

A paved trail curves through a wooded area. The trail is light-colored and appears to be made of concrete or asphalt. It is surrounded by dense green trees and bushes. The sky is clear and blue.

Muscatine County

Trails Plan

2019

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Plan Introduction & Planning Process

Over the past several decades, nonmotorized transportation planning and recreational trail planning has become a significant factor in federal, state, and local efforts. Beginning with the Intermodal Surface Transportation Efficiency Act (ISTEA) in 1991 and continuing through the most recent federal transportation bill, Fixing America's Surface Transportation (FAST), the federal commitment to alternative transportation options has provided the backbone of the growing bicycle and trail network in the United States. States and local governments have also dedicated substantial resources to improving the quality of life of its residents through trail development.

This Muscatine County Trails Plan is an update of the 2007 *Muscatine Countywide Trails Plan*. The previous plan is summarized under "Previous Planning Efforts." The goals and objectives of the 2007 plan serve as a guide for this update:

1. Complete the county's remaining sections of the Mississippi River Trail (MRT) and American Discovery Trail (ADT); both nationally recognized trail networks.
2. Determine viable links, throughout the county, between proposed or existing regional and local trails to the MRT and ADT systems.
3. Identify a cohesive connected network of trail corridors providing alternative transportation and commuting options, and safe and accessible recreational opportunities.
4. Communicate with bordering counties to ensure inter-county trail connections have common meeting points and to avoid duplicative routes.

5. Establish a basic conceptual framework for an intra-county trails network serving multiple user groups and interests.
6. Address costs associated with development and on-going maintenance of identified trail routes.
7. Include information regarding liability to the county for implementing and/or designating separated corridor and/or share-access trails.

This plan update uses these goals and objectives as a guide for revisiting the recommended corridors and routes. In addition, the Muscatine Trails Committee recommended including another goal:

8. Communicate and coordinate trail amenities and branding.

Trail amenities are vital to the user experience of bicycle and pedestrian corridors. Restrooms, drinking fountains, benches, and wayfinding signage all contribute to positive experiences and support trail users of all ages and abilities. Communicating information on these amenities may allow certain users to feel more comfortable taking advantage of the infrastructure.

This plan update takes into account input from officials around Muscatine County. Small, outlying communities indicated the desire to connect to one another, other rural parts of the county, recreation areas, and to the City of Muscatine and the Iowa City region. Muscatine County officials indicated rural portions of the county could stand to benefit from paved shoulders, especially, that would accommodate intercity bicycle traffic as well. The Muscatine Trails Committee and city staff provided input on updates to the existing trail infrastructure and proposed routes.

Definitions

The word “trail” can evoke many types of transportation or recreational facilities. It can be a general, all-encompassing term to indicate any route used by largely non-motorized modes of transportation including bicyclists, pedestrians, paddlers, cross-country skiers, and others. “Trail” has also been used to refer to routes used by snowmobilers and all-terrain vehicles (ATVs). For purposes of this plan, various non-motorized transportation and recreation facilities are detailed in following sections. Various conditions such as width of right-of-way, traffic speeds, and physical or topographic constraints will inform communities on the most appropriate facility for their circumstances. Safety requirements, federal regulations such as the Americans with Disabilities Act (ADA), cost, topography, and public input must be taken into account when a trail facility is proposed.

The rural areas outside the City of Muscatine may require different types of trail facilities to be compatible with the surrounding area. In 2016, the Federal Highway Administration published its *Small Town and Rural Multimodal Networks* guide to “provide information on maintaining accessibility and [Manual on Uniform Traffic Control Devices (MUTCD)] compliance, while at the same time encouraging innovation. It addresses challenges specific to rural areas, recognizes how many rural roadways are operating today, and focuses on opportunities to make incremental improvements despite the geographic, fiscal, and other challenges that many rural communities face.” The guide offers valuable insight on the varied facilities that rural communities can use to improve the

environment for bicyclists and pedestrians. The guide divides facilities into three categories: mixed traffic, visually separated, and physically separated, which are described in the following three sections (Federal Highway Administration, 2016). This plan offers general recommendations using the three broad categories, though various factors can impact the decision to choose one over another, such as right-of-way availability, cost, user safety, and bicyclist and traffic volumes.

Mixed Traffic Facilities

Mixed Traffic Facilities are most appropriate on roads with low volumes of traffic operating at low speeds. These facilities are shared between motorists, bicyclists, and sometimes pedestrians. The low intensity of motor vehicle traffic allows users to negotiate space in comfort without the need for robust separation.

- **Bicycle Boulevard** – Low-stress, shared roadway bicycle facility designed to offer priority for bicyclists operating within a roadway shared with motor vehicle traffic.
- **Yield Roadway** – Designed to serve pedestrians, bicyclists, and motor vehicle traffic in the same slow-speed travel area. Yield roadways serve bidirectional motor vehicle traffic without lane markings in the roadway travel area.
- **Advisory shoulders** – Create usable shoulders for bicyclists on a roadway that is otherwise too narrow to accommodate one. The shoulder is delineated by pavement marking and optional pavement color. Motorists may only enter the shoulder when no bicyclists are present and must

overtake these users with caution due to potential oncoming traffic.

Visually Separated Facilities

Visually separated facilities are most appropriate on roads with low to moderate volumes of traffic operating at moderate speeds. These facilities use markings and buffer striping to increase the distance between motorists and non-motorized users. Facility maintenance, such as removing built-up debris, is critical to how well these types of facilities function.

- **Pedestrian lane** – An interim or temporary pedestrian facility that may be appropriate on roads with low to moderate speeds and volumes. A pedestrian lane is a designated space on the roadway for exclusive use of pedestrians. The lane may be on one or both sides of the roadway and can fill gaps between important destinations in a community.
- **Bike lanes** – Designate an exclusive space for bicyclists through the use of pavement markings and optional signs. A bike lane is located directly adjacent to motor vehicle travel lanes and follows the same direction as motor vehicle traffic.
- **Paved shoulders** – Paved shoulders on the edge of roadways can be enhanced to serve as a functional space for bicyclists and pedestrians to travel in the absence of other facilities with more separation.

Physically Separated

Physically separated facilities are most appropriate on roads with high volumes of traffic operating at high speeds. These facilities use physical barriers, are raised on curbs, or provide wide unpaved separation areas to increase the comfort and safety of non-motorized users.



Two cyclists ride on the shoulder of a two-lane highway in Nebraska.

Source: RuralDesignGuide.com, Bob Boyce.

- **Separated bike lane** – A facility for exclusive use by bicyclists that is located within or directly adjacent to the roadway and is physically separated from motor vehicle traffic with a vertical element.
- **Sidewalk** – Provides dedicated space intended for use by pedestrians that is safe, comfortable, and accessible to all. Sidewalks are physically separated from the roadway by a curb or unpaved buffer space.
- **Sidepath** – A bidirectional, shared-use path located immediately adjacent and parallel to a roadway. Sidepaths can offer a high-quality experience for users of all ages and abilities as compared to on-roadway facilities in heavy traffic environments, allow for reduced roadway crossing distances, and maintain rural and small town community character.
- **Shared-use path** – Provides a travel area separate from motorized traffic for bicyclists, pedestrians, skaters, wheelchair users, joggers, and other users. Shared-use paths can provide a low-stress experience for a variety of users using the network for transportation or recreation.

Previous planning efforts

This plan stands as an update to the 2007 *Muscatine Countywide Trails Plan*, and builds on the efforts to address bicycle and pedestrian accommodations at the local, regional, and state levels. Changing landscapes in transportation policy have affected the development of and guidance for bicycle and pedestrian accommodations. Federal policy and guidance is detailed under “Federal Guidelines and Considerations.” Following are summaries of plans that have been completed since the 2007 *Muscatine Countywide Trails Plan*.

2007 Muscatine Countywide Trails Plan

The 2007 *Muscatine Countywide Trails Plan* brought together groups from the Muscatine County Board; Muscatine County Conservation Board; the cities of Muscatine, West Liberty, and Wilton; and the Muscatine Trails Committee. The plan sought to be a guide for trail construction within the county, while providing continuity with neighboring counties to form a regional network of trails. Connections were proposed to link with the urban trail networks of Iowa City and the Quad Cities, while providing rural connections to Cedar and Louisa Counties as part of the ADT and MRT respectively. Alternatives were provided for numerous routes, including the aforementioned ADT and MRT, to consider the feasibility of trail infrastructure within the public right-of-way taking safety, topography, and other factors into account. Fostering livable communities in the county through a network of trails and bicycle infrastructure would improve the quality of life for

residents and increase the county’s attractiveness as a whole.

