



**COMPASS**  
COMMUNITY PLANNING ASSOCIATION  
of Southwest Idaho

*Working together to plan for the future*

# 2023 Data Bike Report

Report Number 06-2024

February 2024

# COMPASS and Active Transportation

Active transportation's definition originally stems from being powered by human energy. While that remains true, the 21<sup>st</sup> century has witnessed numerous technological advances in this form of transportation. E-bikes and e-scooters, collectively known as micromobility, now fall under this category. Although assisted with electric power, these modes of transportation introduce an element of human experience not typically found when relying on automobiles.

The Community Planning Association of Southwest Idaho (COMPASS) engages with all modes of transportation, recognizing their significance for every user. Active transportation is a crucial element in facilitating movement of residents and visitors throughout Ada and Canyon Counties, and its importance is on the rise. Nationally, people in the U.S. have collectively taken half a billion trips on shared micromobility products since 2010<sup>1</sup>. Locally, the e-bike and e-scooter sharing company, Lime, has had over 1 million riders since starting service in the City of Boise in 2019<sup>2</sup>. This is significant for a city the size of Boise.

COMPASS' Data Bike and Pedestrian and Bike Counter<sup>3</sup> programs support active transportation by collecting pathway condition and use data and using that data to conduct detailed analyses to identify usage patterns and show the significance of multi-use pathways in Ada and Canyon Counties. The collected data reflects the dynamic interactions between individuals and the infrastructure, shedding light on the broader impact of these pathways on the community and its members. By leveraging this data-driven approach, COMPASS strives to provide a comprehensive understanding of the role and importance of these multi-use pathways in the daily lives of residents and visitors alike.

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<sup>1</sup> NAACTO. "Designing for Small Things with Wheels." February, 2023.

<sup>2</sup> Lime. Lime Scooters: Sustainable Urban Mobility. January, 2023.

<sup>3</sup> <https://compassidaho.org/bicycle-and-pedestrian-counters/>

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# About the Data Bike

In 2018, COMPASS secured a Technology Transfer Grant from the Federal Highway Administration (FHWA), enabling the acquisition and customization of a “data bike.” This specialized bicycle was designed to gather quantitative pavement condition data, primarily focusing on roughness and photographs for pathways and other off-street facilities in Ada and Canyon Counties. The bike’s development and testing phase occurred throughout 2020, with the establishment of standardized operating procedures. In the summer of 2021, COMPASS staff began actively using the bike to analyze pathway conditions, contributing valuable insights to comprehend and prioritize pathway maintenance. The collected data serve as a crucial tool for planners, aiding in the identification of segments requiring maintenance intervention to ensure user safety and overall infrastructure health.

In the two-county region, there are roughly 86 miles of multi-use, off-street pathways. In 2023, COMPASS collected data on 54 of those miles – the largest mileage covered in one year since the inception of the program. This large data set has established a baseline for the region to gauge future trends and create efficient maintenance schedules that improve accessibility for all users.

## Executive Summary

The Data Bike program, employing a specially designed bicycle for quantitative pavement condition data collection, focuses on assessing roughness and capturing photographs of off-street facilities in Ada and Canyon Counties. Launched in the summer of 2021 following rigorous development and testing, the program achieved a significant milestone in 2023, inspecting 62% of the region's total pathways. Key findings indicate that 42% of pathways are in good condition, with 5% rated as excellent. However, there is notable opportunity for improvement in segments rated fair to very poor, highlighting areas for targeted maintenance to enhance active transportation infrastructure across the region.

## Key Findings

In 2023, COMPASS' Bicycle and Pedestrian Counter Technician successfully inspected 54 miles, which accounts for 62% of the regional off-network paved pathway system (Figure 1). Of those pathways, 42% were in good condition, while 5% met the "excellent" standard (Figure 2). Significantly, 33% of the pathways were in fair condition, accompanied by 12% considered poor and 9% very poor. By focusing improvements on pathways in fair to very poor condition, there is a considerable opportunity to elevate the overall pathway conditions.

