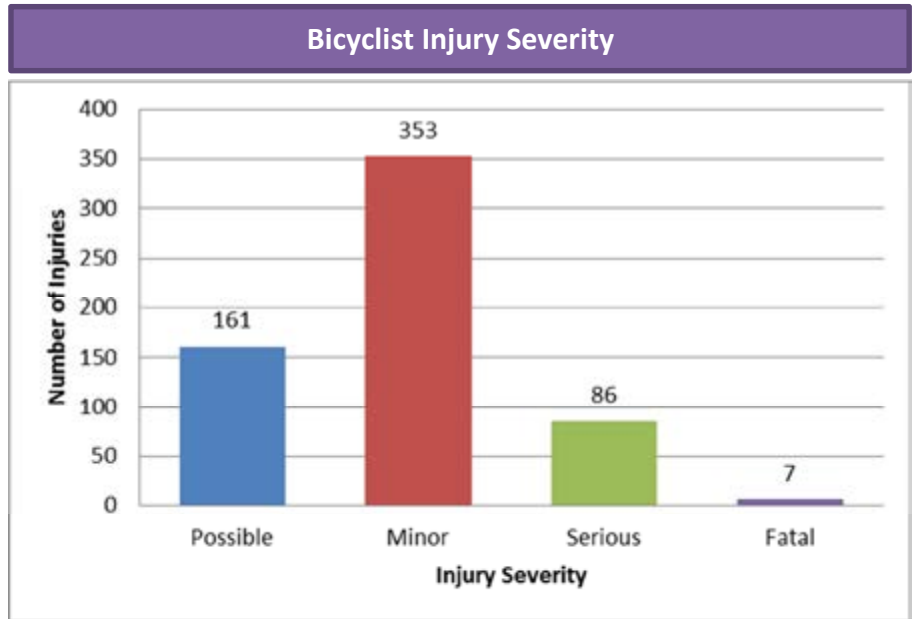
Thus, overall the MARC area would seem to have a better safety record than the overall United States as a whole.



Injury Severity

Most of the bicycle crashes reported resulted in minor injuries.¹ Minor injuries account for 58% of all the injuries. Slightly more than 1% of the injuries were fatal.

Note that five separate events resulted in an injury to the motor vehicle operator involved: these injuries are considered in the graphics presented to the right and throughout this report.

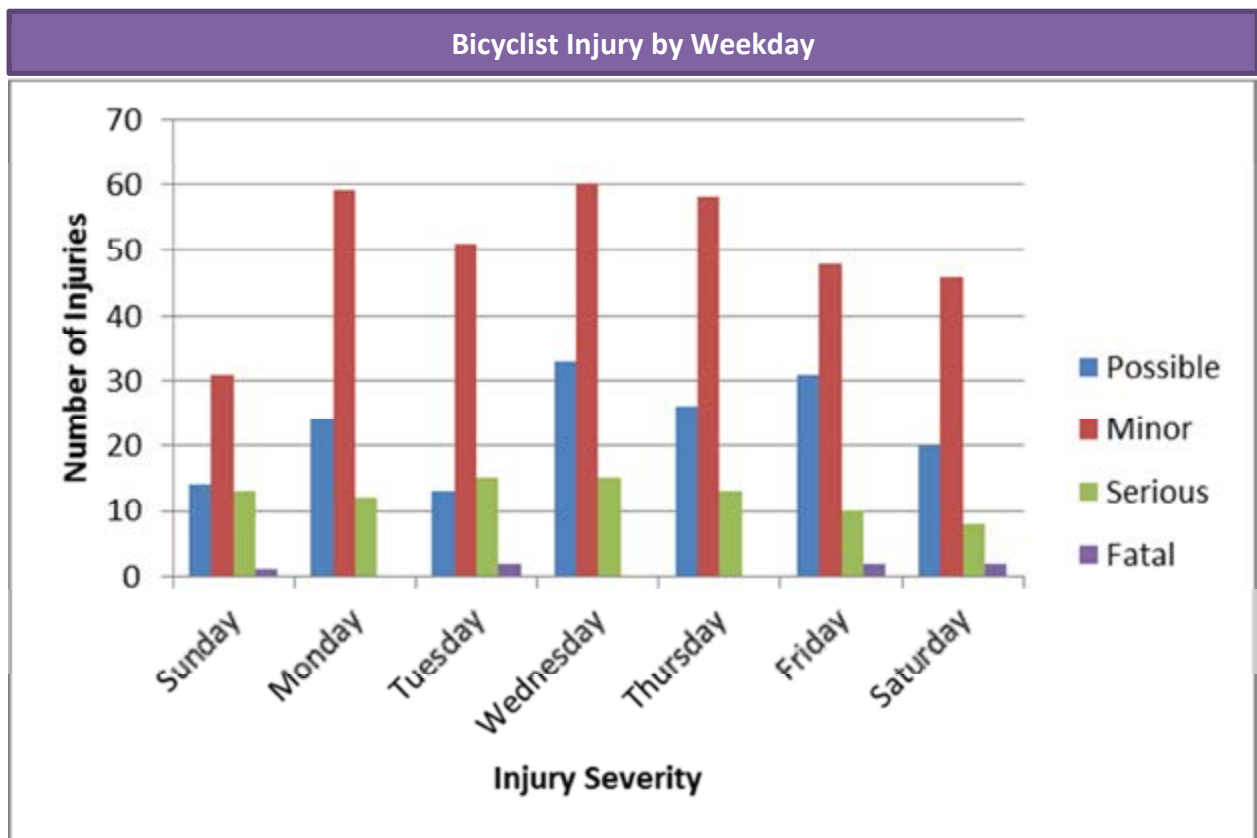


¹ Crash severity was noted differently in each state database. Both states reported fatal crashes. For the purposes of this report *Serious* and *Disabling* crashes are shown as *Serious*. *Minor* and *Non-Disabling* are shown as *Minor*. *PDO* and *Possible Injury* are shown as *Possible*. Some crashes had no code for injury severity; these are included in the *Possible* category.

Day of Week

Weekday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Bicyclist Crashes	58	93	80	105	93	86	75

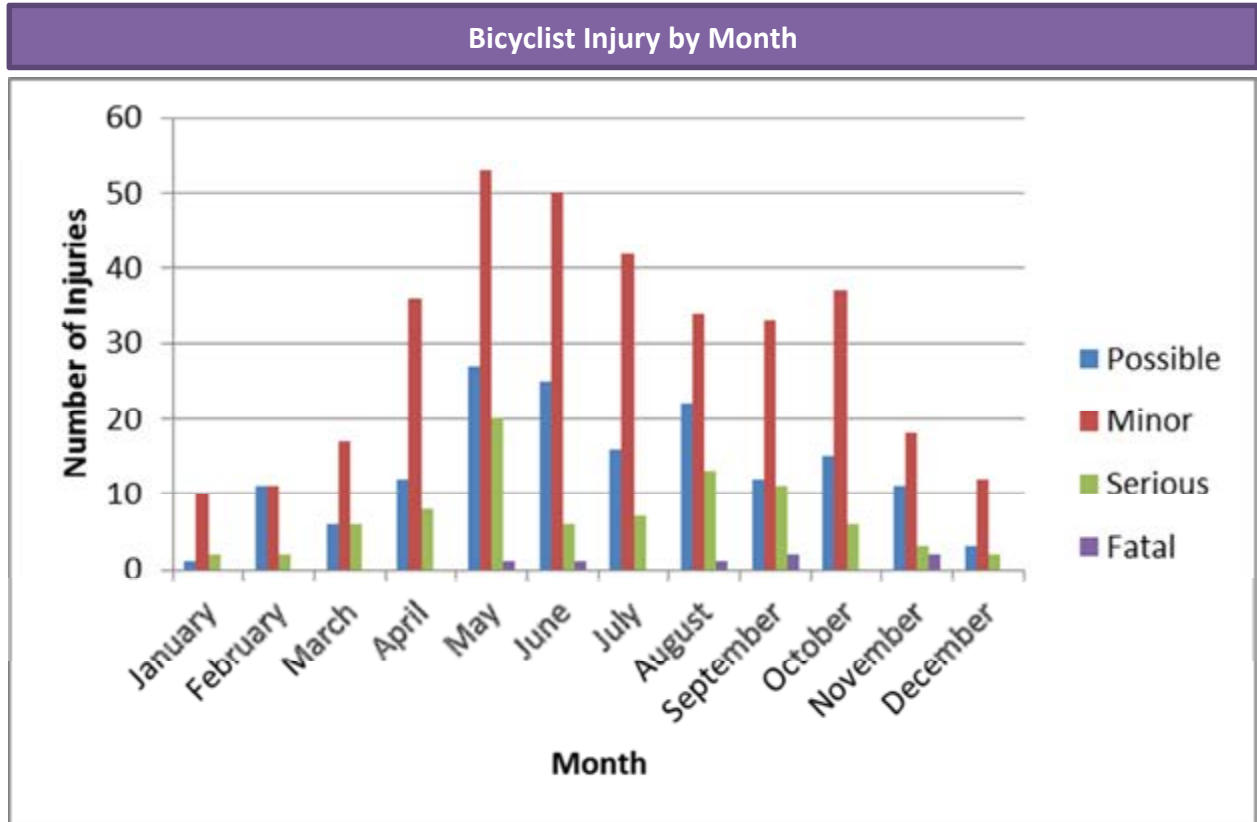
The number of crashes on weekdays is higher than on weekends. Several factors may contribute to this trend. Utilitarian riders are more prevalent on weekdays; that is bicyclists are riding during rush hours in higher traffic volumes than on weekends. Weekday utilitarian riders also may choose routes they would otherwise avoid if riding for recreational purposes. Additionally, weekend riding is frequently recreational, occurring during lower traffic periods, and on roadways that are more comfortable for bicycling.



Month of Year

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bicycle Crashes	12	24	28	55	99	80	62	68	55	57	33	17

The number of bicycle crashes by month shows a clear trend. Fewer bicycle crashes occur in colder months. This is likely tied to a reduction in bicycling activity.



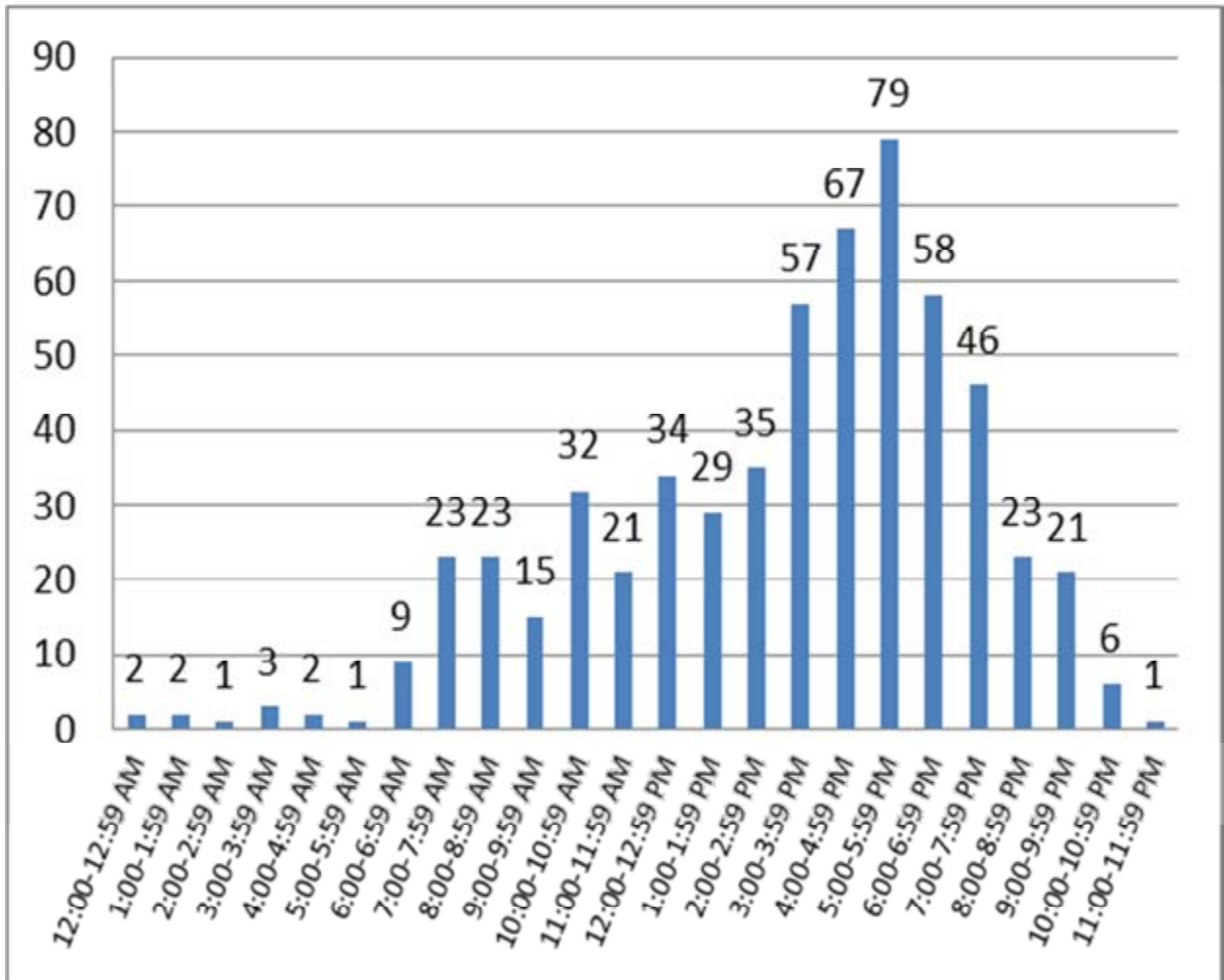
Time of Day

Morning	12:00-12:59	1:00-1:59	2:00-2:59	3:00-3:59	4:00-4:59	5:00-5:59	6:00-6:59	7:00-7:59	8:00-8:59	9:00-9:59	10:00-10:59	11:00-11:59	Total
Number of Crashes	2	2	1	3	2	1	9	23	23	15	32	21	134

Afternoon	12:00-12:59	1:00-1:59	2:00-2:59	3:00-3:59	4:00-4:59	5:00-5:59	6:00-6:59	7:00-7:59	8:00-8:59	9:00-9:59	10:00-10:59	11:00-11:59	Total
Number of Crashes	34	29	35	57	67	79	58	46	23	21	6	1	456

A vast majority of crashes occurred between the hours of 7:00 AM and 10:00 PM. There appears to be a slight peak in the morning between 7:00 and 9:00 AM. This would coincide with the morning commute period. The crashes increased from 2:00 PM to 5:00 PM, at which point crashes decreased into the later hours of the day. Crash volumes drop off significantly at 8:00 PM. There were more than three times the number of crashes in the afternoon as compared to the morning. This is likely due to higher volumes of automobiles and bicyclists present during afternoon hours: commuters, after school bicyclists, and early evening recreational riders.

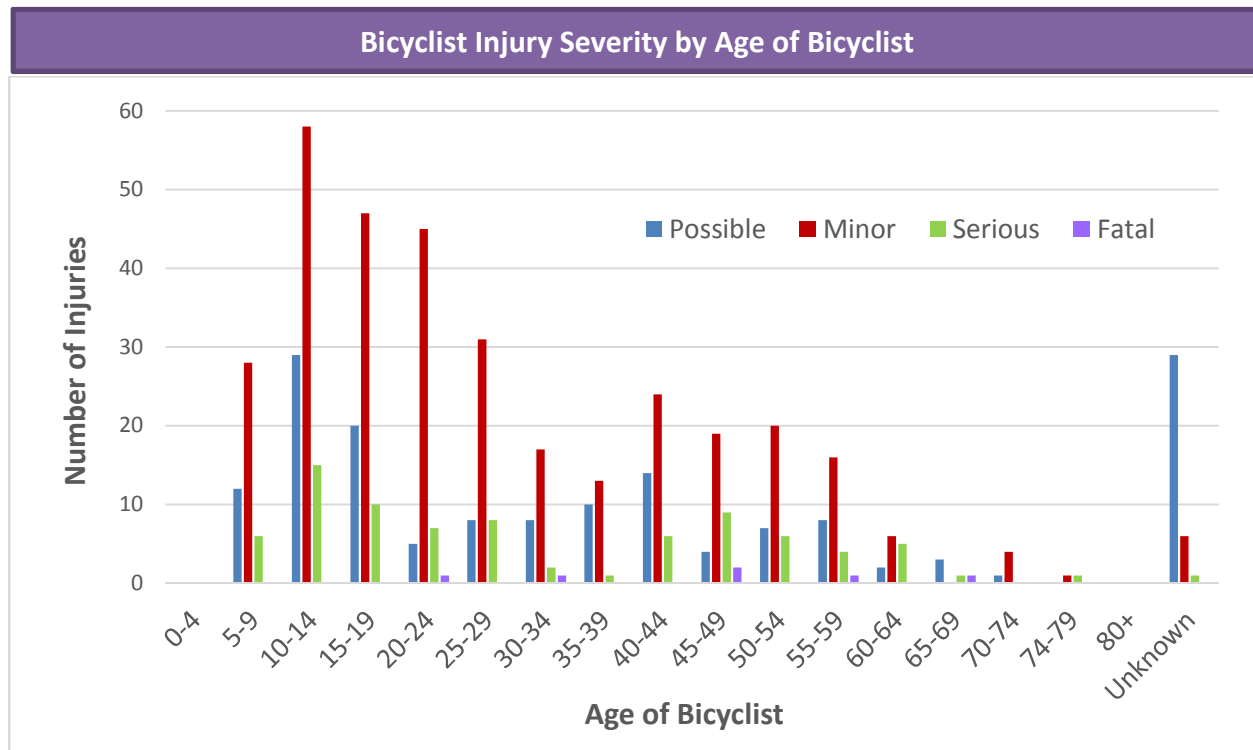
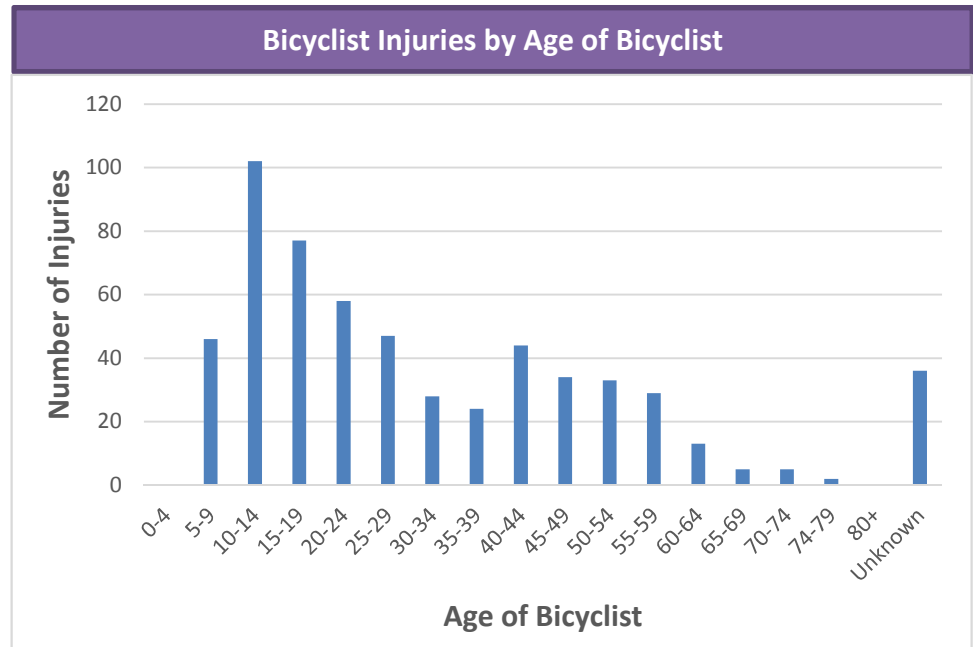
Bicyclist Injury by Time of Day



Age^{2,3}

Data show that young bicyclists, particularly those in their preteen years, are more likely to be involved in crashes than older bicyclists. The number of bicycle crashes decreases generally steadily with age (with a somewhat steeper decline in the 30-39 age range).

The same trend is present for different bicycle crash severities, though individual severities are somewhat more variable by age.

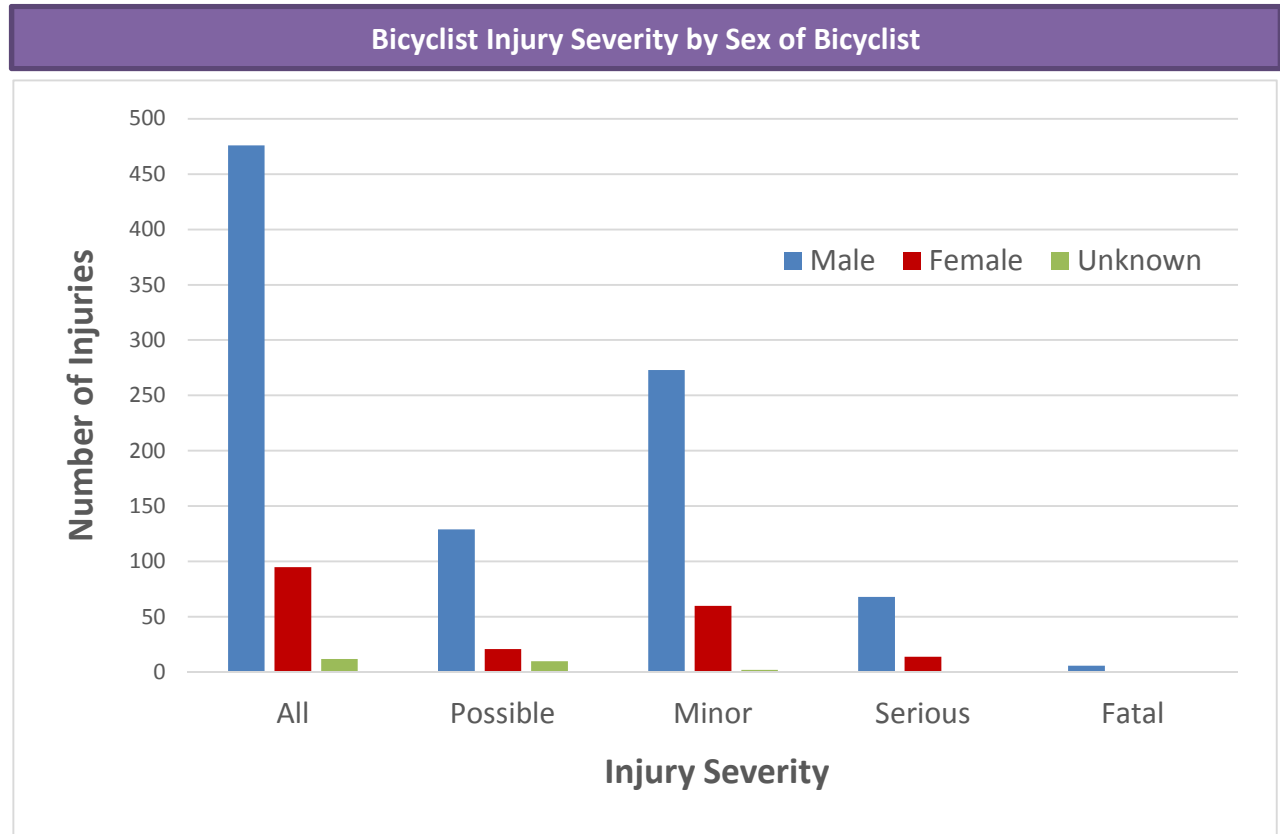


² Age, sex, and contributing cause data are from a different database than the other categories. This database is person-based rather than crash-based and includes a slightly lower overall number of crashes (583 versus 590).

³ The Kansas database is based on crash year rather than crash date, so some ages may be one year off of actual.

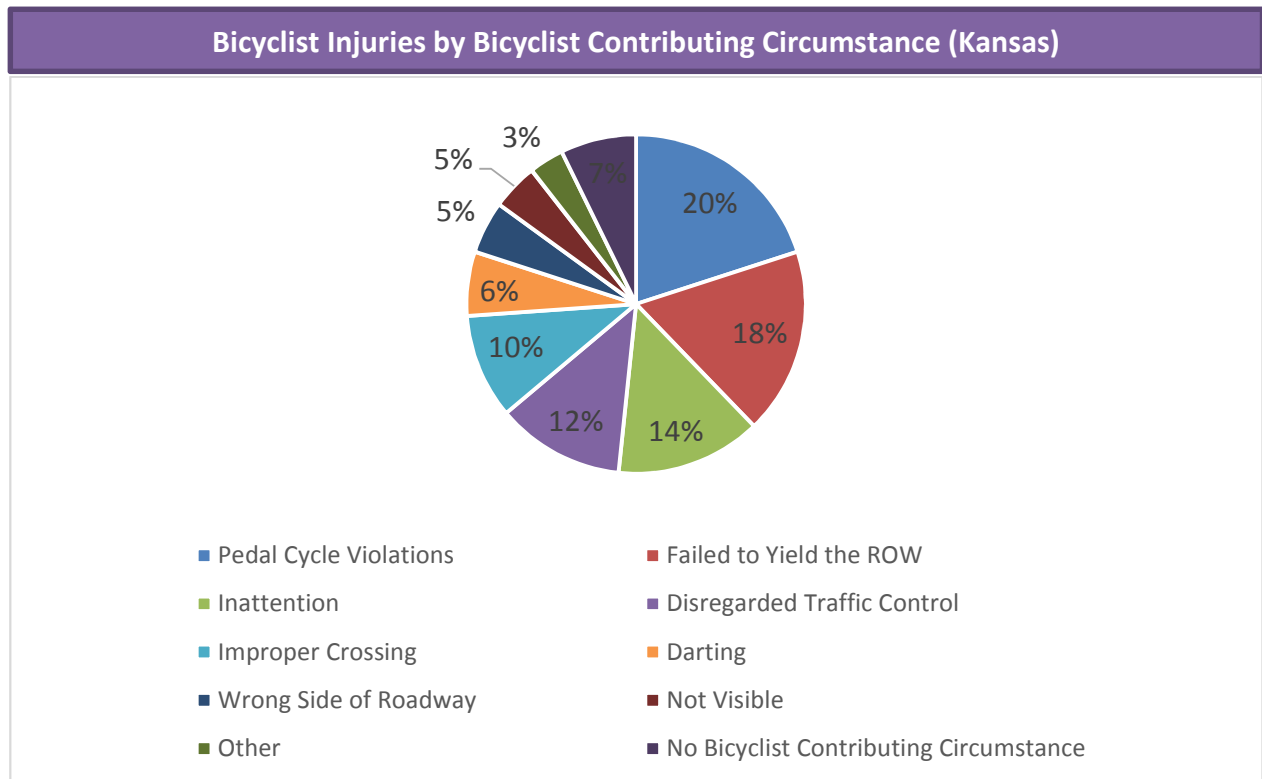
Sex

Data show that males were much more likely to be involved in bicycle-related crashes than females, as they represented more than five times as many crashes as females did from 2009-2012. Males also sustained significantly more serious injuries and fatalities than females.

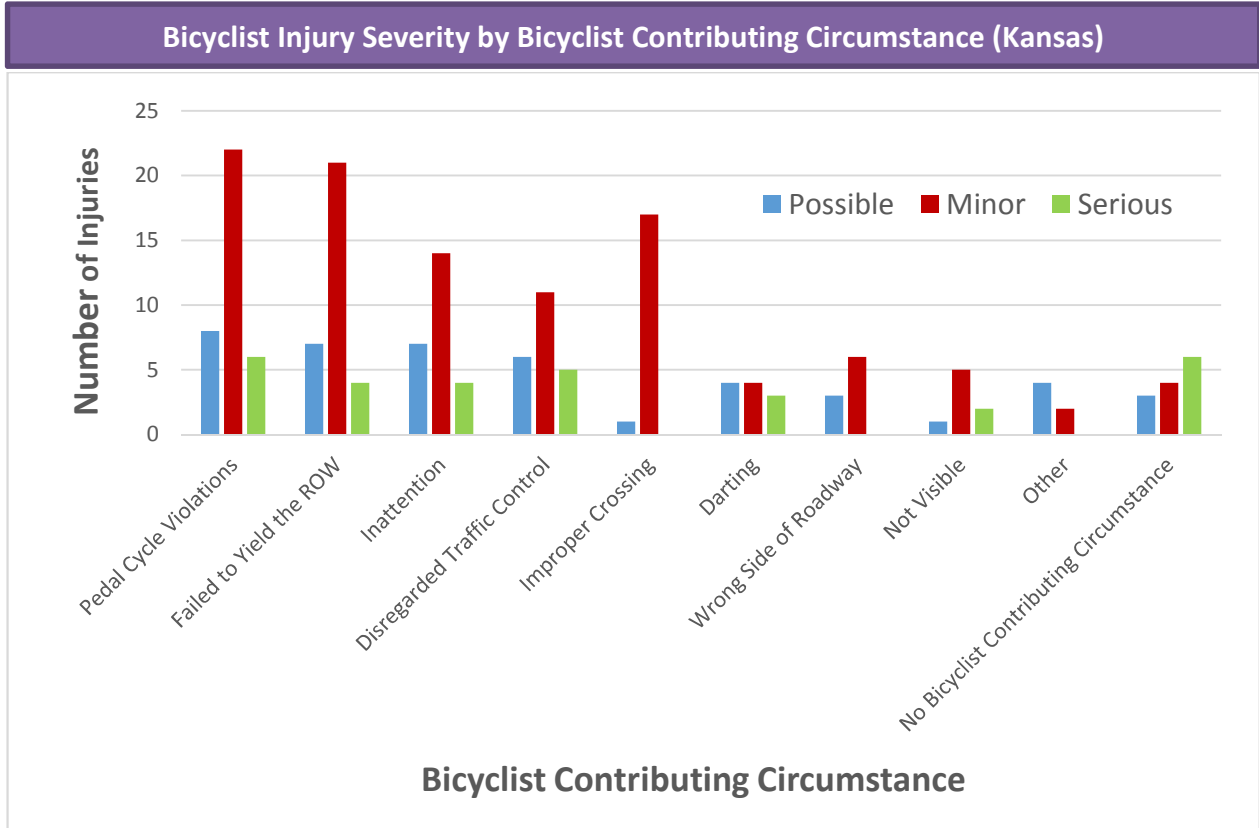


Bicyclist Contributing Circumstance⁴

During the study period 167 bicyclist injuries were associated with an identified contributing circumstance on the part of the bicyclist. Most prevalent among the specific contributing circumstances were failure to yield the right of way, inattention, disregard of traffic control devices, and improper crossing.

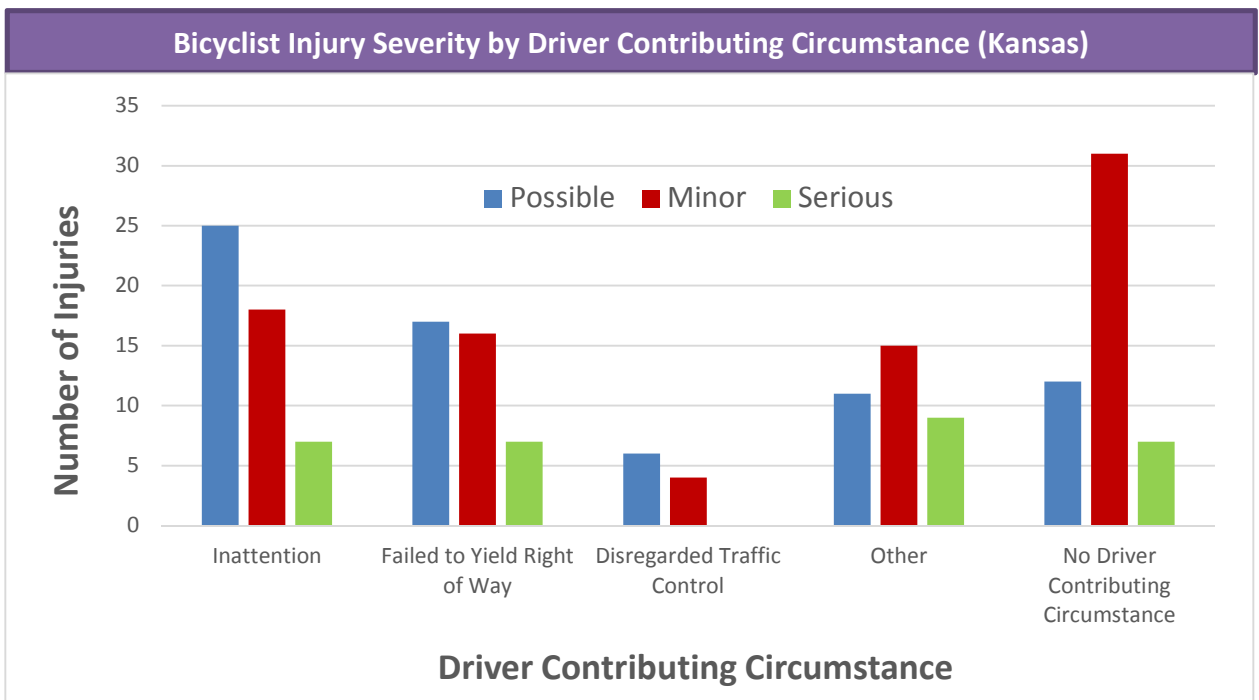
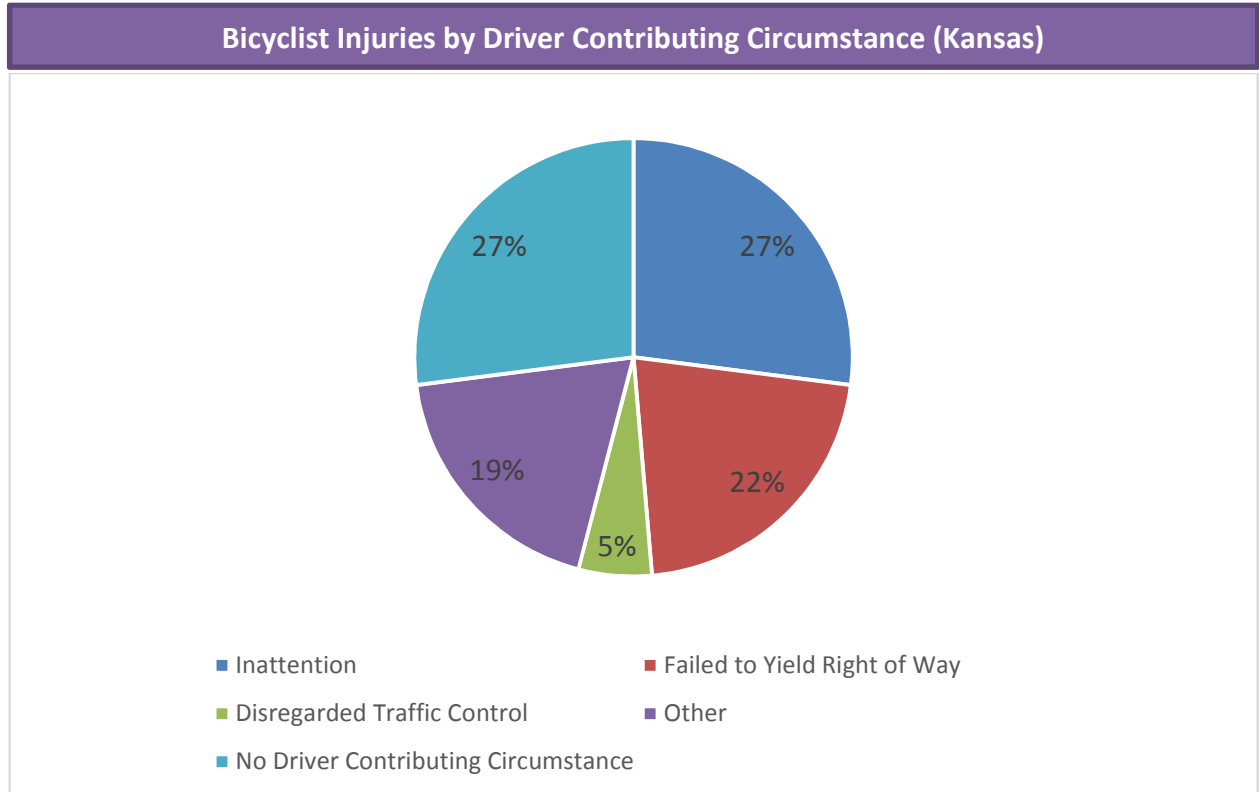


⁴ Contributing circumstance data are for Kansas only and exclude crashes in which the field was not entered. This represented 40% of the crash dataset.



Driver Contributing Circumstance

Driver-related contributing circumstances were somewhat less prevalent overall (135 total reported) than for bicyclists, and included many of the same items among the most prevalent.

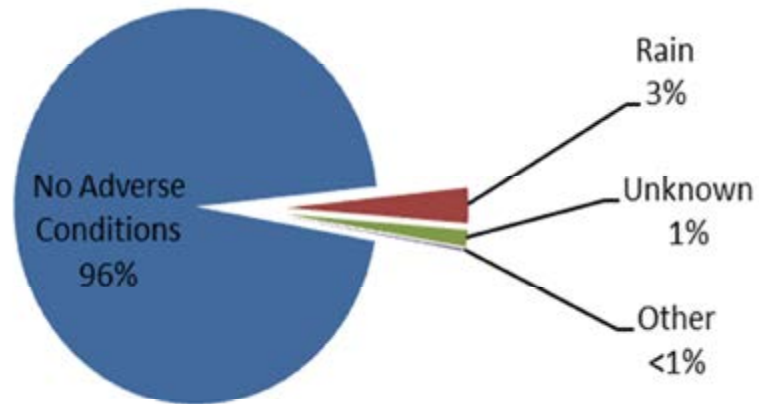


Weather Conditions

A vast majority of bicycle crashes occurred during clear, cloudy, or otherwise non-adverse weather conditions. Only three percent of crashes occurred during rain, one percent during unknown or non-recorded conditions, and only one single incident involving any other kind of weather conditions. This trend would be consistent with expectations: a lesser volume of bicyclists during bad or undesirable weather conditions.