2014 Muscatine County Comprehensive Plan

The 2014 *Muscatine County Comprehensive Plan* offered a snapshot of existing trail facilities in the county, as well as a brief description of future trail corridors. In 2014, there were 25 miles of bicycle facilities. As of 2019, there are approximately 54 miles of separated trails in Muscatine County, a figure that includes nature trails and other hiking and walking paths that may not have been included in the Comprehensive Plan figure. The Comprehensive Plan focused on the national trails, namely the ADT and MRT, in the county. Connections to recreation facilities such as Wildcat Den State Park were discussed as part of the MRT extension between the cities of Muscatine and Buffalo in Scott County.

2014 Muscatine Pedestrian and Bicycle Master Plan

The University of Iowa Initiative for Sustainable Communities conducted a master planning process for the city of Muscatine related to bicycle and pedestrian movement. The study was authored by three graduate students in the Urban and Regional Planning Department, Jeremy Kaemmer, Charlie Nichols, and Yuan Zhang. The plan identified improvements to the city’s pedestrian and bicycle infrastructure through the Five Es: engineering, education, encouragement, enforcement, and evaluation. In addition, proposed projects were ranked using a “GIS model that compares the current infrastructure to an ideal network of sidewalks and trails.” Projects were categorized into three time horizons,

immediate, middle, and long term. This plan was considered when the Muscatine City Council adopted the *Muscatine Bike and Pedestrian Master Plan* (2015). The GIS model used in the plan could not be obtained for this plan update.

2015 Muscatine Bike and Pedestrian Master Plan

The 2015 plan includes information and data retrieved through the 2014 *Pedestrian and Bicycle Master Plan* process. This plan, adopted by the Muscatine City Council, is a “dynamic map based plan” that depicts “existing, planned, and needed improvements to bike and pedestrian infrastructure” in the city. The plan directs investments in bicycle and pedestrian infrastructure to address the following goal from the City of Muscatine Comprehensive Plan:

“Members of the community should have the opportunity to travel safely to their destination by foot, bike, or by other non-motorized means. Children should be able to walk or bike to their school safely. To achieve this goal, critical routes for non-motorized travel linking schools, parks, bus stops, most major employment and shopping centers, and located within 400 feet of most residences in Muscatine, will be identified. These routes will be made safe and attractive for travel by foot, bike, wheelchair, and all other forms of legal non-motorized travel.”

2015 Trails Visioning Design Report, Trees Forever

The City of Muscatine through its Trails Team, the Melon City Bike Club, and Trees Forever undertook a design conceptualization process to detail how specific recommendations within the city

would look when completed. The concepts were developed with the following goals in mind:

- Develop a plan for signage including trailhead, wayfinding, and information signs
- Develop concepts for safety improvement in areas of concern
- Document areas of concern to be discussed with the city
- Enhance vegetation function and aesthetics throughout the trail system

The report focused on site-specific concerns within the City of Muscatine. Blind corners and non-signalized highway crossings were raised as items that needed to be addressed. In addition, signage was proposed to give trail users information in regard to wayfinding and trail-adjacent amenities such as restrooms and drinking fountains.

2018 Iowa DOT Bike and Pedestrian Long-Range Plan

Adopted in 2018, the Iowa DOT undertook a long-range planning evaluation of bicycle and pedestrian accommodations in the state. The plan is intended to augment the State Transportation Plan, *Iowa in Motion 2045*. The plan provides a vision that weaves together the state’s trail network from a patchwork of municipal, county, and regional facilities. “The end goal is to make more of the state of Iowa accessible by bicycle and by foot while eliminating bicycle and pedestrian-related injuries and fatalities, in keeping with the Iowa DOT’s zero-fatality goal,” (p. 19). The plan defines seven clear goals developed from input by a Policy Advisory Committee and Technical Advisory Committee. The goals are (p.21):

1. **“Valid** – Ensure that policy makers, roadway designers and planners, law

enforcement officials, motorists, bicyclists, and pedestrians recognize that bicycling and walking are valid modes of transportation.

- 2. **Safe** – Improve the safety and friendliness of Iowa’s roads and trails to accommodate on-road bikeways and sidewalks, reduce crashes, and eliminate fatalities.
- 3. **Coordinated** – Improve coordination between the Iowa DOT Central Office, each Iowa DOT District, regional agencies, and local partners to streamline maintenance and the implementation of programs, policies, and infrastructure projects, and to increase consistency.
- 4. **Connected** – Enact policies and develop infrastructure to create an interconnected network of on-road bikeways, sidewalks, multi-use trails, and end-of-trip facilities that uses the appropriate facility type to connect people to their destinations.
- 5. **Funded** – Increase the overall level of funding for bicycle and pedestrian infrastructure and programs, explore the flexibility of funding sources, and

maximize the efficiency of funding to bridge the gap between what is needed and what is available.

- 6. **Well-Designed** – Establish guidelines for the design of on-road bikeways, sidewalks, and multi-use trails to ensure they are comfortable, sustainable, convenient, and consistent.
- 7. **Healthy** – Promote opportunities for active and sustainable lifestyles that include walking and bicycling on a daily basis.”

The plan encourages counties to adopt Complete Streets policies or “follow the Complete Streets approach” (p. 35). Projects that utilize state and/or federal funds may see an increased importance in providing bicycle and/or pedestrian accommodation. The role of counties in implementing the plan includes providing accommodations through wayfinding signage, installing paved shoulders on roads with high traffic volumes, and maintaining roadway surfaces that experience high levels of actual or potential bicyclist usage.

Existing conditions

Bicyclists currently use varied infrastructure within Muscatine County. From separated trails and sidepaths to paved shoulders and signed routes, the county offers a mix of bicycle and nonmotorized facilities. Different infrastructure appeals to different user groups, and not all user groups may be targeted for certain bicycle corridor improvements. For instance, paved shoulders are typically meant for interurban, rural travel. Many families might not feel comfortable riding on such facilities with children. Conversely, two-way separated recreational trails appeal to riders of all ages and abilities, but highly experienced, touring cyclists may feel more comfortable on wide open rural roads. Vehicle speeds and traffic volume directly affect the comfort level of many bicyclists. Posted speed limits and average annual daily traffic (AADT) on Muscatine County roads can be seen in Map 1.

The Iowa DOT has set a goal to work toward zero fatalities on the roadway network. According to Iowa DOT crash statistics, an average of 26.7 bicyclists and pedestrians are killed on Iowa roadways each year, in addition to an average of 116.6 who suffer major injuries. Within Muscatine County, a total of 94 crashes occurred between 2008 and 2018 involving bicyclists and pedestrians, the majority of which occurred within the City of Muscatine (see Map 2). A handful of crashes of varying severity happened in outlying rural areas.

Muscatine County is already home to 53.7 miles of separated trail. Much of it is located in the City of Muscatine, which has expanded its Running River Trail System consistently since the previous plan in 2007.

Another 13.5 miles of trail are located on the Hoover Nature Trail (HNT) in the western portion of the county between the cities of Conesville and West Liberty, though not entirely contiguous, namely near the city of Nichols. The HNT shares an alignment with the ADT. The HNT traverses an old Rock Island Railroad bed. It is not paved and is only occasionally maintained. The Iowa Natural Heritage Foundation owns the right-of-way, and in 2016 sold a parcel of land near Burlington Road to help



Source: Bi-State Regional Commission

pay for maintenance on the HNT. Much of the corridor is grassed over and not easily traversed by bicycle. Other intra-park trail networks include those in Wildcat Den State Park, Saulsbury Bridge Recreation Area, and Cedar Bluff Recreation Area.

