# Table of Contents

Acknowledgements........................................................................................................... x
Key Findings.......................................................................................................................... x
Introduction............................................................................................................................ x
Iowa Data Bike........................................................................................................................ x
State of the Trails..................................................................................................................... x
Trail Roughness..................................................................................................................... x
Segment-by-Segment Ratings............................................................................................... x
Acknowledgements

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Key Findings

• Of trail segments collected in 2017, 86 percent are in good condition with smooth or very smooth surface conditions.

• Level 1 regional trails have limited poor condition segments. Overall, they are performing with smooth and very smooth surface conditions.

• Of trail segments collected in 2017, only 3 percent are in rough condition.

• Local connector trails are more likely to be in fair or rough condition.
Introduction

Central Iowa is home to more than 600 miles of shared use trails connecting urban centers with natural rural landscapes that show the beauty of the heart of Iowa. Trails in Central Iowa continue to be an important quality of life aspect for thousands of residents every year by providing recreational opportunities accessible to all ages. More recently, the trails have been leveraged as a tool to generate additional tourism through events like the BaCoon Ride along the Racoon River Trail.

This extensive trail system continues to grow and evolve as missing links in the trail system are constructed by local communities, county conservation boards, or collaborations between local partners. Each year the Des Moines Area MPO provides trail projects with funding through state and federal programs to fill gaps within the trail system. As more Iowans embrace bicycling for both recreation and daily transportation, the Central Iowa trail system will continue to see use throughout the year.

While the network of trails expands, the existing trail network is starting to mature and soon spending priorities will require a greater focus on the maintenance of existing trails. Currently, when trail maintenance is required local governments utilize field investigations to determine the condition of trail segments they plan to maintain. The field investigation process can be time consuming as not all trail segments are readily accessible by road.

Connection to Mobilizing Tomorrow

In 2014, the Des Moines Area MPO completed the update of the long-range transportation plan for the Greater Des Moines Area called Mobilizing Tomorrow. This plan provides the goals for the transportation network to the year 2050. Goal 2 of Mobilizing Tomorrow is to “manage and optimize the transportation infrastructure and services” within the region.

Currently, the MPO utilizes pavement condition data collected for the entire street network to provide a regional review of the investment necessary to maintain the current condition of the roadway network.

Photo courtesy of MPO staff.
The Des Moines Area MPO seeks to support long-range planning of trail maintenance by providing data to make performance-based decisions on prioritizing trail maintenance.

The Central Iowa Trail Condition project was created to fill this information gap within the Central Iowa trail system. It intends to:

- Develop a bike-based data-collection vehicle to improve the efficiency of collecting data on the extensive trail network.
- Create an inventory of condition data for all paved trails within Central Iowa with a focus on trail roughness and geo-located photos of trail surfaces.
- Provide data to local agencies, consultants, and the public to inform a long-term maintenance strategy for the Central Iowa trail network.
- Make the project replicable and promote the project to expand knowledge regarding approaches to collect trail condition data.

Central Iowa Trails

The beginning of the Central Iowa trails network started with the Bill Riley Trail, now known as the Neal Smith Trail. Since the late 1970’s, local community leaders and organizations have pushed for trails within and connecting their communities. This leadership is still seen today as a majority of trails are managed by local agencies rather than state agencies.

In 2004 the Central Iowa Bicycle-Pedestrian Roundtable was formed to further develop bicycle and pedestrian facilities in central Iowa. The Bike-Ped Roundtable encompasses the planning areas of the MPO, the Ames Area MPO, and the Central Iowa Regional Transportation Planning Alliance (CIRTPA). The mission of the Bike-Ped Roundtable is “to facilitate the development, maintenance, and promotion of a world-class commuter and recreational trail system in central Iowa.”

This group assisted the Des Moines MPO staff to created Central Iowa’s first bicycle and pedestrian action plan, CONNECT: Central Iowa Bicycle and Pedestrian Transportation Action Plan 2020. This plan includes projects, programs, and policies on bicycle and pedestrian transportation in upcoming years. Additionally, it includes the breakdown of four Trail Level of Significance Classifications. They are as follows:

**Level 1: State Significance**

Must first meet all of the criteria described in Level 2. Must span two or more counties and be recognized by the State of Iowa/Iowa Department of Transportation as a Level 1 Trail. A decisive knowledge of the trail boundaries must exist. Alternatively, must receive approval by the Central Iowa Bicycle-Pedestrian Roundtable.