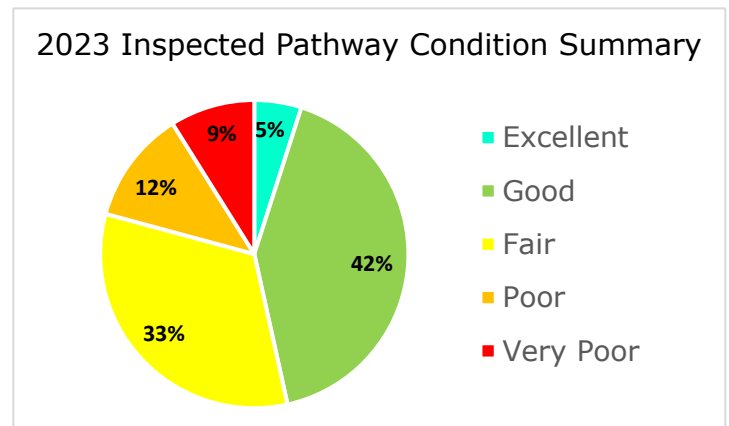


Figure 2. 2023 Inspected Pathway Condition Summary

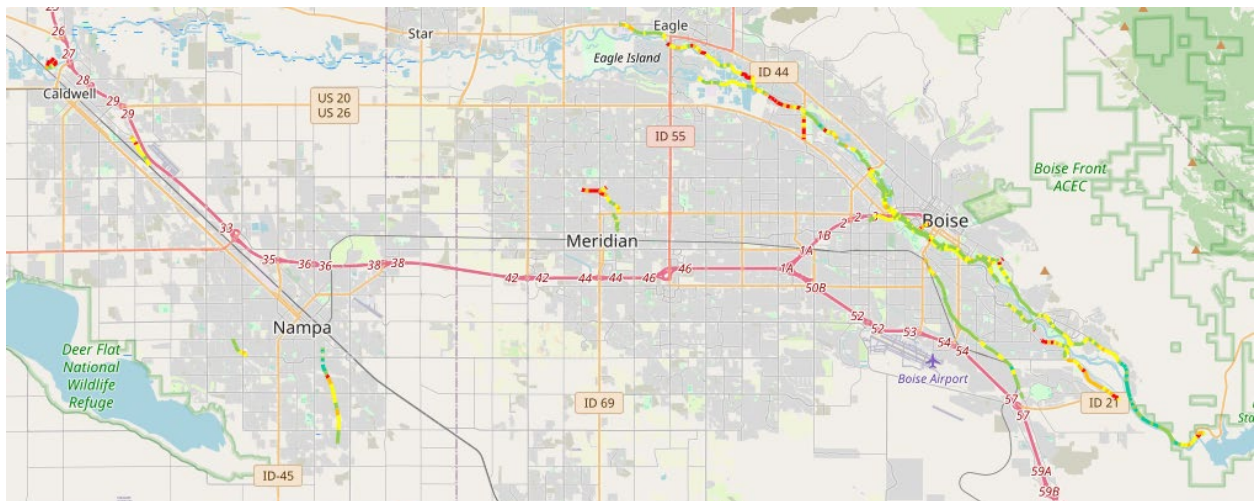


Figure 1. COMPASS Data Bike 2023 Coverage from Rubix

## How it Works

The COMPASS Data Bike includes multiple pieces of equipment (Figure 3 and described below) that work in tandem to collect roughness and other data as the bike is ridden.

1. Tern GSD Electric Cargo Bike: Used to carry all data collection equipment in a smooth and standard manner. The electric motor component of the bike is critical to keep the bike as close to a vertical orientation as possible, which is vital in the roughness app's measurement process. It is also outfitted with panniers for hauling gear.
2. Samsung 360 Camera: Used to photograph the surrounding environment; in the future these photos will be imported to Google Maps.
3. Go Pro Hero 7 Camera: Used to photograph the pavement immediately below the bike. Photos can be compared to the measured roughness.

4. iPhone 7 App: Used to host the rRuf roughness measurement app (Figure 4). The rRuf app scores the condition of trails by using the iPhone's internal accelerometer and gyroscope to produce a standardized condition rating. The app includes an automated intelligent map that matches the data to the trail segment. Through a dashboard on the app, data collection can be monitored to identify gaps. The app is also able to produce averages and other statistics if a section of the trail is ridden multiple times. This helps alleviate any minor inconsistencies in the roughness data.