Bicycle Crashes by Weather Condition

Weather Type	No Adverse Conditions	Rain	Unknown	Other
Number of Crashes	564	17	8	1

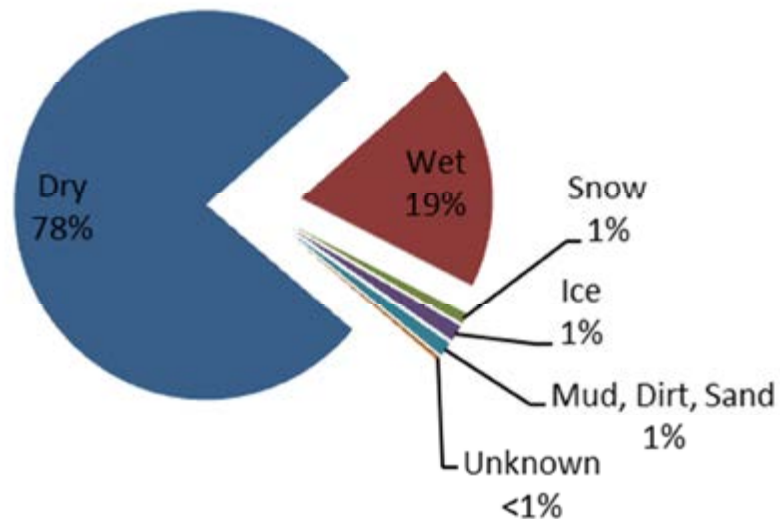


Road Surface Condition

Most bicycle crashes, 78%, occurred on dry roads and 19% occurred on wet roads. All other road surface conditions including, snow, ice, mud, dirt, and sand account for only three percent of crashes. Again, this suggests a reduction in volume of bicyclists during undesirable conditions.

Bicycle Crashes by Road Surface Condition

Road Surface Condition	Dry	Wet	Snow	Ice	Mud, Dirt, Sand	Unknown
Number of Crashes	457	111	5	8	7	2

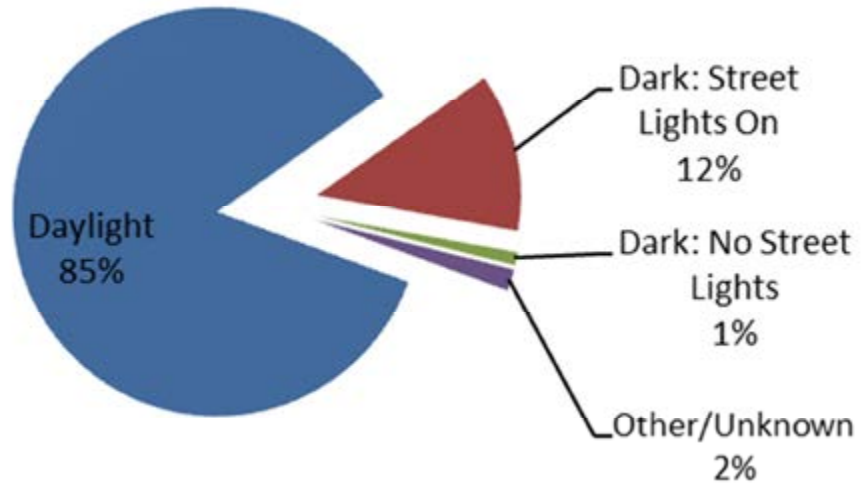


Light Conditions

Most bicycle crashes, 85%, occurred during daylight conditions: this includes dawn and dusk. The second most number of crashes occurred during dark lighting conditions with streetlights on. The remaining three percent of crashes occurred during dark lighting conditions with no street lights and other/unknown conditions. This suggests a higher volume of bicyclists during daylight hours.

Bicycle Crashes by Light Condition

Light Condition	Daylight	Dark: Street Lights On	Dark: No Street Lights	Other/Unknown
Number of Crashes	500	74	6	10

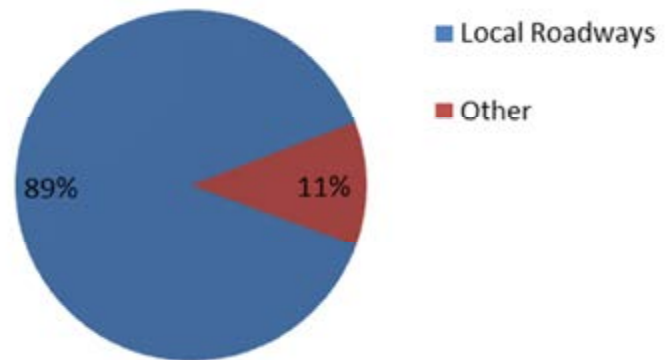


Facility Type

The majority of bicyclist injuries, about 89%, occurred on local roadways. Sixty-nine of the 607 total injuries occurred on “other” facilities including US highways, interstate highways, and facilities which are part of the state highway system. There was a slight jump in local roadway injuries in 2012. There are slightly more injuries, 607, than bicycle crashes, 590, because some events resulted in injuries to multiple parties. Crashes which resulted in only property damage or those which reported no injuries were considered under the “Possible Injuries” category.

Bicycle Injuries by Facility Type

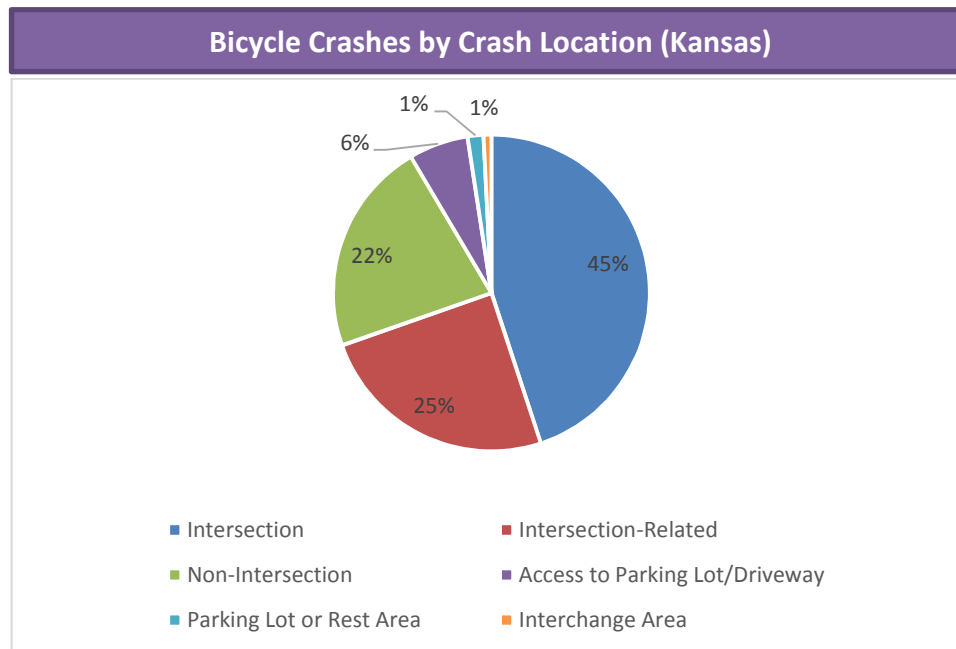
Facility Type	2009	2010	2011	2012	Total	4-year Avg.
Local Roadways	123	129	132	154	538	135
Other	18	14	19	18	69	17



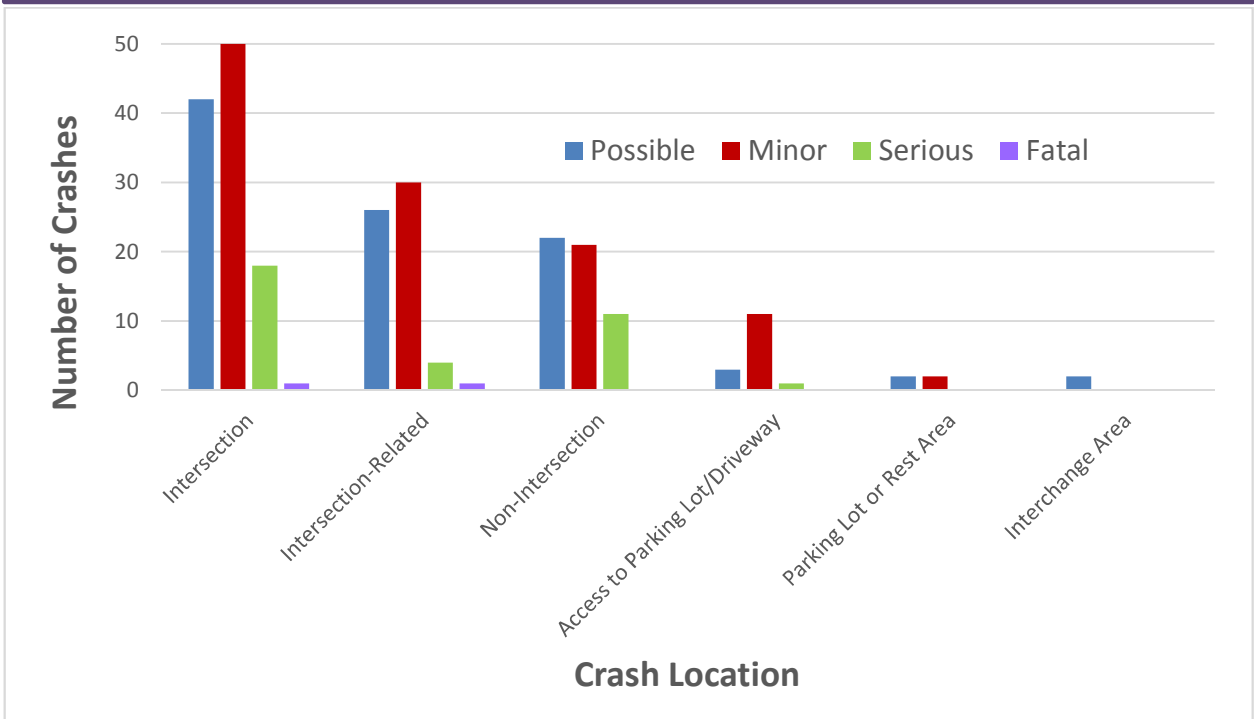
Facility Type	Total Crashes	Total Injuries	Possible Injuries	Minor Injuries	Serious Injuries	Fatalities
Local Roadways	522	538	150	313	72	3
Other	68	69	11	40	14	4
Sum	590	607	161	353	86	7

Crash Location

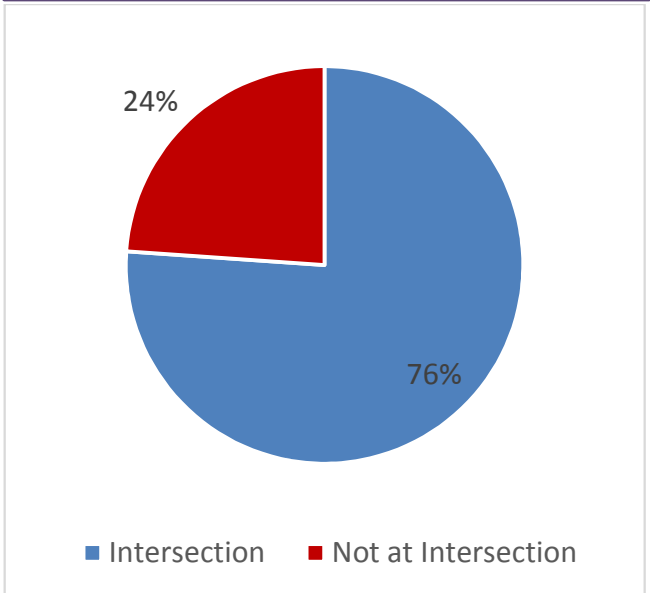
The Kansas and Missouri datasets report location information at different levels of detail. In the datasets, 45% of the Kansas area crashes occurred at intersections versus 76% in Missouri, but the latter figure may include intersection-related crashes, which represent another 25% of the Kansas crashes. Injury severity does not appear to vary significantly based on this variable.



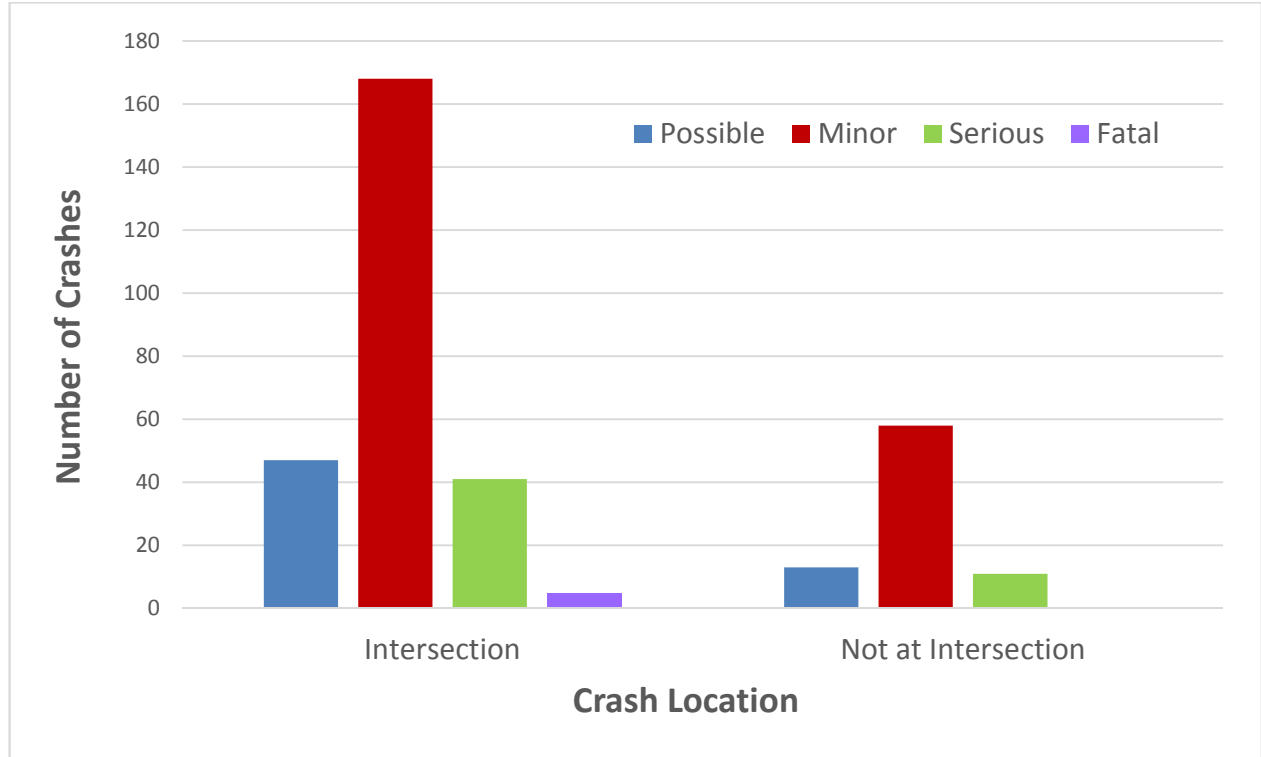
Bicyclist Injury Severity by Crash Location (Kansas)



Bicycle Crashes by Crash Location (Missouri)



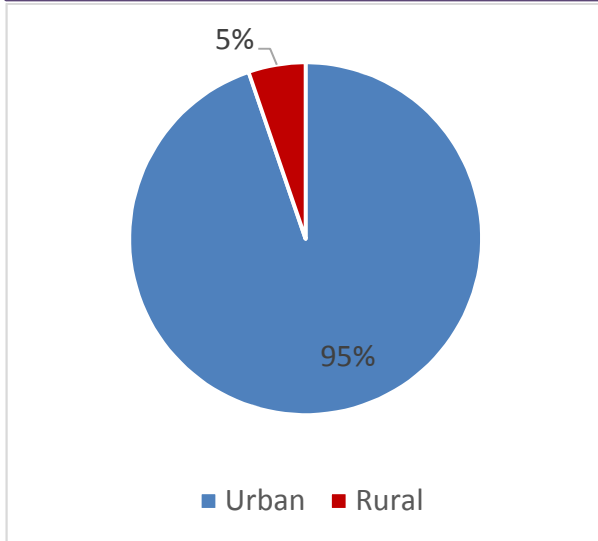
Bicyclist Injury Severity by Crash Location (Missouri)



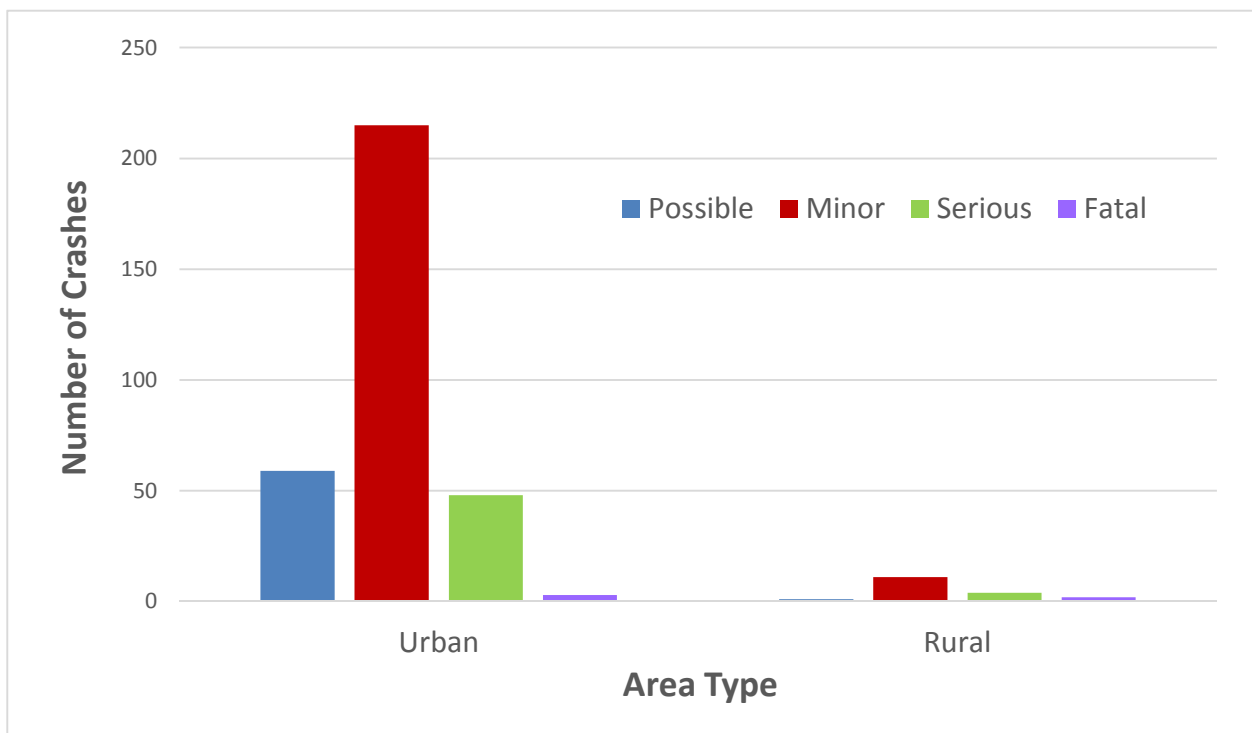
Area Type

Missouri data include a code for the crash area type, urban versus rural. The vast majority of crashes during the study period occurred in urban areas. Although the sample size of rural crashes is small (18), serious and fatal injuries are more commonly associated with rural crashes (33%) than with urban crashes (16%). This could be due to higher speeds on rural roadways.

Bicycle Crashes by Area Type (Missouri)



Bicyclist Injury Severity by Area Type (Missouri)



Alcohol/Drug Related

The Kansas database includes crashes flagged for drug or alcohol involvement (bicyclist or motorist). Incidence is very low, with only two crashes (of 243 total) associated with alcohol and one associated with drugs.

Spatial Analysis

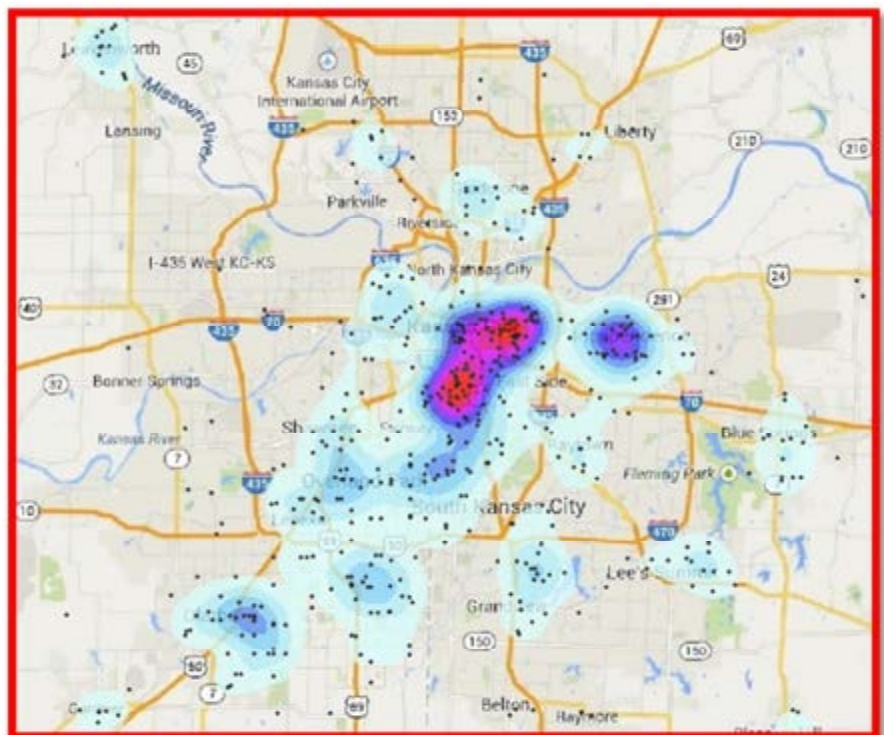
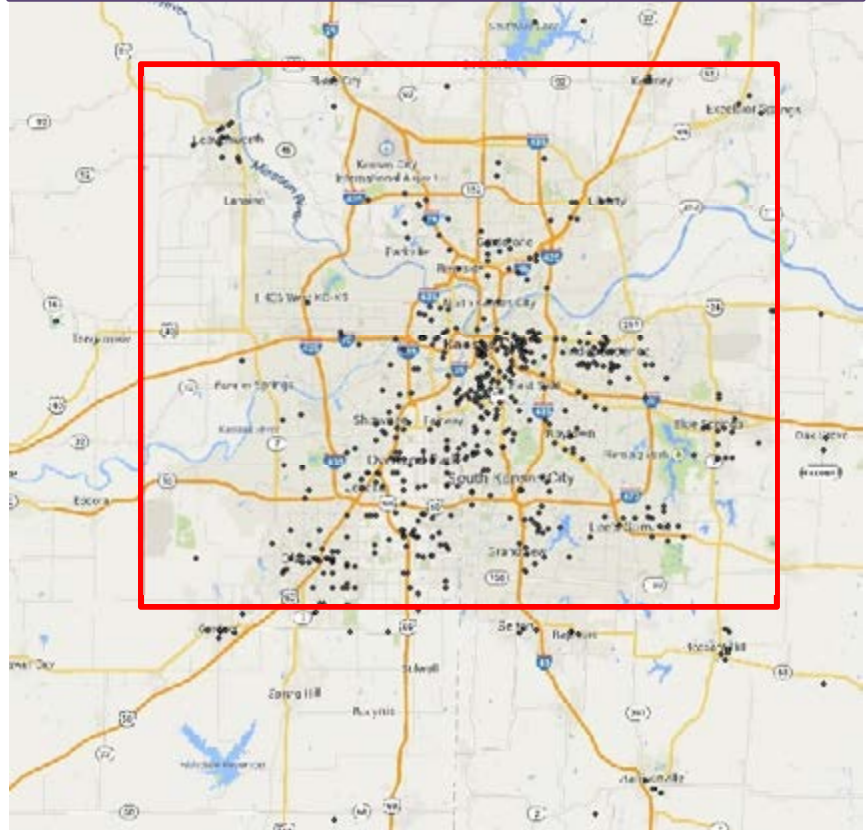
In addition to the tabular analysis of bicycle crash data, a geographical analysis of MARC's regional planning boundary area was conducted.

Using ArcMap and GIS coordinates, bicycle crash locations (shown as dots) were mapped around the Kansas City area including events in Cass, Clay, Jackson, and Platte Counties, MO and Johnson, Leavenworth, Miami, and Wyandotte Counties, KS.

Crash densities were also mapped (shown by colored hot spots) with a focus on the majority of crashes located in the downtown region of Kansas City. A large concentration of crashes occurred in the core of the metropolitan area with events generally decreasing relative to distance from downtown.

The highest concentration of crashes was located in northwestern Jackson County, MO. Notable high crash concentrations also include the areas around Independence, Lee's Summit, Gladstone, Raytown, and Grandview, MO; the two former cities being the fourth and sixth largest cities in Missouri, respectively. Notable high crash concentrations in Kansas include the cities of Leavenworth, Overland Park, and Olathe. Many of these cities are located near major highways, suggesting a relatively high volume of bicyclists and motor vehicles.

Bicycle Crash Locations in the Kansas City Region, 2009-2012

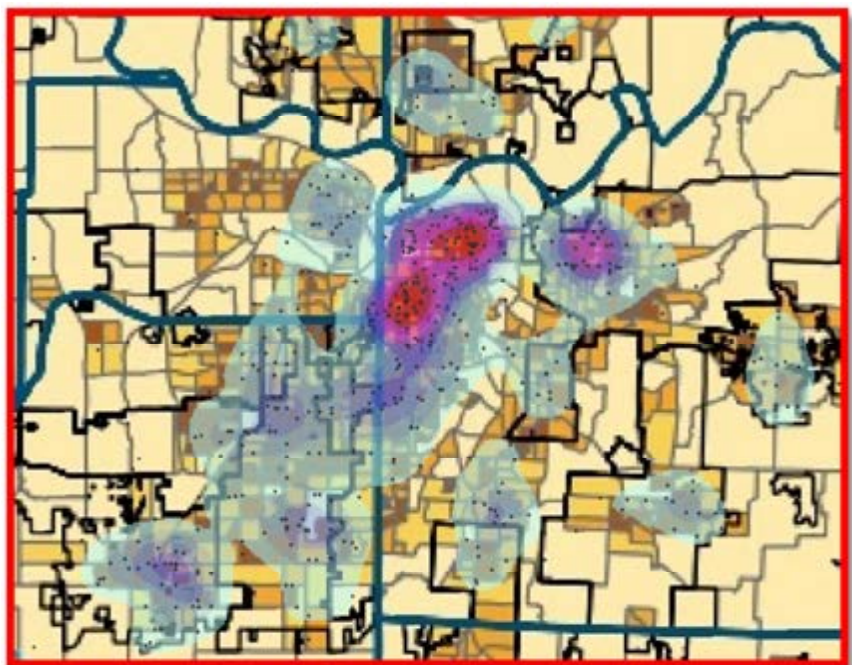
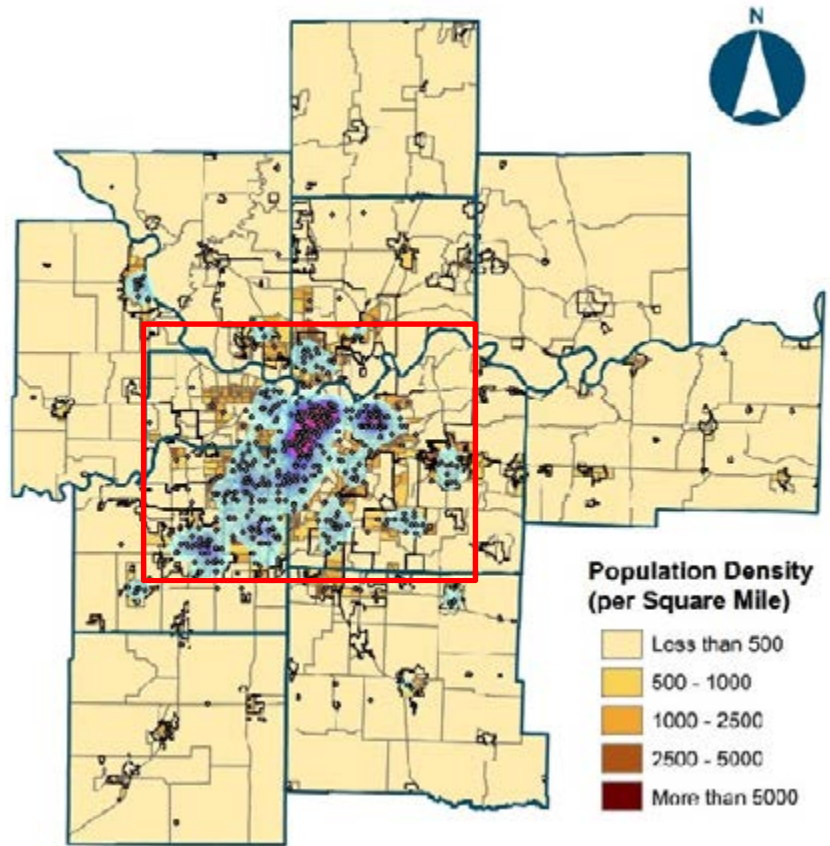


Generally, regions with high population densities also had high bicycle crash concentrations.

Bicycle Crash Locations in the Kansas City Region, 2009-2012, Population Density

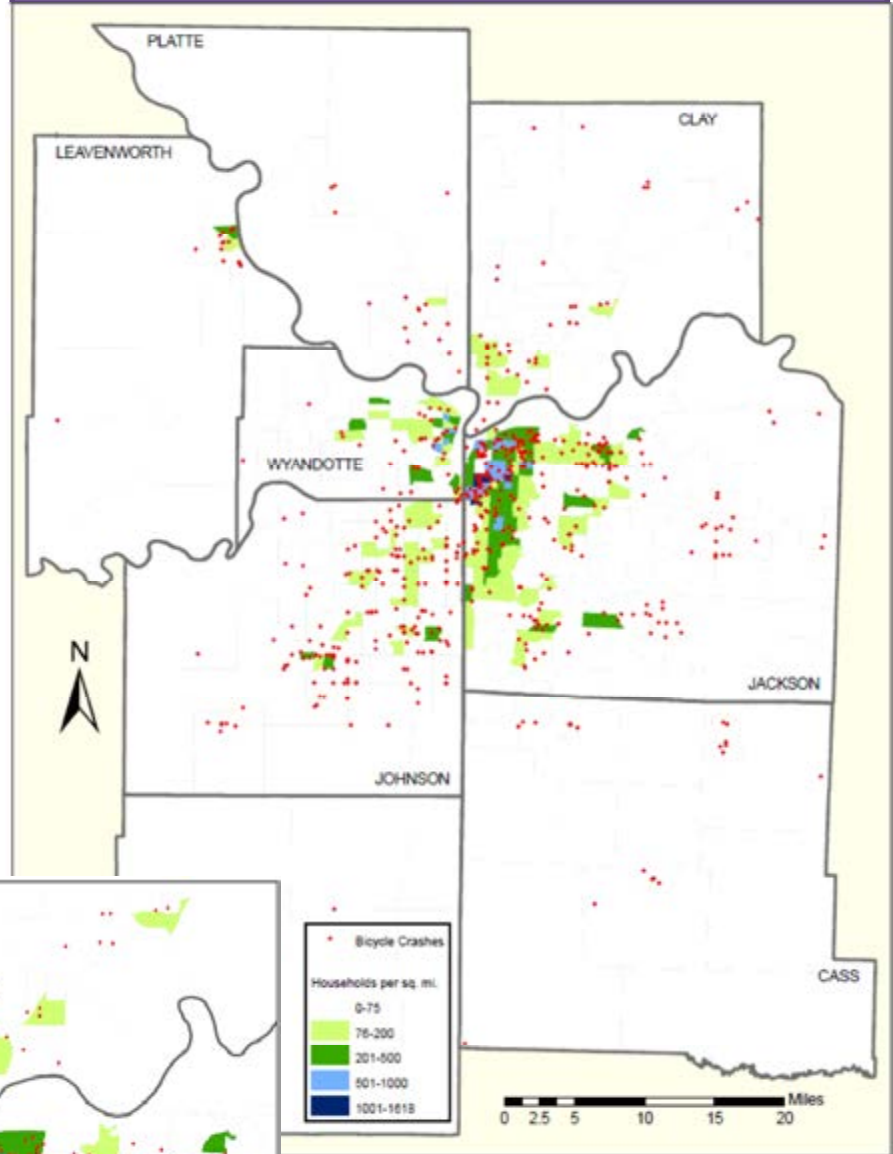
Regions in central downtown Kansas City with the highest number of bicycle crashes often had a corresponding high population density. Areas with large concentrations of population and employment surrounding activity centers generally have higher traffic and bicyclist volumes. This may indicate why the highest concentration of bicycle crashes occurred in the downtown area.

Similarly, areas on the outer edges of central downtown with high population densities also had a correspondingly high number of bicycle crashes. This trend can be seen visually in the areas with higher crash densities that are separated from the downtown cluster.

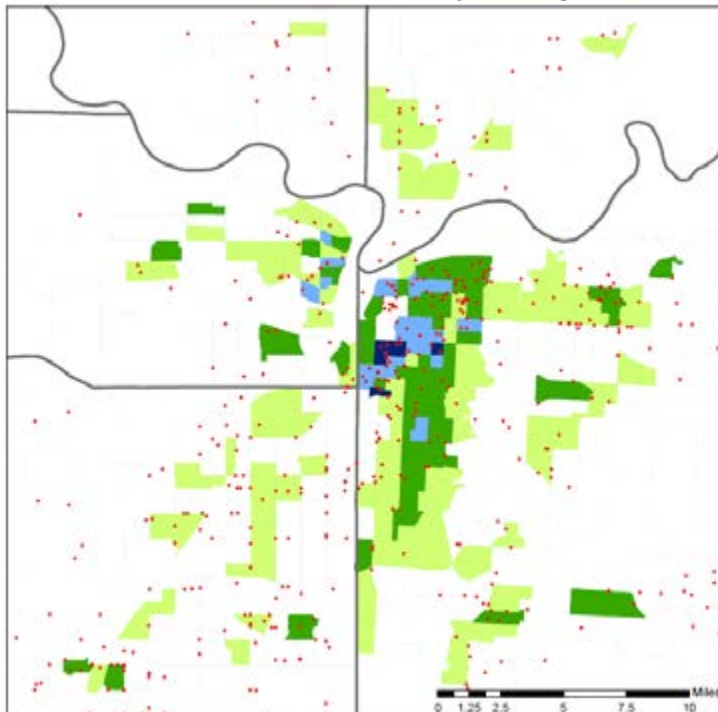


There appears to be a correlation between vehicle ownership and bicycle crashes. Those areas with a high density of zero (motor) vehicle households have increased densities of bicycle crashes. This is likely due to an increase in exposure resulting from the need to use bicycles for transportation.

Bicycle Crash Locations in the Kansas City Region, 2009-2012, Zero Vehicle Households per Mile



Detailed of crash locations in the Kansas City Region



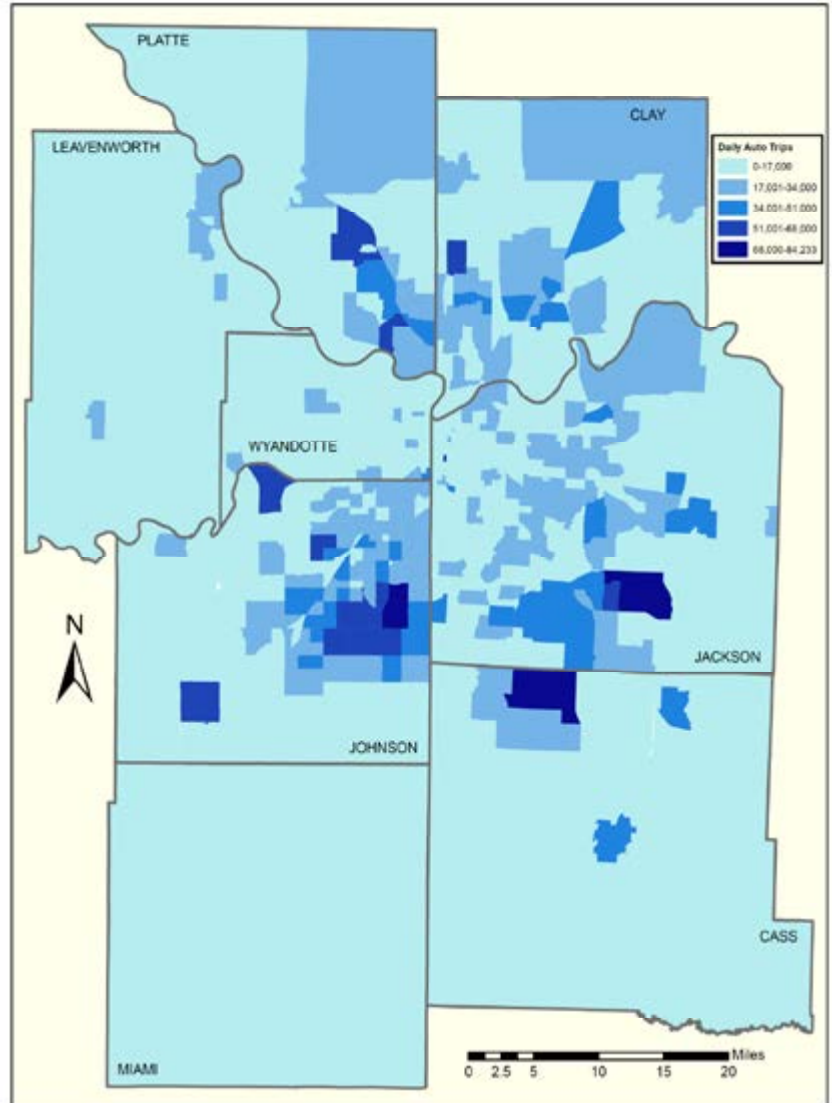
Analysis by TAZ

Traffic Analysis Zones (TAZs) are relatively small areas of land use activity that serve as the primary unit of analysis for travel demand models. They are used to predict where trips begin and end using MARC's travel-demand model. This is a mathematical model — taking into account traffic volumes, land use, roadway type, and population — that predicts travel patterns and trip generation statistics for particular geographic areas throughout the region.