The cities of Muscatine and Wilton have partnered with Bi-State Regional Commission to conduct trail counts at various locations in the two cities (Map 3). Counters in Wilton were intended to count pedestrians on sidewalks near the elementary and junior-senior high schools. In Muscatine, there was a mix of similar safe route to school counts and traditional trail counts on the city's Running River Trail

System. The highest counts were found across the street from the Wilton schools and along the riverfront in Muscatine, each location counting an average of 125 to 225 users each day. The weather, unsurprisingly, was found to have an impact on usage of the trails. The extent of the impact is not definitive at this point, but large drop-offs can be seen on days with rain and when the high temperature is below 60 degrees.

County residents already utilize rural roadways for longer rides. Many of the roads used by members of the Melon City Bike Club contain and may not require additional facilities, as they carry low volumes of vehicular traffic. However, connections to these facilities often cross heavily used roadways, such as U.S. 61 also known as the Muscatine Bypass. Improving the safety at these crossings was considered in the planning process and was discussed in interviews for this plan.

The City of Muscatine adopted a Complete Streets Policy in 2013. The city council adopted the policy to fulfill a goal from its comprehensive plan in coordination with the city's participation in the Blue Zones Project, which seeks to improve health outcomes across communities based on lifestyle characteristics found in locations around the world where people live especially long lives. The City of Muscatine has undergone several planning processes, described in previous sections, to prepare for and guide future trail developments. While this plan incorporates those findings, more detailed information can be found in the plan documents.

A recurring topic in Muscatine is signage, and specifically how communities develop a consistent wayfinding signage program. The topic of signage is important to let users know their location; where important amenities and destinations are; and what kind of necessities are nearby, namely water, restrooms, trailhead parking, etc. Unique signage also lends itself to local placemaking, and can foster a character for the trail network. The 2015 *Trails Visioning Design Report* by Trees Forever developed two style concepts for the trail system that included the name of the trail, the Muscatine city logo, amenity symbols, and directional arrows to other destinations such as city hall. The report developed a plan for signage, including trailhead, wayfinding, and informational signs. The concepts incorporated local branding and the logos of the ADT and MRT national trails. The concepts developed in the report have not been adopted and deployed, and the city is still considering its options.

Outside of the City of Muscatine, there has been little or no talk of a countywide trail wayfinding system. Uncertainty as to the responsible party for funding, installing, and maintaining signs has led to maintaining the status quo. Currently, numerous routes in the county have "Share the Road" signs, such as along Saulsbury Road and Wildcat Den Road. Mixed traffic routes listed under "Future Considerations" would be ideal candidates for new "share the road" signs if they are not already so designated.