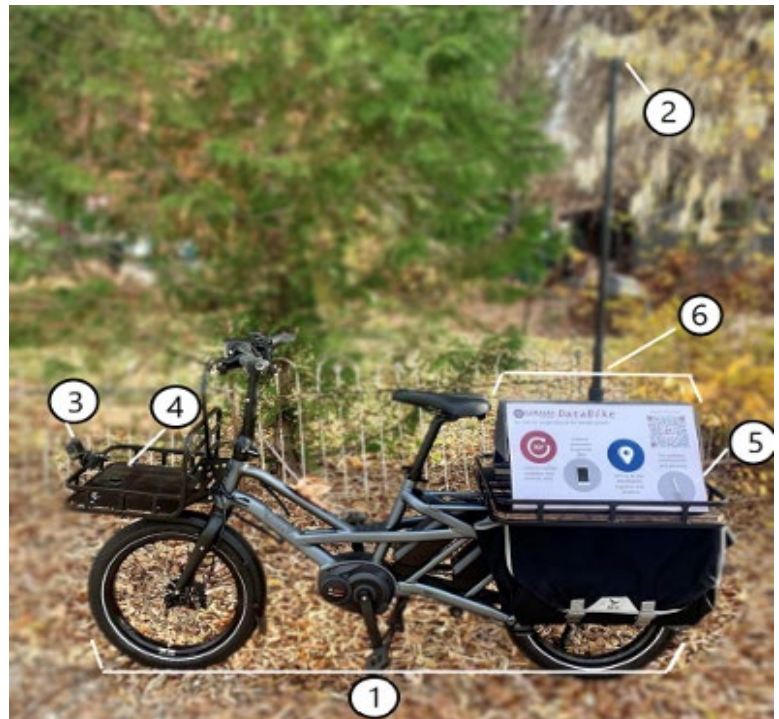


Figure 3: COMPASS Data Bike with Data Collection Equipment

5. Power Bank: Used as an external power source for cameras and the iPhone in the field. This component isn't used for each deployment but can be relied upon for longer deployments that could deplete battery levels.
6. Canopy: Used to stabilize the 360-degree camera.



Figure 4. rRuf roughness Measurement App

Once returning from the field, pavement and environmental photos are uploaded to a database, while the roughness information is transferred to a dashboard where the data are displayed on maps for ease of use.

## Calculating Ratings and What Ratings Don't Measure

Surface conditions are rated using a metric called the "Trail Roughness Index," or TRI, which is a metric used to assess the surface condition of a trail or pathway.

The TRI quantifies the roughness or smoothness of a surface, which can be important for various activities such as biking, walking, or jogging. The TRI is typically calculated and measured by the vertical displacement or variations in height along a given stretch of the pathway.

Pathways are given an overall grade of A through F based on an average TRI score (Figure 5). It's important to note that scores are averaged, meaning that even one segment of a pathway in poor condition can have a significant impact on the overall score, even if the rest of the pathway is in good condition. This ensures a nuanced evaluation that considers the impact of specific areas on the overall pathway experience.

### Pathway Grades

- A (0 to < 2): Very Smooth
- B (2 to < 3.5): Smooth
- C (3.5 to < 5.5): Fair
- D (5.5 to < 7): Rough
- F (> = 7): Very Rough



**Excellent – Very Smooth, Grade: A**

Very smooth trails have nearly no cracking or vegetation growing on them. Variations in smoothness can be due to seams between concrete sections or other material spread across the trail.



**Good – Smooth, Grade: B**

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 – Grade: C**

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



**Poor – Rough, Grade: D**

Rough trails show minor buckling or advanced cracking, with vegetation growing through the surface. These cracks are typically wider and deeper than cracks along fair condition trails and can cause discomfort for riders.



**Very Poor – Very Rough, Grade: F**

Very rough trails have cracking similar to trails in rough condition, but also have buckling of the trail surface. Very rough conditions on trails, if traversed, can cause discomfort for riders.

Figure 5: TRI Index



The data bike exclusively measures the roughness of the pathway surface. It does not assess components such as slope, debris, or tree and shrub overgrowth that can also impact the quality of the user's experience. Additionally, pathways featuring wooden bridges, sections with gravel, or brick pavers may register as rough or very rough even when in good condition.

To address these limitations and provide a more comprehensive assessment, COMPASS is actively working on enhancing the reporting methodology to supplement the data bike results with additional visuals, including photos and videos. This initiative aims to offer a more comprehensive understanding of pathway conditions, considering factors beyond surface roughness.

## **Challenges**

Flooding occurred in several areas surrounding the Boise River Greenbelt in 2023, hindering data collection efforts. Inclement weather also led to the deposition of debris from trees and bushes, creating obstructions along the pathways. Additionally, the requirement for the data bike to maintain consistent speeds for accurate data collection posed challenges, as high volumes of pedestrian traffic occasionally impeded its progress.

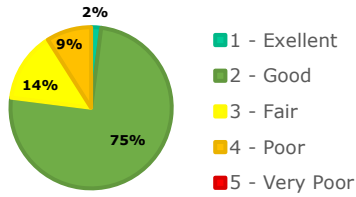
In addition, seamlessly integrating the 360 camera and GoPro with the software provider, Rubix, has also posed challenges. Consequently, technicians have had to manually capture images, deviating from the ideal automated process. Addressing these challenges remains a priority as COMPASS works towards optimizing field operations and enhancing the efficiency of data collection.