The following series of maps integrates the TAZ data with bicycle crash data.

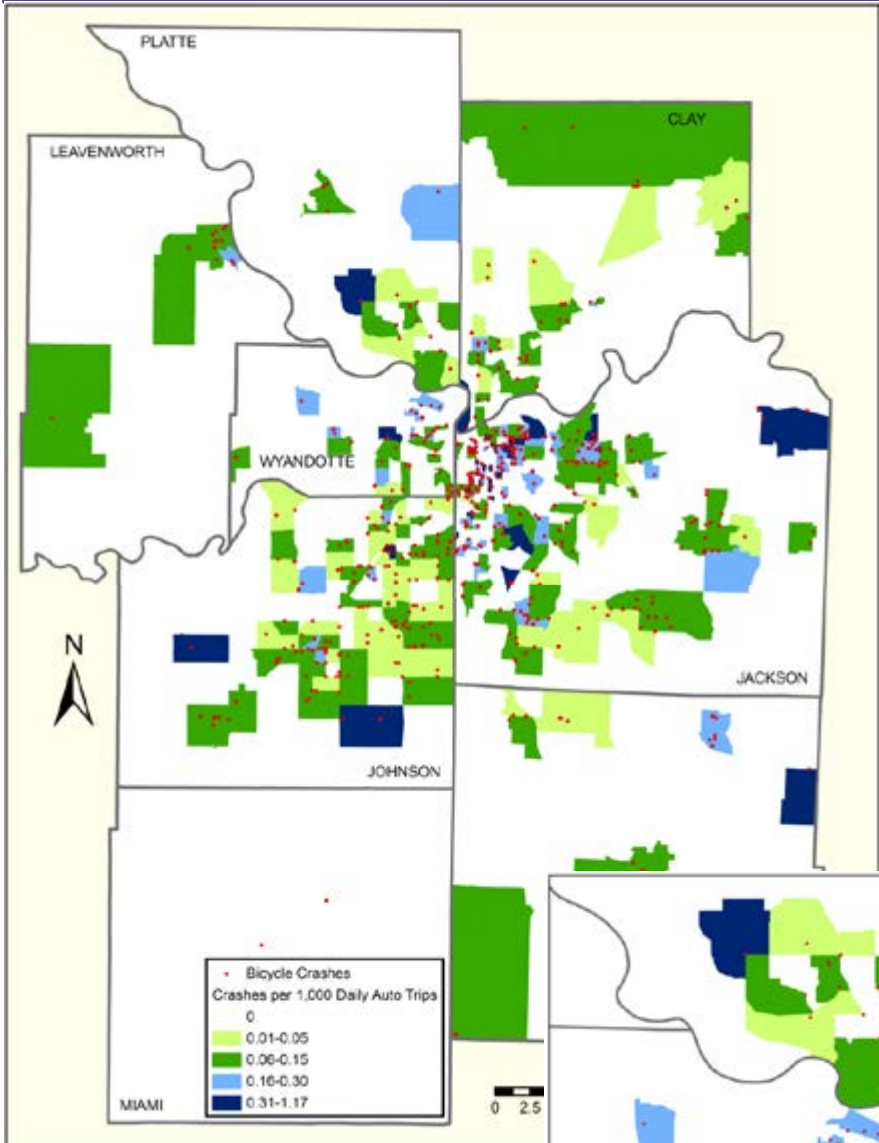
TAZ's are identified by land use. It should be remembered that the daily auto trips per TAZ vary widely across the MARC region. Some TAZ's generate none while the maximum is more than 84,000 trips per day.

Auto Trips per TAZ in the Kansas City Region, 2009-2012,

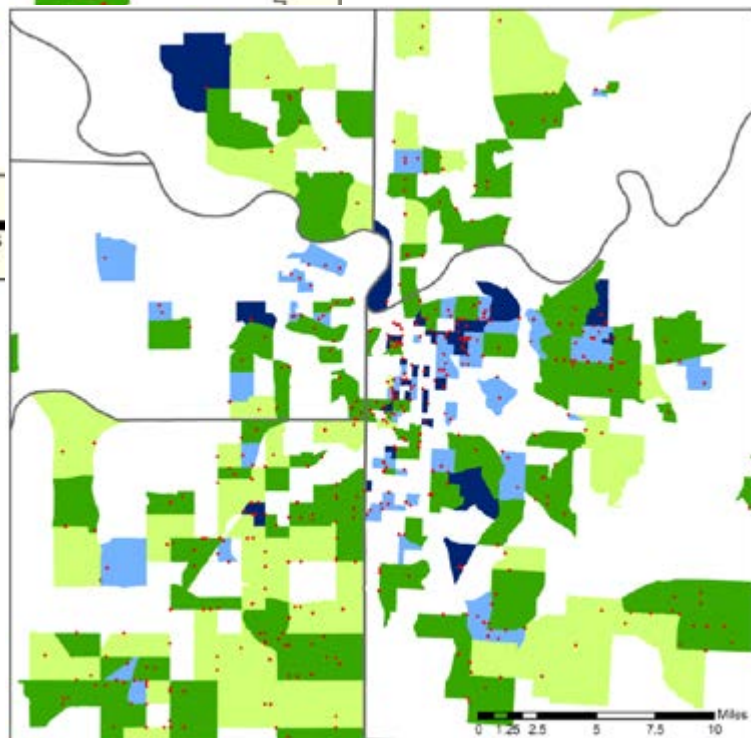


Bicycle Crash Locations in the Kansas City Region, 2009-2012, per Auto Trips per TAZ

One method of identifying high crash locations is to compare the bicycle crashes to some measure of exposure. For example, auto trips per TAZ could be used to represent overall travel demand. This graphic represents the bicycle crashes per 1,000 auto trips per TAZ with the bicycle crash locations represented by red dots.

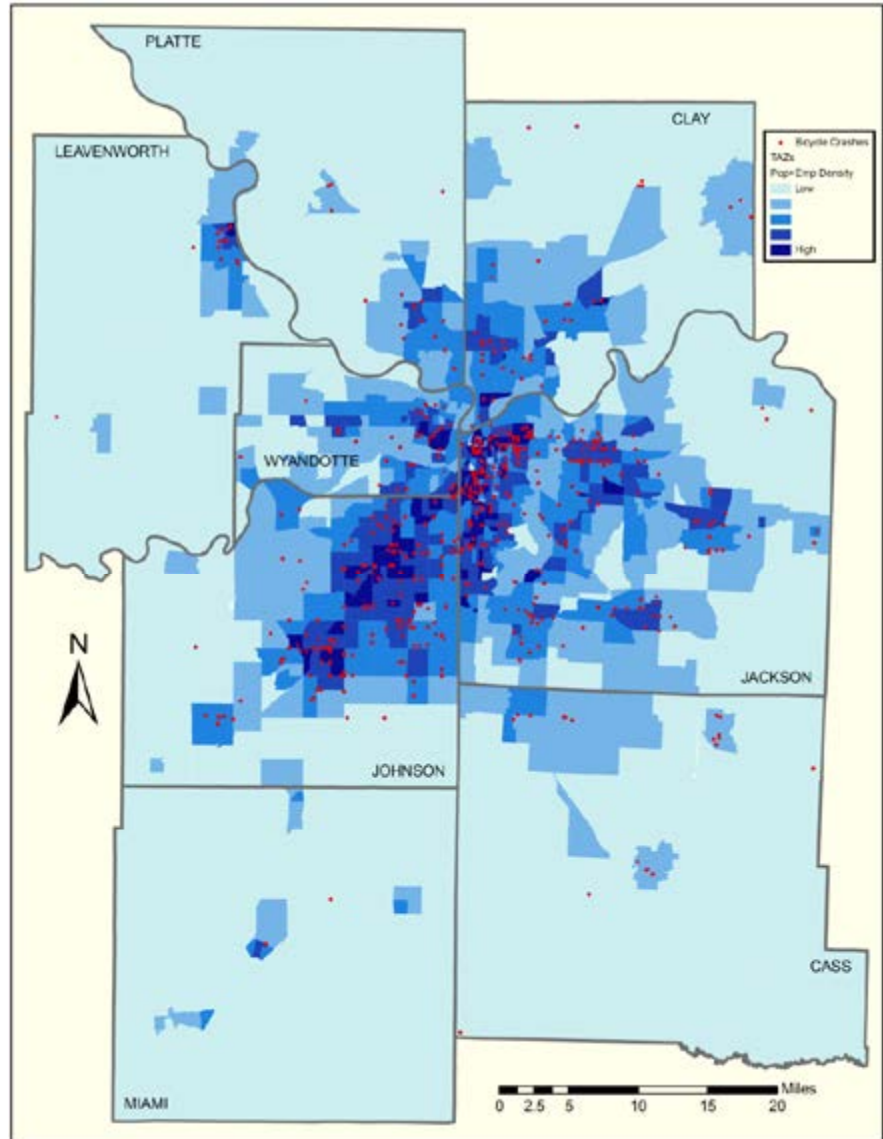


Detailed of crash locations in the Kansas City Region and Bicycle Crashes per 1,000 Daily Auto Trips



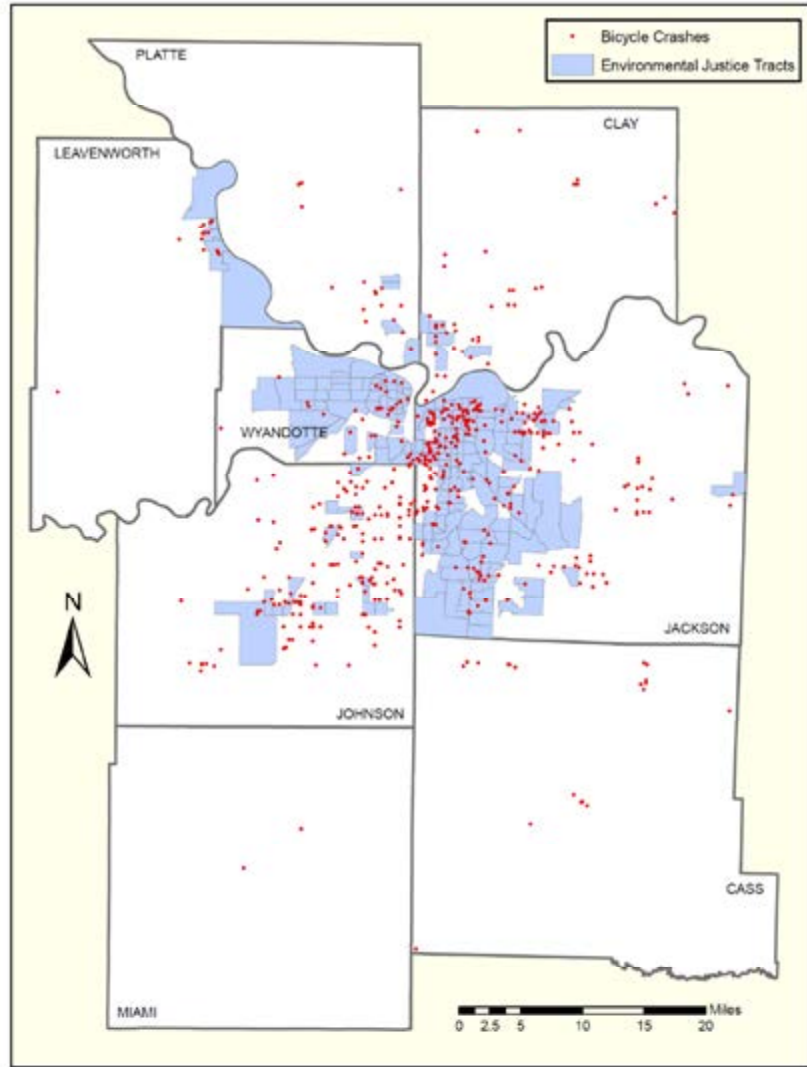
A more comprehensive measure of exposure might be the combination of population and employment – or activity centers. This map shows a very strong correlation between activity centers and bicycle crashes.

Bicycle Crash Locations in the Kansas City Region, 2009-2012, Population – Employment Density



Environmental justice is defined by the U.S. Environmental Protection Agency (EPA) as “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.” As the metropolitan planning organization (MPO) for the bi-state Kansas City region, MARC is federally mandated to incorporate environmental justice into its planning and programming activities. In terms of regional transportation planning, this means that no group of people — racial, ethnic or socio-economic — should receive unfair treatment or bear a disproportionate share of negative environmental consequences as a result of decisions made by MARC.

Bicycle Crash Locations in the Kansas City Region, 2009-2012, Environmental Justice Tracts

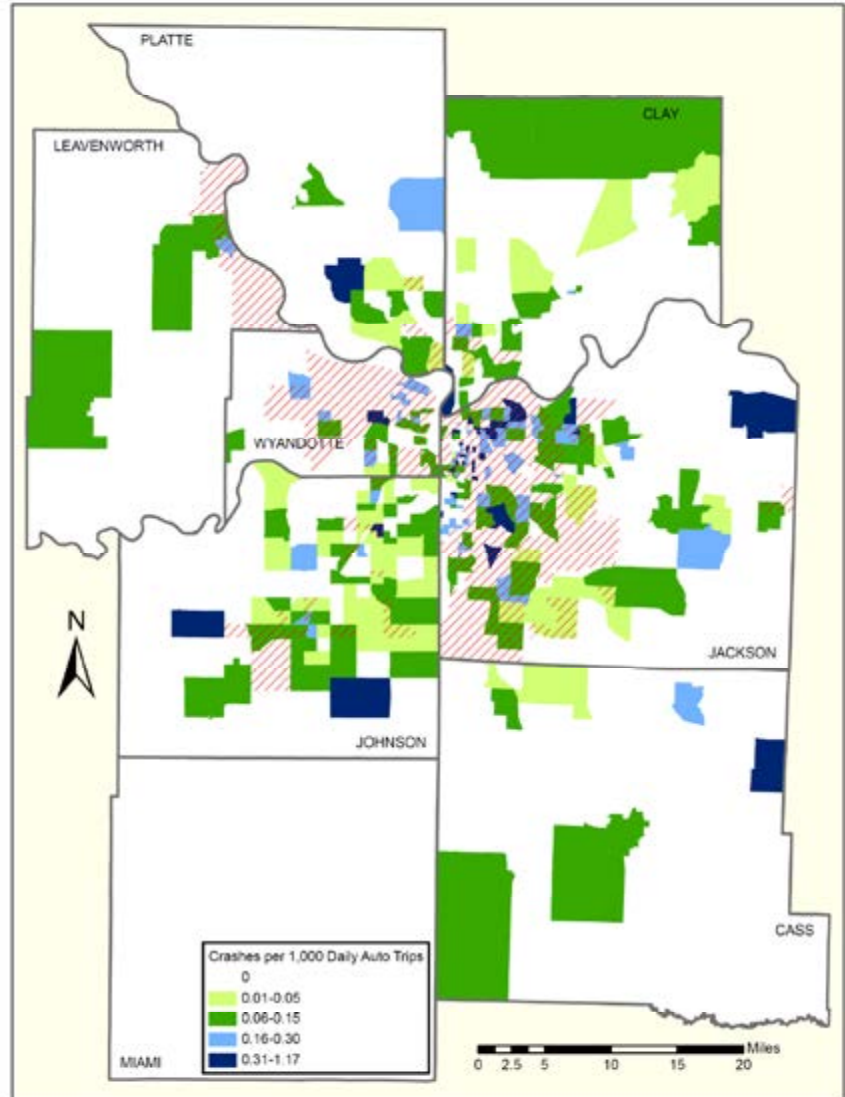


A map of the bicycle crashes over environmental justice tracts and the table below suggest such a correlation between socio-economic conditions and bicycle crashes. It is worth noting that fatal and serious injury crashes are not as highly correlated with environmental justice-identified areas.

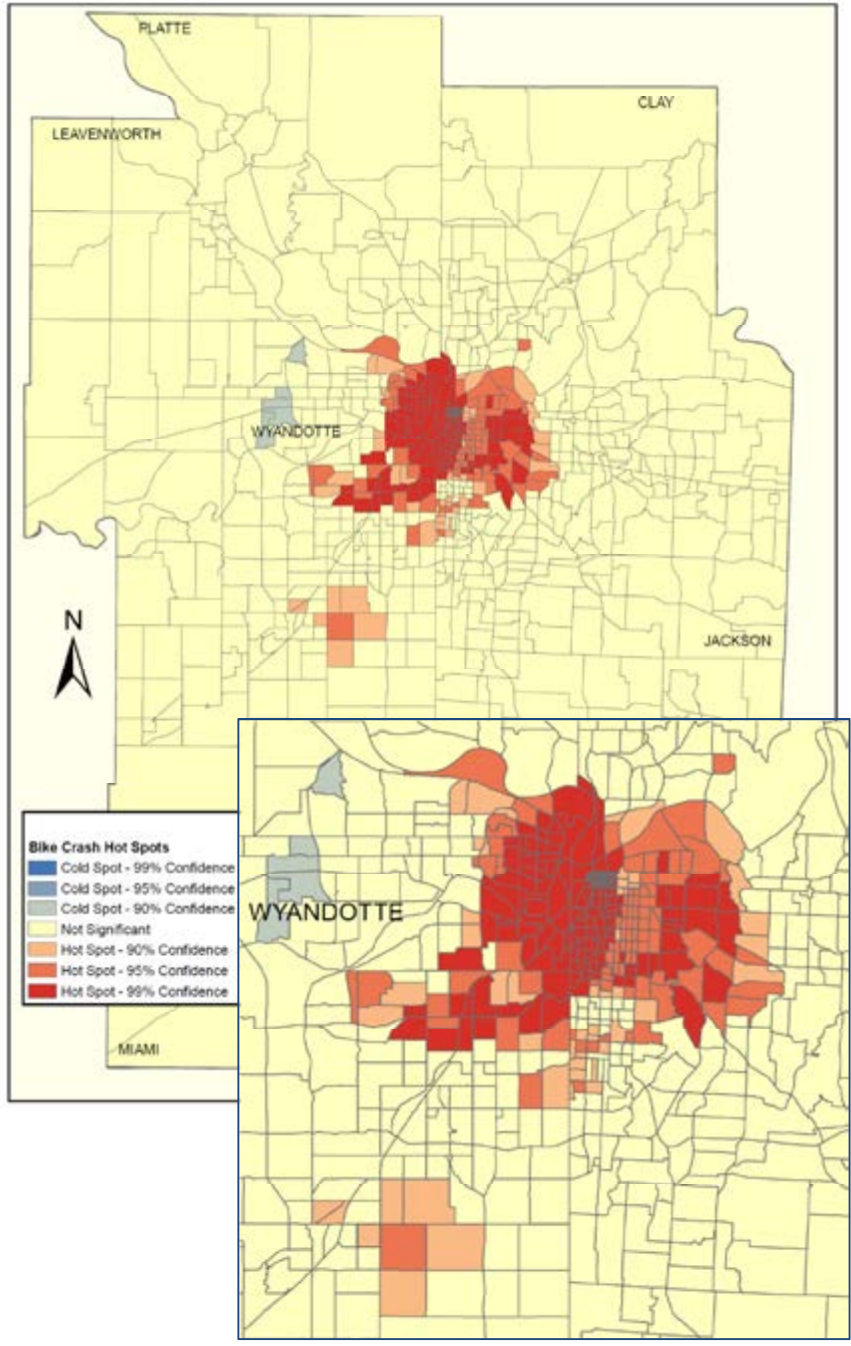
Bicycle Crashes, 2009-2012			
	EJ Areas	Non-EJ Areas	Total
Bicycle Crashes	251	339	590
Percent Bicycle Crashes	42.5%	47.5%	100.0%
Serious Injury Bicycle Crashes	27	66	93
Percent Serious Injury Bicycle Crashes	29.0%	71.0%	100.0%
Population	620,937	1,347,932	1,968,869
Population Percentage	31.5%	68.5%	100.0%

The environmental justice tracts are shown coincident with the plot of crashes per 1,000 auto trips by TAZ. This further suggests a correlation between socio-economic conditions and crash propensity. However, this may be partially a function of those areas having a higher density of bicycling trips.

Bicycle Crashes per 1,000 Auto Trips by TAZ, 2009-2012, Environmental Justice Tracts



**Bicycle Crashes per Trip Origins by TAZ, 2009-2012,
 Hot Spot Analysis**



Hot Spot Analysis

A specific hot spot analysis involves identifying locations with a statistically high number of crashes for a given characteristics. For this project, a hot spot analysis was conducted to determine whether or not there are locations that have abnormally high (or low) concentrations of bicycle crashes. The analysis was conducted comparing bicycle crashes per TAZ trip origins. The majority of the hot spots were located in Kansas City and southeast toward the Mission and Shawnee areas.

No locations were located that showed “cold spots” to the 95 or 99% confidence levels. 90% confidence cold spots were located around Wyandotte County Lake Park and near the Kansas Speedway area.

Potential Crash Countermeasures

Potential crash countermeasures include infrastructure and behavior based interventions to reduce crashes, fatalities, and injuries. Often this approach is referred to as a 4E approach to safety: Engineering, Enforcement, Emergency Response, and Education.

Other Es have been suggested as well.⁵ One that stands out as an important consideration is Evaluation.

Evaluations

The crash countermeasures discussed below are general – based upon area-wide statistics. Their broad application should reduce crashes. Area-wide statistical analysis should help determine if the countermeasures, when implemented, are having generally the desired effect.

A thorough review of the details of crashes – crash types and causation – would inform an approach that would implement specific countermeasures on specific hot spot corridors targeted at specific populations. Subsequent evaluations would allow for the determination of whether or not the countermeasures are reducing the types of crashes they are intended to address.

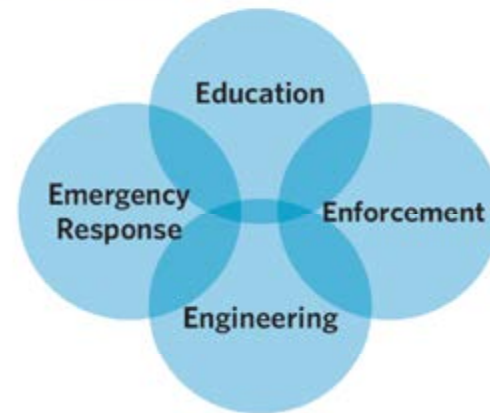
Evaluations tell you if you are making progress. Such information can lead to more funding for crash reduction programs. Additionally, evaluations indicate which programs are most effective. This can help you better direct your resources. Evaluations can also help influence decision makers, affected agencies, and the public of the efficacy of your bicycle safety program.

Engineering Countermeasures

When one thinks of countermeasures that can improve pedestrian safety, the first thing that usually comes to mind is to build more facilities. Such recommendations, coupled with improving the geometry or operations of existing facilities, are essentially engineering countermeasures; they result in changes

⁵ Equity – looking at marginalized populations; Environment – addressing emissions and health care costs; Economics – addressing costs associated with crashes. We feel these can be addressed under the other 4Es.

The Four Es of Transportation Safety



Education

Typically involves informing users about unsafe behaviors and suggesting ways to improve safety when using the transportation system.

Engineering

Often implemented by a local public works department or state department of transportation. Infrastructure solutions are often low-cost, reactionary improvements.

Enforcement

Law enforcement officers play a valuable role in transportation safety as their presence can encourage appropriate driving behaviors, prevent motor vehicle crashes, and deter criminal acts.

Emergency Services

Individuals including paramedics, first responders, nurses, and doctors play a role in ensuring additional deaths and disabling injuries do not occur on the transportation system after an initial incident.

¹ The Four E's as described in the Destination Safe 2013 Pedestrian Crash Analysis

to infrastructure. But when one considers infrastructure countermeasures, one should consider more than just those specifically targeted at bikes and consider complete streets and improved communities.

Bicycle Facilities

Bicycle facilities such as bike lanes can improve bicyclists' compliance with traffic laws and result in more predictable behavior by motorists and bicyclists. Bike lanes, buffered bike lanes, shared lane markings, cycle tracks, and separated bike facilities can improve bicyclists' comfort and, if properly designed, safety.

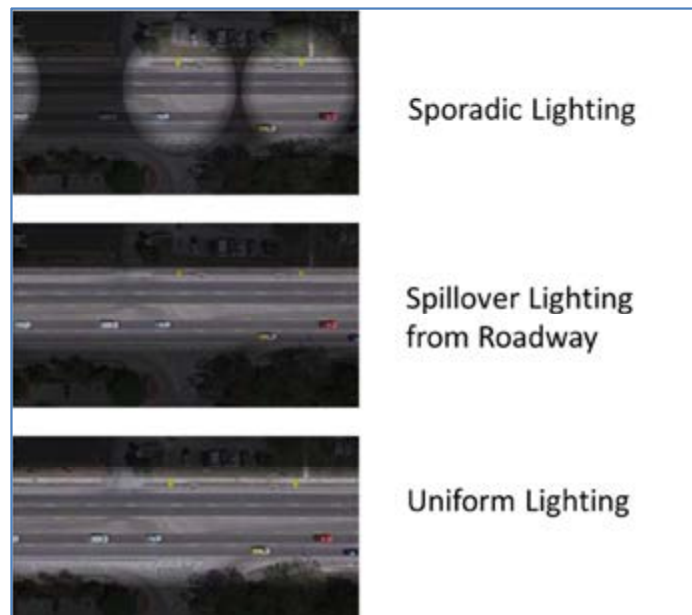
Traffic control devices should be reviewed to ensure they address the needs of bicyclists. Traffic signal detection should be responsive to bicyclists' presence. Pavement markings should be non-slip. Wayfinding signs for bicyclists (Bike Routes) can encourage more bicycling while providing bikes information of lower (motor vehicle) speed and lower volume routes. Roadways with high incidence of wrong-way riding, wrong way bike (R5-1b) could be installed.

Roadway lane striping should be maintained to be highly visible during the daytime and at night. Research suggests that improving the roadway striping reduces all crashes because drivers are able to devote less attention to maintaining lane position and are better able to observe more of what is occurring within the environment.

As shown in the previous section, a significant number of bicycle crashes occurred at night. Lighting along many roadways in the MARC area is sporadic at best. Even where street lighting exists, it is often not uniform. Dark areas intermixed with very bright areas can make bicyclists even harder to see than in areas where lighting levels are lower but uniform.

Compliance with average maintained illuminance and illuminance uniformity ratios (L_{avg}/L_{min} , L_{max}/L_{min}) as specified in AASHTO design guidelines should be attained. Luminance is the measure of light reflected off the roadway surface, measured in candelas per square meter (cd/m^2). Special emphasis should be placed on evaluating crash hot spots for substandard lighting and upgrading lighting along the study corridors in accordance with AASHTO.

It is also important to note that lighting must be designed to illuminate the entire travel way, including the roadway, bike lanes, paths, and sidewalks. Failure to consider bikeways in the lighting design can result in situations where



Lighting levels and visibility

motorists are not able to see bicyclists before they begin crossing the street.

Complete Streets

Complete Streets are intended to provide safe travel conditions for pedestrians, bicyclists and transit riders as well as motorists. Complete street treatments include the construction and installation of sidewalks, bicycle lanes, bus stops with shelters and related amenities and connections to the sidewalk network and crosswalks with pedestrian signals. Additional complete street improvements may include pedestrian refuge islands in the median, bike-friendly traffic calming, curb bulb outs (that accommodate bikes) and narrower or curvilinear (motor) vehicle lanes. Establishing and applying a complete streets policy is one of the most effective methods of reducing the occurrence of bicycle and pedestrian crashes. It provides a safe environment for these travel modes through engineering design while encouraging motorists to drive more cautiously.

Livable Community Approaches

The term “livable communities” is used to describe urban environments where walking, bicycling and transit service is safe, comfortable and efficient and where the physical environment offers an interesting and unique experience from the standpoint of street, land and building design. Central to the livable communities’ concept is the employment of street and land design strategies that encourage these travel modes.

Educational Countermeasures

Educating motorists and bicyclists in safe driving habits can help reduce the risks of crashes. There are numerous educational programs aimed at students. Younger children often participate in bike rodeos. Some driver’s education classes should promote safe motorist and bicycle interaction. Unfortunately, most motorist and bicyclists are not in a school-type environment where they can have lectures on bike safety. Consequently, other methods must be used to deliver safety messages. Billboard campaigns promoting safe passing distances or same-road-same-rules-same-responsibilities programs have been used in numerous jurisdictions around the country. Working with employers to provide bike commuter training is another technique that is often used to educate bicyclists. Driver safety courses for those who receive traffic tickets can be used to promote bike safety messages. Other programs range from television and radio news items to flyers inserted into utility bill envelopes.

The most common contributing cause of bicycle crashes (nationwide, local data is unavailable) is motorists turning



right from a side street or driveway failing to look for traffic coming from their right on the sidewalk. Two potential countermeasures may be appropriate to address this behavior:

- Use horizontal signing and
- Conduct a public information campaign to heighten awareness.

Horizontal signing (messages painted on the sidewalk) could be used at driveways to alert bicyclists (and pedestrians) and could take the form of a pair of eyes looking to the bicyclists' (or pedestrians') left or some other message that alerts them to the dangers of drivers turning right. Signage like this is being recommended to mitigate similar crashes in other parts of the country. Such a treatment, if installed, should be evaluated for its effectiveness.



An education campaign including flyers or advertising on bus shelters and/or benches may also be an effective way to educate bicyclists that they are riding in a position that is not safe. This sort of campaign will also help to remind drivers to be aware of bicyclists riding on the sidewalk. To localize the campaign, a photo of the bicyclist riding against traffic and a motorist failing to look to the right could be taken on a MARC Roadway. The example below is from Mayport, Florida.



Think the driver will see you?

Think again.

Florida law requires motorists to yield to all traffic on the sidewalk. However, turning motorists tend to look only where they expect to see cars. If you are walking or riding against traffic on the sidewalk, a motorist turning out of or into a driveway may not look in your direction.

Watch for right turning motorists coming from driveways and sidestreets. Also look out for left turning motorists coming from behind you. Before walking or riding in front of a car, make eye contact with the driver and be sure the driver is going to yield to you.

Where motorists look

Some of these crashes will involve bicyclists riding on the roadway against traffic. This is not legal and educational campaigns should be supplemented by law enforcement.

Educational campaigns could also help improve the night time visibility of bicyclists. People often believe themselves to be more visible than they are. Bicyclists assume that because motorists have headlamps they can see bicyclists at great distances. By letting cyclists know how hard it is for motorists to see them (possibly through a poster campaign), bicyclists may be induced to improve their visibility.



Enforcement Countermeasures

The effort to enforce the traffic laws as they relate to bicycle safety should be addressed in an overall, area wide, coordinated bicycle enforcement campaign. Sporadic enforcement will not result in significant improvements to motorists' or bicyclists' behavior and will likely result in resentment of law enforcement personnel. Those behaviors to be targeted should be determined at the outset of the law enforcement campaign. The following behaviors should be targeted in MARC communities:

- motorists violating traffic signs and signals (30%);
 - emphasis on illegal turn on red
 - failure to make complete stops at stop signs
- motorists unsafe passing (emphasis on the 3 ft. passing law)
- riding at night without lights (13% of crashes);
- riding on sidewalks in downtown areas;
- texting or using headphones (14%); and
- riding against traffic on the roadway (5%).

These six behaviors were chosen for two reasons. First, they represent particularly hazardous behaviors which result in many crashes. Secondly, and very importantly, the enforcement of these behaviors is easy to justify to the public. When coupled with (and in fact preceded by) a large scale education campaign, the public will understand the importance of the campaign and consequently will accept the enforcement activity. Finally, not all enforcement needs to result in a ticket – many law enforcement agencies provide bike lights to cyclists they stop at night. To others they may issue a warning and educational materials.

Enforcement of three-foot laws has been sporadic around the country. Austin, TX has used police officers on bikes in a sting operation to ticket drivers violating the three-foot rule; they issued more than 100 citations. Palm Beach, FL implemented a multimodal law enforcement campaign which included enforcement of motorist yielding and passing behaviors resulting in 175 citations and 148 warnings.

Motorist speeding is not listed as a contributing cause for any of the bicycle crashes. This does not however mean that speed is not a contributing cause of crashes. The probability that a crash will occur increases with the speed of motorists. Efforts to reduce motor vehicle traffic speeds will likely have a reducing effect on bicycle crashes as well. Targeted speed enforcement should be considered on crash hot spot corridors.

In addition to the need to educate bicyclists and motorists, some targeted training of law enforcement may also be appropriate. Some questions that could be covered in this training include: “When is it okay for bicyclists to ‘claim the lane?’” “What width constitutes ‘traffic lanes too narrow for a bicycle and a vehicle to travel safely side-by-side within the lane?’” “Why is it important for a bicyclist to use headlamps and tail lamps?” “Why is riding against traffic such a problem?” By answering these and other similar questions, and discussing what infractions are most likely to lead to bike crashes, cities can encourage law enforcement to help promote bike safety by targeting those behaviors most likely to result in crashes. Some communities educate local law enforcement through the enforcement agency’s standing roll-call meetings, while others send officers to the League of American Bicyclists’ Traffic Skills 101 courses.

Another key role enforcement professionals play in reducing bicycle crashes is filling out crash reports. By accurately identifying the conditions surrounding crashes and contributing circumstances, law enforcement professionals can help transportation professionals identify specific countermeasures to prevent future crashes.

Emergency (Response and Medical Professionals)

It may seem that emergency responders and medical professionals, because they are involved after a crash, are not in a position to prevent crashes. However, like law enforcement, medical professionals fill out reports that describe the reasons for injuries and the severity of injuries. This data, when accurately and thoroughly entered into databases such as the National Electronic Injury Surveillance System (NEISS) or other hospital discharge or trauma registries, can help researchers identify behaviors that lead to crashes or increase their severity.

Medical professionals also have a significant role to play in educating the public to safe bicycling and driving behaviors. They are often called upon to give presentations at schools, civic organizations, or other venues where their opinions and advice are given great respect. The respect accorded their profession makes them excellent spokespersons for bicycle safety.

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Survey

Local government practices regarding bicycle and pedestrian issues

Local government survey primary contact:

First name:	<input type="text"/>
Last name:	<input type="text"/>
Employer:	<input type="text"/>
Department:	<input type="text"/>
Position:	<input type="text"/>
Email address:	<input type="text"/>

We appreciate your participation in completing our survey to the best of your ability.

Please submit your completed survey by **Friday, March 28**. Simply save and return the file by email or, if it is more than 4MB, upload it using the file transfer protocol (FTP) instructions below.

Using MARC's FTP site to upload files:

1. First, go to our FTP site in Internet Explorer using this link: **ftp://www.marc2.org/Incoming/RBP Survey**
2. Press (and release) the Alt key
3. Select the View menu
4. Select Open FTP Site in Windows Explorer.

Note: You will not be able to rename, copy over or delete files once files are uploaded by FTP.

Questions?

Aaron Bartlett
816-701-8238
abartlett@marc.org

Thank you for participating in our survey. Your information will help advance planning for bicycle and pedestrian facilities in our region and incorporate more active transportation options in our long-range planning.

Best regards,
Aaron Bartlett
Senior Transportation Planner
Mid-America Regional Council

Plans/Polices/Programs

1. Has your community adopted plan(s) that address bicyclists and/or pedestrians needs? Does your community have plans underway to address these types of needs?

Yes

Check all types of adopted plans or plans under development that address bicyclist or pedestrian needs. If you'd like to share additional information such as the URL, space is provided; you may also attach a file or send a document by FTP. (see cover sheet)

Adopted		Underway	– optional –
			URL of document or send attachment/document
<input type="checkbox"/>	<input type="checkbox"/>	Bikeway Master Plan	
<input type="checkbox"/>	<input type="checkbox"/>	Pedestrian Safety Action Plan	
<input type="checkbox"/>	<input type="checkbox"/>	Sidewalk Plan	
<input type="checkbox"/>	<input type="checkbox"/>	Comprehensive Plan	
<input type="checkbox"/>	<input type="checkbox"/>	Transportation Plan	
<input type="checkbox"/>	<input type="checkbox"/>	Parks and Recreation Plan	
<input type="checkbox"/>	<input type="checkbox"/>	Greenway Linkage Plan	
<input type="checkbox"/>	<input type="checkbox"/>	Trails Plan	
<input type="checkbox"/>	<input type="checkbox"/>	Multimodal Corridor Plan	
<input type="checkbox"/>	<input type="checkbox"/>	Other plan/document	

No plans underway.