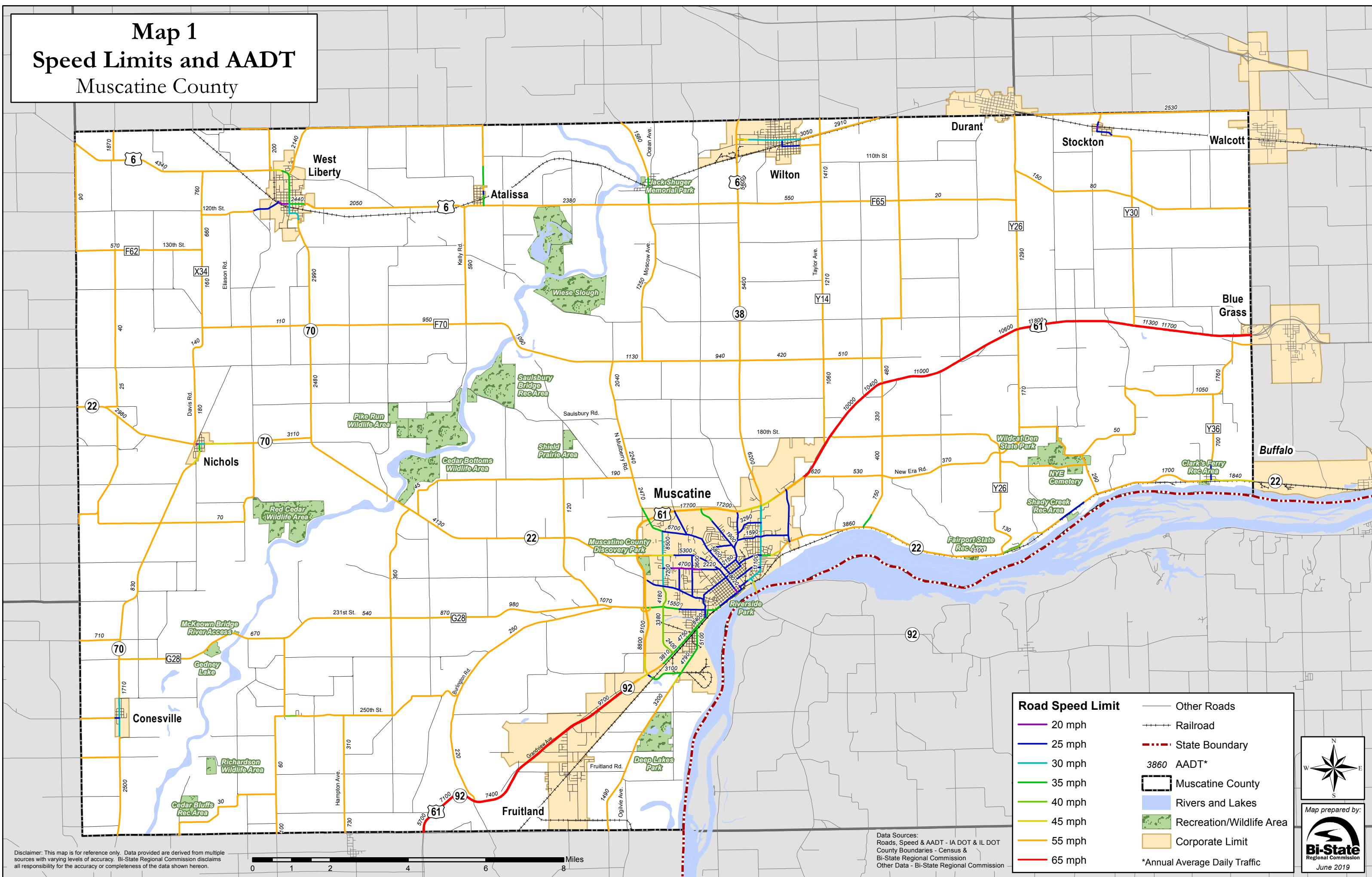


Source: Bi-State Regional Commission

Map 1

Speed Limits and AADT

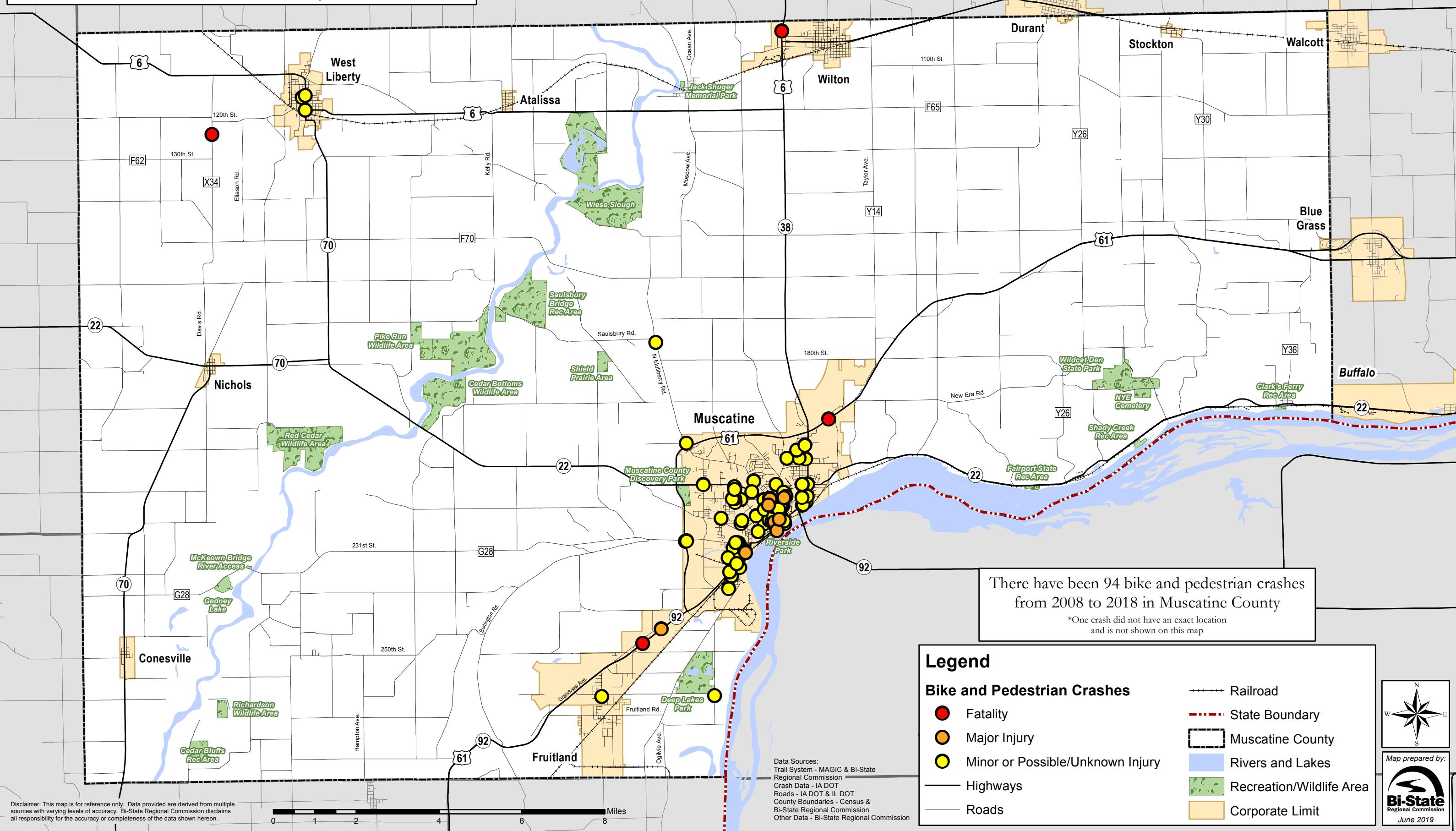
Muscatine County



Map 2

Bike and Pedestrian Crashes (2008-2018)

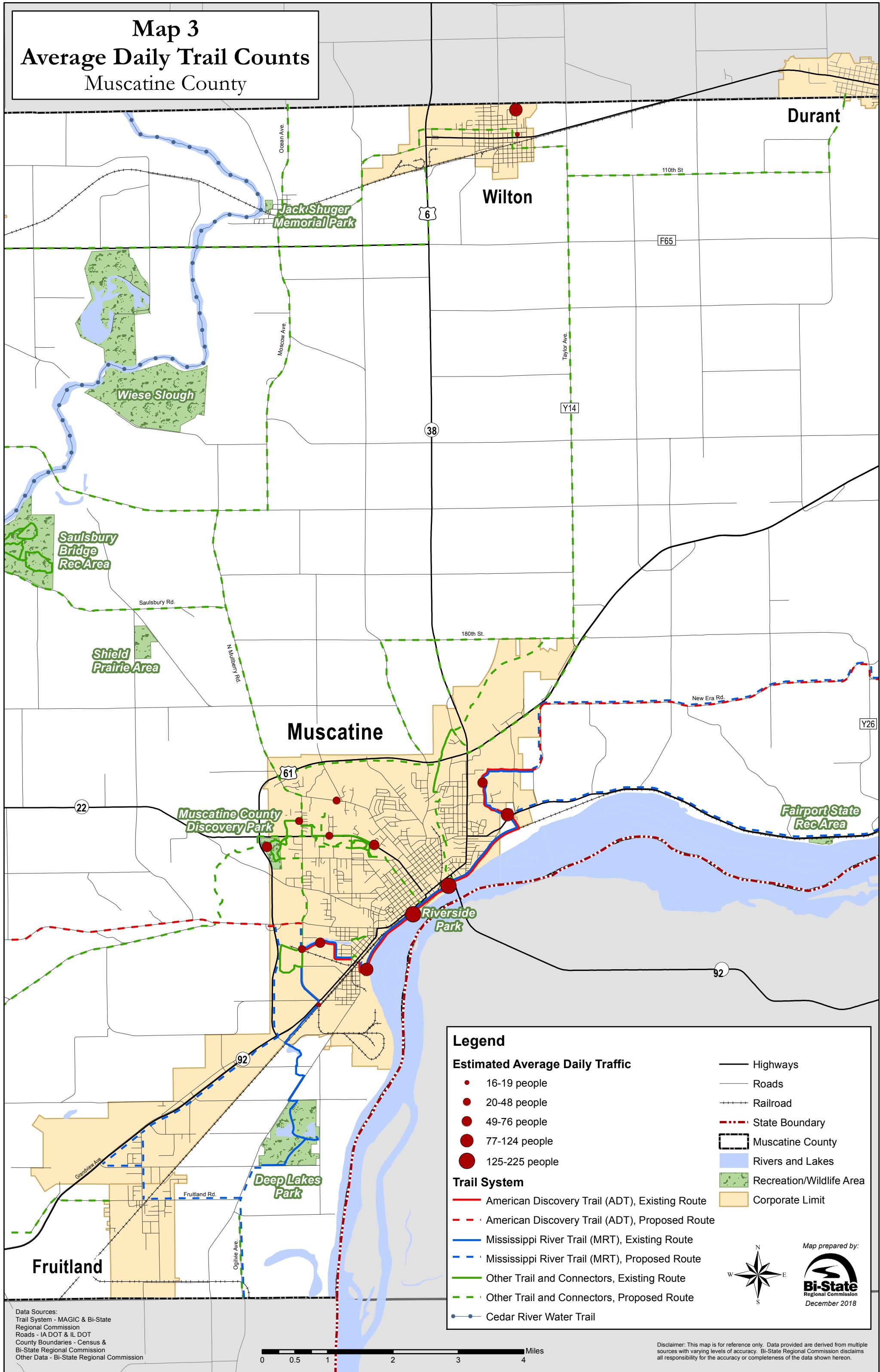
Muscatine County



Map 3

Average Daily Trail Counts

Muscatine County



Federal guidelines and considerations

Since the previous *Muscatine Countywide Trails Plan* was adopted in 2007, the federal government has published multiple reports, research findings, manuals, and other guidance documents for state and local authorities to utilize in their consideration of bicycle and pedestrian facilities. These documents offer technical recommendations for incorporating such facilities on-road and off.

Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations

Signed in March 2010, the Policy Statement declared that USDOT policy was that every transportation agency “incorporate safe and convenient walking and bicycling facilities into transportation projects.” The impetus for this statement came from the desire to promote efficient transportation, as walking and bicycling were seen as very efficient modes of transportation for short-distance trips. Transportation agencies were encouraged to go beyond minimum standards because of the many benefits walking and bicycling provide, including health, safety, environmental, transportation, and quality of life. Actions recommended in the policy included:

- “Consider walking and bicycling as equals with other transportation modes.
- Ensure that there are transportation choices for people of all ages and abilities, especially children.
- Go beyond minimum design standards.
- Integrate bicycle and pedestrian accommodation on new, rehabilitated, and limited-access bridges.
- Collect data on walking and bicycling trips.

- Set mode share targets for walking and bicycling and track them over time.
- Remove snow from sidewalks and shared-used paths.
- Improve nonmotorized facilities during maintenance projects.”

Investment in nonmotorized facilities was seen as addressing numerous USDOT goals, including for cleaner air and more livable communities. This policy statement was followed by many other resources to aid in the development of safe and efficient nonmotorized networks.

Bicycle and Pedestrian Facility Design Flexibility Memorandum

This memorandum, released in August 2013, clarified that a flexible approach to facility design would be allowed by the USDOT. It lists four separate guides that could be resources in “planning, designing, and operating bicycle and pedestrian facilities.” Namely, the guides included:

- The American Association of State Highway and Transportation Officials (AASHTO)
 - Guide for the Planning, Design, and Operation of Pedestrian Facilities (2004)
 - Guide for the Development of Bicycle Facilities (2012)
- The National Association of City Transportation Officials (NACTO)
 - Urban Bikeway Design Guide (2010)
- The Institute of Transportation Engineers (ITE)
 - Designing Walkable Urban Thoroughfares: A Context Sensitive Approach (2010)

Incorporating On-Road Bicycle Networks into Resurfacing Projects

The purpose of this workbook is to provide transportation agencies case studies, best practices, considerations, and recommendations to create connected bicycle networks in an efficient and cost-effective manner. Restating the federal support for bicycling, the guide offers support for the inclusion of bicycle facilities in urban and rural settings. The workbook details the planning required to deliver bicycle facilities as part of larger resurfacing projects, noting that extra design work and public outreach may be needed. Adequate time must be provided when including bikeways in such projects. The FHWA, as noted above, supports design flexibility when including bicycle facilities, and a variety of guidance documents can support decision-making in resurfacing projects.