**Level 2: Regional Significance**

Must first meet all of the criteria described in Level 3. Must exist in two or more city or county jurisdictions. Must connect places, streets or trails of significance to the central Iowa region. Alternatively, must receive approval by the Central Iowa Bicycle-Pedestrian Roundtable.

**Level 3: Jurisdiction Significance**

Must first meet all of the criteria described in Level 4. Must be a minimum of 8 feet in width. Must connect places, streets, or trails of jurisdictional significance. Alternatively, must receive approval by the Central Iowa Bicycle-Pedestrian Roundtable.

**Level 4: Local/Neighborhood Significance**

Must meet the minimum criteria to be designated as a Shared-Use Path, Bicycle Lane, or Bicycle Route, as specified in the Manual on Unified Traffic Control Devices.

Today, Iowans and visitors continue to enjoy trails and what they provide for communities. The demand for trails and better connectivity between individual trails persists. As the Central Iowa trail system continues to grow, it will be important to create a reliable procedure to conduct condition assessments in order to maintain a high quality network and locate gaps in the network.
Iowa Data Bike

A primary objective of the Central Iowa Trails Condition project was to develop a bike-based data-collection vehicle to improve the efficiency of collecting data on the extensive trail network.

Using an electric-assist bicycle, an iPhone, an app designed to detect pavement roughness, and a pair of cameras, the Des Moines Area MPO created a tool to efficiently collect data to evaluate trail condition. The “Data Bike,” a moniker provided to the bike, was able to provide a consistent speed for data collection regardless of terrain as the electric-assist bicycle provided the rider additional power while pedaling.

The Data Bike uses three main components to collect data.

1) The rRuf app on the iPhone collected accelerometer data to produce a segmented Class 3 response based roughness condition rating.

2) A GoPro camera mounted at the rear of the bike provided geo-located photos of the trails.

3) A Samsung Gear 360 mounted above the rider’s head provided imagery used for Google Street View.
State of the Trails

During the summer and fall of 2017, the MPO with the assistance of INHF collected approximately 400 miles of smoothness data, over 100,000 photos of the trail surface, and more than 2,700 photos for Google Street View.

The data collected to date provides evidence that the regional trail network in Central Iowa is in good condition with 86 percent of trail miles in smooth or very smooth condition. While these trails may have intermittent cracking, maintenance has need completed to keep trail users on a smooth surface.

The photos collected on the trails provide a snapshot of the experience available to residents and tourists. As previously stated, the trails provide a link between the urban cityscapes and the rolling rural landscapes. Trailheads in towns throughout the region highlight the investment in ammenities that make Central Iowa a cycling destination.
**Trail Roughness**

The accelerometer data collected by the Data Bike indicated significant changes in the smoothness of the trail segment. Using the accelerometer data, the trails can be categorized into five roughness categories. The photos to the right illustrate roughness conditions for each of the five levels.

**Very Smooth** -
Very smooth trails have nearly no cracking or vegetation growing on the trail. Variations in smoothness can be caused at seams between concrete or other material spread across trail.

**Smooth** -
Smooth trails are typically in good condition, but are beginning to show signs of cracking. Cracking on smooth trails generally does not create discomfort for the rider.

**Fair** -
Trails in fair condition are beginning to show increased wear typically have more cracking. Cracking on trails in fair condition cause minor discomfort for riders.

**Rough** -
Trails in rough condition are showing advanced cracking with vegetation growing through the surface. These cracks are typically wider and deeper than cracks along fair conditioned trails and can cause discomfort for riders.

**Very Rough** -
Very rough condition trails have cracking similar to trails in rough condition, but also have vertical displacement of the trail surface. Very rough conditions on trails may be avoidable by the rider, but if traversed can cause discomfort.
Level 1 Regional Trail Condition

Note: Based on percent of milage collected in 2017
Downtown Trails & Connector Trails

Miles
Regional Class
Maintenance Jurisdiction
Surface Type
Width

1
2
3
4
5

DRAFT