Optional notes/comments:

2. Do you have personnel who would manage the following responsibilities?

		Employee name	Job title and department	Email
<input type="checkbox"/>	On-road Bikeway Planning			
<input type="checkbox"/>	Off-road Trails Planning			
<input type="checkbox"/>	ADA Compliance in ROWs			
<input type="checkbox"/>	Coordination of Education/ Encouragement Programs			

3. Does your community have a community-based advisory committee that meets regularly to address issues related to bicyclists and/or pedestrians:

Yes

Name of advisory group:

Contact name:

Email address:

No

Notes/comments:

Programs

The League of American Bicyclists operates the national recognized Bicycle Friendly Communities program. The program provides a roadmap, hands-on assistance and recognition for states, communities, universities and businesses. The BFC program is a tool for states, communities, business and universities to make bicycling a real transportation and recreation option for all people.

4. Has your community received a Bicycle Friendly Communities designation?

Yes, our jurisdiction was awarded the following designation:

<input type="checkbox"/>	Honorable Mention
<input type="checkbox"/>	Bronze
<input type="checkbox"/>	Silver
<input type="checkbox"/>	Gold
<input type="checkbox"/>	Platinum

Other recognition/designation/comments:

No, but our jurisdiction is considering application.

No, but our jurisdiction would like to learn more about the Bicycle Friendly Community program.

No, this is does not apply to this jurisdiction.

The Pedestrian Bicycle Information Center operates the nationally recognized Walk Friendly Communities program. The program encourages towns and cities across the U.S. to support safer walking environments. The WFC program recognizes communities that work to improve a wide range of conditions related to walking, including safety, mobility, access and comfort.

5. Has your community received a Walk Friendly Communities designation?

Yes, our jurisdiction was awarded the following designation:

<input type="checkbox"/>	Honorable Mention
<input type="checkbox"/>	Bronze
<input type="checkbox"/>	Silver
<input type="checkbox"/>	Gold
<input type="checkbox"/>	Platinum

Other recognition/designation/comments:

- No**, but our jurisdiction is considering application.
- No**, but our jurisdiction would like to learn more about the Walk Friendly Community program.
- No**, this is does not apply to this jurisdiction.

6. Does your community perform bicycle/pedestrian counts?

Yes:

- Our community collects counts for** (check all that apply):
- Bicyclists Pedestrians Not applicable

- We conduct counts** (check all that apply):
- Manually With automated equipment Not applicable

- We collect counts of bicyclists and/or pedestrians in the following locations.** (check all that apply):
- Street/midblock Intersections

No.

7a. Does your community have policies to build and maintain any of the following:

	Optional: Please describe or add comments.
On-road bikeways <input type="checkbox"/> Yes <input type="checkbox"/> No	
Bikeway way finding, including signs or pavement markings <input type="checkbox"/> Yes <input type="checkbox"/> No	
Off-road and shared use paths <input type="checkbox"/> Yes <input type="checkbox"/> No	
Sidewalks <input type="checkbox"/> Yes <input type="checkbox"/> No	
Crosswalks and crossing treatments <input type="checkbox"/> Yes <input type="checkbox"/> No	
ADA curb ramps <input type="checkbox"/> Yes <input type="checkbox"/> No	

7b. Does your community include maintenance in the Capital Improvements Program (CIP) for any of the following?

On-road bikeways	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Bikeway way finding, including signs or pavement markings	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Off roads and shared paths	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Sidewalks	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Crosswalks and crossing treatments	<input type="checkbox"/> Yes	<input type="checkbox"/> No
ADA curb ramps	<input type="checkbox"/> Yes	<input type="checkbox"/> No

8. Does your community use any of the following sources to develop bicycle/pedestrian facilities?

Please check all items that apply to your community.

<input type="checkbox"/> Sales tax	<input type="checkbox"/> Street excise tax
<input type="checkbox"/> County property tax	<input type="checkbox"/> Community Improvement District / CID
<input type="checkbox"/> Parks tax	<input type="checkbox"/> Subdivision Development Park Fee
<input type="checkbox"/> Transportation tax	<input type="checkbox"/> Other: <input style="background-color: #e0e0e0;" type="text"/>

Policy

9a. Has your community adopted a Complete Street Policy or related policy?

Yes:

If you have adopted a complete streets policy, please provide the following information:

City/County Resolution/Ordinance title:	<input style="background-color: #e0e0e0;" type="text"/>
Departmental Procedures or Guidance title:	<input style="background-color: #e0e0e0;" type="text"/>

No, but we are studying /considering a complete streets policy.

No, we are not considering a complete street policy.

9b. Does your community require bike parking facilities with development?

Yes.

No, but we are considering bike parking requirements.

No, but we encourage bike parking accommodations.

No.

Engineering

10. Our community uses transportation facility design industry best practices and guidance provided by:

Please check all that apply.

- KC APWA Best Practices 2012 Local Bikeway Planning and Design Guide
- NACTO Urban Bikeway Design Guide
- NACTO Urban Streets Design Guide
- AASHTO Guide for the Development of Bicycle Facilities, 4th Edition
- AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities, 1st Edition
- Other

11. What type of bicycle facilities/accommodations are used in your community?

- Bike Lanes
- Buffered Bike Lanes
- Bike Route and Wayfinding Signs
- Share the Road Signs
- Bike Boxes
- Shared Use Paths
- Green Bike Lanes
- Wide Curb Lanes (width: ft.)
- Share Lane Markings
- Paved Shoulder (width: ft.)
- Sidepaths
- Other:

12. In our community's developing areas, sidewalks are required for:

Functional Class	Sidewalk on one side	Sidewalk on both sides	Width of sidewalk	No sidewalk requirements
Major arterial	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="checkbox"/>
Minor arterial	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="checkbox"/>
Industrial/Commercial collectors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="checkbox"/>
Residential collector	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="checkbox"/>
Residential locals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text"/>	<input type="checkbox"/>

Does your community have an adopted a policy for sidewalk snow removal?

Yes.

Ordinance or policy:

No.

Education and Encouragement Programs

13. Does your community have any community-wide programs that educates drivers, cyclists and or pedestrians on their rights and responsibilities as road users?

Paid media (radio/TV/billboards) <input type="checkbox"/> Yes <input type="checkbox"/> No	Printed materials (maps/tip/bulletins) <input type="checkbox"/> Yes <input type="checkbox"/> No	Website/URL: <input type="checkbox"/> Yes <input type="checkbox"/> No
Social media: Facebook URL: <input type="text"/> Twitter URL: <input type="text"/>	Special events: <input type="checkbox"/> Yes <input type="checkbox"/> No	Community classes: <input type="checkbox"/> Yes <input type="checkbox"/> No
Optional – Additional programs/comments: <input style="width: 100%; height: 40px;" type="text"/>		

14. Our community promotes:

<input type="checkbox"/> The Green Commute Challenge (a program of RideShare)	<input type="checkbox"/> Walk to School Month (October 2014) <input type="checkbox"/> Official proclamation <input type="checkbox"/> Sponsored events <input type="checkbox"/> Media campaign <input type="checkbox"/> Other <input type="text"/>
<input type="checkbox"/> May Bike Month (2014) <input type="checkbox"/> Official proclamation <input type="checkbox"/> Sponsored events <input type="checkbox"/> Media campaign <input type="checkbox"/> Other <input type="text"/>	<input type="checkbox"/> National Trails Day (June 7, 2014) <input type="checkbox"/> Official proclamation <input type="checkbox"/> Sponsored events <input type="checkbox"/> Media campaign <input type="checkbox"/> Other <input type="text"/>

Enforcement Programs

15. Does your community have law enforcement or other public safety officers on bikes?

Yes.

No.

16. Does your community have local ordinances that address bicycle travel and/or safety?

Yes. If possible, please provide ordinance number:

No.

Professional Development

MARC hosts many webinars and workshops.

We would like to know what topics are most relevant to you and your staff. Please indicate the relevance of these topics for future professional development opportunities.

High	Moderate	Low	Topics Programs
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Walk Friendly Communities, a program of the Pedestrian Bicycle Information Center. (PBIC)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Bicycle Friendly Communities, a program of the League of American Bicyclist (LAB)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Bicycle Transportation Planning
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pedestrian and Bicycle Safety for Law Enforcement
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Safe Routes to School Training
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Complete Streets Training
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Urban Streets Design Guide, a product of the National Association of City Transportation Officials (NACTO)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Urban Bikeway Design Guide, NACTO
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Designing Urban Walkable Thoroughfares, a project of Institute of Transportation Engineers (ITE)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pedestrian Safety Action Plans
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Pedestrian Accessibility and ADA
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Bicyclists and pedestrians counts
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Other: <input style="background-color: #e6f2ff;" type="text"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Other: <input style="background-color: #e6f2ff;" type="text"/>

Metrics for Local Government Report Card MARC Regional Bikeways Plan

Below is a selection of the questions from the full MARC “Local Government Practices Regarding Bicycle and Pedestrian Issues” survey which was distributed by MARC to all local governments in the region. Because response to the full survey was small, the following questions were pulled out to cover major topics of interest to MARC, and then local governments were contacted directly to answer this subset. Their answers are plotted in a table on the following pages.

Planning

1. Does the community have adopted plan(s) that address bicyclists and/or pedestrian needs? What types?

Public Involvement

3. Does your community have a community-based advisory committee that meets regularly to address issues related to bicyclists and/or pedestrians?

Project Prioritization

6. Does your community perform bicycle/pedestrian counts?

Funding

8. Does your community use any of the following sources to develop bicycle/pedestrian facilities?

Institutionalizing Practices/Complete Streets

9a. Has your community adopted a Complete Streets policy?

Design of Facilities

11. What types of bicycle facilities/accommodations are used in your community?

Planning & Design

vireo

BeVireo.com

Kansas City

929 Walnut Suite 700
Kansas City MO 64106
816-756-5690

Omaha

1111 N. 13th Street Suite 116
Omaha, NE 68102
402-553-5485

METRIC & QUESTION NUMBER	BELTON	GARDNER	GRAIN VALLEY
<p>Planning 1. Does the community have adopted plan(s) that address bicyclists and/or pedestrian needs? What types?</p>	<p>Yes. The Belton Parks Department has developed a Master Plan that includes routes around the community for trails, off-street and bike lanes.</p>	<p>Yes. Adopted Parks and Recreation Plan.</p>	<p>Yes. Comprehensive Plan Underway, Adopted Trails Plan.</p>
<p>Public Involvement 3. Does your community have a community-based advisory committee that meets regularly to address issues related to bicyclists and/or pedestrians?</p>	<p>No.</p>	<p>No. The city does have a Planning Commission and the parks and recreation department is governed by the Gardner City Council.</p>	<p>No.</p>
<p>Project Prioritization 6. Does your community perform bicycle/ pedestrian counts?</p>	<p>No.</p>	<p>No.</p>	<p>No.</p>
<p>Funding 8. Does your community use any of the following sources to develop bicycle/pedestrian facilities?</p>	<p>(None selected).</p>	<p>Other: Many of the bicycle/ pedestrian trails (Madison Street, North Center Street, South Center Street, Moonlight Road, 183rd Street, Grand Street) were funded through street improvement projects. Some were done so through benefit districts while others were City/ State funding sources.</p>	<p>Sales tax, Transportation tax.</p>
<p>Institutionalizing Practices/ Complete Streets 9a. Has your community adopted a Complete Streets policy?</p>	<p>No, but we are studying/ considering.</p>	<p>No, we are not considering.</p>	<p>No, but we are studying/ considering.</p>
<p>Design of Facilities 11. What types of bicycle facilities/ accommodations are used in your community?</p>	<p>(None selected). *Under discussion.</p>	<p>Other: Most of our trails are asphalt or concrete. Most are 10' in width.</p>	<p>Shared Use Paths</p>

METRIC & QUESTION NUMBER	JACKSON COUNTY	JOHNSON COUNTY	KANSAS CITY, KS
<p>Planning</p> <p>1. Does the community have adopted plan(s) that address bicyclists and/or pedestrian needs? What types?</p>	Yes. Adopted Trails Plan.	No. JCPRD does not have a plan that deals specifically with bicyclist or pedestrian needs.	Yes. Adopted City-Wide Master Plan, Adopted Downtown Master Plan, Adopted Sidewalk and Trail Plan (city-wide).
<p>Public Involvement</p> <p>3. Does your community have a community-based advisory committee that meets regularly to address issues related to bicyclists and/or pedestrians?</p>	No.	No.	Yes. Healthy Communities Infrastructure Action Team (IAT)
<p>Project Prioritization</p> <p>6. Does your community perform bicycle/pedestrian counts?</p>	No.	Yes. With automated equipment.	No.
<p>Funding</p> <p>8. Does your community use any of the following sources to develop bicycle/pedestrian facilities?</p>	County property tax.	County property tax. Other: JCPRD's primary funding source is county property tax; revenue from other sources is very limited.	Other: Typically federal grants via matching funds.
<p>Institutionalizing Practices/ Complete Streets</p> <p>9a. Has your community adopted a Complete Streets policy?</p>	Adopted policy in 2012. (Survey response indicated: "No, we are not considering.")	No, we are not considering.	Yes.
<p>Design of Facilities</p> <p>11. What types of bicycle facilities/accommodations are used in your community?</p>	Bike Lanes, Shared Use Paths.	Shared Use Paths, Other: We have bicycle racks at a few facilities.	On-Street Bike Lanes, Sharrows, Off-Street, Joint-Use Trails.

METRIC & QUESTION NUMBER	LANSING	CITY OF LEAVENWORTH	LEAVENWORTH COUNTY
<p>Planning</p> <p>1. Does the community have adopted plan(s) that address bicyclists and/or pedestrian needs? What types?</p>	<p>Yes. Adopted Comprehensive Plan, Adopted Trails Plan.</p>	<p>Yes. Adopted City-Wide Trail Master Plan.</p>	<p>No.</p>
<p>Public Involvement</p> <p>3. Does your community have a community-based advisory committee that meets regularly to address issues related to bicyclists and/or pedestrians?</p>	<p>No.</p>	<p>Currently we are working with LAD on their county-wide trail plan, map completed 2013.</p>	<p>Yes. Leavenworth County Development Corporation- Trails Committee.</p>
<p>Project Prioritization</p> <p>6. Does your community perform bicycle/ pedestrian counts?</p>	<p>No.</p>	<p>No.</p>	<p>No.</p>
<p>Funding</p> <p>8. Does your community use any of the following sources to develop bicycle/pedestrian facilities?</p>	<p>County property tax.</p>	<p>(None selected)</p>	<p>No.</p>
<p>Institutionalizing Practices/ Complete Streets</p> <p>9a. Has your community adopted a Complete Streets policy?</p>	<p>No, we are not considering.</p>	<p>No, we are not considering.</p>	<p>No, we are not considering.</p>
<p>Design of Facilities</p> <p>11. What types of bicycle facilities/ accommodations are used in your community?</p>	<p>Share the Road Signs.</p>	<p>Shared Lane Markings, with and without on-street parallel parking.</p>	<p>Marked On-Street Bike Routes, Multi-Use Trails, Off-Road Bike Trails.</p>

METRIC & QUESTION NUMBER	LEAWOOD	LEE'S SUMMIT	LIBERTY
<p>Planning 1. Does the community have adopted plan(s) that address bicyclists and/or pedestrian needs? What types?</p>	<p>Yes. Adopted Comprehensive Plan, Adopted Other plan/document (135th Street Corridor Plan).</p> <p>Bikeway Master Plan, Sidewalk Plan, Parks and Recreation Plan underway.</p>	<p>Yes. Adopted Bikeway Master Plan, Adopted Sidewalk Plan, Adopted Comprehensive Plan, Adopted Transportation Plan, Adopted Parks and Recreation Plan, Adopted Greenway Linkage Plan, Adopted Trails Plan.</p> <p>Pedestrian Safety Action Plan underway, Other plan/document underway.</p>	<p>Yes. Adopted Comprehensive Plan, Adopted Parks and Recreation Plan.</p> <p>Sidewalk Plan underway, Trails Plan underway.</p>
<p>Public Involvement 3. Does your community have a community-based advisory committee that meets regularly to address issues related to bicyclists and/or pedestrians?</p>	<p>Yes. Bicycle Friendly Committee.</p>	<p>Yes. Livable Streets Advisory Board.</p>	<p>No.</p>
<p>Project Prioritization 6. Does your community perform bicycle/pedestrian counts?</p>	<p>No.</p>	<p>Yes. Bicyclists and Pedestrians. Manually. At intersections.</p>	<p>No.</p>
<p>Funding 8. Does your community use any of the following sources to develop bicycle/pedestrian facilities?</p>	<p>(None selected)</p>	<p>Sales tax, Parks tax, Transportation tax, Street excise tax, Other: State and Federal Aid/Grants.</p>	<p>Parks tax.</p>
<p>Institutionalizing Practices/ Complete Streets 9a. Has your community adopted a Complete Streets policy?</p>	<p>Yes. Leawood Complete Streets Resolution #3592</p>	<p>Yes. City Resolution 10-17</p>	<p>No, but we are studying/considering.</p>
<p>Design of Facilities 11. What types of bicycle facilities/accommodations are used in your community?</p>	<p>Bike Lanes, Share the Road Signs, Shared Use Paths, Paved Shoulder (4'), Sidepaths.</p>	<p>Bike Lanes, Bike Route and Wayfinding Signs, Share the Road Signs, Shared Use Paths, Wide Curb Lanes (14-16'), Paved Shoulder (4-6'), Sidepaths.</p>	<p>Bike Route and Wayfinding Signs, Share the Road Signs, Shared Use Paths.</p>

METRIC & QUESTION NUMBER	MIAMI COUNTY	MISSION	PAOLA	PECULIAR
<p>Planning</p> <p>1. Does the community have adopted plan(s) that address bicyclists and/or pedestrian needs? What types?</p>	No.	<p>Yes. Adopted Comprehensive Plan.</p> <p>Parks and Recreation Plan underway.</p>	<p>Yes. Adopted Comprehensive Plan.</p> <p>Bikway Master Plan, Pedestrian Safety Action Plan, Sidewalk Plan, Transportation Plan, Parks and Recreation Plan, Greenway Linkage Plan, Trails Plan, Multimodal Corridor Plan, Other plan/document all underway.</p>	<p>Yes. Adopted Comprehensive Plan.</p>
<p>Public Involvement</p> <p>3. Does your community have a community-based advisory committee that meets regularly to address issues related to bicyclists and/or pedestrians?</p>	No.	No.	Yes. Paola Pathways.	No.
<p>Project Prioritization</p> <p>6. Does your community perform bicycle/pedestrian counts?</p>	No.	Yes. Bicyclists. Manually. At intersections.	No.	No.
<p>Funding</p> <p>8. Does your community use any of the following sources to develop bicycle/pedestrian facilities?</p>	Sales tax, County property tax.	Sales tax, Street excise tax.	(None selected)	Parks tax.
<p>Institutionalizing Practices/ Complete Streets</p> <p>9a. Has your community adopted a Complete Streets policy?</p>	No, but we are studying/ considering	No, but we are studying/ considering	No, but we are studying/ considering	No, we are not considering.
<p>Design of Facilities</p> <p>11. What types of bicycle facilities/ accommodations are used in your community?</p>	Bike lanes, Shared Use Paths.	Bike Lanes, Shared Use Paths.	(None selected)	(None selected)

METRIC & QUESTION NUMBER	PLATTE COUNTY	OLATHE	SHAWNEE
<p>Planning</p> <p>1. Does the community have adopted plan(s) that address bicyclists and/or pedestrian needs? What types?</p>	<p>Yes. Adopted Parks and Recreation Plan, Adopted Trails Plan.</p>	<p>Yes. Adopted Bikeway Master Plan, Adopted Comprehensive Plan, Adopted Greenway Linkage Plan, Adopted Trails Plan.</p> <p>Pedestrian Safety Action Plan underway, Sidewalk Plan underway, Transportation Plan underway, Parks and Recreation Plan underway, Multimodal Corridor Plan underway</p>	<p>Yes. Adopted Bikeway Master Plan, Adopted Pedestrian Safety Action Plan, Adopted Sidewalk Plan, Adopted Comprehensive Plan, Adopted Transportation Plan, Adopted Parks and Recreation Plan, Adopted Greenway Linkage Plan, Adopted Trails Plan.</p>
<p>Public Involvement</p> <p>3. Does your community have a community-based advisory committee that meets regularly to address issues related to bicyclists and/or pedestrians?</p>	<p>Yes. Platte County Park Board.</p>	<p>No.</p>	<p>Yes. Shawnee Bicycle Advisory Board.</p>
<p>Project Prioritization</p> <p>6. Does your community perform bicycle/pedestrian counts?</p>	<p>Yes. (Nothing further selected)</p>	<p>No.</p>	<p>No.</p>
<p>Funding</p> <p>8. Does your community use any of the following sources to develop bicycle/pedestrian facilities?</p>	<p>(None selected)</p>	<p>Park sales tax Other: State and Federal Aid/Grants.</p>	<p>Sales tax, Subdivision Development Park Fee.</p>
<p>Institutionalizing Practices/ Complete Streets</p> <p>9a. Has your community adopted a Complete Streets policy?</p>	<p>No, we are not considering.</p>	<p>(Unanswered)</p>	<p>Yes. Comprehensive Plan.</p>
<p>Design of Facilities</p> <p>11. What types of bicycle facilities/accommodations are used in your community?</p>	<p>Shared Use Paths (Primarily adjacent to our streams, rivers, local roadways, and state highways).</p>	<p>Bike Lanes, Bike Route and Wayfinding Signs, Share the Road Signs, Shared Use Paths.</p>	<p>Bike Lanes, Share the Road Signs, Shared Use Paths, Paved Shoulder (4')</p>



APPENDIX C

Greater Kansas City Bikeways Plan

Implementation

Best practices and strategies

Peer MPO Interviews

Facility design standards

Effective Promotion and Marketing

Bike-ped counting recommendations

Maintenance of bikeways

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MEMORANDUM

Date: April 11, 2014
To: Aaron Bartlett, MARC
From: Kevin Luecke & Tom Huber
Project: MARC Regional Bikeway Plan
Re: Task 1: Best Practices and Planning Strategies

The purpose of this memorandum is to identify the best practices which are strongly associated with a successful Metropolitan Planning Organization (MPO) bicycle and pedestrian program. An effective MPO program is inextricably tied to successful community bicycle programs within the MPO region they serve; therefore, this memo will also include strategies that communities within the MPO can follow to be successful. The five common traits of most successful bicycle programs are provided below and are followed by more specific best practices.

- Commitment to bicycling and walking
- A well-honed plan
- The ability to move plans into real practices
- An understanding of how funding works and a means to direct it to bicycle and pedestrian projects
- Public involvement and political support

Best Practices

The following are a variety of practices used by agencies to improve bicycling conditions and are considered to be either exemplary or exceptional, thus "best practices". Not every one of these practices will automatically be a good fit for the Mid-America Regional Council (MARC) or for communities within the MPO planning area. In many cases, these practices are already being used. Communities and agencies within these areas can focus on the best practices are not in use or those that are the most timely to implement. The first set of best practices generally applies to communities and counties within the MPO, but in some cases are also valid for consideration by MARC. The second set of best practices that are outlined, are directed almost entirely at MARC.

For every best practice described, at least one example is provided. Whenever examples that were geographically close to the Kansas City metro area could be highlighted they were. In other cases, if exceptional practices were found to exist in other areas of the United States and it was believed that they portrayed a good practice for the Kansas City metro area, they were provided. The following approach was used to provide a summary of the best practices and examples:

- Toole Design Group staff members were interviewed to learn of overall best practices with a special emphasis on best practices in planning;
- Existing plans across the U.S. were reviewed and considered for recommendations - the Toole Design Group used its experience gained from producing over 100 community, county, MPO and state bicycle plans over the past 10 years;
- A search of MPO resources and reports was conducted; and
- Survey results from the MARC "report cards" were reviewed to identify locally derived best practices. (Note, this has not been compiled.)

Best Practices – Communities within MPOs

Planning

Most community and county efforts to improve bicycling conditions begin with a planning effort. Furthermore, all MPOs are required by federal transportation rules to address bicycling and walking in either a free-standing plan or as part of their long-range transportation plan. A plan does not necessarily guarantee a successful bicycle program, but it improves the chances that facets of the plan will be implemented. For local agencies it also improves the chances that state or federal funds will be invested in the actions recommended by the plan. This is especially true for the bicycle infrastructure (network plan) that is recommended in the plan.

Many of the plans are patterned after the five “E’s” of transportation – engineering, education, enforcement, encouragement, and evaluation. The principle behind this approach is that these five “E’s” tend to function together. For example, designing bicycle lanes without considering how bicyclists will be taught to use them will undermine the design and make them less safe for everyday use. Nevertheless, the emphasis of these plans almost always is directed at engineering and contains bicycle network maps. For example, the *Austin 2009 Bicycle Plan Update* (http://www.pedbikeinfo.org/pdf/PlanDesign_SamplePlans_Local_Austin2009.pdf) is a major update of their 15 year old plan and provides a set of comprehensive goals, objectives, and actions to be completed over a 10 year period that specifically addresses the five “E’s.”

Specialty plans are also becoming more common, and are often completed in addition to comprehensive bicycle plans. *Chicago Streets for Cycling Plan 2020* is an excellent example of a network plan focused on short and medium term recommendations. It has ten area plans that constitute a city-wide network plan which is focused towards on-street facilities. The plan provides a simple hierarchy of bikeways ranging from neighborhood routes to spoke and crosstown routes. It includes several case studies, as well as a concisely outlined implementation chapter. It is simple to follow and written in commonly understood language. Although this is a plan for a much larger city than exists as part of the MARC MPO area, its simplicity and focused area plans are good models for the smaller cities in the MPO.

For communities developing their own plans, or wanting to hire a consultant to help with the work, *Creating a Road Map for Producing & Implementing a Bicycle Master Plan* (http://www.bikewalk.org/pdfs/BMP_RoadMap.pdf) offers a multi-step process and a complete planning approach. It contains an important chapter on the steps involved in putting the plan in action including how to get the plan adopted, establishing annual work plans, seizing opportunities for incorporating bicycle projects, etc.

Funding

One of the common metrics for measuring improvement for bicycling is bikeway development. Bikeway construction is primarily a factor of funding. One of the major changes in funding over the past 20 years has been the large increase in federal funding available for projects. Bikeways are funded either as integrated parts of larger street and highway projects or as separate or independent projects. MPOs usually have control over only a small portion of the federal transportation funds that are programmed through their planning process. This has recently changed. The new Federal Transportation Bill passed in July 2012—known as *Moving Ahead for People in the 21st Century* (MAP-21)—restructured and redefined eligibility for several federal funding programs for which bicycle and pedestrian projects are eligible. MARC is currently reviewing applications for three federal programs - Congestion Mitigation/Air Quality (CMAQ), Surface Transportation Program (STP), and Transportation Alternatives (TAP) (see Table 1). In the past, the majority of these funds have been awarded to traditional highway

projects. Even if funds are used to construct streets and highways, bikeways can be added as integrated parts of those projects. This approach is strongly recommended by federal policies and is consistent as a complete streets approach.

Table 1: CMAQ, STP and TAP funding

Program	Period	Total Anticipated Funding*	
		Kansas	Missouri
Congestion Mitigation/Air Quality (CMAQ)	2015 - 2018	\$9.1 M	\$9.1 M
Surface Transportation Program (STP)	2017 - 2018	\$24.0 M	\$53.0 M
Transportation Alternatives (TAP)	2014 - 2018	\$6.1 M	\$11.0 M

* Since the majority of these funding years are outside the extent of MAP-21, some uncertainty remains about the level of funding available for programming by MARC and these estimates are subject to change.

Nationwide, most federal transportation funds are distributed to the state DOTs for disbursement, largely as the state DOTs decide. It is important to note that in general state, DOTs may transfer up to 50% of annual apportionments of STP, CMAQ, and TAP to any other program. STP and TAP funds that are sub-allocated to areas based on population, as well as Metropolitan Planning funds, cannot be transferred.

There are several ways to fund bikeway projects and they fall under these basic practices or strategies:

- Incorporation, mainstreaming, complete streets
- Budget set aside
- Pursue federal and state funds
- Pursue a variety of funding sources

Incorporating bikeways or roadway features (i.e. paved shoulders) which benefit and improve safety for bicyclists as integrated parts of larger street and highway projects is the most important funding strategy. This has also been labeled as mainstreaming, inclusion, and completing the street. This should be thought of as a longer-term strategy since any given bikeway improvement will need to be delayed until a street or highway project provides an opportunity for that bikeway to be incorporated. The cost for including bike facilities at the time of street redesign is typically just a marginal increase. Additionally, the extra space designated for bicyclists most often benefits motorists as well. For instance, bike lanes and shoulders provide more space for turns, temporary snow storage, transit stops, disabled vehicles, postal delivery vehicles, etc. This additional space, especially for rural cross-section streets (no curb or gutters), provides significant maintenance and safety benefits which increase as volumes and speeds of traffic increase.

As part of the City of Madison’s bicycle plan in 1991, the standard street cross-sections were changed to provide additional space for bicyclists. At that time the City’s plan called for wide outside curb lanes or combination bicycle/bus lanes. Every proposed arterial street cross-section included this space. During the late 1990’s the City re-examined their position on wide curb lanes and decided to convert that space into functioning bike lanes. Not only were the four lane arterials restriped to include bicycle lanes, but the new cross-sections provided in the 2000

bicycle plan included bicycle lanes. Many of the street reconstructions were funded through STP Urban funds. After 25 years of street reconstruction and pavement replacement projects, most arterial streets have bicycle lanes in the city. When state highway projects are funded within the city, state and federal funds are used to incorporate bicycle lanes, even on East Washington Avenue – one of the only six lane state highways in the city. Additionally, in 1993 the city decided to set-aside part of their STP-Urban funds for smaller bicycle and pedestrian projects and to fund a bicycle education coordinator.

A committed community should not wait until streets need to be reconstructed before bikeways are considered. It could take decades for this strategy to work. Many bikeway projects are not tied to street or highway projects and are located in separate corridors. Many arterial streets are so constrained that they cannot be widened for bikeways even with best faith efforts. Communities need to consider *budgeting* funds from its own general revenue sources to fund smaller projects or to gradually stage development of larger projects. Given the constraints of today's local budgets, communities may only be able to budget small amounts of funding, but even minor resources can be used for painting bicycle lanes, wayfinding signs, bicycle racks, and to match larger grants. Larger cities such as Seattle, Minneapolis, and Washington D.C. will budget in the millions of dollars per year for bicycle projects while smaller cities may contribute in the hundreds of thousands. A moderate sized city such as Madison has a separate bikeway budget of \$500,000 which often swells to over \$4,000,000 when all federally-funded projects are added in.

In some localities, a portion of an increase in the sales tax will be set aside for recreational trail or other conservation funding. Rarely are new taxes levied to exclusively support bicycle projects, yet an excellent example exists in Missouri. The passage of Proposition C in 2000 which created a 0.1 percent sales tax for parks and open spaces in St. Louis led to the formation of the Great Rivers Greenway District, a nonprofit organization spearheading an interconnected system of greenways, parks and trails in the region.

Over the course of the past 21 years, the level of federally funded projects has increased substantially. Aside from the projects that are incorporated into larger street and highway projects, several federal programs have become major sources for the funding of stand-alone or independent bicycle projects. These programs are primarily run by state DOTs. As a recommended practice, cities and counties should first become acquainted with the programs and the criteria established for the funding to evaluate how that matches up with their own bikeway priorities. Bicycle friendly communities should consider *pursuing state and federal funds* which can fund up to 80% of project costs. This is an excellent means of using potentially available resources for the development of significant bikeways. (Given the significant paperwork involved, it typically does not stand to reason to pursue federal funding for bikeway construction projects of less than \$100,000.) Nearly every community of over 50,000 people within the Kansas City MPO has applied for federal funding for bicycle and pedestrian projects so this practice is already in play in the Kansas City metro area. The program having the most potential for bikeway funding is the Transportation Alternatives Program – see Table 1 for current funding levels for the MPO area.

There are a *variety of sources of funding* extending beyond those commonly available through federal transportation sources. Communities putting best practices into action will continue to look for funding opportunities in other places. These opportunities take a variety of forms including recreational trails and park funds, private foundation funding, and public and private utility funding. The latter has considerable potential within path corridors where utilities – transmission companies, power utilities, fiber optic carriers - are often willing to construct or reconstruct paths for the opportunity to share corridors. For example, the city of Madison has constructed or reconstructed approximately 10 miles of path through such arrangements.

Public involvement, advisory committees, advocacy groups, partnerships

Where you find successful bicycle programs you will also find a variety of local support. Often public involvement begins first as a community prepares a bicycle plan. The type of techniques to involve the public through planning initiatives has increased overtime and includes the standard techniques such open houses, charrettes, workshops, committee meetings, but also includes newer approaches such on-line mapping and the use of social media. As plans are being prepared, typically a steering or advisory committee is formed to provide input.

The continued use of an advisory committee, beyond the development of a plan, is a strongly recommended best practice. Without a continuous forum for input, communities are often content to be satisfied with the status-quo. An advisory committee will provide an avenue for new ideas and will be in a position to solicit them as well. Community staff will often need the committee's support when new ideas are incubated within city government, but little support exists for such change within city hall.

Regional and local advocacy groups can also bring public awareness to important issues. These organized groups are commonly effective, but even unorganized citizens can coalesce to provide support for important initiatives involving funding and bikeway projects, as well as non-engineering efforts such as education, enforcement, and encouragement efforts.

Communities themselves cannot take overt efforts to organize or support advocacy efforts. They can, however, ensure that the public has multiple opportunities for public involvement and, through this, groups and citizens can be brought together. Through such means, formal and informal associations are made and advocacy efforts can often arise organically.

Partnerships take on a more formal relationship between individuals or groups characterized by mutual cooperation and responsibility. Partnerships are formed when there is recognition of common goals. For instance, many local, state, and national groups have formed partnerships with each other and with public agencies to increase bicycling. Partnerships flourish when certain groups can conduct certain actions that others cannot. Some examples of the most obvious partnerships recommended as models include:

- Health officials working with local governments and advocates to improve bicycling conditions and to encourage day-to-day bicycling
- Safety organizations supporting education, enforcement and engineering efforts for bicyclists
- Businesses and advocacy groups entering into certain partnerships to encourage bicycle transportation and to include bike sharing, cyclovias, bike-to-work events, etc.

Institutionalization and complete streets

If plans are about policies, other efforts that address the design of facilities and projects are about putting those policies into action. The ultimate in best practices is when communities are so in sync with improving conditions for bicycling that they automatically incorporate facilities for bicyclists and give consideration to bicycling regardless of the scope of a project. This has been referred to as many things, but perhaps the best monikers are "institutionalization" or "mainstreaming". Institutionalization takes on a broader meaning and can apply across the board with all of the "E's". Mainstreaming is a term that has been used by the Federal Highway Administration (FHWA) in the past and involves the policy and practice of including or "completing the street" for bicyclists and pedestrians. That policy has been in place since 2001 and has been spotty in its application across the nation by the FHWA offices. It acknowledges the history of ignoring bicycle and pedestrian accommodation in transportation projects, the challenges of retrofitting existing infrastructure and the complexity of developing

bicycle and pedestrian systems in built environments designed around automobile dependence. Elements of the current document allude to modern 'Complete Streets' principles, including providing a real choice of transportation modes. The guidance found at http://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/design_guidance/design.cfm contains three key elements:

- a policy statement **that bicycling and walking facilities will be incorporated into all transportation projects** unless exceptional circumstances exist;
- an approach to achieving this policy that has already worked in State and local agencies; and
- a series of action items that a public agency, professional association, or advocacy group can take to achieve the overriding goal of improving conditions for bicycling and walking.

The Secretary of the U.S. DOT has instructed FHWA to follow this policy whenever federal funds are being used, and FHWA has also encouraged state DOT's to accept this policy. In an assessment of every street and highway crossing of the Kansas City metro area freeways (state highways), and bridges crossing major rivers very few of them included bicycle accommodations. Although this memo is directed at communities and MARC, it is strongly recommended that Kansas and Missouri DOT's follow the federal policy. Local agencies should apply the same "mainstreaming" policies and guidance included in the federal policy as they incorporate Complete Streets practices in their own systems.

Communities such as Davis, California and Boulder, Colorado get a lot of credit for adhering to this practice for decades, but lesser known examples also exist. For example, all of Gilbert, Arizona's major streets have bike lanes. This policy is written into the city's Public Works and Engineering *Standards and Details*.

The following are a list of accomplishments MARC has completed in the Complete Streets arena since the last MTP update in 2010:

- MARC Complete Streets Policy
- MARC Complete Streets Handbook
- Livable Streets fact sheet
- Health Benefits fact sheet
- Universal Design fact sheet

In addition, MARC hosts ongoing webinars on the benefits of Complete Streets, and has assisted with the development of several demonstration projects.

Design standards

In an effort similar to "mainstreaming" or Complete Streets, changing design and facilities manuals to include space for bicycle accommodations is an effective way to help ensure inclusion of facilities for this mode. Although nearly every reconstruction or pavement replacement project is unique, starting with street cross-sections that include bicycle lanes or paved shoulders is a significant step in accepting bicyclists in the design of projects. The written narrative explaining the design process is equally important and requires that facilities manuals clearly point out the need to include bicyclists and provide clear steps to follow if engineers want to use other cross-sections that exclude space for bicyclists.

In the past three years, numerous complete streets manuals have been completed which provide detailed design guidance on various types of bicycle accommodations given the complexity of providing space for bicyclists on existing streets where there are constraints and trade-offs. The city of Boston has an excellent guide. The city of Dallas has an outstanding set of bicycle facilities guidelines developed as part of its bicycle plan (http://dallascityhall.com/public_works/bikePlan/pdf/2011_Dallas_Bike_Plan_Addendum.pdf).