Small Town and Rural Multimodal Networks

The *Small Town and Rural Multimodal Networks* guide provides a framework for this plan, as noted in the Definitions section. With examples from across the country, the guide provides a resource for transportation agencies to address conditions unique to rural areas and encourages innovation in network development. The guide offers design information on multiple facility types categorized into three groups: mixed traffic routes, visually separated facilities, and physically separated facilities. Based on conditions such as speed and volume, roadway functional classification, and land use, transportation agencies may make informed decisions on which, if any, bicycle and pedestrian facilities to include on their roadways.

Future considerations and performance goals

The 2007 plan placed priority on national trail routes, namely the ADT and MRT. This plan also seeks to prioritize the two national routes. Their significance was reaffirmed in May 2019, when the Rails to Trails Conservancy chose a similar alignment as the ADT for their Great American Rail Trail (GART). The GART identified a continuous route from Washington D.C. to Washington State. The route in Muscatine County follows IA 22 from the Scott County line to Wildcat Den Road where it splits, just as the ADT does, to either continue on IA 22 or take the quieter New Era Road above the river valley. Once in Muscatine, users ride the Running River Trail System to Hershey Avenue, which continues west to meet up with the HNT.

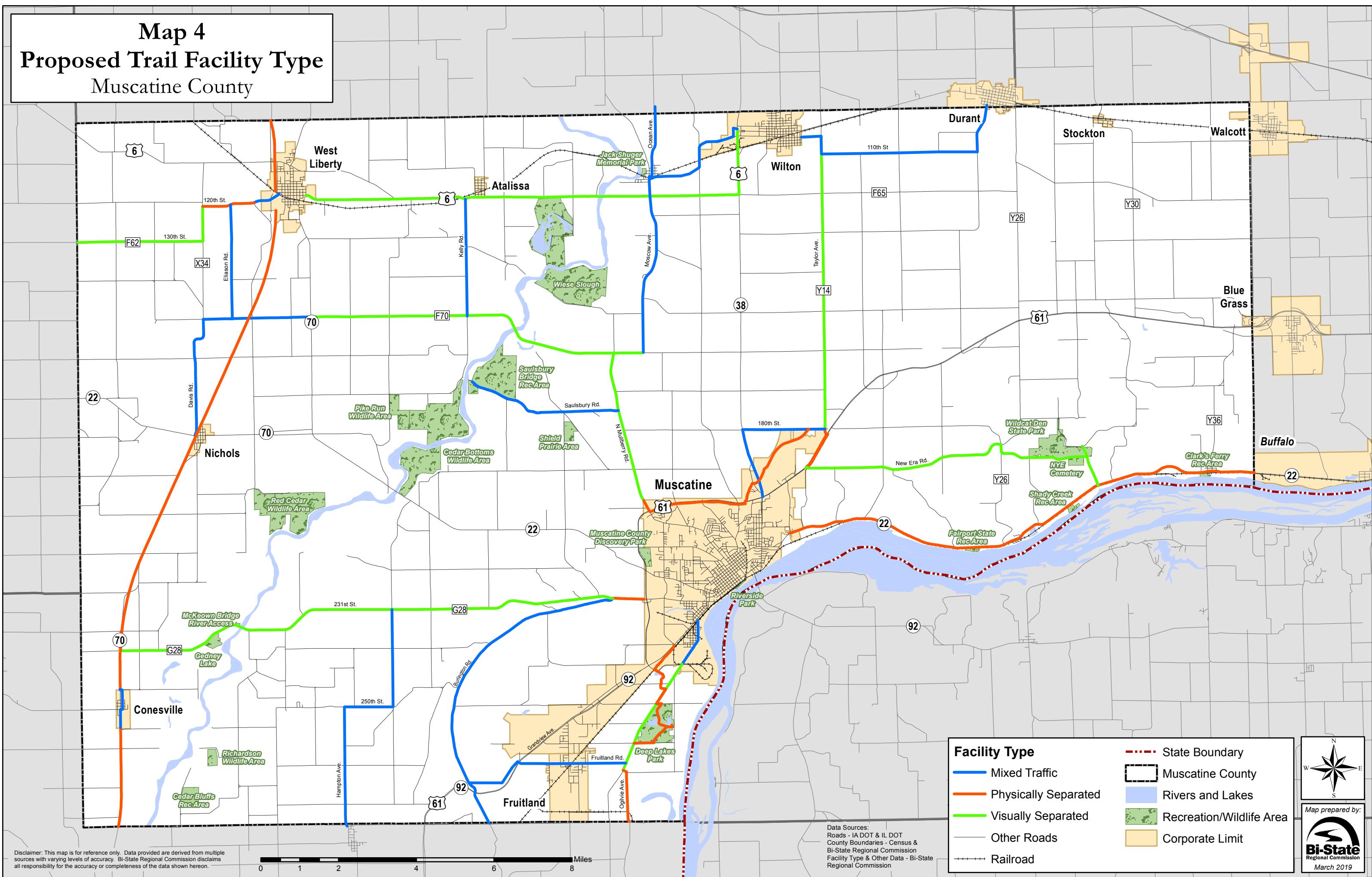
Implementation of the GART requires the incremental improvement of trail networks along the route. As such, the implementation of this plan in general will require the long-term incremental improvement of roadways and trails to serve bicyclists and pedestrians appropriately. One by one, each added facility will improve the environment for alternative transportation and recreation in the county. Tying into national trail routes increases the ability to access them, thereby adding to their utility. The national routes bring a level of exposure to the trail network as a whole, and act as promotional efforts to increase trail awareness and usage.

The goal of this plan is to promote a countywide trail network with the three

national trail systems, namely the ADT, MRT and GART, as its backbone. Connecting into that main stem will improve the overall system performance, while improving access to county facilities, parks, and other amenities that benefit the users of the network. Trail amenities are occasionally overlooked in the development of a multimodal transportation and recreation system. Bathrooms, drinking fountains, trash receptacles, benches, and other essential amenities allow for a more comfortable experience for people of all ages and abilities. Conveying these and other amenities, through various media such as paper or online maps and wayfinding signage, is often as vital as depicting the locations of trails themselves.

Proposed trail facility types and the proposed countywide trail system are depicted in Maps 4 and 5 respectively. Trail facility types are shown as mixed traffic routes, visually separated routes, and physically separated routes. Each is described in more detail below. Some trail corridors within some communities, namely Muscatine, Wilton, and West Liberty, are now shown on the map for the sake of cartographic clarity. Decisions on the type of trail facility will be determined through further corridor studies. Map 5 depicts the ADT and MRT routes through the county and the local and regional connectors that provide access to them. The numbered routes listed below, organized by facility type, correspond to facilities on Map 5.