## **Data Bike Report Cards**

Report cards detailing the pavement conditions of pathways measured in 2023 can be found on pages 10 - 22. Each pathway is named, accompanied by a detailed chart breakdown of its overall health, an overall grade, and trail-specific information. Some pathways include attached pictures; however, technical constraints prevented this for every pathway. It is COMPASS' goal to include this for every pathway in future reports.

# Federal Way

## Detailed Breakdown:



## Overall Grade:

**B (3.2)**

## Trail Information:

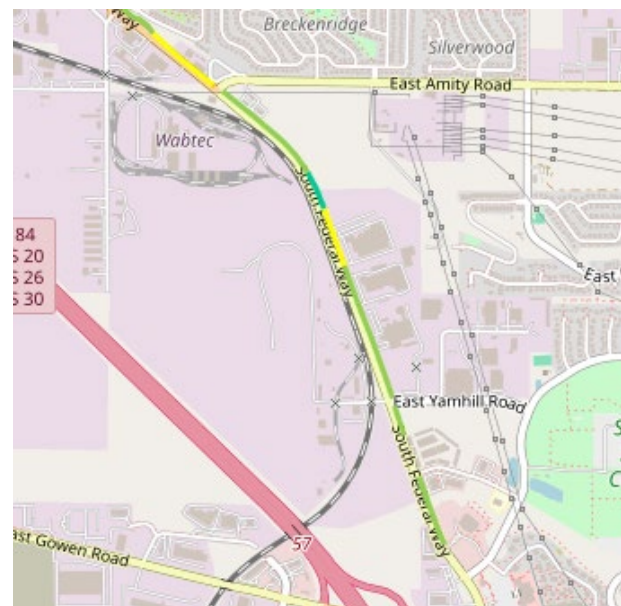
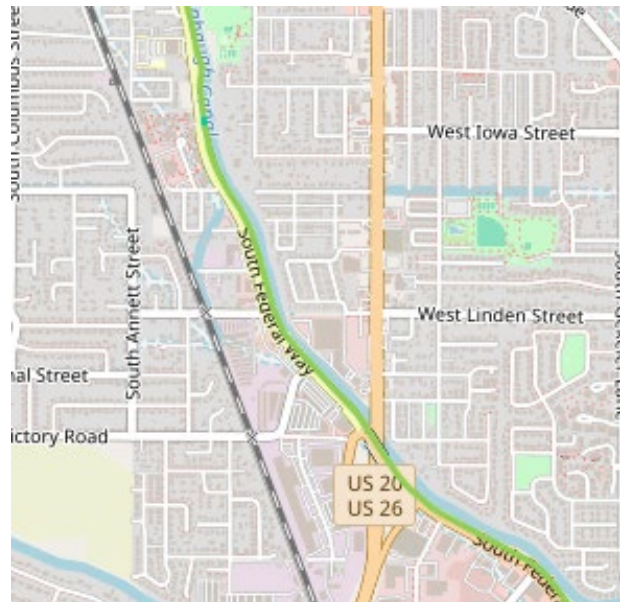
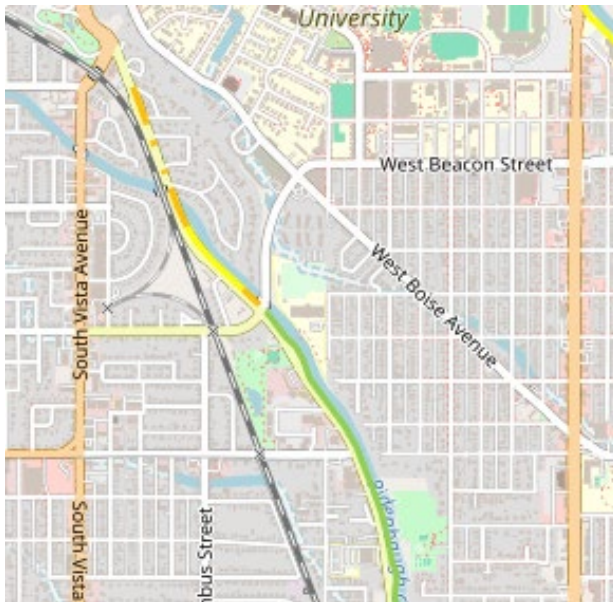
**Location:** Southeast Boise, along Federal Way, from south Vista Avenue to east Lake Forest Drive