Best Practices - MPO Planning

Bicycle Planning at the Regional Level

At the regional level, MPOs provide several important functions related to bicycle planning:

- coordinate bicycle planning between jurisdictions
- develop regional bicycle plans
- establish regional project priorities
- provide technical assistance to communities
- create overall regional plans that coordinate transportation with land use (this has significant impacts on creating an environment that supports the practicality of bicycling for transportation)

Every MPO is required by federal transportation rules to plan for bicycles. Many MPOs have developed detailed bicycle plans often with pedestrian elements. Although this produces capable and comprehensive bicycle plans, the network component and other recommendations of these plans must still be included in the MPO's long-range transportation plan. Most MPOs simply include bicycle planning as part of their long-range transportation plan. All of the best planning practices cited under the first section of this memo aimed at communities also apply to MPOs. That includes public involvement, bikeway identification, and consideration of funding. The most significant difference is the scale – MPO plans should focus on regionally significant routes and projects. Appropriately, MARC considers bicycle projects that are multijurisdictional, cross major barriers, and connect existing facilities; as indicated by MARC planning guidelines: "Regional bicycle and pedestrian facilities link jurisdictions, mitigate major barriers to non-motorized travel such as rivers or highways, or connect gaps between existing facilities. These facilities could also provide connections to regional activity centers, livable communities, and transit routes."

There are dozens of good examples of MPO plans. The best plans provide regional bikeway networks that are more than just a combination of bikeways recommended in local plans. Regional plans provide direction on key regional routes and facilities. The *New Orleans Metropolitan Bicycle and Pedestrian Plan* is a good example. It offers an opportunity to better integrate bicycle planning with the wider transportation plans for the City. It lays out policies and programs to promote and support increased pedestrian and bicycle transportation and safety. Many of the recommendations from this report are now being implemented by the Greater New Orleans Pedestrian & Bicycle Program.

The Metropolitan Council of the Twin Cities will soon release the *Twin Cities Regional Bicycle Systems Study*. The study is similar to the work MARC is undertaking with this plan and provides definitions and guidelines for the assessment of the bicycle network and recommends placement of corridors within that regional network. Priority corridors are also identified, and after engaging stakeholders, specific alignments were established within many corridors based on existing and planned bikeways. For other corridors, wide corridors are still mapped without specific street and/or path alignments. Lastly, bicycle performance measures were reviewed for consideration in the long range transportation plan.

The Flagstaff Metropolitan Planning Organization 2030 Regional Transportation Plan is a good example of a smaller MPO plan addressing the range of transportation modes. This 2009 award winning plan calls for compact development, punctuated by activity centers and an emphasis on walking and bicycling modes. In order to turn these plans into actuality, the MPO played a central role in a tax campaign that yielded dedicated taxes of more

than \$800,000 annually for pedestrian and bicycle safety and capacity projects. With this money, they were able to increase their bike lane miles from 59 to 117 (<http://www.flagstaff.az.gov/DocumentCenter/Home/View/10092>).

Funding and project prioritization

MPOs have an important role of prioritizing projects for federal funding including bicycle projects. MARC reviews and recommends applications for three federal programs - Congestion Mitigation/Air Quality (CMAQ), Surface Transportation Program (STP), and Transportation Alternatives (TAP) (see Table 1 for a list of current funding allotments).

Having project selection criteria that includes safety, potential for increasing bicycle trips and reducing automobile trips (relative to cost of the project), relationship to regional plans, and project readiness are important criteria to start with. As with any rating scheme, being able to support the criteria with quantifiable data is difficult, but should not stymie efforts to continue to improve the rating process.

Two important funding strategies exist for use of STP funding at the MPO level. A time-tested strategy is to ensure that criteria used to rate and fund street and highway projects include strong consideration of bicycle and pedestrian facilities. Dozens, perhaps over a hundred MPOs, now make it virtually impossible to fund a street project within an MPO with STP funding without bicycle and pedestrian accommodations. The Green Bay and Madison, Wisconsin MPOs were some of the first MPOs to incorporate this strategy for approval of STP-Urban funds in the early 1990s.

Secondly, more MPOs have now created a set-aside of STP funds for bicycle and pedestrian projects. Although this practice has been used sparingly by other MPOs in the past, more MPOs are beginning to consider this. For instance, the Metropolitan Area Planning Association in Omaha has factored a fair amount of flexibility in how they use STP funds to fund bicycle and pedestrian projects. Depending on the quality of applications and how they meet approved criteria, up to 25% of MAPA's annual STP apportionment can go to bicycle and pedestrian projects. The more funds flexed, the more it would exceed a more standard allocation of Transportation Alternatives funding.

Technical assistance

There is typically no entity within in an MPO that is better prepared to provide technical assistance to communities on bicycle planning than an MPO itself. This stems from the MPO's expertise honed as it prepared its own regional bicycle plans, its knowledge of state and national guidelines, and its overall familiarity of the communities within the region. An MPO's ability to provide technical assistance is limited – although they can advise a community on how to do a plan, they usually do not have the resources to actually prepare a community bicycle plan in the first place. A list of recommended best practices for technical assistance for MPOs includes:

- *Guidelines*
MPOs should provide guidance on how to develop bicycle plans. Often this means that MPOs modify, adopt and use other state and national guidelines as their own. An example of a MPO planning guide is at <http://www.dot.wisconsin.gov/projects/state/docs/bike-guidance.pdf>
- *Workshops and conferences*
An excellent way to help inform communities of current and best practices is through the sponsorship of conferences and workshops.

- *Technical tools*

During the past 10 years an increasing number of analysis tools have been developed including bicycle level-of-service models, crash analysis tools, and mapping tools. It is impractical to expect that communities can easily become adept at using these tools without some upfront assistance. Additionally, some of the analyses are more easily done at the regional level to begin with.

- *Planning coordination*

MPOs the size of MARC will focus on regional bikeway routes. Counties and communities will also work on locally-significant routes that tie into the regional network. As an MPO, helping to coordinate this will result in a more complete bikeway system and will provide the opportunity for a community to learn more about the MPO bicycle plan and resources available through the MPO.



MEMORANDUM

Date: June 4, 2014
To: Aaron Bartlett, MARC
From: Tom Huber & Kevin Luecke
Project: MARC Regional Bikeway Plan
Re: Surveys of Peer MPOs

Five peer Metropolitan Planning Organizations (MPOs) were contacted to survey their practices associated with bicycle planning and the current state of the implementation of their plan. Current plans were reviewed before making contact with the MPOs. All of the MPOs were contacted and personal interviews were possible with agency representatives for four of the five. The five MPOs are:

- Madison-Area MPO, Madison, WI
- Metropolitan Area Planning Agency (MAPA), Omaha, NE
- Des Moines Area MPO, Des Moines, IA
- Metropolitan Council, Minneapolis-St. Paul, MN
- Kentuckian Regional Planning and Development Agency (KIPDA), Louisville, Kentucky

Despite repeated attempts, no one at the Kentuckian Regional Planning and Development Agency (KIPDA) was available for a personal interview. A change in staffing compounded the problem. However, a base level of information was still available and a contact was made with a planner working on the update of the Louisville long range transportation plan.

The following is a summary of those five surveys.

- Every MPO, except KIPDA, either has a free-standing bicycle and pedestrian plan or they were working on one. Most MPOs provided some guidance on bicycle planning to communities mostly because of their familiarity with doing the regional bicycle plans. Similarly, all of the MPOs were offering at least limited services for transportation planning based on their knowledge and expertise as regional transportation planning organizations. The Metropolitan Council in the Twin Cities reviewed local bicycle plans, but that was as close as any organization got to actually completing local plans. The MPOs were available for limited assistance, for general coordination and for participating on local planning advisory committees.
- The Metropolitan Council offered the most assistance with other planning efforts in large part due to its organization's role in community development activities. This assistance was limited to review of plans and technical assistance. None of the other MPOs offered any of the other forms of planning or prepared local plans that featured the following: sidewalk planning, comprehensive planning, greenways/trails, and park/recreation.
- Only the Des Moines MPO had a standing bicycle and pedestrian committee, while the other MPOs made use of advisory committees while plans were being developed.
- Every one of the MPOs had at least one bicycle friendly community within their region, but none of them helped with the applications. A couple of the MPOs said that they encouraged participation in the BFC program, but acknowledged it was at low level of effort.

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- None of the MPOs had formally adopted any bicycle facility guidelines. Several of the MPOs mentioned that they use or are familiar with the AASHTO guidelines. Additionally, two mentioned that they felt that the use of the guidelines is pretty much up to the communities and counties since they are responsible for actual project implementation. The Madison MPO included a concise summary of the facility guidelines in their plan which was based directly on the AASHTO guidelines.
 - Communities within all of the MPOs provided nearly the complete set of bikeway facilities as listed in the survey. There were two exceptions. Only City of Madison, City of Louisville and the Met Council communities provided both green bike lanes (at conflict points) and only Madison was using bike boxes. Louisville and Minneapolis are currently adding bike boxes this Spring or Summer.
 - None of the MPOs offered bicycle education or safety programs directly to communities; however, there were a few notable offerings. MAPA funds a comprehensive bicycle education program on contract with Live Well Omaha, and the City of Madison's bicycle safety coordinator has been funded through the MPO for over 20 years (using STP urban funds).
 - None of the MPOs were collecting their own bicycle count data, but several were participating. For instance the Des Moines MPO was providing the actual counters, but expecting the counts to be done by the local units of government. In Madison, staff assisted the one-day field counts by dedicating the help of a few staff people. The Bicycle Federation of Wisconsin leads this annual effort.
 - None of the MPOs collected bicycle crash data. All of them indicated that they did analyze available bicycle data for the plans they were doing. None of them were doing regular crash analyses or reports.
 - The MPOs all responded differently to the question on implementation. The Metropolitan Council at first indicated that they do no implementation and that they have advisory authority only. However, Steve Elmer went on to explain how they expect to work directly with communities to begin fleshing out alignments for their new corridor study. He also mentioned ways they can influence project development through the selection of projects. Mike Cechvala of Madison simply stated that they do a lot through coordination, but also acknowledged that their plan is 14 years old. Mike Helgerson from MAPA MPO had the most complete answer indicating their involvement in the bicycle education program, the funding and current development of a new bicycle and pedestrian plan, and that there is an approach in development on how to fund projects in way that is consistent with their new plan. Aaron Bartling with the Des Moines MPO indicated that there has been a decided shift in how area communities are focusing on bicycle transportation with more on-street facilities while also expressing an uptick in implementation.

Other Comments and Conclusion

There were some noteworthy comments that were made by the MPOs or simply some observations that might be of interest to MARC:

- For the Des Moines MPO plan, a bicycle Level of Service (LOS) was added as a factor in the STP scoring system for road projects with and without bicycle accommodations. "Adding Bicycle LOS as a factor in the STP scoring process could help the MPO, the CIRTPA, and the Ames Area MPO consider bicyclists during the planning process. By planning and designing transportation projects with a Bicycle LOS score of C or better, the MPO, the CIRTPA, and the Ames Area MPO can ensure that no projects applying for STP funding will worsen a road's Bicycle LOS." The Des Moines MPO plan

also included several interesting benchmarks and policies in their bike plan:

- Integrate 100 miles of bicycle lanes on central Iowa's arterial and collector roads, by 2020.
 - Install paved shoulders on 50% of county roads where bicycle use or demand is potentially high, by 2020.
 - Amend the MPO's STP Guidelines scoring criteria to award extra points for projects that include bicycle and pedestrian accommodations, by Federal Fiscal Year 2015.
-
- The Madison MPO has always been a leader in Wisconsin and the country in bicycle planning. The MPO has been a major player in developing a city of Madison bicycle plan, an MPO bike plan, and a county bike plan. Major changes occurred in the early 1990's for the MPO when they changed the STP criteria to make it nearly impossible for a community to get STP funds without a "complete street" (well before the notion of complete streets was hatched). They were also one of the first MPOs to provide STP urban funding for bicycle-only projects.
 - MAPA and the Met Council are doing regional bikeway corridor identification that are most on par with the work currently in progress for MARC.
 - Although KIPDA has not been terribly active in bicycle planning they have identified a general set of bikeway corridors. The City of Louisville within the KIPDA region has made considerable progress in just the last two years and is worth keeping on the MARC radar. Many of the facilities put in place were done just last year and already this year. The city also has a very good on-line bike map which recommends point to point travel for bicyclists using 3 different routes based on directness and safety.

The full survey results for each MPO that was interviewed are attached.

Madison-Area MPO – Michael Cechvala

1. Does your MPO have a regional active transportation, bike/ped or non-motorized transportation plan?
Yes, bike plan since 1980's. Currently being updated from year 2000 edition. Plan coordinated with City of Madison long range plan update. No free-standing ped plan, but part of long range transportation plan.
 - a. If so, can you provide us with a copy of the plan/map? Yes, can provide a link.
<http://www.cityofmadison.com/trafficEngineering/documents/BikeTranspPlan/bikeplanoo.pdf>
2. Does your MPO encourage/assist local communities with bike/ped needs and planning?
 - a. If so, which types:
 - i. Bikeway Master Plan Y
 - ii. Pedestrian Safety Action Plan N
 - iii. Sidewalk Plan N, but sidewalk inventory in Madison
 - iv. Comprehensive Plan Y
 - v. Transportation Plan Y
 - vi. Parks and Recreation Plan N
 - vii. Greenway Linkage Plan Y
 - viii. Trails Plan Part of bike plan
 - ix. Multi-modal Corridor Plan Y
 - x. Other plan/document
3. Does your MPO have a community-based bike/ped advisory committee? Just to update plan.
4. Are there communities which have achieved "Bicycle Friendly Community" designation in your region? Y, Madison and Fitchburg
5. Do you have a program to encourage Bicycle Friendly Community or Walk Friendly Community designations for communities in your region? No, but will provide assistance
6. Does your MPO collect bike/ped count data? No, but assisted Bicycle Federation in manual counts in the Fall
 - a. If so, do you have a standard methodology?
 - b. Please describe your methodology.
7. Does your MPO encourage state and/or local communities to collect bike/ped counts? Yes, recommended in the plan
8. Does your MPO provide facility design and industry best practices guidance for local agencies.
 - a. If so, which guidelines do you promote? (AASHTO, NACTO, other?)
Guidelines provided in the plan's appendix – consistent with AASHTO guidelines
9. What types of facilities are used in your MPO region? (Optional: Can they tell us how many miles of each?)
 - a. Bike lanes y
 - b. Buffered bike lanes y
 - c. Bike route and wayfinding signs y

-
- d. Share the road signs y
 - e. Bike boxes y
 - f. Shared use paths y
 - g. Green bike lanes y, but only at conflict areas
 - h. Wide curb lanes y, but most converted to bike lanes in past 10 years
 - i. Share lane markings y
 - j. Paved shoulder y
 - k. Side paths y, but few compared to shared use paths within their own corridor
10. Does your MPO provide educational programs for bike/ped safety? N, but safety info is provided with rideshare outreach
11. Does your MPO collect and analyze bike/ped safety data? Analyze especially for plan, but no special reports. Does not collect data.
- a. If so, please describe your methodology.
12. How is your MPO implementing your bike/ped plan?
- 14 year old plan so implementation has waned. Not a ped plan. Implementation has been successful normally through regional coordination, STP-Urban funding consistency, TAP direction. Any federally funded project gets bike and ped facilities, power of influence over any project that gets state and/or federal funding.
- a. Local Agency Group -
 - b. Civil Leader Group
 - c. Friends Groups
 - d. Other

Other Notes:

Madison MPO has had a strong relationship with both the city and Dane county in developing and sponsoring a bicycle plan. In the early 1990's they changed the STP criteria to make it virtually impossible to fund a STP project without it being a "complete street." That same criteria also made it possible for the funding of minor bike and ped standalone projects.

Omaha - MAPA

1. Does your MPO have a regional active transportation, bike/ped or non-motorized transportation plan? Currently being developed as a free-standing plan. Bicycle and pedestrian elements approved as part of long range transportation plan.
 - a. If so, can you provide us with a copy of the plan/map? When complete, yes
2. Does your MPO encourage/assist local communities with bike/ped needs and planning?
 - a. If so, which types: ?
 - i. Bikeway Master Plan – no, but currently in the works
 - ii. Pedestrian Safety Action Plan - no
 - iii. Sidewalk Plan - no
 - iv. Comprehensive Plan – yes, coordinates with comp planning
 - v. Transportation Plan – a long range transportation plan for the metro area and will often assist a community
 - vi. Parks and Recreation Plan - no
 - vii. Greenway Linkage Plan - no
 - viii. Trails Plan – county wide - coordinates with National Park Service
 - ix. Multi-modal Corridor Plan – yes regional transit vision
 - x. Other plan/document
3. Does your MPO have a community-based bike/ped advisory committee? No
4. Are there communities which have achieved “Bicycle Friendly Community” designation in your region? Yes, Omaha is bronze
5. Do you have a program to encourage Bicycle Friendly Community or Walk Friendly Community designations for communities in your region? no
6. Does your MPO collect bike/ped count data? Does not collect, but will analyze for plan products.
 - a. If so, do you have a standard methodology?
 - b. Please describe your methodology.
7. Does your MPO encourage state and/or local communities to collect bike/ped counts? Yes, Omaha collects data
8. Does your MPO provide facility design and industry best practices guidance for local agencies.
 - a. If so, which guidelines do you promote? (AASHTO, NACTO, other?) no
9. What types of facilities are used in your MPO region? (Optional: Can they tell us how many miles of each?)
 - a. Bike lanes y
 - b. Buffered bike lanes y
 - c. Bike route and wayfinding signs y
 - d. Share the road signs y
 - e. Bike boxes n
 - f. Shared use paths y

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- g. Green bike lanes n
 - h. Wide curb lanes y, but very few and not done for bicyclists
 - i. Share lane markings y
 - j. Paved shoulder Y
 - k. Side paths y
10. Does your MPO provide educational programs for bike/ped safety? Yes, MAPA sponsors Live Well Omaha which conducts courses for adults and children
 11. Does your MPO collect and analyze bike/ped safety data? No, just for plans. Does a regional crash map of all crashes – does include Omaha and Iowa, but not suburbs in Nebraska
 - a. If so, please describe your methodology.
 12. How is your MPO implementing your bike/ped plan?
 - a. Local Agency Group
 - b. Civil Leader Group
 - c. Friends Groups
 - d. Other

Other Notes:

- Doing a bike and pedestrian plan
- On-going “complete streets” policies
- Education program – Live Well Omaha
- Funding – Made available and will flex STP funds for TAP projects if key projects are submitted
- STP program had no criteria 3 years ago to prioritize bicycle and pedestrian accommodations. Now includes criteria.
- As soon as bike/ped plan is done, projects have to be consistent with corridor plan and complete streets approach.

Des Moines MPO – Aaron Bartling

1. Does your MPO have a regional active transportation, bike/ped or non-motorized transportation plan?
 - a. If so, can you provide us with a copy of the plan/map?

Yes, a free standing bicycle plan - *Connect: Central Iowa Bicycle and Pedestrian Transportation Action Plan* (<http://dmampodemo.files.wordpress.com/2013/10/connect-august-5-2009-final.pdf>). Also a bicycle and pedestrian element included in LRTP. Together these two plans include Inventory, Gap Identification, Assessment of BLOS, Crash Mapping, Planned Facilities, Bicycle and Pedestrian Supportive Land Use Strategies, Implementation Strategies & Policies. Plan knits together community plans, but no regional corridors proposed. Interesting LOS goal (added at end) .

2. Does your MPO encourage/assist local communities with bike/ped needs and planning?
 - a. If so, which types: ?
 - i. Bikeway Master Plan – on street regional bikeway facilities plan
 - ii. Pedestrian Safety Action Plan – recommended in the plan
 - iii. Sidewalk Plan - no
 - iv. Comprehensive Plan - no
 - v. Transportation Plan – just regional
 - vi. Parks and Recreation Plan - no
 - vii. Greenway Linkage Plan - no
 - viii. Trails Plan - no
 - ix. Multi-modal Corridor Plan - no
 - x. Other plan/document

3. Does your MPO have a community-based bike/ped advisory committee? Yes, various "Roundtables" (this seems to be a unique way to help put into action a variety of their plans).

4. Are there communities which have achieved "Bicycle Friendly Community" designation in your region?

Yes, Des Moines

5. Do you have a program to encourage Bicycle Friendly Community or Walk Friendly Community designations for communities in your region? No

6. Does your MPO collect bike/ped count data? No, but have trail counters which are loaned to communities. The data is then shared.
 - a. If so, do you have a standard methodology?
 - b. Please describe your methodology.

7. Does your MPO encourage state and/or local communities to collect bike/ped counts? yes

8. Does your MPO provide facility design and industry best practices guidance for local agencies.
 - a. If so, which guidelines do you promote? (AASHTO, NACTO, other?) Promotes the AASHTO guidelines in plan

9. What types of facilities are used in your MPO region? (Optional: Can they tell us how many miles of each?)

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- a. Bike lanes - y
 - b. Buffered bike lanes - n
 - c. Bike route and wayfinding signs -Y
 - d. Share the road signs - y
 - e. Bike boxes - n
 - f. Shared use paths - y
 - g. Green bike lanes - n
 - h. Wide curb lanes - y
 - i. Share lane markings -y
 - j. Paved shoulder -y
 - k. Side paths - y
10. Does your MPO provide educational programs for bike/ped safety? No, but many recommendations in plan. Webinar series. Low effort
 11. Does your MPO collect and analyze bike/ped safety data? No, but use DOT crash data; crashes are a performance measure
 - a. If so, please describe your methodology.
 12. How is your MPO implementing your bike/ped plan?

Have had lots of trails put in place in the past, but more focus on on-road. Des Moines doing well and now more focused on transportation and on street facilities.

 - a. Local Agency Group
 - b. Civil Leader Group
 - c. Friends Groups
 - d. Other

Other Notes:

- Added the Bicycle LOS as a factor in the STP scoring system for road projects with and without bicycle accommodations. "Adding Bicycle LOS as a factor in the STP scoring process could help the MPO, the CIRTPA, and the Ames Area MPO consider bicyclists during the planning process. By planning and designing transportation projects with a Bicycle LOS score of C or better, the MPO, the CIRTPA, and the Ames Area MPO can ensure that no projects applying for STP funding will worsen a road's Bicycle LOS."
- Interesting Benchmarks from bike plan:
- 3.3.1. Benchmark: Identify all central Iowa arterial and major collector roadway locations suitable for bicycle lanes, by 2011.
- 3.3.2. Benchmark: Integrate 100 miles of bicycle lanes on central Iowa's arterial and collector roads, by 2020.
- Other key policies:
- Install paved shoulders on 50% of county roads where bicycle use or demand is potentially high, by 2020.
- Amend the MPO's STP Guidelines scoring criteria to award extra points for projects that include bicycle and pedestrian accommodations, by Federal Fiscal Year 2015.

1. Does your MPO have a regional active transportation, bike/ped or non-motorized transportation plan? A regional bicycle system study was just finished and was made part of the transportation policy plan. This plan lays out an approach and a mapped corridor system comprised of bikeways.
 - a. If so, can you provide us with a copy of the plan/map?
<http://www.metrocouncil.org/Transportation/Planning/Transportation-Resources/Regional-Bicycle-Master-Study-Introduction.aspx>

2. Does your MPO encourage/assist local communities with bike/ped needs and planning?

The Met Council conducts a full range of planning for the Twin Cities metro area. The following questions were answered in a way which reflects what the Met Council offers and not necessarily just what the MPO offers.

 - a. If so, which types: ?
 - i. Bikeway Master Plan no, but assistance including grants, local assistance handbook
 - ii. Pedestrian Safety Action Plan, no
 - iii. Sidewalk Plan, no
 - iv. Comprehensive Plan, Comp plans have to be reviewed by Met council. The Met council provides assistance, but does do the community plans.
 - v. Transportation Plan, no, but community transportation plans are reviewed by them
 - vi. Parks and Recreation Plan, Regional plan produced, community plan reviewed by Met Council and approved. Funding contingent on approval
 - vii. Greenway Linkage Plan, no greenway plan per se, but a regional parks and trails plan covers many greenway locations
 - viii. Trails Plan no
 - ix. Multi-modal Corridor Plan, does transit planning
 - x. Other plan/document

3. Does your MPO have a community-based bike/ped advisory committee? no

4. Are there communities which have achieved "Bicycle Friendly Community" designation in your region? St. Paul , Minneapolis, Richfield, and Edina

5. Do you have a program to encourage Bicycle Friendly Community or Walk Friendly Community designations for communities in your region? no

6. Does your MPO collect bike/ped count data? No. But lots of counting taking place sponsored by others. Consumer of count data BTW -has a regional bicycle travel planner called cyclopath which provides origin-destination recommendations for bicyclist trips (the usefulness has been usurped by Google planner)
 - a. If so, do you have a standard methodology?
 - b. Please describe your methodology.

7. Does your MPO encourage state and/or local communities to collect bike/ped counts? Maybe included in a policy statement someplace.

-
8. Does your MPO provide facility design and industry best practices guidance for local agencies.
 - a. If so, which guidelines do you promote? (AASHTO, NACTO, other?) No design guidelines approved. Wayfinding guidelines? Transit oriented development. Trans Policy plan

 9. What types of facilities are used in your MPO region? (Optional: Can they tell us how many miles of each?)
 - a. Bike lanes y
 - b. Buffered bike lanes y
 - c. Bike route and wayfinding signs y
 - d. Share the road signs y
 - e. Bike boxes n, but on drawing board
 - f. Shared use paths y
 - g. Green bike lanes y
 - h. Wide curb lanes y
 - i. Share lane markings y
 - j. Paved shoulder y
 - k. Side paths y

 10. Does your MPO provide educational programs for bike/ped safety? no

 11. Does your MPO collect and analyze bike/ped safety data? Consumer of data and will analyze for plans
 - a. If so, please describe your methodology.

 12. How is your MPO implementing your bike/ped plan? Traditionally has shied away from a mapped plan, but now has bikeway study and broad corridors.
 - a. Local Agency Group
 - b. Civil Leader Group
 - c. Friends Groups
 - d. Other

Steve: Not implementing per se, two systems within in the Met Council that are responsible for bicycle and pedestrian – the MPO (transportation) and community development (recreation). Parks dept is in com develop division and they plan and fund regional park system. Also the met council bonds for projects.

Communities are the real implementers.

For STP urban – have to prove transportation function for an independent project. Met used prioritization factors (as referred to as Investment Priorities and Requirements) and one of those is multi-modal – how it serves all users, overcomes barriers and improves safety. Separate criteria for free– standing bike and ped projects.

Other Notes:

- Will be doing a Regional solicitation – TAP and Urban STP for 2018/2019. Are revising the criteria based on bike study.
- Tier one and tier two corridor projects from study will receive priority points (see map in study). Can still fund “Critical bicycle links” that are not tier one or two if they overcome a barrier, etc.
- This is the main way projects are tied to the plan.

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- With the study being completed and incorporated into LRTP, the Met will be more involved in coordination and support for network build out. That means working with communities in defining alignments. 1300 miles of proposed alignment – twice the mileage of peer MPOs.
 - TPH Comments – this seems to be a very similar plan/study to what MARC is doing. I would have thought that the Met Council would have done this 15 years ago, but is only a year ahead of MARC. Is a good plan to watch on how it is implemented. Steve is a good contact and is interested in KC plan.

1. Does your MPO have a regional active transportation, bike/ped or non-motorized transportation plan?
Page 31 and 32 of long range transportation plan -
http://www.kipda.org/files/PDF/Transportation_Division/LRP/MTP2030/06_AltModes.pdf
 - a. If so, can you provide us with a copy of the plan/map?
http://www.kipda.org/files/PDF/Transportation_Division/Maps/bike_ped_sml_upd_.pdf
2. Does your MPO encourage/assist local communities with bike/ped needs and planning?
 - a. If so, which types: ?
 - i. Bikeway Master Plan n
 - ii. Pedestrian Safety Action Plan n
 - iii. Sidewalk Plan n
 - iv. Comprehensive Plan n
 - v. Transportation Plan y, but on regional level
 - vi. Parks and Recreation Plan ?
 - vii. Greenway Linkage Plan n
 - viii. Trails Plan n
 - ix. Multi-modal Corridor Plan ?
 - x. Other plan/document TDM program
3. Does your MPO have a community-based bike/ped advisory committee? n
4. Are there communities which have achieved "Bicycle Friendly Community" designation in your region?
Louisville
5. Do you have a program to encourage Bicycle Friendly Community or Walk Friendly Community designations for communities in your region?
6. Does your MPO collect bike/ped count data? n
 - a. If so, do you have a standard methodology?
 - b. Please describe your methodology.
7. Does your MPO encourage state and/or local communities to collect bike/ped counts?
8. Does your MPO provide facility design and industry best practices guidance for local agencies.
 - a. If so, which guidelines do you promote? (AASHTO, NACTO, other?)
9. What types of facilities are used in your MPO region? (Optional: Can they tell us how many miles of each?)
 - a. Bike lanes y
 - b. Buffered bike lanes y
 - c. Bike route and wayfinding signs y
 - d. Share the road signs
 - e. Bike boxes y
 - f. Shared use paths y

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- g. Green bike lanes y
 - h. Wide curb lanes y, but not specifically intended for bicyclists
 - i. Share lane markings y
 - j. Paved shoulder y
 - k. Side paths
10. Does your MPO provide educational programs for bike/ped safety? n
 11. Does your MPO collect and analyze bike/ped safety data? n
 - a. If so, please describe your methodology.
 12. How is your MPO implementing your bike/ped plan?
 - a. Local Agency Group
 - b. Civil Leader Group
 - c. Friends Groups
 - d. Other

Other Notes

- KIPDA has not been a leader in bicycle planning; however, the City of Louisville has made considerable progress in just the last two years. Many of the facilities put in place were done just last year and this year. The city updated its plan in 2010:
<http://www.louisvilleky.gov/BikeLouisville/bikefriendly/2010bikemasterplan.htm>
- The city has what appears to be a very good on-line point to point bike map which recommends 3 different routes based on directness and safety. Also provides total elevation change.
<http://www.ridethecity.com/louisville#3509422>

MARC Regional Bikeways Plan

Bicycle Facilities Design Guidelines Overview

Introduction

The design guidelines contained in this section are intended to support the recommendations presented in this plan. They are not intended as comprehensive design standards. Rather, they reference existing design standards and provide clarification or supplemental information as necessary. There are six primary sources of bicycle and pedestrian facility design information that were used to develop the guidelines provided in this section:

1. The Mid-America Regional Council and the Kansas City Metro Chapter of the American Public Works Association Best Practices Local Bikeway Planning and Design Guide
2. Federal Highway Administration *Manual on Uniform Traffic Control Devices (MUTCD)* – The *MUTCD* is the national standard for signing, markings, signals, and other traffic control devices.
3. American Association of State Highway and Transportation Officials (AASHTO) *Guide for the Development of Bicycle Facilities* – This document is intended to present information on how to accommodate bicycle travel and operations in most riding environments. It is the design guidance upon which most state and local design guidelines are based. In many jurisdictions this document is considered to set the minimum values for bicycle design.
4. AASHTO *Guide for the Planning, Design, and Operations of Pedestrian Facilities* – This document is intended to present information on how to accommodate pedestrian travel and operations in (primarily) roadway environments. It is the design guidance upon which most state and local design guidelines are based. In many jurisdictions this document is considered to set the minimum values for pedestrian design.
5. Institute of Transportation Engineers *Designing Walkable Urban Thoroughfares: A Context Sensitive Approach* – This document’s development was supported by FHWA. *Designing Walkable Thoroughfares* helps designers understand the flexibility for roadway design that is inherent in the AASHTO guide *A Policy on the Geometric Design of Highways and Streets* with a focus on balancing the needs of all users.
6. National Association of City Transportation Officials (NACTO) *Urban Bikeway Design Guide* – FHWA has issued a memo supporting the use of this document to further develop non-motorized transportation networks, particularly in urban areas. Many of the designs in this document have been used successfully in urban areas. However, care should be exercised when applying the treatments described in this document to suburban or rural areas.

In this guidance section of the MARC Regional Bikeways Plan the following facility types are discussed:

- sidewalks,
- curb ramps,
- bike lanes,
- shared lane markings,
- bike boulevards,
- buffered bike lanes,
- cycle tracks,
- midblock crossings, and
- shared use paths.

Sidewalks

For the purposes of design, the term *sidewalk* means a smooth, paved, stable and slip-resistant, exterior pathway intended for pedestrian use along a vehicular way. All sidewalks constructed within the MARC region must be compliant with the Americans with Disabilities Act Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (July 26, 2001) or most recent ADA standards for public rights of way. Sidewalks should be provided on both sides of all public roadways. Sidewalks are not a bicycle facility however; because cyclists ride along the sidewalks we have included them into this section.

Sidewalk Width

The preferred minimum sidewalk width is 5 feet. Under constrained conditions, 4-foot wide sidewalks are acceptable provided a 5-foot by 5-foot area with less than 2% cross slope is provided every 200 feet (maximum) to allow for the passing of one pedestrian using a wheelchair by another. Sidewalks placed at the back of curb should be at least 6 feet wide.

Location of Sidewalks

On roadways with curb and gutter sidewalks should be located six feet from the back of curb. This minimizes the encroachment of curb ramps and driveway cuts into the sidewalk width. On roadways without curb and gutter sidewalks should be separated from the roadway as shown by the following criteria, which are given in a sequence of desirability:

- at or near the right of way line (ideally, 3 feet of width should be provided behind the sidewalk for utilities or to match existing grades),
- outside of the minimum required roadway clear zone, or
- as far from the edge of the driving lane as practical.

Sidewalk alignments, which are set back from the roadway, should taper for alignment closer to the roadway at intersections. This will allow for coordinated placement of crosswalks and stop lines.

Sidewalk Slopes

The maximum cross slope on a sidewalk is 2%. This includes pedestrian access routes across driveways and crosswalks at intersections.

Sidewalks may follow the grade of the adjacent roadway. However, on new structures the grade of the sidewalk cannot exceed 5%. If a grade of more than 5% is required on a new structure, an ADA compliant ramp must be provided.

Curb Ramps and Blended Transitions

A curb ramp is a ramp that cuts through or is built up to the curb. A blended transition is a relatively flat area where a sidewalk meets a roadway. Curb ramps and blended transitions are primarily used where a sidewalk meets a roadway or driveway at a pedestrian crossing location. Blended transitions include raised pedestrian street crossings, depressed corners, or similar connections between pedestrian access routes at the level of the sidewalk and the level of the pedestrian street crossing that have a grade of 5% or less. Accessibility requirements for blended transitions serve two primary functions. First, they

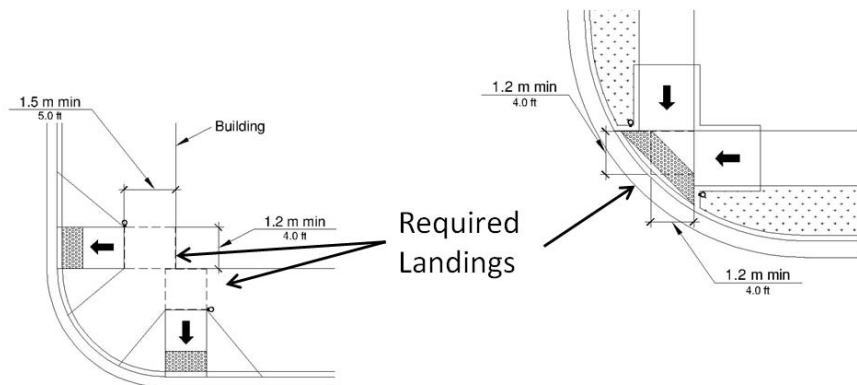
must alert pedestrians that have vision impairments to the fact that they are entering, or exiting, the vehicular area. Second, they must provide an accessible route for those using wheelchairs or other assistive devices. Ideally, a separate ramp should be provided for each crossing of the roadway.

Curb Ramp Slopes

The slope of a curb ramp shall not exceed 8.33%. The only exception to this standard is when a sidewalk is located along a roadway with a significant slope, in which case the maximum length of the curb ramp is 15 feet.

Landings

All curb ramps must have a landing at the location where a wheelchair user would have to turn to prepare to enter the roadway. For perpendicular ramps, this means a 4-foot by 4-foot landing at the top of the ramp (5-foot by 5-foot if there is a vertical obstruction adjacent to the landing). For parallel ramps where the sidewalk is depressed, the 4-foot by 4-foot landing is required at the bottom of the ramp.



For parallel ramps where the sidewalk is depressed, the 4-foot by 4-foot landing is required at the bottom of the ramp.

Detectable Warnings

Detectable warning surfaces shall extend a minimum of 2 feet in the direction of pedestrian travel and shall extend the full width of the curb ramp. Detectable warning surfaces are not required, nor desirable, at crossings of residential driveways since the pedestrian right-of-way continues across the driveway aprons. However, where commercial driveways are provided with yield or stop control, detectable warnings should be provided at the junction between the pedestrian and vehicular routes.

Bike Lanes

A bike lane is a portion of the roadway that has been designated for preferential or exclusive use by bicyclists by striping, signing and pavement markings (the *MUTCD* does not require signs). Bike lanes are intended for one-way travel, usually in the same direction as the adjacent travel lane. Bike lanes should be designed for the operation of bicycles as vehicles. They should be designed to encourage bicyclists and motorists to interact in a safe, legal manor.

Width

On roadways with curb and gutter, or next to parallel parking, the minimum bike lane width is 5 feet. On roadways with open shoulders a 4-foot bike lane is permissible. Additional width may be desirable on higher speed roadways. Bike lanes should be designated with bike lane markings, arrows, and bike lane signs.