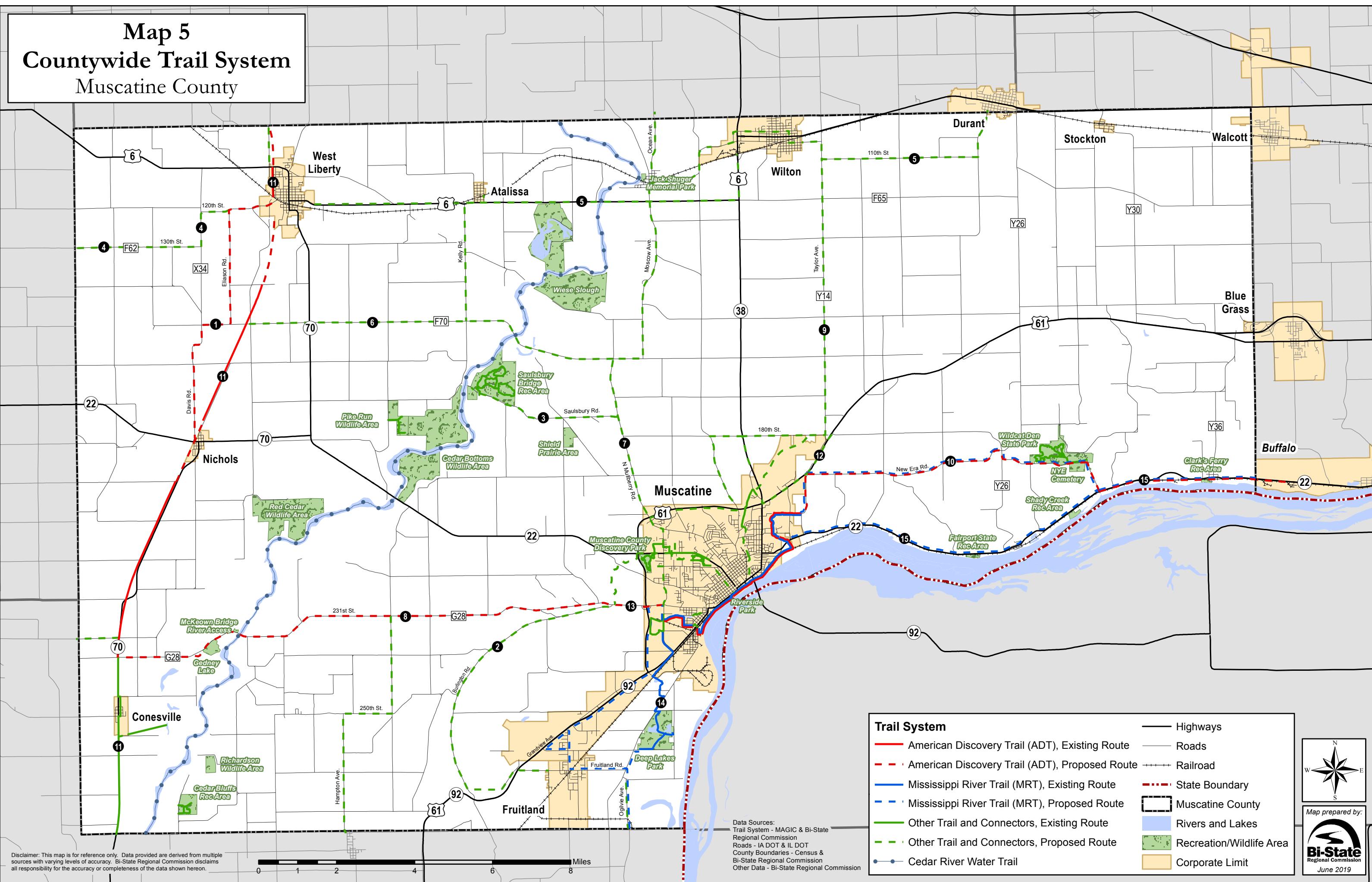
Map 4
Proposed Trail Facility Type
Muscataine County



Map 5

Countywide Trail System

Muscatine County



Mixed Traffic Routes

This plan offers 22.54 miles of trail routes on mixed traffic facilities. These routes generally have low motor vehicle volumes and/or speeds, and are characterized by different modes of traffic utilizing the same space. The *Rural Design Guide* recommends speeds no higher than 30 mph for mixed traffic facilities and no more than 3,000 vehicles per day. Rural town roadways often provide safe and convenient bicycle facilities. Additional amenities such as bicycle wayfinding signage and “Share the Road” signs may be needed, but costs and impact on adjacent land uses are typically minimal.

Wayfinding signage can also sometimes be combined with unique design elements, such as those proposed in the 2015 Trees Forever *Trails Visioning Design Report* for the City of Muscatine.

1. Northwest Muscatine County

Mixed traffic facilities proposed between Nichols and West Liberty are located on gravel roads. While gravel is not a surface many bicyclists prefer to ride on, some, however, enjoy the very low volume of traffic and often scenic, bucolic character of the routes. The proposed facilities on Davis Road, CR (County Road) F70, and Eliason Road were offered as an alternative route to the ADT and HNT that runs through the western part of the county.

A short on-road connector from West Liberty westward is proposed to follow W. Prairie Street from Railroad Park at W. 4th Street. The 0.7-mile-long connection will link with a separated trail or a paved shoulder approximately 1.3 miles in length. The facility will change to a visually separated route, turning south on CR X34 for 1 mile, then heading west to link with

the paved shoulders on Sand Road in Johnson County.

2. Burlington Road

West of the City of Muscatine, Burlington Road arcs with the bluff line surrounding the wide, flat valley known as Muscatine Island. The roadway corridor offers cyclists a quiet route flanked by a bluff ranging from 150 to 200 feet on one side and fertile farmland on the other. The route could loop in to other facilities in the southern portion of the county, namely the MRT near Deep Lakes Park. While speeds on the road are posted at 55 mph, AADT reaches only 200-250 vehicles per day.

3. Saulsbury Road

The last mixed traffic route provides access to the Saulsbury Bridge Recreation Area from Mulberry Road. The park's 675 acres are maintained by the Muscatine County Conservation Board and includes scenic views of the Cedar River, creeks, wetlands, forested areas, a handicapped accessible fishing dock, boat ramps, camping, and more. Access to the Cedar River is available at the site, which could provide support facilities for users of the Cedar River Water Trail.



Source: Bi-State Regional Commission

Visually Separated Routes

Bicycle and pedestrian facilities that are visually separated from traffic with roadways markings and/or buffer striping. The visual separation of bicyclists and pedestrians from vehicular traffic improves safety for the roadway's vulnerable users. Delineated space allows roadway users their own portion of right-of-way. Visually separated routes can be implemented on most roadway types, including local roads, collectors and rural highways. Preferred traffic speeds range from less than 30 mph to 55 mph.

This plan proposes 62.88 miles of visually separated routes, largely located on rural roadways as paved shoulders. The Iowa DOT and the county engineering department include paved shoulders on road resurfacing projects. Occasionally on county roads, there may not be enough right-of-way to allow for the full 4-foot requirement for bicycle facilities and 8-foot recommendation. Paved shoulders offer other benefits in addition to providing for a bicycle facility. Maintenance costs are less on roads with paved shoulders. Truck winds damage the edges of roads, and paved shoulders provide more protection than gravel. Another benefit of paved shoulders is the enhanced safety of the roadway with rumble strips. Rumble strips indicate to drivers that they are veering out of the travel lane. This proven safety countermeasure decreases single vehicle run-off-road crashes common on rural highways. However, rumble strips represent a hazard to bicyclists if they are not installed with gaps so that bicyclists can enter and leave the shoulder to avoid obstacles such as debris. Likewise, farmers driving large farm equipment generally prefer roads without rumble strips.

The *Iowa Bicycle and Pedestrian Long Range Plan* provides the following discussion on the cost per mile of paved shoulders:

“Based on cost data retrieved from projects completed during the past two to three years, it costs approximately \$25,000 per mile to add 1 additional foot of paved shoulder width as part of a 3R [Resurfacing, Restoration, or Rehabilitation] project. Historically, the majority of 3R projects in Iowa include shoulder work, which is understood as typically adding paved shoulders of widths commensurate with the traffic volume of the roadway. Therefore, the marginal cost for accommodating bicyclists on rural roads as part of 3R projects is typically \$50,000 per mile (the cost of 2 feet of HMA [hot mix asphalt] on each side of the road). This assumes adequate granular or earthen shoulder width exists or would otherwise be provided as part of each 3R project, which is largely in keeping with Iowa DOT practice.”