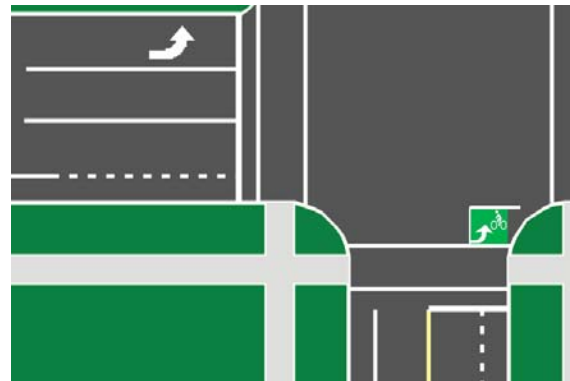
Intersections

At intersections, bike lanes must be designed to encourage legal movements at the intersection; this includes proper positioning of bicyclists and motorists. Bike lane stripes should be dashed on the approaches to intersections without right turn lanes. Where there are right-turn lanes, through bike lanes must be placed to the left of the right turn lane. Section 4.8 of the AASHTO *Guide for the Development of Bicycle Facilities* (2012) provides numerous graphics illustrating bike lane markings at intersections.

Bike lanes should be continuous through intersections. That is, if a bike lane is provided to the intersection, a receiving bike lane should be provided on departure side of the intersection.

Two-Stage Left Turn Box

One method that many bicyclists use to turn left at busy intersections is to make a through movement, turn the bike, then make a second through movement – a two-stage left turn. A two-stage left turn box is simply a designated place for bicyclists to stage in beyond a crosswalk.



Advance Stop Line Bike Box

The more common implementation of a bike box, in which the box is placed between the stop bar and the crosswalk to provide for queuing of through bicyclists, is illustrated below (source: NACTO *Urban Bikeway Design Guide*). It should be noted that in some states some operational factors may prevent this application from operating as intended. This occurs because right turn motorists are discouraged from moving into the bike lane (separated by a solid line), while the rules of the road (including those in Kansas¹ and Missouri²) require that right turns be made as close as practical to the right hand curb edge of the roadway.

¹ Kansas Statutes, **8-1545. Required position and method of turning vehicles.** (a) The driver of a vehicle intending to turn shall do so as follows: (1) *Right turns.* Both the approach for a right turn and a right turn shall be made as close as practicable to the right-hand curb or edge of the roadway.

² Missouri Revised Statutes, 304.341. 1. The driver of a vehicle intending to turn at an intersection shall do so as follows: (1) Right turns. -- Both the approach for a right turn and a right turn shall be made as close as practicable to the right-hand curb or edge of the roadway.

Missouri prohibits blocking or driving in a bike lane except when making an otherwise lawful maneuver that requires driving in the bike lane.

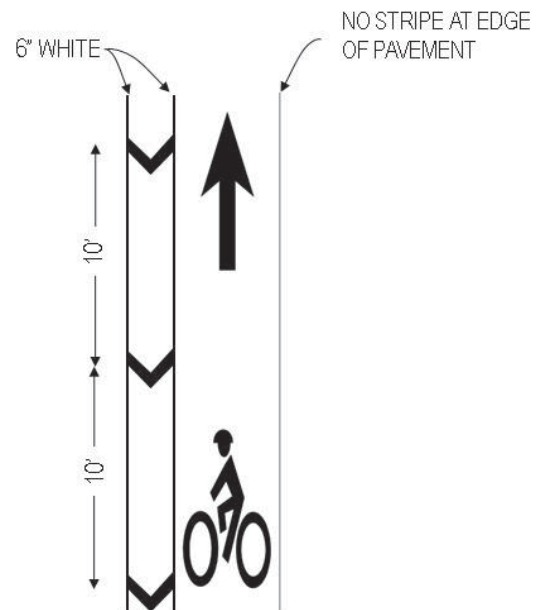


Green Bike Lanes

Some communities have begun using green paint in bike lanes to call motorists attention to potential conflict areas between motorists and bicyclists. Green paint is intended as a supplement to proper bike lane markings.

Buffered bike lanes

A buffered bike lane is a bike lane that is separated from adjacent through lanes by a striped out buffer area. In some locations it may be desirable to use less than the full space available for a bike lane. Such locations include sections of roadway where a wide bike lane might be perceived as on-street parking or another travel lane. In these locations a buffered bike lane may be considered. A buffered bike lane may also be considered where a bike lane of six or more feet is being provided to meet a minimum level of accommodation. At midblock locations the buffered bike lane is separated from the travel lanes by a chevron labeled buffer. The width of the buffer will vary depending upon such conditions as motor vehicle speed, percent heavy vehicles, roadway cross slopes, and desired level of accommodation of bicycles.



At intersections, buffered bike lanes must be striped to allow for right turning motorists. Typically this is done by eliminating the buffer on the approach to intersections and striping the area as one would a regular bike lane.

Cycle Tracks

Cycle tracks are bikeways located on the street between the general travel lanes and the sidewalk. They are distinct from shared use paths in that they are bicycle only facilities. Typically they are separated from the general travel lanes by on street parking and a physical divider. Operationally, they can be very challenging particularly at their intersections with driveways and streets.

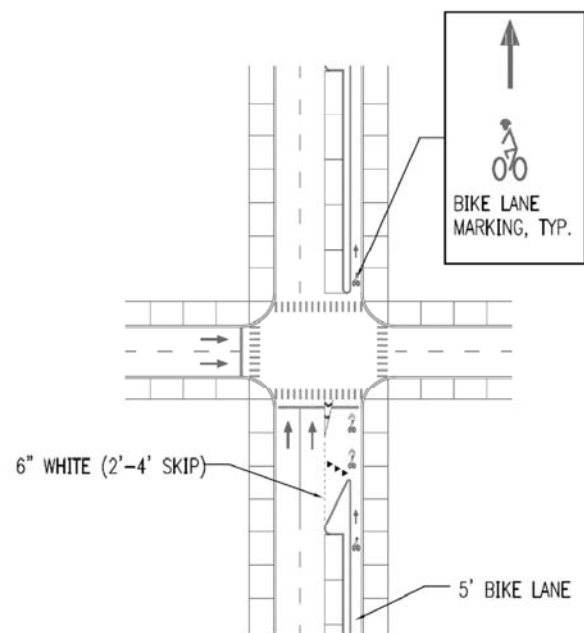
There are no national standards for cycle tracks; research is currently underway to identify best practices. However, some guidance is provided for those designers who may have cycle tracks included on their projects. The NACTO Urban Bikeway Design Guide provides information on the operations of cycle tracks; FHWA is currently developing a best practices report on cycle track design.

The implementation of cycle tracks may require close coordination with local businesses to coordinate their parking needs and loading zone requirements that may conflict with the cycle tracks.

Ideally, cycle tracks are one-way facilities. However where there are space constraints or wrong way riding is common, two-way facilities may be considered.

The separation between the cycle track and the adjacent travel lane or on street parking should be at least four feet. This is to provide space for opening car doors when on street parking is present.

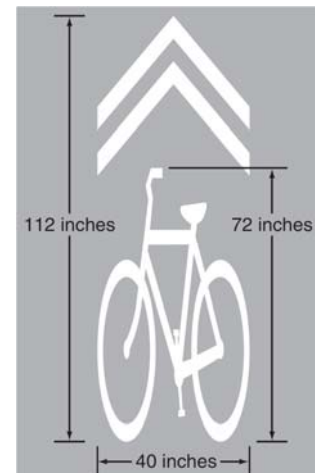
At right turn conflict points, motorists should be required to yield to bicyclists on the cycle track. At intersections the cycle track is discontinued and the space is used as shared space for right turning motorists and through cyclists. Left turns are addressed through a pair of through movements or through an upstream weave. Space on the far side of intersecting roadways is provided for bicyclists to stage prior to making their second through movement. An example of treatments at conflict points and intersections is provided in Figure 14-22. A BEGIN RIGHT TURN LANE YIELD TO BIKES (R4-4) could be installed on the island at the beginning of the turn lane.



Shared Lane Markings

A Shared Lane Marking (SLM) is a pavement symbol that indicates an appropriate bicycle positioning in a shared lane. Research suggests that SLMs:

- assist bicyclists with lateral positioning in a shared lane with on-street parallel parking to reduce the chance of a bicyclist's impacting the open door of a parked vehicle,
- assist bicyclists with lateral positioning in lanes that are too narrow for a motor vehicle and a bicycle to travel side by side within the same traffic lane,
- alert road users of the lateral location bicyclists are likely to occupy within the traveled way,
- encourage safe passing of bicyclists by motorists, and
- reduce the incidence of wrong-way bicycling.



SLMs are not to be used on shoulders or in designated bicycle lanes. The MUTCD includes a guidance statement saying that the SLM should not be placed on roadways that have a speed limit above 35 mph. While this does not preclude the use of SLMs on higher speed roadways, no research is available as yet to suggest how effective they may be on higher speed roadways.

One purpose of SLMs is to encourage good lane position by bicyclists; or to discourage them from riding too close to parked cars or from hugging the curb. Consequently, the *MUTCD* requires they be placed with the marking centerline *at least* 11 feet from the face of curb on roadways with on-street parking and at least 4 feet from the edge of pavement on other roadways.

When used, SLMs should be placed after each intersection and then periodically at a spacing not exceeding 250 feet between markings.

SLMs are sometimes used at the ends of bike lanes or shoulders to inform motorists that the bicyclists no longer has a separate space and will be sharing the main travel lane.

Bike Routes

Bike routes are not an actual facility type. A bike route is a designation of a facility, or collection of facilities, that links origins and destinations that have been improved for, or are considered preferable for, bicycle travel. Bike routes include a system of route signs that provide at least the following basic information:

- Destination of the route
- Distance to the route's destination, and
- Direction of the route.

Bike routes can be designated in two ways: General Routes and Number Routes. General Routes are links tying specific origins to specific destinations. Number Routes form a network of bike routes that do not necessarily connect specific destinations, but serve as general travel routes through an area.

General Routes connect users to destinations within a community. Typical destinations include the following:

- Attraction Areas (i.e. libraries, parks, etc.)
- Neighborhood Areas (i.e. downtown, historic neighborhoods, etc.)
- Trail Networks or Trailheads (i.e. Lake Ontario Trail)

Bicycle Guide (the D11 series in the *MUTCD*) signs may be provided along designated bicycle routes to inform bicyclists of bicycle route direction changes and to confirm route direction, distance, and destination. Typical signs that convey the basic wayfinding information for general routes are shown in Figure 14-1. The *MUTCD* provides a number of different types of signs that can be used to provide guidance along bike routes.



Figure 14-1

Some communities implement bike routes with unique designations (numbers or names). These routes should be designated using Bike Route signs.

Signing Roadways with Paved Shoulders

The Local agencies may want to sign some roadways with paved shoulders to either guide bicyclists to destinations or to alert motorists to the presence of bicyclists.

If the subject roadway is along a designated bicycle route, then bike route guidance signs can be used to alert bicyclists to the presence of the interregional or state route.

Bike Boulevards

A bike boulevard is a local street or series of contiguous street segments that have been modified to provide enhanced accommodation as a through street for bicyclists while discouraging through automobile travel.

Bike boulevards often make use of low volume, very low speed local streets. Frequently, streets are made more accommodating for bicyclists by significantly keeping motorists' speeds and volumes low. Often bike boulevards include bicycle friendly traffic calming treatments (speed pillows, mini traffic circles, chicanes with bike bypass lanes) to reduce speeds of motor vehicles along the roadway. While local motor vehicle traffic is maintained along the bike boulevard, motor vehicle traffic diverters may be installed at intersections to prevent through motor vehicle travel while having bypasses for bicyclists to continue on along the bike boulevard. Bike boulevards can be facilitated by connecting the ends of cul-de-sac roadways with shared use paths. At intersections the bicycle boulevard should be given priority over side streets.

Because of low motor vehicle speeds and volumes, bike lane markings are often not necessary along bike boulevards. SLMs may be used along bike boulevards. Alternatively, larger than normal bike symbols supplemented with the text BIKE BLVD have been used to designate bike boulevards.

In some communities, bike boulevard networks begin as a "one-off" system of bikeways. When a primary arterial roadway cannot be improved to a point where most cyclists feels safe and comfortable using the facility, a parallel roadway - often one street off the main road (or "one-off") - may be

improved with bicycle facilities and traffic calming features to provide an enhanced cycling street. By paralleling the main road, the “one-off” network provides access to the businesses along the arterial using a pleasant cycling roadway. A “one-off” roadway can be improved in stages: initially with signage and shared lane markings and then into a bike boulevard by instituting more substantial features such as traffic calming and diverters.

Since bike boulevards typically serve as bike routes, wayfinding signage should be provided. This signage should include destination, direction, and distance (or travel time) information to attractors throughout the MARC region. Wayfinding adds to the utility of bike boulevards because it educates cyclists and would be cyclists that there are safe, comfortable ways of accessing the region by bike.

Shared Use Paths

Shared use paths are facilities separated from motor vehicle traffic by an open space of barrier and either within the highway right-of-way or an independent right-of-way. They are open to many different user types and are often used by bicyclists, pedestrians, skaters, wheelchair users, joggers, and other non-motorized users. Motor vehicles are not allowed on shared use paths. Most shared use paths are two-way facilities.

Shared use paths have design criteria for many of the same parameters as roadways. These include widths, horizontal clearances, design speed, horizontal alignment, stopping sight distance, cross slopes, grades, vertical clearance, drainage, and lighting. The *AASHTO Guide for the Development of Bicycle Facilities* should be consulted for design values.

The *MUTCD* provides the standards for signing, striping, and marking shared use paths. In most cases, the signs and markings use on shared use paths are smaller versions of those used on roadways.

Many shared use paths are separated from the roadway network. Consequently, street name signs should be provided to help users orient themselves to the roadway network. Wayfinding signs should be used on paths and to potential destinations along the path such as locations where users can access water fountains and restrooms. At trailheads and rest areas, the distance and direction to the next trail head should be posted.

Most shared use path projects will be paved. Asphalt and Portland cement concrete are the two most common surfaces for shared use paths. In areas where path use is expected to be primarily recreational, unpaved surfaces may be acceptable for shared use paths. Materials should be chosen to ensure the ADA requirements for a firm, stable, slip resistant surface are met. Even when meeting ADA criteria, some users such as in-line skaters, kick scooters, and skateboarders may be unable to use unpaved shared use paths.

The geometric and operational design of shared use paths is quite similar to that of roadways. However, additional considerations such as aesthetics, rest areas, amenities, and personal security are also important to ensure the maximum number of potential users are encouraged to use the path for utilitarian and recreational purposes.

Midblock Roadway Crossings

Midblock crossings are different from intersection crossings in three important ways: there are many more potential crossing locations at midblock than at intersections, motorists are less likely to expect pedestrians crossing at midblock, and pedestrians with visual impairments have fewer audible clues for determining the best time to cross. Each of these differences leads to important design considerations for midblock crossings:

- Make the crossing location convenient for pedestrians - Midblock crossings are provided in locations where crossings at intersections are not available or are inconvenient for pedestrians to use. Midblock crossings must be placed in convenient locations to encourage pedestrians to use them rather than other, more convenient, unmarked midblock locations.
- Make drivers aware of the crossing as they approach it - Drivers should be warned of the pedestrian crossing in advance of the crossing location, and the midblock crossing should be highly visible to approaching drivers. Drivers should have clear lines of sight to the crossing so that pedestrians at the crossing are visible. The approach to the crossing should encourage drivers to reduce their speeds prior to the crossing. Drivers should be given plenty of time to recognize the presence of a pedestrian and stop in advance of the crossing.
- Make pedestrians aware of the opportunity to cross - Provide aids for pedestrians with visual impairments to recognize the presence of a midblock crossing and the best opportunities for crossing. Auditory and tactile information should be provided for pedestrians with visual impairments since clues present at an intersection crossing are not always available at a midblock crossing (such as the sound of traffic stopping and starting).
- Make drivers and pedestrians aware of their responsibilities and obligations at the crossing and provide opportunities to meet these responsibilities/obligations - use *MUTCD* guidance to establish a legal crossing. Vehicle approach, pedestrian approach, and traffic control design should provide pedestrians with clear messages about when to cross, and drivers about where to yield. Where necessary, a refuge area should be provided for pedestrians to complete the crossing in stages. Traffic control devices can be used to create gaps in traffic for pedestrians to cross.

Pedestrian Approach (Sidewalk/Curb Line)

The pedestrian approach is the area near the crossing where pedestrians wait on the side of the roadway and away from traffic until they are able to cross. It is often part of the sidewalk, if the sidewalk is adjacent to the curb line, or an extension or spur of the sidewalk that provides a path from the sidewalk to the crossing, if the sidewalk is not immediately adjacent to the curb. The pedestrian approach design should accomplish the following:

- Make pedestrians, especially those with visual impairments, aware of the crossing location. In complex pedestrian environments, wayfinding signs may be appropriate to guide people to their desired destination. Auditory and tactile cues can be provided with traffic control devices adjacent to and in the sidewalk to direct pedestrians toward the crossing.
- Direct pedestrians to the proper location to activate a pedestrian signal (if present) and wait for an appropriate time to cross. Pedestrian-activated traffic control devices should be accessible to pedestrians with visual impairments and those using wheelchairs, scooters, and walkers. The approach design should make clear where pedestrians should stand while waiting to cross.

- Encourage pedestrians to cross at the marked crossing. The approach design should discourage pedestrians from crossing away from the marked crossing to the extent possible. The path to the crossing should be as direct and easy to navigate as possible.
- Keep pedestrians visible to approaching drivers and oncoming vehicles visible to pedestrians. Pedestrian furniture, traffic control devices, planters, and other objects should be located so they do not block pedestrians from the site of approaching drivers. Also, on-street parking should be restricted near the crossing so that parked vehicles do not limit sight lines.
- In areas with high volumes of pedestrians, there should be sufficient space for pedestrians to queue as they wait for an appropriate time to cross. Pedestrian storage should be designed to prevent crowds of pedestrians from spilling onto the roadway. Pedestrian storage area design can be especially important at bus stops, and care should be taken so that children can wait a safe distance from the roadway while waiting for a school bus.

Midblock curb extensions are a common and effective treatment at midblock locations and have many benefits.

Motorist Approach

As noted in the discussion about locating a midblock crossing, care should be taken to avoid locations where horizontal or vertical alignment of the roadway limit drivers' sight distance, view of the pedestrian approach to the crossing, or view of the crossing itself. Consideration should be given to how trees, shrubs, poles, signs, and other objects along the roadside might limit a driver's view of the crossing. On-street parking should be prohibited near the crossing using either signs with markings or physical barriers such as a curb extension, since a pedestrian who steps out into the road between parked cars can be blocked from the view of oncoming drivers.

Signing and markings on and along the motor vehicle approach to a midblock crossing should be designed in such a way as to make drivers aware of the crossing in time to notice and react to the presence of a pedestrian, and to enhance the visibility of the crossing. Advanced warning signs should indicate any special traffic control used at the pedestrian crossing. Refer to the *AASHTO Guide for the Development of Bicycle Facilities* for examples of midblock control treatments for shared use paths.

Traffic calming devices and other measures to prevent high vehicle speeds should be considered along routes with midblock pedestrian crossings. More than 80% of pedestrians die when struck by vehicles traveling at greater than 40 mph versus less than 10% when cars are traveling at 20 mph or slower. In addition, vehicles traveling at lower speeds require less distance to come to a complete stop when braking.

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MARC Regional Bikeways Plan

Effective Promotion and Marketing



A successful bicycle and pedestrian network depends on users being able to safely, appropriately and frequently utilize the network. To assist in creating an effective, safe bicycle and pedestrian network, outreach, education, and zoning enhancements will be necessary. Educating roadway users (both bicyclists and motorists) about the rules of the road and safe bicycling behavior is essential, while at the same time, encouraging more people to get out and ride their bikes.

The outreach and education recommendations in this section aim to increase the number of bicyclists and pedestrians while improving safe and appropriate behavior by bicyclists, motorists, and pedestrians. The network will attract users of different skill levels and ages, as well as provide opportunities for interaction with motorists and pedestrians. Education and outreach programs must consider all of these different user groups. The 1999 version of AASHTO's *Guide for the Development of Bicycle Facilities* recommended that an education plan address the following four groups:

- Young bicyclists;
- Adult bicyclists;
- Parents of young bicyclists; and
- Motorists.

This Plan recommends that the following groups be addressed as well:

- Senior pedestrians and bicyclists;
- Low income pedestrians and bicyclists;
- Visiting pedestrians and bicyclists; and
- School-age pedestrians and bicyclists.

Important Informational Elements

It is important to make sure each group is addressed in multiple and suitable ways. For example, programs for young bicyclists should use age-appropriate curriculum and language to explain concepts and issues. In addition, the MARC region is home to people of many different ethnic backgrounds. Language barriers should be considered as educational materials are developed. MARC and local jurisdictions should seek partnerships that bridge cultural boundaries. Such partnerships would provide a valuable channel for distribution of educational materials and for general promotion of bicycling in underserved communities. MARC should ensure that all parts of the region, not only geographically, but also demographically, have equal access to active transportation information and facilities. Table 6 at the end of this Plan section provides a thorough summary of existing active transportation related education and outreach programs and partnerships.

One of the key things to keep in mind when planning outreach and education efforts is not to “reinvent the wheel”. Many successful programs, campaigns and resources are available. Locally,

there are already many efforts underway. Other communities throughout the U.S. and Canada have already developed tools that can be adapted and modified for the MARC region. This adaptation is important in order to effectively localize the educational campaigns. Locally created campaigns that include materials with a local feel have been shown to have a more noticeable influence on motorist and bicyclist behaviors than generic FHWA-produced materials.

“1,152 pedestrians were treated in emergency rooms after being injured while using a cellphone or some other electronic device in 2010 — and the number had doubled since the year before.”

US Consumer Product Safety Commission

Bike and pedestrian education and outreach are vitally important in light of the growing number of distracted pedestrians. Much attention has rightly been focused on distracted drivers. But a recent National Highway Traffic Safety Administration reported that pedestrian fatalities rose by 4.2 percent in 2010 over the previous year, and injuries were up 19 percent, even though overall traffic deaths declined.

As we look around us every day, pedestrians are being distracted by their handheld devices. Researchers believe that the number of injured pedestrians is actually much higher than these results suggest, since police don't always collect that data. A recent survey by Liberty Mutual suggests 60 percent of 1,000 people surveyed routinely read and send texts and emails, talk on their cell or smartphones, and listen to music while walking. Current trends, such as this, are important factors in designing bicycle/ pedestrian safety, education and outreach programs. The framework for these recommendations was crafted with all this in mind.

Recommendations

Recommendation 1: Connect partners to maximize the effectiveness of existing resources, programs, and materials.

A list of potential partners has been developed, and their existing programs and partnerships have been inventoried to identify opportunities for new partnerships and enhanced use of resources. Some of these partners are already working together, but there are new partnerships that can be nurtured and developed, and new ways for existing educational materials to be used. Not all of the potential partners are specifically focused on bicycle/ pedestrian-related issues, but may still be a useful partner for their ability to communicate with a certain part of the Rochester population. Some examples of education and outreach programs are suggested here:



1. Coordinate different organizations that offer bicycle rodeos for young bicyclists to see ways they can support each other and maximize existing resources.
2. Locate volunteers for bicycle rodeos and bicycle repair programs, and to distribute information about bicycling to young adults.

3. Coordinate safety education with the three school districts within the Region.
4. Learn from successful outreach and education examples in other active transportation-friendly communities. Many successful programs, campaigns and resources are already available. Other communities throughout the U.S. and Canada have already developed tools that can be adapted and modified for the MARC region.
5. May is National Bike Month - recognize those who commute by bike and encourage people to become new bicycle commuters or increase their trips by bike during the season when spring has sprung and new beginnings abound. This program features a month long calendar of events that offers organized rides for different ages and abilities, bike handling skills and maintenance workshops, and a Bike to Work Day Commuter Challenge. The program is most successful when led by a community-based organization with financial support from the region and greater business community.
6. Bicycle Ambassadors - A team of at least two ambassadors encourages an increase in bicycling by engaging the general public to answer questions about bicycling and teach bicycle skills and rules of the road. Ambassadors attend community-based events throughout peak cycling season to offer helmet fits, route planning, bike rodeos and commuting 101 workshops. Community members also may request an appearance by a team of ambassadors at businesses, schools or a conflict zone location along the bikeway system.
7. Bike Light Campaign - With shorter days, when it gets dark before commuters head home from the office, fall is a good time of year to remind cyclists that proper equipment is required when riding at night. A bike light campaign also offers the opportunity to introduce cyclists to bicycle shops and strengthen partnerships between the City and retailers. This program could offer discounts on bicycle headlights and rear red reflectors and lights. It is recommended that the campaign be rolled out in September with the return of university as well as K-12 students to school. The campaign should expire before peak holiday season when bike shops are busy and less interested in offering discounts.
8. League of American Bicyclists: Bicycle Friendly Community status - The Bicycle Friendly Community (BFC) program created by the League of American Bicyclists (LAB) offers the opportunity to be recognized for achievements in supporting bicycling for transportation and recreation. It also serves as a benchmark to identify improvements yet to be made.
9. League Certified Instructor training course scholarships - The League of American Bicyclists offers certification courses to train those interested in teaching others to ride their bike safely and legally as a form of transportation. League Certified Instructors (LCIs) are a valuable asset to the community and can offer a variety of workshops for adults lacking confidence to ride in traffic as well as children learning to ride for the first time. LCI training courses require a two and a half day commitment and are offered through the LAB. To facilitate a cadre of cyclists to become LCIs, this program coordinates with the LAB to schedule training course offerings in the community and provide scholarships.
10. Expand the Safe Routes to School (SRTS) program – SRTS is a national program that addresses barriers that inhibit students from walking and biking to school. The MARC and local

agencies should work with the different schools operating in region to consider how the program could be used to assess barriers at all local schools. Increasing the number of children that can safely walk and bicycle to school as well as protecting the safety of those that already do so requires a holistic approach. SRTS programs need to be cooperative efforts involving the entire region and the various schools or districts.

11. Conduct public safety announcements on following the rules of the road. For motorists, this campaign could address the need to look left prior to turning right, and provide clear passing space. For bicyclists, this campaign could address bicycle lights and lack of visibility when not riding in the road. For pedestrians, this campaign could address crossing at designated crossing facilities, and walking on the sidewalk in all seasons.



12. Walk Friendly Communities is a national recognition program developed to encourage counties, towns and cities across the U.S. to establish or recommit to a high priority for supporting safer walking environments. The WFC program will recognize communities that are working to improve a wide range of conditions related to walking, including safety, mobility, access, and comfort. www.walkfriendly.org/

13. Distribute a Bike Map – MARC has created a regional bike map that includes bicycle suitability ratings, extensive safety information for bicyclists, a listing of area bicycle shops and repair services, location of bicycle lockers and how to obtain access to use them, information about how to use the bike racks that are provided on all buses, and a listing of multi-use trails in the region. The map is free and can be provided upon request.

14. Institute a “Sunday Parkways” ride once per month - In Madison, WI, Sunday Parkways are times set aside on weekends and holidays for traffic-free biking and walking on a network of selected streets.

15. Create and build upon an active transportation wayfinding program that includes identification of routes and signing plans (destination, distance, direction) as well as assessments of potential improvements along the proposed routes.



16. Bicycle and Pedestrian Safety videos review safety rules using age appropriate videos for PreK-1, Grade 2-3, Grade 3-6 and three adult safety review videos. These videos could be incorporated into school district curriculum and shown at events.

17. Adapt Oregon’s program “Bike Wheels to Steering Wheels.” The program helps youth better understand the relationship between bicycle/ pedestrian safety and motion, and ultimately gives students a better understanding of safety when traveling by all modes of transportation, in which the laws of physics are applied without exception. The concepts are learned through normal math, science, or physics curriculum in schools.

Other Possible Examples:

- a. Commuter of the Year Contest - This contest recognizes those who choose to bike, walk, or ride transit. An aim is to encourage others to reduce their drive alone motor vehicle trips. Nominated by their peers, contestants may be employees, residents, or students in the community and could be asked to provide an inspirational story about their transportation choice and habits. Based on nominations, categories could recognize Youth, Student, Senior, and Family Commuters. Winners also should be encouraged to serve as role models and participate in events throughout the year to mentor others and help them set goals to reduce their drive alone trips
- b. Business Pool Bike Program - Offering employees the opportunity to check out and ride a bike to meetings, lunch or run errands is a great benefit. Pool bikes are a form of bike sharing where an employer manages a fleet of bikes for this purpose. This program offers subsidies for the purchase and on-going maintenance of bikes as part of an agreement to track use and achieve the goal of reducing vehicle miles traveled and greenhouse gases. Employees sign up, make reservations and log their trips using a web-based management tool.
- c. Conduct pedestrian and bicycle counts on a seasonal basis to track whether there is an increase in pedestrian and bicycle activity, exploring new methods as suggested by the public and the League of American Bicyclists.
- d. Bicycle Rodeo Kits - Children learning to ride should be confident with their bike-handling skills before riding in traffic. A Bike Rodeo is an interactive and controlled environment where cyclists practice a new skill at a series of stations. The number and difficulty of skills can be tailored based on attendance and number of instructors available to staff the event. This initiative will create a self-service bicycle rodeo kit that can be reserved by League Cycling Instructors (LCIs), Bike Ambassadors and community members. It contains instructions, diagrams and props necessary to host a bike rodeo. A programmatic collaboration with Monroe County Office of Traffic Safety should be explored.
- e. Participate in an annual meeting of all bicycle/pedestrian planners and engineers in the region. An annual meeting should be held to allow local communities and organizations to communicate their plans and programs, as well as share best practice information.
- f. AARP Network of Age-Friendly Communities Toolkit can be adapted by municipal and local governments, non-profit organizations, community partners and volunteers to guide and support age-friendly initiatives that make "Livable Communities" great places for all ages.
www.aarp.org/livable-communities/network-age-friendly-communities
- g. Identify properly enhanced visibility clothing for bicyclists and pedestrians, and advise the local active transportation community of the associated safety benefits.

- h. As part of a larger roadway safety campaign, develop an educational campaign to eliminate bicycle and pedestrian fatalities. In Minnesota, “Toward Zero Deaths” is a statewide partnership involving federal, state, county and academic partners. The mission is to create a culture in which traffic fatalities and serious injuries are no longer acceptable through the integrated application of education, engineering, enforcement, and emergency medical and trauma services.



Recommendation 2: Appoint a public bicycle/pedestrian committee to promote non-motorized transportation and to actively engage with citizens, planning committees, and boards to expand commuting and recreational paths for walkers and cyclists.

- Promote safe routes to school, greenways and connected corridors with adjacent regions,
- Publish and maintain cycling and walking maps,
- Review proposed development for active transportation considerations,
- Recommend amenities to enhance safe walking and cycling.

The 5 E's: Essential elements for communities to become great places for bicycling:

1. **Engineering:** Creating safe and convenient places to ride and park
2. **Education:** Giving people of all ages and abilities the skills and confidence to ride
3. **Encouragement:** Creating a strong bike culture that welcomes and celebrates bicycling
4. **Enforcement:** Ensuring safe roads for all users
5. **Evaluation & Planning:** Planning for bicycling as a safe and viable transportation option

(The League of American Bicyclists)

Recommendation 3: Coordinate an ongoing public information and enforcement campaign regarding safe sharing of the roadways for pedestrians, bicyclists and motorists.

Pedestrians - Law enforcement departments can take a leading role in improving public awareness of existing traffic laws and ordinances for motorists (e.g. obeying speed limits, yielding to pedestrians when turning, traffic signal compliance, and obeying drunk-driving laws) and pedestrians (e.g. crossing the street at legal crossings and obeying pedestrian signals). Many local law enforcement agencies have instituted annual pedestrian awareness weeks when they issue tickets to motorists who disregard pedestrian laws and warn pedestrians to follow the laws as well.

Bicyclists - A campaign should be designed keeping in mind the League of American Bicyclists' recommendation that communities make connections between the bicycling community and law enforcement. Sporadic enforcement will not result in significant improvements to bicyclist behavior and

will likely result in resentment of law enforcement personnel. The behaviors to be targeted should be determined at the outset of the law enforcement campaign. The following behaviors should be targeted consistently:

- Riding at night without lights;
- Violating traffic signals;
- Riding on sidewalks; and
- Riding against traffic on the roadway.

These four behaviors were chosen for two reasons. First, they represent particularly hazardous behaviors which result in many crashes. Secondly, and very importantly, the enforcement of these behaviors is easy to justify to the public. When coupled with (and in fact preceded by) a large-scale education campaign, the public will understand the importance of the campaign and consequently will accept the enforcement activity.



Sidewalk plows, Rochester area

In addition to the need to educate bicyclists, pedestrians, and motorists, some targeted training of law enforcement may also be appropriate. Some questions that could be covered in this training include:

- When is it okay for bicyclists to ‘claim the lane?’
- What width constitutes ‘traffic lanes too narrow for a bicycle and a vehicle to travel safely side-by-side within the lane?’
- Why is it important for a bicyclist to use headlamps and tail lamps?
- Why is riding against traffic such a problem?

By answering these and other similar questions, and discussing what infractions are most likely to lead to bike crashes, cities can encourage law enforcement to help promote bike safety by targeting those behaviors most likely to result in crashes. Some communities educate local law enforcement through the enforcement agency’s standing roll-call meetings, while others send officers to the League of American Bicyclists’ Traffic Skills 101 courses.

Program Effectiveness Measures

Program effectiveness measures can be used to determine if the recommended strategies meet their objectives, discover any areas that need change, justify funding, and provide guidance for similar programs. Baseline data is required prior to implementing recommendations. The region could observe the outcomes or contract with a consultant to measure effectiveness on their behalf. Observable outcomes include: number of crashes, injuries, and fatalities; behaviors; number of citations issued; number of people walking or bicycling; knowledge, opinions and attitudes; changes in organizational activity; traffic volumes; and traffic speeds. The effort to enforce the traffic laws as they relate to bicycle and pedestrian safety should be addressed in an overall, countywide, coordinated enforcement campaign. Targeted enforcement initiatives result in everyone following the rules of the road.

Encouraging Public Private Partnerships

These types of regulation standards stimulate private sector partnerships to provide end of trip provisions as well as increased choices of interesting and essential destinations for bikers and pedestrians. The two most influential end-of-trip provisions consistently cited by North Americans in nationally prominent opinion surveys as affecting their choice to bicycle for transportation are:

- Bicycle parking- availability and convenience, and
- Lockers and workplace showers for commuters.

Changes to applicable codes are recommended in the form of stronger incentives, rather than mandates. Recommended bicycle parking standards should formalize developers' ability to reduce the number of required motor vehicle parking spaces by the number of bicycle parking spaces required; this strategy will become more of an incentive as gas prices continue to rise in the future.



Sample Bike Parking Requirements

Bicycle parking shall be provided at multi-family developments on two (2) or more acres, parks and recreation facilities, and commercial establishments according to the following standards:

1. All bicycle parking facilities shall be located on the same Building site as the Use for which such facilities serve and as close to the Building entrance as possible without interfering with the flow of pedestrian or motor Vehicle traffic. Bicycle and auto Parking Areas shall be separated by a physical barrier which shall be at a minimum a two (2) foot high wall, fence or berm; a ten (10) foot wide buffer; or a six (6) inch curb with four feet of buffer width to protect parked bicycles from damage by cars.
2. All bicycle parking facilities shall be clearly identified as bicycle parking. Where bicycle Parking Areas are not clearly visible to approaching cyclists, signs shall clearly indicate the location of the facilities. When possible, this facility should protect the bike from inclement weather including wind-driven rain. Bike parking shall be consistent with the surroundings in color and design and be incorporated whenever possible into buildings or street furniture design.
3. The number of bicycle spaces required is as follows:



Type of Use	Minimum Number of Bicycle Spaces
Parks and recreation facilities	1 space per 10 required vehicle parking spaces
Commercial uses	1 space per 25 required vehicle parking spaces
Multi-family development	1 space per 20 required vehicle parking spaces

4. Bicycle parking spaces may be provided as either bicycle racks or other storage facilities, provided that the following standards are met:
 - a) Facilities shall be designed to allow each bicycle to be secured against theft;
 - b) Facilities shall support the bike in a stable position without damage to wheels, frames, or components; Facilities shall be installed to resist removal;
 - c) Facilities shall be installed to resist damage by rust, corrosion, or vandalism;
 - d) Facilities shall accommodate a range of bicycle shapes and sizes and allow easy locking without interfering with adjacent bicycles;
 - e) Facilities shall be located in convenient, highly-visible, active, well-lighted areas;
 - f) Facilities shall include an aisle or space for bicycles to enter and leave parking racks. This aisle shall have a width of at least four (4) feet to the front or rear of a standard six (6) foot bicycle parked in the facility;
 - g) Facilities shall provide safe access from the parking spaces to the right-of-way or bicycle lane;
 - h) Facilities shall be located not to interfere with pedestrian or vehicular movement;
 - i) Bicycle parking spaces shall have a minimum width of two (2) feet and minimum length of six (6) feet, and
 - j) The Administrator shall be authorized to modify these standards where the facilities will be used predominately by bicycles having different space needs such as adult tricycles, or when another design (such as the provision of bike lockers) could serve the needs to an equal or greater degree

Furthermore, the design specification for bicycle parking should stipulate that the parking location be similar to that required for handicapped (motor vehicle) parking, and that the bicycle parking location be secure, covered, and at grade level. Workplace bicycle lockers, change and/or shower facilities are not generally being constructed. Thus there are two options to be considered: increase the incentives or mandate the facilities. The first option of offering more effective incentives is recommended; outlined herein are several approaches to this strategy.