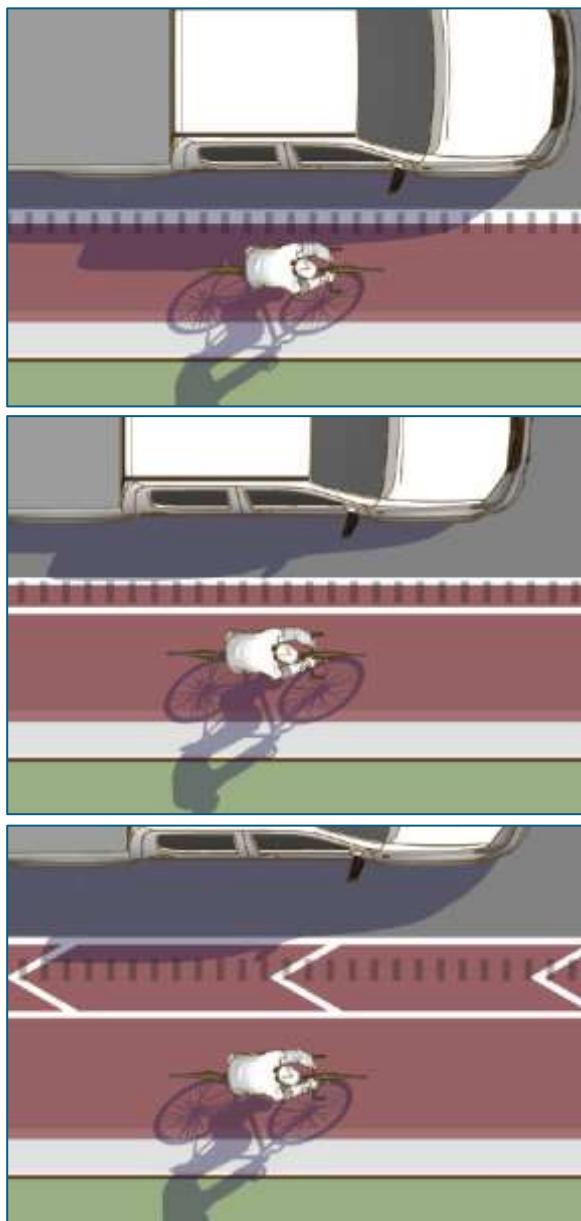
4. F62/X34

Travelling west from West Liberty on W. Prairie Street, cyclists reach the intersection of 120th Street and CR X34/Davis Avenue. The route turns south for approximately one mile, then continues west on CR F62. Approximately 10 miles west on F62, bicyclists may link to existing paved shoulders along CR W66 in Johnson County, which tie into the Iowa City regional trail network.

5. U.S. 6

Along the northern tier of Muscatine County, U.S. 6 connects the communities of West Liberty, Atalissa, and Wilton. With a speed limit of 55 mph and an AADT

approximately between 2,000 and 5,500, widened shoulders with increased buffer space is preferred. This could be achieved potentially with a combination of paved shoulder, rumble strips, and additional white lines delineating the shoulder. Examples of these can be seen in the following images.



Source: Federal Highway Administration, *Small Town and Rural Multimodal Networks*, 2016.

East of Wilton, a mixed traffic facility on 110th Street may be utilized to reach Durant. The Iowa DOT does not have traffic counts on this roadway, but it can be assumed that the route carries low volumes of traffic. Additional paved shoulder facilities are anticipated to be complete between Durant and Walcott in FY2020.

6. *F70*

CR F70 offers a crossing of the Cedar River north (upstream) of the Saulsbury Bridge Recreation Area. The rural road with approximately 1,000 AADT links Mulberry Road coming north from the City of Muscatine to the HNT in the west. Access across the Cedar River may allow redundancy in trail crossings with the CR G28 crossing in the southern portion of the county. While the southern route carries the ADT designation, the F70 corridor allows for easier access to Saulsbury Bridge's campgrounds, which may appeal to touring bicyclists.

7. *North Mulberry Road*

The county added paved shoulders to curves on North Mulberry Road in the early 2000s. Local officials indicated that this stretch of road sees quite a few bicyclists and other non-motorized use, and could be a candidate for improved infrastructure. Mulberry Road provides access to the City of Muscatine's planned trail network. Currently, the northwestern extent of city's trail network is just north of Cedar Street on Houser Street, connecting to Fuller Park near Muscatine Power and Water. Overcoming the Muscatine Bypass (U.S. 61) is a significant barrier due to the road's high speeds for an urban area and traffic counts, about 17,000 AADT. If a safe crossing can be developed, access between the City of Muscatine and the northern parts of the county will improve.

8. Hershey Avenue/G28 (ADT)

Within the City of Muscatine, the ADT and MRT split and continue in different directions. The ADT runs west from the city, following Hershey Avenue through an underpass of the Bypass. A small section of separated trail exists beginning at Newcomb Boulevard and running approximately one-half mile west as Hershey Avenue becomes CR G28. Additional ADT signage may be warranted to inform bicyclists and motorists of the roadways designation. The route crosses the Cedar River near the McKeown Bridge River Access, allowing users direct access to the Cedar River and the Cedar River Water Trail. Just to the west of the bridge is Gedney Lake in the Cedar River floodplain, which offers interesting natural amenities, such as unique-in-Iowa reptile and amphibian populations, wetlands, fishing areas, and an old highway bridge converted for pedestrians. The western terminus of the proposed paved shoulder is the HNT, which runs parallel to IA 70. AADT on the route is approximately 600-1,000 vehicles per day.

9. Y14

The need for north-south access points between the City of Muscatine and the rest of the county was indicated by numerous participants of the planning process. One such route could be CR Y14, which runs south from the east side of Wilton to U.S. 61 on the northeast side of Muscatine. As Y14 does not directly connect to other trail infrastructure, a safe crossing on U.S. 61 must be found. As such, a small segment of separated trail is proposed and discussed in more detail below. This route on Y14 is preferable to the parallel route of IA 38 due to the higher AADT, approximately 5,500 vehicles per day, and

truck traffic, approximately 600-700 trucks per day.

10. New Era Road (ADT/MRT)

A vital connection for the ADT and MRT between Muscatine and the Quad Cities, New Era Road offers a low-volume route of between 300 and 600 vehicles per day for distance cyclists. The route offers access to Wildcat Den State Park in the eastern part of the county. New Era Road is a parallel alternative to IA 22, discussed following, which runs adjacent to the Mississippi River. An improved facility on Solomon Avenue, just before New Era Road intersects with U.S. 61, which is currently a gravel road, is proposed by the City of Muscatine to connect with the eastern terminus of the city's trail system at Keener Road.

Physically Separated Routes

The highest level of service for bicyclists and other nonmotorized roadway users are physically separated from the roadway entirely. Modal separation increases comfort and safety of nonmotorized road users. However, the separation comes at a cost, which must be weighed with budget constraints and other priorities around the county. This plan includes 41 miles of physically separated trail routes, which includes existing and proposed sections.

11. Hoover Nature Trail (HNT)

The longest stretch of trail infrastructure outside the City of Muscatine, the HNT sits atop a former Rock Island Railroad track bed and is the designated ADT route in western Muscatine County. Running north-south, it connects the cities of Conesville, Nichols, and West Liberty. The right-of-way continues north to West Branch and south toward the Muscatine-Louisa County line. The HNT is owned by the Iowa Natural

Heritage Foundation. The trail is not contiguous throughout the county. It is notably absent through Nichols, where local leaders indicated a desire to connect to the trail. Much of the trail's length is grassed and can be overgrown at times. The Natural Heritage Foundation is committed to maintaining the developed trail between Conesville and West Liberty. In 2018, the foundation sold several landlocked and undeveloped parcels of land west of Muscatine to help fund maintenance of the trail.

12. U.S. 61 right-of-way

Between CR Y14 and New Era Road, a connecting segment of approximately one mile will be needed to safely access the northern areas of the county. Traffic speeds and volumes are high enough to warrant full separation of modes. The connection will allow for a northern spur of the ADT from New Era Road. A safe crossing of U.S. 61 would improve the comfort and security for nonmotorized roadway users.

13. Hershey Avenue/G28 (ADT)

Extending west from the City of Muscatine, Hershey Avenue/G28 is the gateway for ADT riders coming from the west. A short section of separated trail exists near the underpass of the Muscatine Bypass. This portion of separated trail may connect to the West Side Trail that links Kent Stein and Discovery Parks. Outside of the urban area, the separated trail currently yields to a shared road facility. The route is recommended to be improved with a visually separated facility.

14. MRT, southern leg

In 2017 and 2018, the Muscatine trail network was extended from Kent Stein Park along Houser Street and Grandview

Avenue to connect to the new Deep Lakes Park south of Muscatine. The MRT now extends through Muscatine to Deep Lakes Park. South of the park, trail planners and supporters have discussed routing to the Louisa County line. Major industries sit at the river's edge, preventing direct access to the Mississippi. Partnerships with these industries may provide viable route alternatives, and flexibility in deciding the route may be required in the future. Nevertheless, a separated trail is proposed on Ogilvie Avenue to continue the MRT to Louisa County.