Photo: R. Torzynski

Continued investment by MARC and local agencies in public bicycle transportation infrastructure can be complemented by developers and commercial property owners providing on-site showers and locker facilities for employees. There are a number of incentives that can be offered to the private sector developing and managing commercial properties; many of these incentives can be offered at little or no actual expense to MARC or local agencies.

Development Incentives

There are two phases in which the incentives can be effective: upon initial land development and during tenant build-out and/or remodeling or renovation. Among the compelling incentives for the construction of bicycle locker/changing/shower facilities at initial land development (or during site re-development) are:

- Trip generation (hence traffic impacts) reduction during traffic impact assessments (e.g., up to five percent of total trip generation, depending on land use);
- Floor area bonus (equal to the space taken up by the bicycle commuter facility) for those

districts and uses that specify maximum square footage;

- Reductions to required yard/setbacks (e.g., up to 20 percent for providing shower and locker facilities with capacity of serving up to five percent of employees);
- Administrative variances for more compact parking lot dimension(s); and
- Greenspace (for vehicle utilization area (VUA)) requirement reduction, (e.g., up to twenty times the building square footage dedicated to the bicycle facility).

Incentives for actions subsequent to initial development (i.e., tenant build-outs and internal building renovations) include ad valorem tax exclusion of at least two times the square footage of the building dedicated to the locker/changing/shower facility. Other incentives could include offsets to collected user fees.

As the MARC region transforms its transportation system in the public rights-of-way, a concomitant partnership by the private sector will ensure the effectiveness of the public initiative. The end result will be increased opportunities for the residents of the region to choose bicycling for, not only recreation, but also for commuting and travel. Their choice will enhance workplace productivity and employee health, which will in turn improve the economic well-being and overall quality of life in the MARC region.

Count Locations Introduction

The Kansas City area covers a wide geographic area with multiple city and county agencies as well as the Mid-America Regional Council (MARC) and two state Department of Transportation agencies including Kansas and Missouri. As of March 2014, these agencies are collecting a limited number of bicycle and pedestrian volume counts and most of these counts are being collected for project specific purposes. A few years ago, the MARC purchased mobile bicycle/pedestrian infrared counters, along with pneumatic (air-filled) tube counters, with the intention of developing a regional bicycle and pedestrian counting equipment loaner program. Since then, the MARC bicycle and pedestrian counters have been moved around to different locations by partner agency requests and are loaned out for the purpose of collecting short-duration counts on multi-use paths. This regional bicycle/pedestrian loaner equipment program is a good first of many more steps required to develop a comprehensive regional bicycle and pedestrian volume counting program.

Following the documented recommendations for developing a regional non-motorized data collection program (10 recommendations listed below) will ensure the MARC geographic area data partners, contributors and users a way to determine widespread use of multi-use paths and bike facilities throughout the region. Implementing these recommendation will allow for better quantification of safety mitigation performance measures, needs and requirements. Following these recommendations will also ensure implementation of a nationally accepted and regionally implemented credible, reliable, and statistically accurate non-motorized data collection program.

Regional Counting Program Advice and Recommendations

Standardized regional traffic monitoring (counting) programs requires two program elements to ensure, support, calculate, and provide accurate volume statistics. These program elements include short-duration counts and a continuous counting program and are documented throughout the Federal Highway Administrations (FHWA's) *Traffic Monitoring Guidebook (TMG)* found at http://www.fhwa.dot.gov/policyinformation/tmguidetmg_fhwa_pl_13_015.pdf. Without both continuous and short-duration counting program elements, reliable statistics such as the annual average daily bicycle (AADB) and the annual average daily pedestrian (AADP) cannot be calculated using national accepted statistical calculation methods.

The MARC data collection equipment is being used to collect short-duration counts throughout the Kansas City region. Currently there are no continuous counting bicycle and pedestrian stations in the MARC geographic region.

Recommendation #1 - It is recommended that the MARC geographic region develop a continuous counting bicycle and pedestrian counting program. Establishing and developing a continuous counting program in the MARC geographic region would provide the second traffic monitoring program element required to ensure, support, calculate and provide accurate volume statistics.

Developing a bicycle and pedestrian continuous volume counting program is a seven step process. These seven steps are outlined in the FHWA's *TMG* Chapter 4 for non-motorized data collection program development.

Recommendation #2 – It is recommended the MARC geographic region follow the seven step process in developing a comprehensive non-motorized (bicycle and pedestrian) continuous and short-duration counting volume program. These steps are summarized in the numbered list below:

1. Review the existing continuous count program
2. Develop an inventory of available continuous count locations and equipment
3. Determine the traffic patterns to be monitored
4. Establish pattern and factor groups
5. Determine the appropriate number of continuous monitoring locations
6. Select specific count locations
7. Compute month-of-the-year (MOY), hour-of-the-day (HOD), and day-of-the-week (DOW) factors to use in annualizing short-duration counts

Recommendation #3 – Within the continuous count program, it is recommended that the MARC geographic area consider installing at least 3 to 5 continuous count stations per factor group. This recommendation is based on the *TMG* section 4.4.4 that recommends establishing and selecting the number of count locations based on what is feasible from a budgetary standpoint and ideally three to five continuous count stations for each factor group. Assigning continuous count stations to factor groups are a way of assigning similar types of continuous counting stations to a statistically homogenous cluster of sites that together accurately represent a factor group. One example of factor groups that might be defined in a non-motorized continuous count program could include a factor group designation of Urban, Rural, or Mixed. These factor group assignments are critical to establishing and calculating any annualized bicycle and pedestrian counting statistics. Once continuous count station factor groups are established, the factor groups provide a way of calculating individual factors for each group. When these individual factors have been calculated, it is necessary to assign all short-duration count stations to a factor group. The next step in calculating an annualized volume statistic for a short-duration count is to apply the factors from the assigned factor group to the raw count data collected at the short-duration count site.

Recommendation #4 - Since factor groups are not yet established in the MARC area, it is recommended the MARC area develop a Strategic Data Collection and Standardized Methods Plan. This plan could include coordinating and documenting a standardized method of collecting non-motorized data as well as establish methods for calculating traffic volume statistics such as the annual average daily bicycle or pedestrian traffic (AADB/AADP) statistics. This strategic plan should include documenting quality control and data handling business processes such as how to establish factor groups, what factors groups should be applied regionally, and how to use the factor group assignments to calculate non-motorized traffic statistics. How to evaluate automated reports including establishing data quality checking methods for data and reports generated directly from vendor's software also needs to be included in the development of a strategic data collection and standardized methods plan.

Recommendation #5 - Once a regional Data Collection Plan is completed, and to ensure consistent and standardized data collection methods are implemented in the region, it is recommended a traffic data committee be established. MARC already has a group of stakeholders within the Kansas City area that are interested in contributing to the development of a regional non-motorized data collection program. Developing a traffic data committee should include the development of a website with data supplier/contributor/user members.

Recommendation #6 - Supplementing the development of a Strategic Data Collection and Standardized Methods Plan, it is recommended that a regional bicycle and pedestrian volume counting workshop be held with all potential agency stakeholders. This workshop should include

providing training and information to stakeholders such as counting for safety reasons, counting for maintenance and operations reasons, counting for engineering design/construction reasons, and counting data used for making better bicycle and pedestrian infrastructure investment decisions.

Recommendation #7 – It is recommended that a regional data wrangler be established. With a Strategic Data Collection Plan and a Traffic Data Committee in place, it will be necessary to coordinate, integrate, and evaluate the collection of bicycle and pedestrian volume data in the region. A ‘data wrangler’ is regional coordinator managing data for a specific geographic area that handles all the communication and coordination of gathering bicycle and pedestrian volume count data while promoting data integration and quality processes are implemented throughout the geographic area. Establishing a leader for the MARC region as the Traffic Data Wrangler would provide non-motorized data suppliers/contributors/users with a critical resource to contact about various aspects of a regional non-motorized data collection program. For example the Traffic Data Wrangler could provide information on how to (1) acquire count data, (2) provide quality control and quality assurance of data, (3) evaluate data for proper usage and application, and (4) provide answers to questions about how to standardize, integrate, and format data properly according the regional strategic data collection plan.

Recommendation #8 - After a Strategic Data Collection Plan has been developed, the regional Traffic Data Committee and Data Wrangler has been determined, and data is being collected from both continuous and short-duration counting stations; it is recommended that an analyses of the regional data be completed. This analysis would document the data findings from a regional perspective including identifying travel volume trends such as the volume range, peak hour, commuter/recreational/mixed pattern identification and any other data observations of significance. Analyses of the regional data should include defining data analyses methods that establish standardized and nationally/regionally accepted methods for ensuring the quality of data.

Recommendation #9 – Developing a regional data collection program should also include a number of research projects to ensure, support, and provide accurate bicycle and pedestrian volume statistics. Therefore it is recommended that a list of research projects be developed. Since establishing and developing non-motorized volume data programs is still relatively new to metropolitan planning organizations and non-motorized equipment is continuing to evolve and improve over time, a research projects list that is monitored and funded by the region is recommended. For example, pedestrian counting methodologies and data handling research should be one of the research projects established for the region. Another research project that should be considered is a data source/equipment evaluation project. This type of project would include evaluating various types of equipment for capturing bicycle and pedestrian traffic volumes.

Recommendation #10 – As referenced in recommendation #2 (following the seven step process for developing a count program) it is recommended that the MARC region establish site selection criteria for determining optimal locations within the region in which to install and collect data from continuous and short-duration counting stations. Establishing and documenting MARC area site selection criteria is critical for ensuring regional standardization for collecting non-motorized traffic data. Here is a subset of site selection criterion that could be established for the region:

1. Establish a minimum of 3 to 5 continuous counting sites per factor group
2. Collect data at sites that help to define factor groups in urban, rural, and mixed areas
3. Install 9 to 15 continuous counting stations per county
4. Install continuous counting locations on a variety of different types of facilities such as (1) multi-use paved trails, (2) on-street designated bicycle lanes, (3) sidewalks, etc.

This MARC area Regional Bikeway Plan provides a way of establishing the needs and requirements that can ultimately drive and help to establish a comprehensive and regional non-motorized data collection program. It is critical to understand that since the recommendations listed above have not been completed for the MARC area, the process of identifying specific short-duration and continuous counting locations throughout the existing, planned and proposed bikeways and trails network for this project cannot and is not based on the completion of these recommendations. Once the recommendations from above are completed, site specific location recommendations are likely to change.

Recommended Site Selection – List of Assumptions

In effort to advise and identify continuous and short-duration counting locations throughout the MARC region, a number of assumptions were made and are listed below:

1. Selection Criteria includes the need to collect data from potential factor groups that include (R) Rural, (U) Urban, (M) Mixed.
2. Selection Criteria includes the need to collect data from the following traffic patterns: recreational, commuter, and mixed (mix of recreational and commuter).
3. Selection Criteria includes the need to collect data from different types of facilities that include multi-use paths, on-street designated bike lanes, on-street (no bike lane designations), sidewalks, bridges, etc.
4. Manual counts will be conducted prior to installation in order to verify the presence of bicycle and/or pedestrian traffic at the sites recommended for counting.
5. Virtual and on-site evaluations for counting will be conducted prior to installation of counting equipment. This includes selecting the proper counting technology (manual, infrared, loop, and image detection) given the specific site conditions. For example, site conditions that are not recommended for infrared counting technology include sites that have overhead/underground power lines, pointing the counter toward vehicular traffic, and/or pointing the counter towards water.
6. There are no budget constraints on installing sites or purchasing equipment. This, of course, is not the case but sites recommended will have to be prioritized based on site selection criteria established for the MARC area and further prioritized according to the appropriate and available budgetary funding sources.
7. Existing counts will be evaluated and compared to recommended site locations.
8. Sites recommended be will evaluated for short-duration versus continuous counting installations through on-site evaluations.

Identified Counting Locations

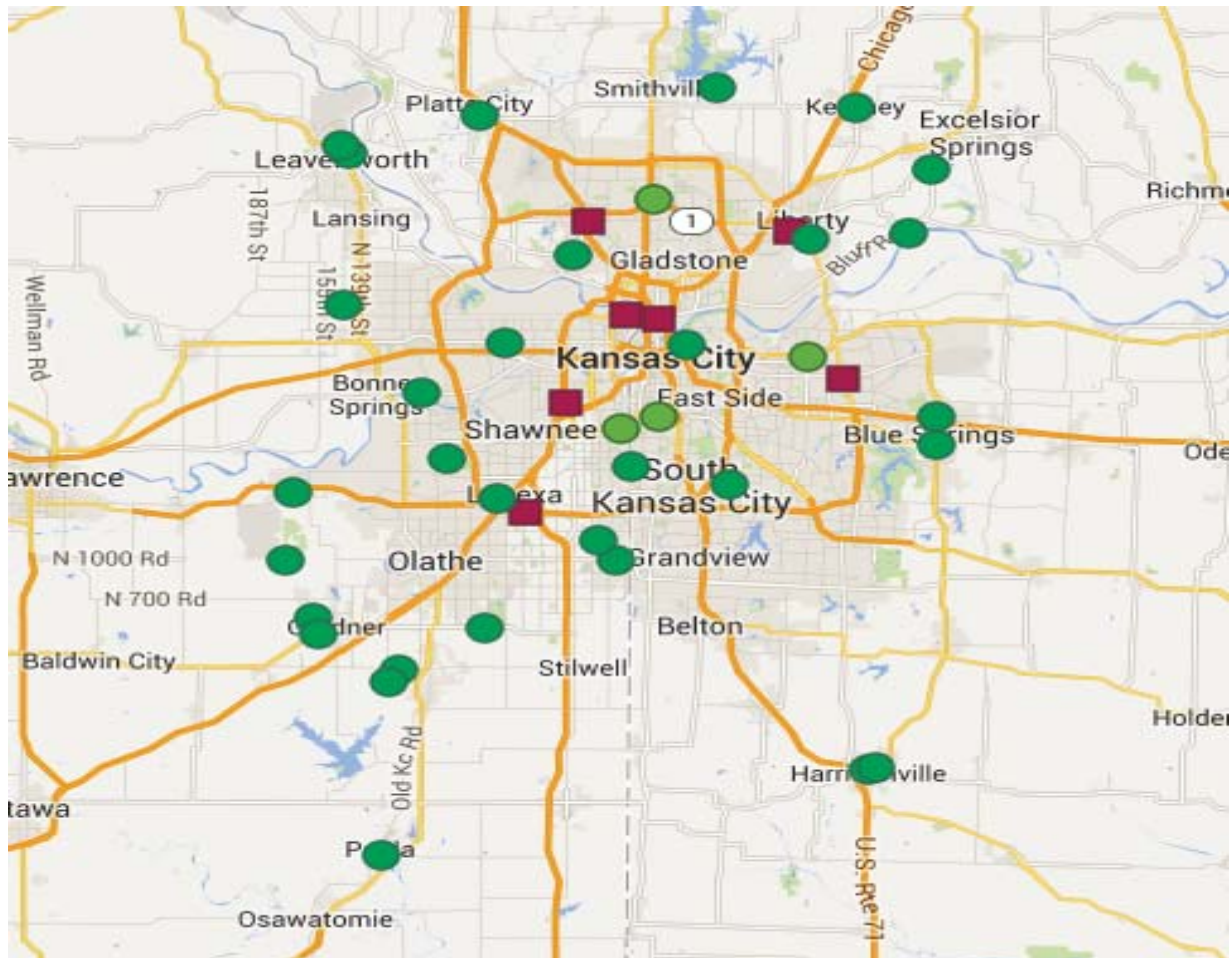
Keeping the assumptions list in mind, a number of recommended continuous and short-duration counting locations are listed below. These counting locations include a county name, city name, type of facility, potential factor group assignment (Urban, Rural, Urban-Rural), and traffic pattern type (Commuter, Recreational, Mixed). Sites should be evaluated with an on-site visit before determining whether the site could serve as a continuous or short-duration count site so that the environmental conditions (pavement condition, overhead power lines, proximity to water, proximity to traffic, etc.) can be evaluated. Conducting on-site evaluations allows an agency to pinpoint the exact and precise global positioning system (GPS) location within the recommended textual location description. For example,

an entire corridor/bikeway/greenway might be recommended and an on-site evaluation reveals the exact location within the corridor/bikeway/greenway.

The Bicycle and Pedestrian Counting Location Recommendations Table below includes all the sites recommended for bicycle/pedestrian volume data collection consideration. Within these recommendations there are a total of 35 sites recommended. Recommendations were carefully selected so that a representative mix of possible travel trends would be represented. Therefore the recommendations in the table below includes a total of (9) commuter, (16) mixed, and (10) recreational possible traffic trend sites. Since there are no designated factor groups in the MARC geographic area, possible factor groups were assigned to the site locations. The MARC area needs to determine the factor group designations for the area so that all factor groups can be adequately represented. In the recommendations below, there are (5) Rural, (26) Urban, and (4) Urban-Rural sites. These are subject to change once the MARC area determines how to designate factor groups in the MARC area.

Also below is a map of the recommended locations. Green dots on the map represent the recommended counting locations (listed in the Bicycle and Pedestrian Counting Location Recommendations table) and red squares on the map represent a highlighted list of locations where MARC has already collected 4-hour counts using Miovision data collection devices. While the data already collected can be used for project specific needs, it does not meet the needs of developing a regional traffic data collection program that requires 24-hours (minimum of hourly consecutively) collected data. The Miovision product is capable of collecting longer durations of time but is client request and budget dependent. Ultimately Miovision data collection options could be cost prohibitive and the data handling is all outside of the client's control. For places where the client can use no other technology, using Miovision might make sense when needing to collect short-duration counts but this technology is typically not suitable/financially feasible for a continuous counting station installations.

DATA COLLECTION SITE LOCATION RECOMMENDATIONS



Bicycle and Pedestrian Counting Location Recommendations - Mid-America Regional Council Geographic Area

#	County	City	Facility Type / Name	Possible Factor Group	Possible Traffic Trend	Location
1	Cass	City of Harrisonville	Existing Bikeway	Urban	Mixed	Cass County, City of Harrisonville – Existing Bikeway – Urban / Mixed
2	Cass	City of Harrisonville	Proposed Bikeway	Urban	Mixed	Cass County, City of Harrisonville - Proposed Bikeway – Urban / Mixed
3	Clay	City of Kansas City	Existing Bikeway (Cliff Drive Corridor)	Urban	Mixed	Clay County, City of Kansas City – Existing Bikeway (Cliff Drive Corridor) – Urban / Mixed
4	Clay	City of Missouri City	Existing Bikeway (Missouri Riverfront Trail)	Rural	Recreational	Clay County, City of Missouri City – Existing Bikeway (Missouri Riverfront Trail) – Rural / Recreational
5	Clay	City of Liberty	Existing Bikeway/on-street	Urban	Mixed	Clay County, City of Liberty – Existing Bikeway/on-street – Urban / Mixed
6	Clay	City of Excelsior Springs	Existing Bikeway/ on-street 100 th Street Corridor	Urban	Commuter	Clay County, City of Excelsior Springs – Existing Bikeway/on-street 100 th Street Corridor – Urban / Commuter
7	Clay	City of Kearney	Existing Bikeway/on-street	Urban	Mixed	Clay County, City of Kearney – Existing Bikeway/on-street – Urban / Mixed
8	Clay	City of Smithville	City of Smithville – Crow’s Creek Park	Urban	Recreational	Clay County, City of Smithville – Crow’s Creek Park – Urban / Recreational
9	Jackson	City of Raytown	Proposed Bikeway	Urban	Commuter	Jackson County, City of Raytown – Proposed Bikeway – Urban / Commuter
10	Jackson	City of Kansas City	Brush Creek	Urban	Commuter	Jackson County, City of Kansas City – Brush Creek – Urban / Commuter
11	Jackson	City of Kansas City	Proposed Bikeway (40)	Urban	Commuter	Jackson County, City of Kansas City – Proposed Bikeway (40) – Urban / Commuter
12	Jackson	City of Independence	Proposed Bikeway (St. Truman Road Corridor)	Urban	Commuter	Jackson County, City of Independence – Proposed Bikeway (St. Truman Road Corridor) – Urban / Commuter
13	Jackson	City of Blue Springs	Existing Bikeway	Urban	Mixed	Jackson County, City of Blue Springs – Existing Bikeway – Urban / Mixed
14	Johnson	City of Olathe	Indian Creek Greenway	Urban-Rural	Recreational	Stakeholder Input Recommendation - Michael Latka - City of Olathe Parks & Rec Recommendation
15	Johnson	City of Olathe	Mill Creek Greenway	Urban-Rural	Recreational	Stakeholder Input Recommendation - Michael Latka - City of Olathe Parks & Rec Recommendation

**Bicycle and Pedestrian Counting Location Recommendations - Mid-America Regional Council Geographic Area
(CONT'D)**

#	County	City	Facility Type / Name	Possible Factor Group	Possible Traffic Trend	Location
16	Johnson	City of Olathe	Rolling Ridge Trail	Urban-Rural	Recreational	Stakeholder Input Recommendation - Michael Latka - City of Olathe Parks & Rec Recommendation
17	Johnson	City of Gardner	Existing Bikeway	Rural	Mixed	Johnson County, City of Gardner – Existing Bikeway – Rural / Mixed
18	Johnson	City of Gardner	Proposed Bikeway	Rural	Mixed	Johnson County, City of Gardner – Proposed Bikeway – Rural / Mixed
19	Johnson	City of DeSoto	Kill Creek Greenway	Urban-Rural	Mixed	Johnson County, City of DeSoto - Kill Creek Greenway – Urban-Rural / Mixed
20	Johnson	Johnson County,	Spoon Creek Greenway	Rural	Recreational	Johnson County, Unincorporated - Spoon Creek Greenway – Rural / Recreational
21	Johnson	City of Overland Park	Tomahawk Creek Greenway	Urban	Recreational	Johnson County, City of Overland Park – Tomahawk Creek Greenway – Urban / Recreational
22	Johnson	City of Leawood	Proposed bikeway	Urban	Mixed	Johnson County, City of Leawood – Proposed bikeway – Urban / Mixed
23	Johnson	City of Lenexa	On-Street Bike Count	Urban	Mixed	Johnson County, City of Lenexa – On-Street Bike Count – Urban / Mixed
24	Johnson	City of Shawnee	Gary L Haller Greenway	Urban	Recreational	Johnson County, City of Shawnee – Gary L Haller Greenway – Urban / Recreational
25	Johnson	City of Prairie Village	Brush Creek	Urban	Mixed	Johnson County, City of Prairie Village – Brush Creek – Urban / Mixed
26	Johnson	Mission Hills	Existing Bikeway	Urban	Mixed	Johnson County, Mission Hills – Existing Bikeway – Urban / Mixed
27	Leavenworth	City of Leavenworth	Existing on-street bikeway	Urban	Commuter	Leavenworth County, City of Leavenworth – Existing on-street bikeway – Urban / Commuter
28	Leavenworth	City of Lansing	Existing bikeway	Urban	Commuter	Leavenworth County, City of Lansing – Existing bikeway – Urban / Commuter
29	Leavenworth	City of Bonner Springs	Proposed bikeway (hog creek extension)	Urban	Recreational	Leavenworth County, City of Bonner Springs – Proposed bikeway (hog creek extension) – Urban / Recreational
30	Leavenworth	City of Kansas City	Existing bikeway (Georgia Street Corridor)	Urban	Commuter	Leavenworth County, City of Kansas City – Existing bikeway (Georgia Street Corridor) – Urban / Commuter

**Bicycle and Pedestrian Counting Location Recommendations - Mid-America Regional Council Geographic Area
(CONT'D)**

#	County	City	Facility Type / Name	Possible Factor Group	Possible Traffic Trend	Location
31	Leavenworth	City of Edwardsville	Existing bikeway (Kaw Levee Trail)	Urban	Commuter	Leavenworth County, City of Edwardsville – Existing bikeway (Kaw Levee Trail) – Urban / Commuter
32	Miami	City of Paola	No Bikeways – On-Street Bike Count	Rural	Mixed	Miami County, City of Paola – No Bikeways – On-Street Bike Count – Rural / Mixed
33	Platte	City of Platte City	Existing Bikeway	Urban	Mixed	Platte County, City of Platte City – Existing Bikeway – Urban / Mixed
34	Platte		Tiffany Springs Parkway – Existing Bikeway	Urban	Mixed	Platte County, Tiffany Springs Parkway – Existing Bikeway – Urban / Mixed
35	Platte	City of Parkville	Existing bikeway (southern platte pass)	Urban	Recreational	Platte County, City of Parkville – Existing bikeway (southern platte pass) – Urban / Recreational
36	Johnson	City of Olathe	Heritage Trail	Urban	Recreational	Stakeholder Input Recommendation - Michael Latka - City of Olathe Parks & Rec Recommendation
37	Johnson	City of Olathe	Mahaffie Trail	Urban	Recreational	Stakeholder Input Recommendation - Michael Latka - City of Olathe Parks & Rec Recommendation

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MARC Regional Bikeways Plan

Bicycle Facilities Maintenance Overview

Maintenance of Bicycle Facilities

Maintenance of pavement surfaces is critical to safe and comfortable bicycling. Full width of the travel path and shoulders of bicycle facilities should be maintained. Maintenance of on-street bicycle facilities should be included with road maintenance.

Construction Measures for Preventative Maintenance

While regular maintenance activities will be required, some design treatments will help minimize maintenance needs:

- Place public utilities such as manhole covers and drainage grates outside of bikeways.
- Ensure that drainage grates, if located on or near a bikeway, have narrow openings and that the grate openings are placed perpendicular to the riding surface.
- Design of appropriate cross slopes should help to keep the riding surface clear of debris and water.

Vegetation encroaching into bikeways is both a nuisance and a problem. Many vegetative maintenance problems can be mitigated during the design and construction of the facility. The following are examples of vegetation control methods that may be done before or during construction.

- Place a tightly woven geotextile or landscape fabric under the asphalt pavement. This method may be chosen in sensitive areas where a nonselective herbicide is undesirable. Several brands of geotextiles are available. Many provide additional structural support for the asphalt paving as well, and may allow reduced pavement thickness.
- Control undesirable “volunteer” vegetation and noxious weeds during construction.
- Use root barriers where they are beneficial to prevent root intrusion to the path surface. Suckering plants are the ones most likely to come through the path surface.
- Place a non-selective herbicide under asphalt paving. All applications must be done according to label directions. This herbicide will prevent vegetative growth from penetrating the asphalt paving for a number of years. Caution is needed in applying non-selective herbicides. They may injure nearby trees if their root systems grow into the treated area.

In designing roadways, roads should be designed to allow for snow storage. The roadside should have adequate space to place plowed snow so that it does not block a shared use path that may be adjacent to the roadway. Separation between road and path allows for snow storage.

Maintenance Schedule

Several jurisdictional documents from around the country provide specifics on bikeway maintenance schedules. Examples of recommended maintenance tasks and frequencies for those tasks are provided in Table 1. It should be noted that of maintenance schedules used in the development of this table, only one was adopted as a standard in its community’s comprehensive plan (Arlington, Virginia). That document did not include all of the listed tasks. For many of those tasks it did list, the scheduled frequency was given as “As needed” and not tied to a given frequency.

Figure 1 – Example pathway maintenance with a sweeper-vac



Table 1 Recommended Maintenance Tasks Range of Recommended Frequencies

Maintenance Task	Recommended Frequencies
Regular Inspection	Monthly – twice per year
Sweep bikeways	Weekly – twice per year
Sign replacement	Annually – every ten years
Pavement marking replacement	Annually – every three years
Shoulder and mowing	Weekly
Weed control	Monthly – every six months
Tree/shrub trimming	Every four months – annually
Pruning	Annually – every four years
Pavement sealing, potholes	Every five years – every ten years
Path resurfacing	Every ten years – every twenty years
Maintain furniture	Biannually – annually
Litter removal	Weekly – every two months

Inspection of the entire system on a monthly basis would be reasonable. These inspections should include evaluations of the pathway surfaces, vegetation encroachments, debris on the pathways and general condition of signing and pavement markings. Additionally, nighttime evaluations of signing and

striping – particularly at crosswalks, should be performed as part of these inspections. Deficiencies should be noted and mitigating maintenance scheduled as they are noticed.

These inspections and resulting spot maintenance repairs/mitigation serve two primary purposes. First they will identify and address smaller maintenance concerns before they become larger and are more expensive to repair or a hazard to users. The monthly inspection will also provide the opportunity to evaluate the proposed maintenance schedule provided above. If, for instance, it is found that litter removal need only occur every two weeks, or that tree trimming should occur on a monthly basis, the regular schedule can be modified for future maintenance planning.

Snow and Ice

Snow and ice should not be allowed to accumulate on bikeways or sidewalks. On-street facilities should be cleared as the roadways are cleared. Smaller equipment may be instituted for off-street facility plowing. Monitor low points for potential ice accumulation and fix drainage issues accordingly. Remove ice accumulations from bikeways and sidewalks as quickly as possible to prevent accidents.

Vegetation

Once facilities are constructed, vegetation should be controlled to maintain sight lines and a regular schedule of mowing sodded areas should be established. Weed control and vegetation management must be included in the system maintenance program. Vegetation contributes greatly to the pathway users' experience.

The most common vegetation related maintenance issue is groundcover (grass) encroaching onto the asphalt surface; it will initially narrow the usable asphalt surface and eventually result in the raveling of the pavement edges.

Roots can also damage pathway surfaces, causing heaving and cracking of the pavement. Ideally, the way an agency would address this problem is through some barrier that would prevent the grass or roots from ever growing over, or under, the surface of the trail. An example would be a product by DeepRoot®. Initial results have indicated that the application has been effective, and continued use is recommended.

Litter

Costs can be greatly reduced by using volunteers to perform simple routine maintenance such as litter pickup; this could be instituted as an Adopt-a-Path program. It is important to note that adequate City resources would need to be available and allocated to manage such volunteers. If such a program is not created, a regular maintenance schedule for litter cleanup on pathways should be maintained.

Maintenance of Signage

Signage on shared use paths can serve a variety of purposes: to inform users of their legal requirements (STOP), to provide warnings (LOW BRANCH), or to inform (RESTROOMS). All of these uses are important to make the pathway users' experience safe and pleasant. Consequently, once placed, signs should be

replaced if they are damaged. Signs on shared use paths are also required to be retroreflective.¹ Consequently, just as with roadway signs, pathway signs should be reviewed under night time conditions and replaced if no longer retroreflective.

Reporting

Bicycle facility users should report routine maintenance issues (those that do not present an immediate safety risk) to the relevant City's Department of Public Works.

¹ *Manual on Uniform Traffic Control Devices*, Section 9B.01, FHWA, Washington, D.C., 2003.



APPENDIX D

Greater Kansas City Bikeways Plan

Maps

Planned and existing facilities

Bikeway network, by county

Bikeway network gaps

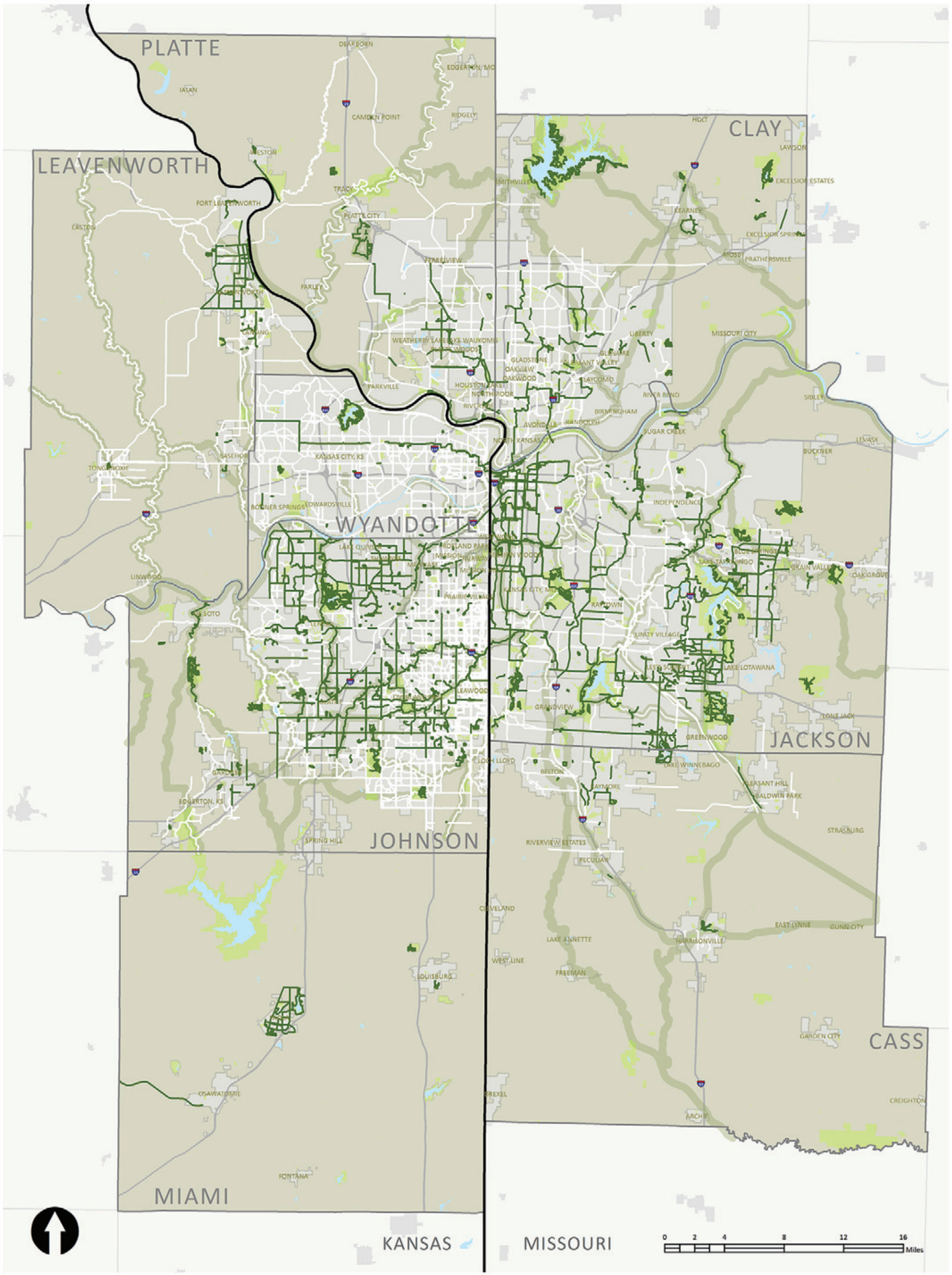
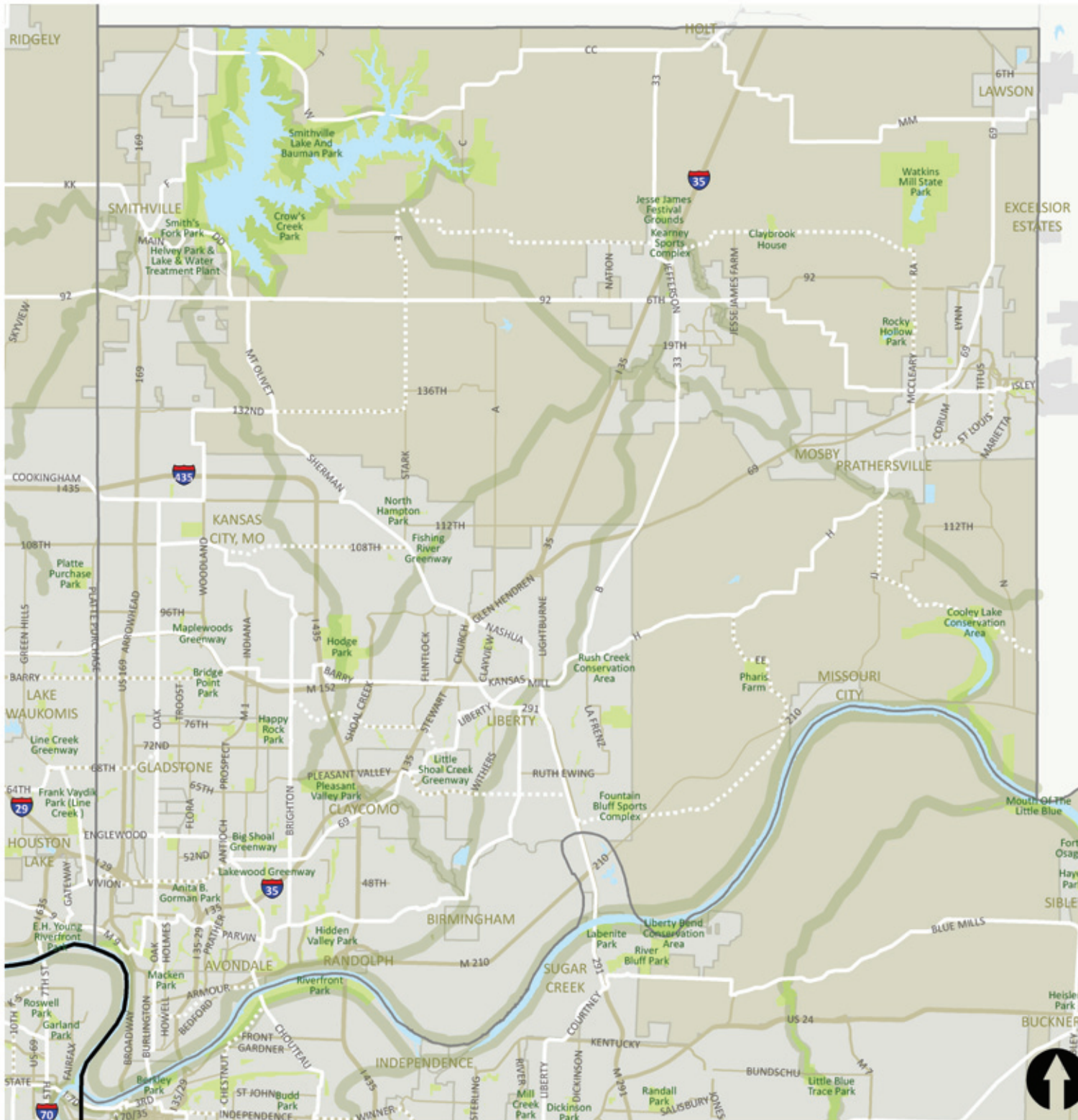


Figure 11 | Existing and Proposed Bicycle Facilities








-
 Existing Bikeways
 -
 MetroGreen Plan
 -
 Cities

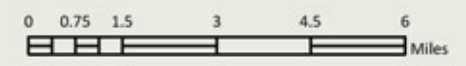
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 Proposed Bikeways
 -
 Parks
 -
 Counties

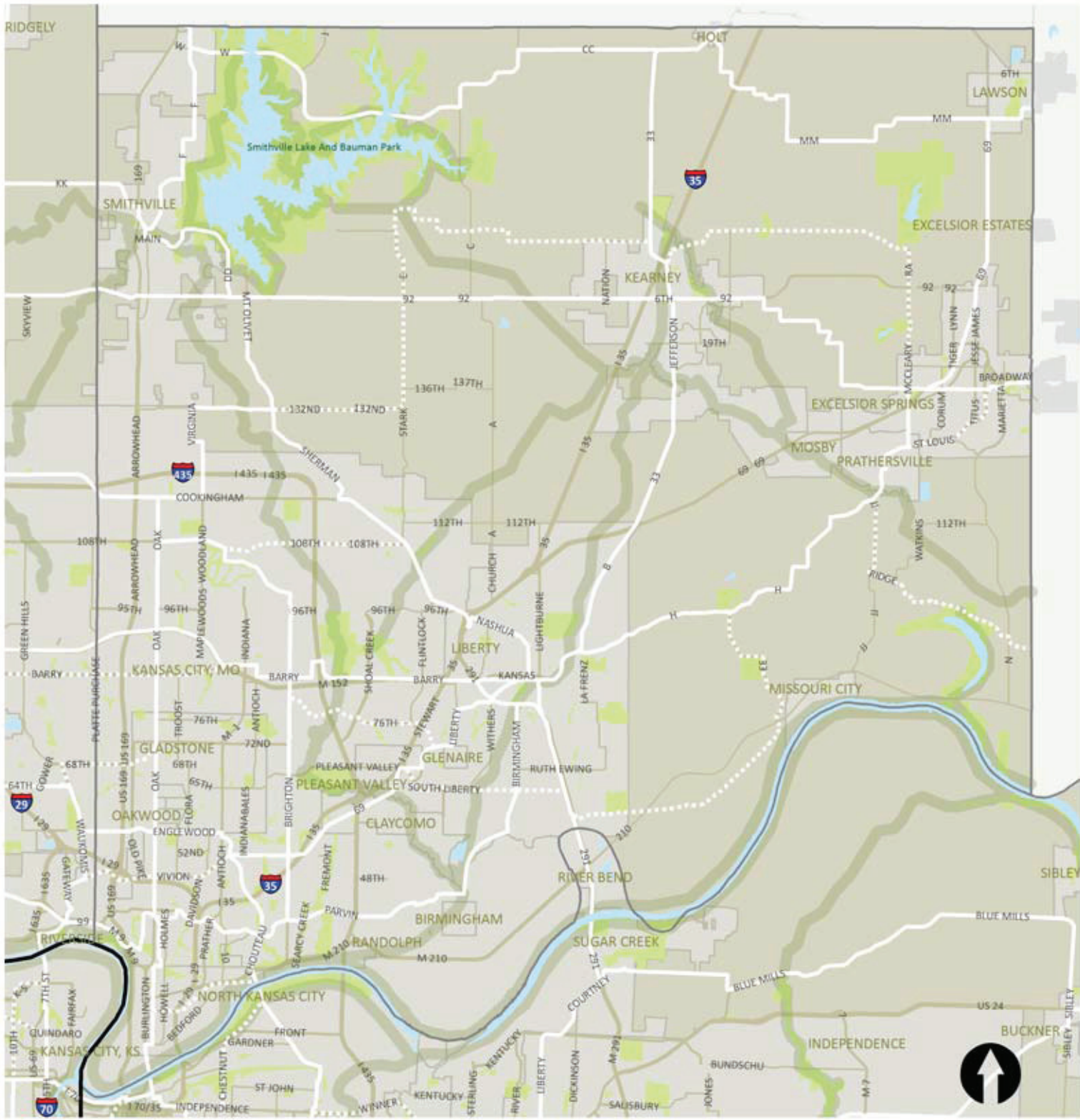
More detail provided in Appendix D



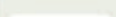


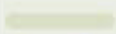
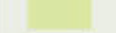


Regional Bikeway Network

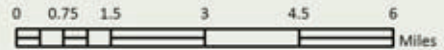
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-  Proposed Regional Connector
-  MetroGreen Addition
-  MetroGreen Plan
-  Parks
-  Cities
-  Counties

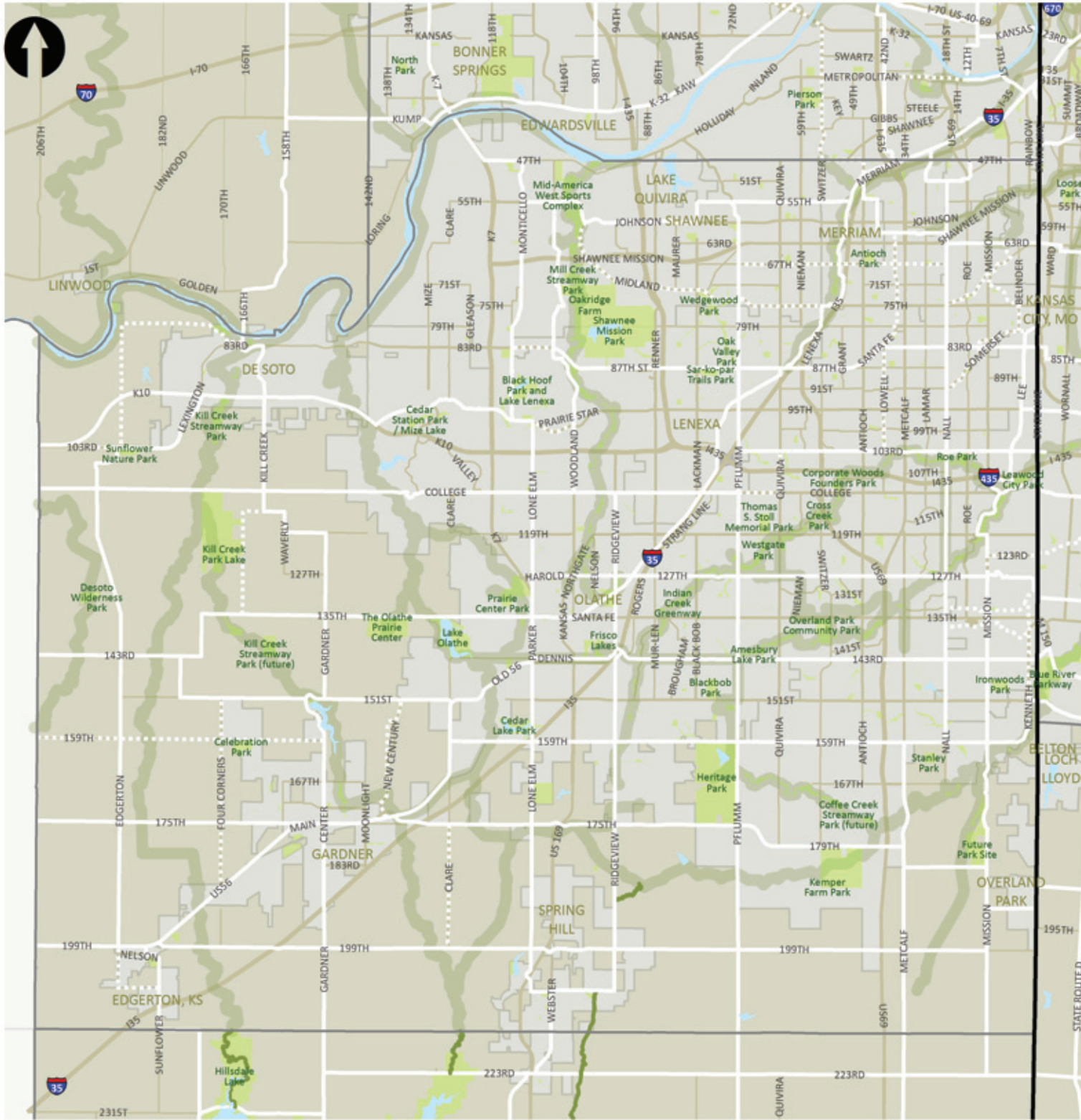











Regional Bikeway Network

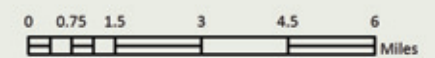
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-  Proposed Regional Connector
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-  MetroGreen Plan
-  Parks
-  Cities
-  Counties



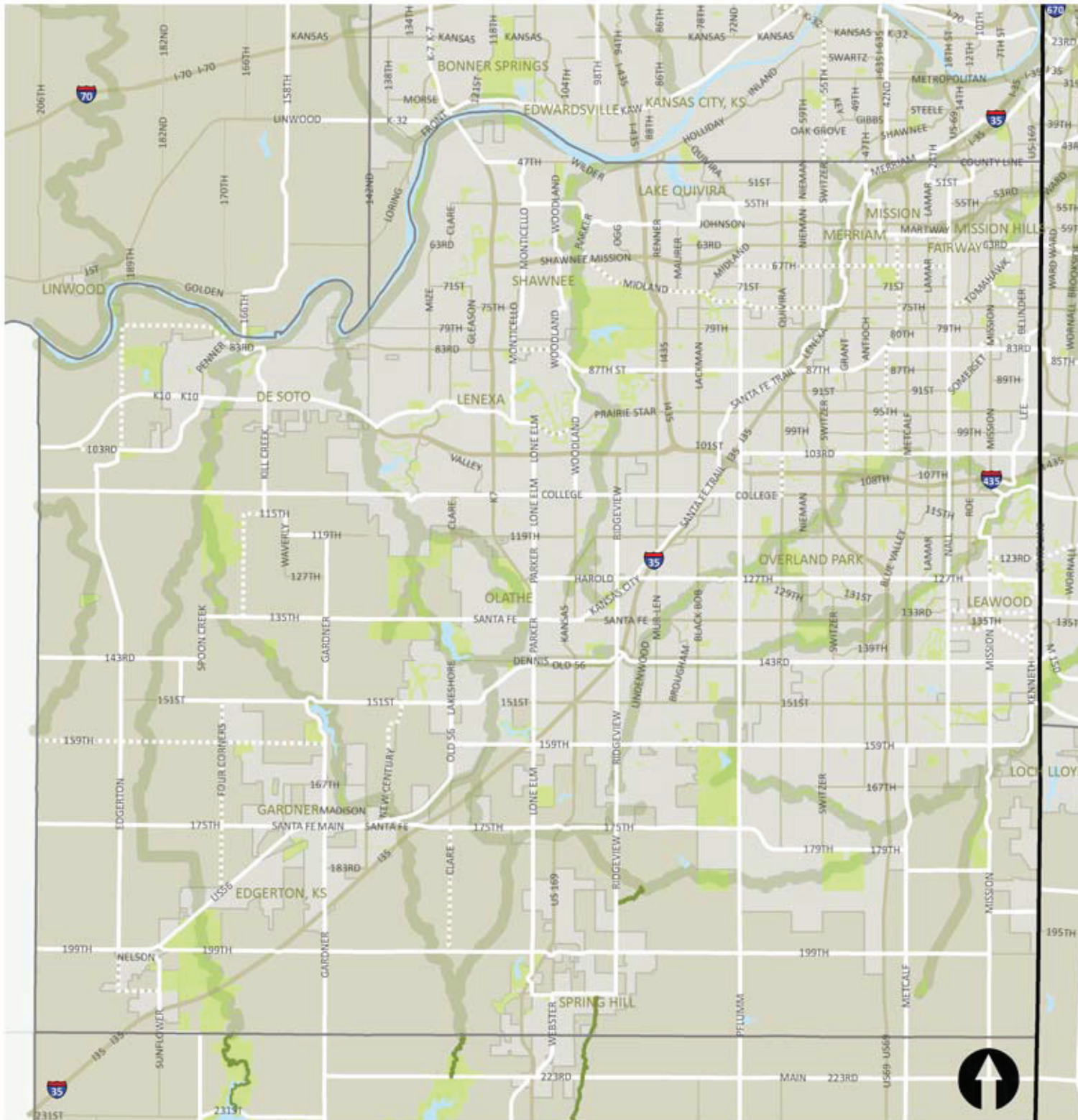









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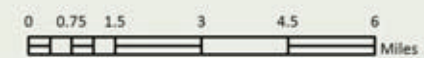
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-  Proposed Regional Connector
-  MetroGreen Addition
-  MetroGreen Plan
-  Parks
-  Cities
-  Counties










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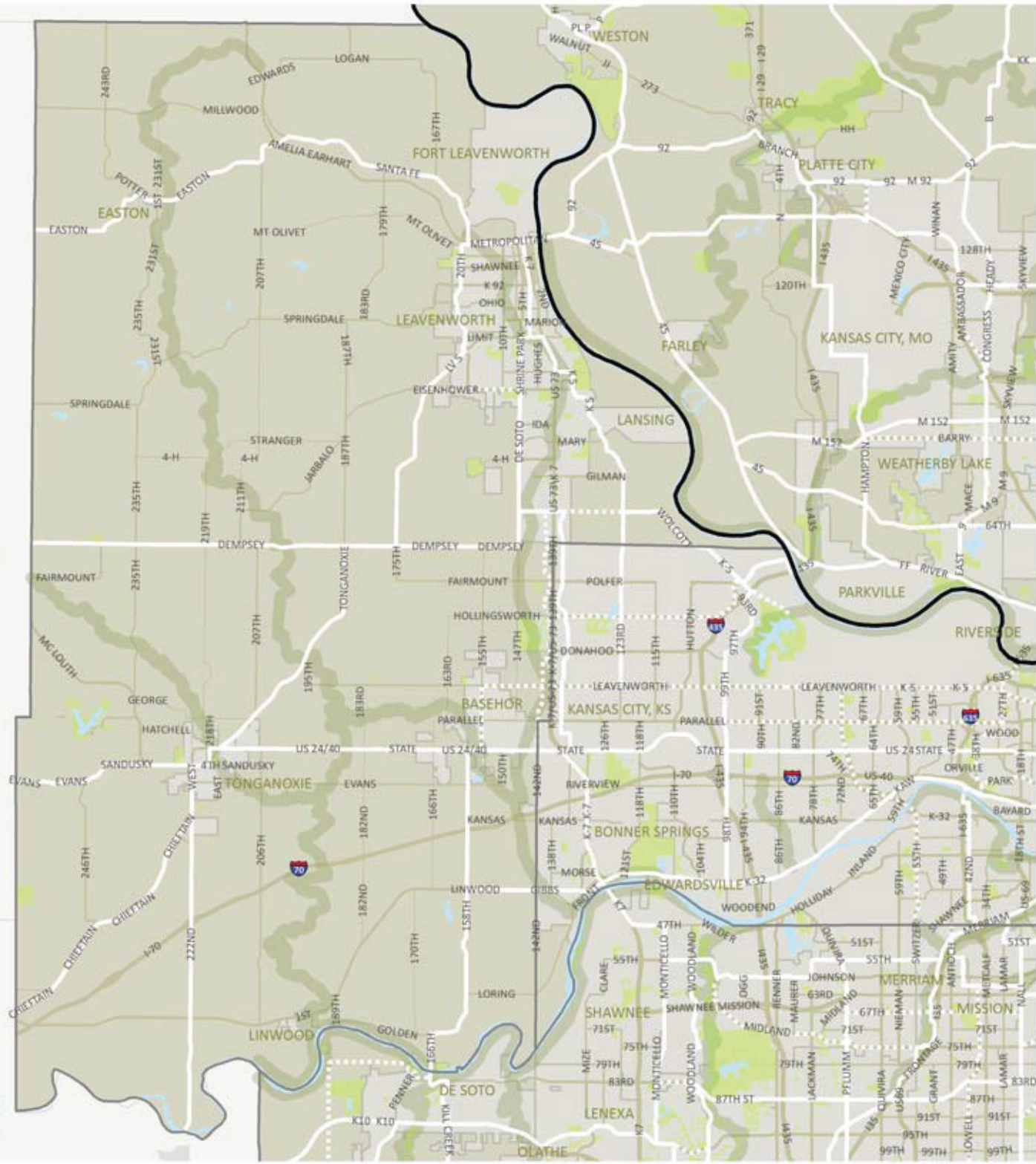
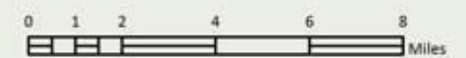


-  Proposed Regional Corridor
-  Proposed Regional Connector
-  MetroGreen Addition
-  MetroGreen Plan
-  Parks
-  Cities
-  Counties










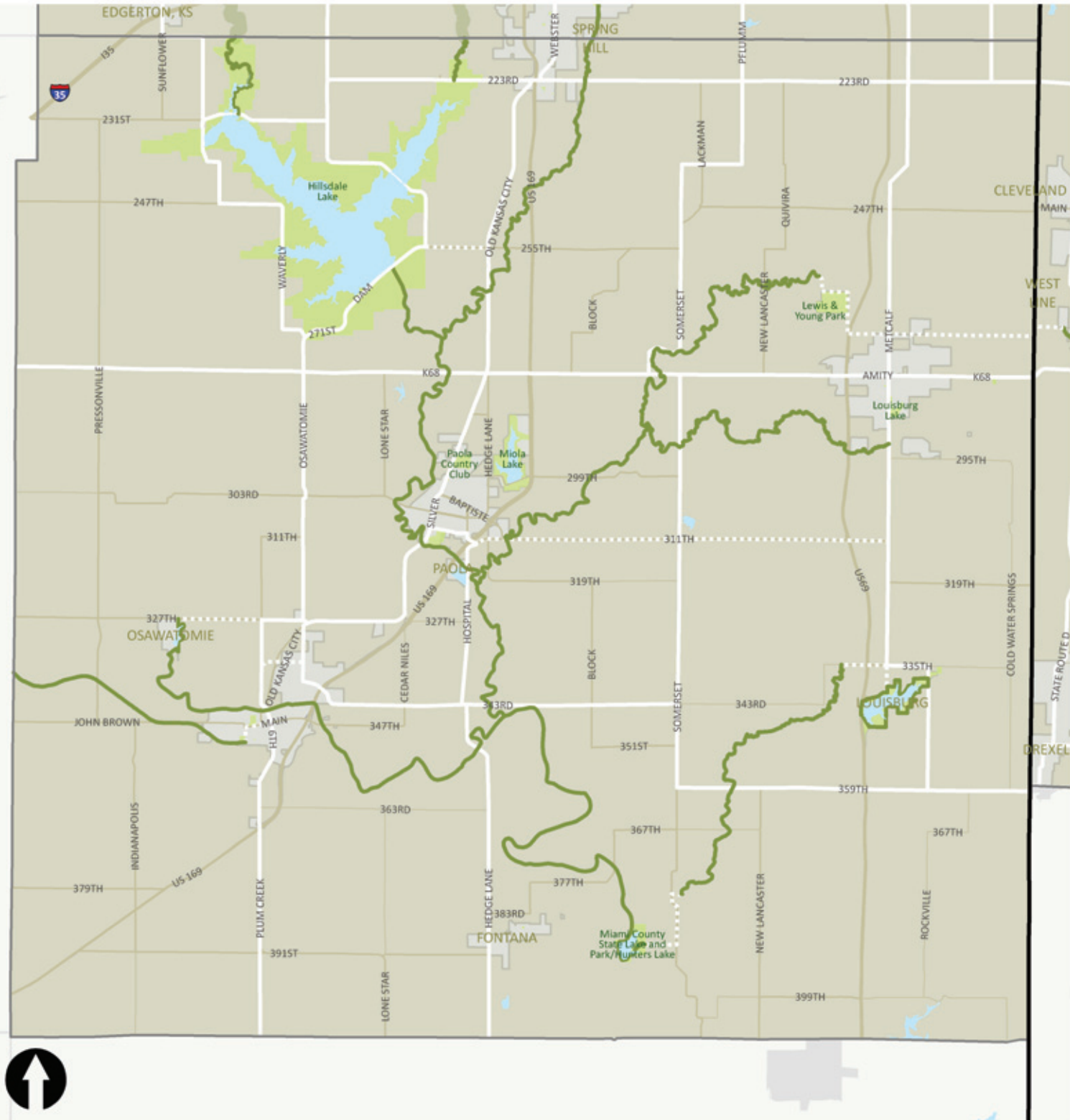
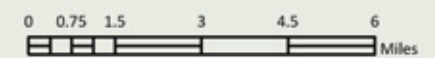
Regional Bikeway Network

-  Proposed Regional Corridor
-  Proposed Regional Connector
-  MetroGreen Addition
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-  Parks
-  Cities
-  Counties

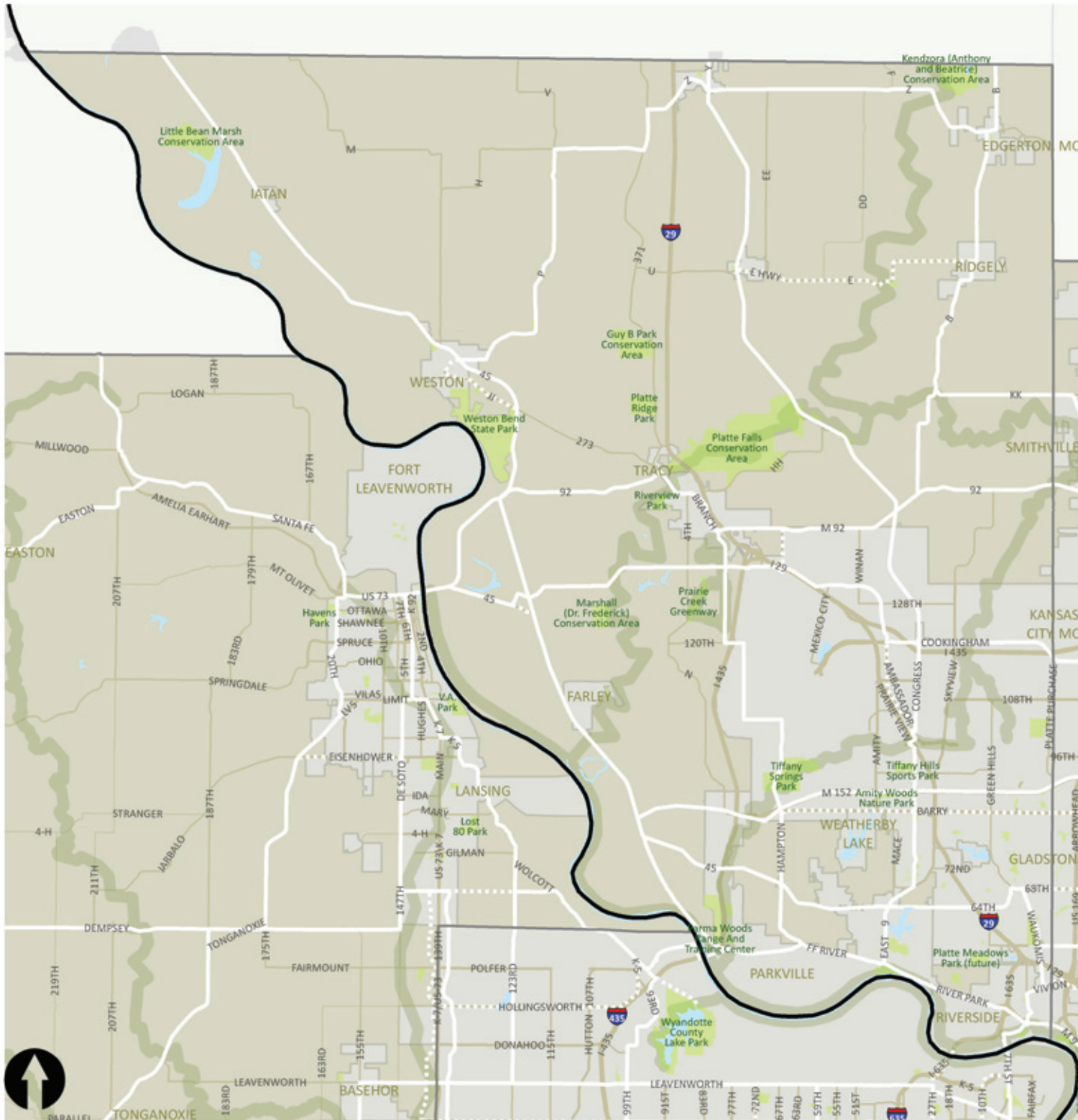


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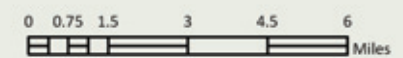
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-  Counties










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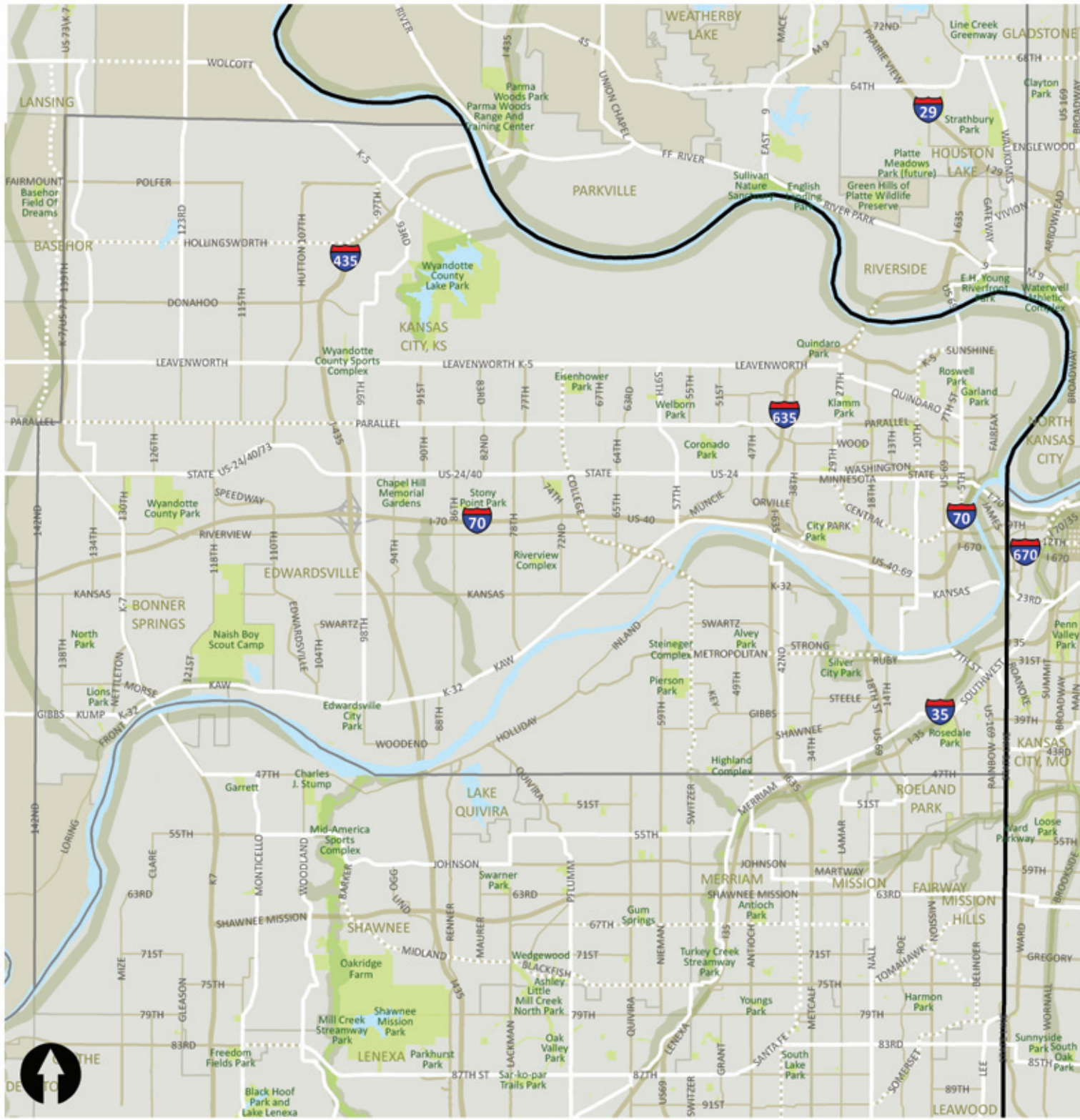
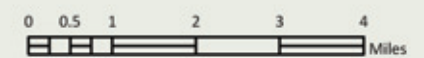


- Proposed Regional Corridor
- Proposed Regional Connector
- MetroGreen Addition
- MetroGreen Plan
- Parks
- Cities
- Counties



Regional Bikeway Network

-  Proposed Regional Corridor
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-  Cities
-  Counties



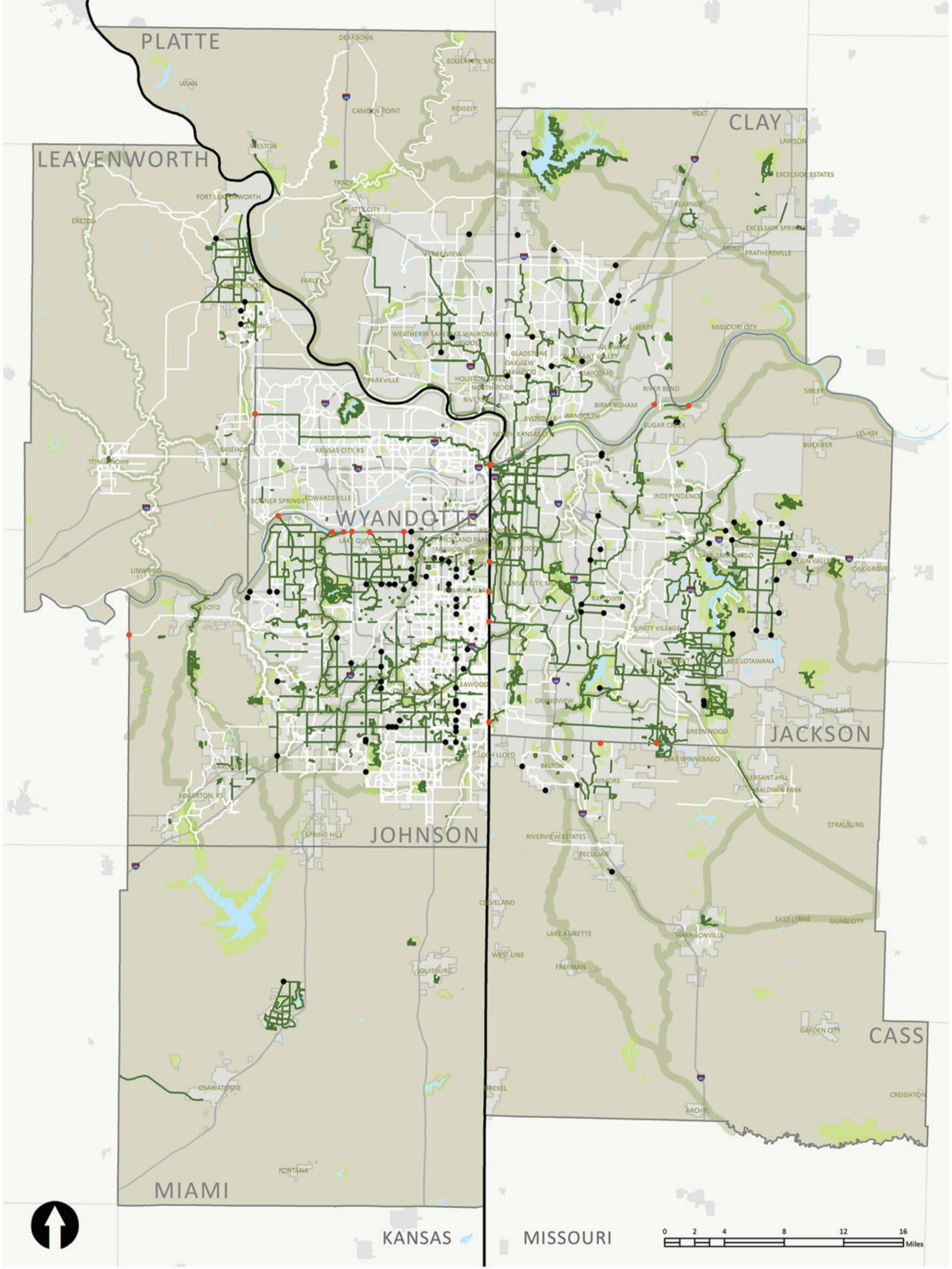


Figure 14 | Identified Bikeway Gaps

More detail provided in Appendix D

Bikeway Gaps

- City Border
- County Border

- Existing Bikeways
- - - Proposed Bikeways

- ▭ MetroGreen Plan
- ▭ Parks

- ▭ Cities
- ▭ Counties

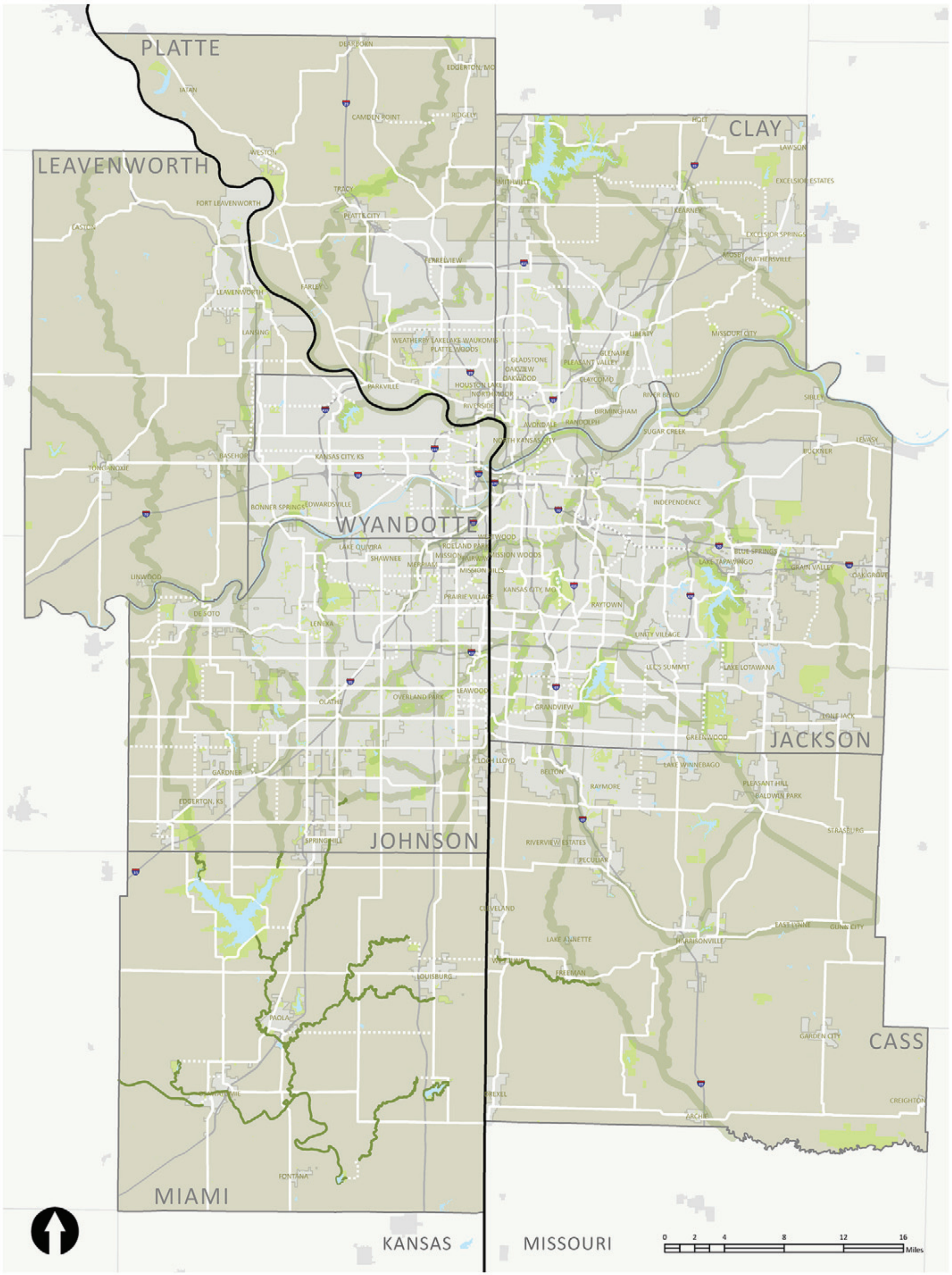


Figure 19 | Regional Bikeway Network, Proposed Corridors and Connectors
 More detail provided in Appendix D

	Proposed Regional Corridor		MetroGreen Plan		Cities
	Proposed Regional Connector		Parks		Counties
	MetroGreen Addition				