15. MRT, eastern leg/IA-22

The goal of the MRT is to offer trail facilities as close as practicable to the river. The IA 22 corridor presents a natural opportunity to provide riders a close-up view of the Mississippi River for much of its length between Buffalo and Muscatine. While numerous portions of the corridor have issues with right-of-way and topography, the long-range vision of the MRT recommends that the IA 22 corridor add a separated trail facility to provide the highest level of service on this national trail route. The proposed trail passes through the communities of Montpelier and Fairport, and provides access to numerous riverfront recreation areas and camping facilities.

Cedar River Water Trail

The Cedar River winds approximately 30 miles through Muscatine County. The Iowa Department of Natural Resources produced the *Lower Cedar River & Black Hawk Creek* paddling brochure to provide practical information for people using the river. The Muscatine County portion of the river provides paddlers with a naturally flowing, dam-free paddling experience. Local input, however, mentioned the prevalence of snags and other obstructions in the river, in

addition to the river's ever-changing conditions. Nonetheless, the county has numerous river access points, namely at Jack Shugar Memorial Park, Saulsbury Bridge Recreation Area, and McKeown Bridge River Access, and improving river access and amenities would benefit the overall trail and recreational infrastructure in the county.

Implementation strategies

The 2007 *Muscatine Countywide Trails Plan* identified potential avenues for funding the

recommendations laid out in the plan. The discussion below is based on those recommendations, updated with new information and opportunities. The 2018 *Iowa Bicycle and Pedestrian Long Range Plan* provided "typical per mile cost estimates for multi-use trails based on historic costs in Iowa." The table below is adapted from Table 5.2 in the *Long Range Plan*.

Table 1

Facility Type	Typical Cost per Mile	Modification Factors
New paved multi-use trail on independent alignment, 10' wide	\$400,000	Former RR grade 0.5 Flat terrain 0.6 Rolling terrain 1.0 Hilly terrain 1.2 Along stream bank 1.2 Densely developed area 2.0
New paved sidepath, 10' wide	\$300,000	Along urban roadway 1.0 Along rural roadway 1.6 Densely developed area 1.4
Unpaved multi-use trail	\$200,000	Former RR grade 0.6 Flat terrain 1.0 Rolling terrain 1.2 Hilly terrain 1.4

Implementation of prospective trails and trail connections identified in this plan will require subsequent planning and engineering work. In general, trail development will consist of more in-depth routing and alignment studies, determination of possible impacts along preferred corridors, engineering plans and specification, identifying potential funding sources and actual construction. The following discussion attempts to analyze the ways in which the various financial methods can be used to implement the plan. Actual use of these possible sources

is dependent upon current and future policies adopted by the county.

Current Revenues

The main advantage of financing trail projects from current revenues is that it is less expensive in the long run, because interest charges can be eliminated. Financing from current revenues is the most appropriate when expenses are of a recurrent nature, which unfortunately is not the normal situation with regard to trails. Costs for on-going maintenance and unforeseen repairs need to be considered

through a separate trail operations and maintenance fund or included as a line item in the responsible entity's annual budget.

Borrowing

In some cases, deficit financing can be used to fund trail construction and improvements. The sale of bonds to be paid back with future revenues can provide for the construction of trails in those instances where existing needs exceed current revenues. In addition, bond financing provides equitable means by which the cost of trails can be shared by both present and future users. The disadvantage of financing trail improvements with the sale of bonds is the amount of potential funds lost in the payment of interest charges.

Gifts and Trusts

Another method for financing the development and possibly the long term up-keep and operation of a trail, or system of trails, is through land or monetary donations and endowments. Trusts may provide additional methods for financing the development and maintenance of trails. Trust funds have played an important role in providing and maintaining facilities in various communities across the nation.

Grants-In-Aid

To assist local governments and private individuals in the development of multi-purpose trails, the federal and state governments have instituted various financial cost-share programs. Below are descriptions of some of the more commonly used funding assistance programs. There may also be regional or local groups, clubs, not-for-profit organizations, trusts, and corporate funding assistance available for various projects.

Federal Recreational Trails Program

The Federal Recreational Trails Program funds up to 80% of eligible project costs for recreational trail construction for motorized and non-motorized use, trail maintenance or restoration, or trailhead facilities among other projects. Federal, state, and local governments as well as non-profit organizations are eligible to apply. Grants are awarded annually.

State Recreational Trails Program

The State Recreational Trails Program operates similarly to its federal counterpart. State and local governments and nonprofit organizations are eligible to apply for and receive funds. The program funds up to 75% of project costs and are awarded on an annual basis.

Transportation Alternatives Program

(TAP)/Transportation Alternatives Set-Aside (TASA)

Federal transportation funds are set aside for the development and promotion of alternative transportation options, such as bike and pedestrian infrastructure, and development of streetscape beautification. The statewide program (TAP) is focused on statewide and multiregional projects. Local projects may apply for Region 9 Transportation Alternatives Set-Aside (TASA) funds administered by Bi-State. Grants are awarded up to 80% of total project costs.

Iowa Resource Enhancement and Protection (REAP)

The IA DNR administers this grant program to preserve and enrich natural areas throughout the state. Strong REAP trail project applications have highlighted connections to the environment and natural areas that the trail runs through. REAP provides up to 100% of project costs, with maximum grant awards based on

population. Projects are awarded annually through a regional and statewide scoring process.

Iowa Clean Air Attainment Program (ICAAP)

Bicycle and pedestrian facilities and programs are eligible projects under the ICAAP program when they promote bicycling and walking for commuting purposes. The federal Congestion Mitigation and Air Quality Improvement (CMAQ) Program helps states finance transportation projects and programs that result in attaining or maintaining the National Ambient Air Quality Standards (NAAQS). Awards require a 20% match.

Iowa Snowmobile Trail Grant Program

Since 2017, the Iowa State Snowmobile Association administers the Snowmobile Trail Grant Program for the IA DNR. Incorporated, private organizations, cities, and counties can apply for financial assistance for trail signs, fencing, trail groomers, temporary and permanent bridges, and other trail-related expenses. Applications are due annually by May 1.

All-Terrain Vehicle (ATV) Grant Program

Local governments and incorporated private organizations can apply for funding to acquire or develop ATV trails and parks for public use. The program is funded from vehicle registration fees on ATVs and administered by the IA DNR. Grant applications are due annually by February 1.

Other Potential Sources

There are some other possible funding sources. These include but are not limited to, area service clubs, area wide support groups, not-for-profit organizations, and foundations. Volunteers can play an important role in maintaining and operating a viable trail system. Trails should be included as a component of new developments. This can be accomplished through various types of land dedication ordinances, subdivision codes, dedicated easements, land set-asides, or proffers. Multi-jurisdictional cooperation and cost sharing in the design and development of projects serving more than one community or area has proven to be advantageous. Unified projects not only offer potential cost benefits, they typically strengthen the project application for funding assistance.

Plan Summary

Incremental additions to the Muscatine County trail network will likely offer the most efficacious strategy for development. Maintenance of the existing system, however, will remain paramount in order to sustain user interest in the network. Rural areas in general pose challenges and opportunities to developing trail networks as described in the *Small Town and Rural Multimodal Networks* guide. For instance, the distances between destinations are most often longer than in urban areas. However, small rural communities often offer a “compact center well suited for walking and bicycling trips.”

Multiple agencies and municipalities must work cooperatively to achieve the vision of a well-connected trail network in Muscatine County. Agencies include Muscatine County, cities in the county, the

Iowa DOT, the Iowa Natural Heritage Foundation, and other nonprofit and civic oriented groups. The Iowa DOT in the *Iowa Bicycle and Pedestrian Long Range Plan* adopted a Complete Streets Policy, which was noted as “the most important recommendation of this plan.” The state shall consider multimodal options on DOT projects, “including new construction, reconstruction, and 3R (resurfacing, restoration, or rehabilitation) projects.” This incremental approach to improving the environment for bicyclists and pedestrians, which will require periodic updating, provides an example for other agencies to develop the trail system in the county in a cost efficient manner that, in time, will result in a connected and effective network for residents of and visitors to Muscatine County.