**Jurisdiction:** Boise

**Total length:** 5.13 miles

**Primary Surface:** Concrete

## Condition Maps

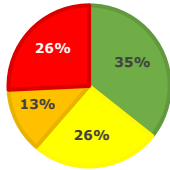


# Five Mile Pathway

Detailed Breakdown:

Overall Grade:

Trail Information:



- 1 - Excellent
- 2 - Good
- 3 - Fair
- 4 - Poor
- 5 - Very Poor

**D** (5.7)

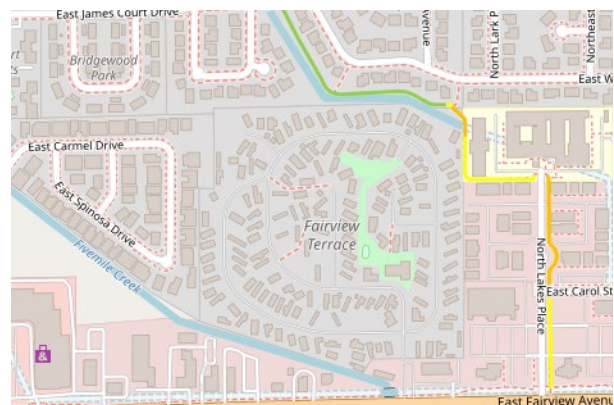
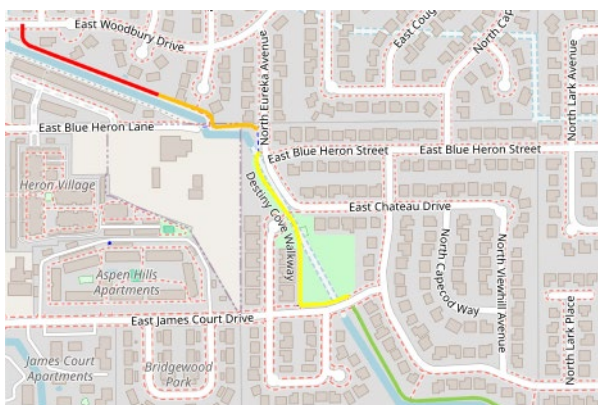
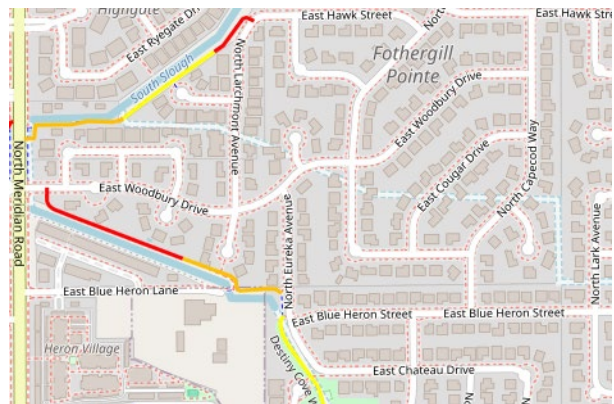
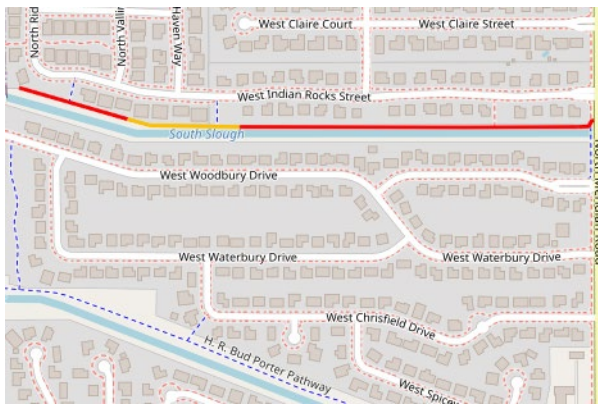
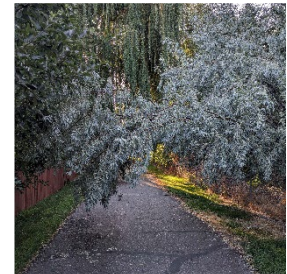
**Location:** North of Fairview Avenue

**Jurisdiction:** Meridian

**Total length:** 2.21 miles

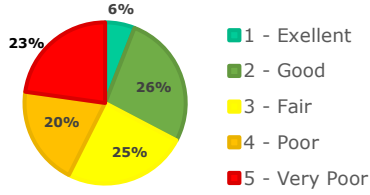
**Primary Surface:** Mixed (Concrete and Asphalt)

## Trail Photos and Condition Maps



# Greenbelt - Fairgrounds

Detailed Breakdown:



Overall Grade:

**C (4.8)**

Trail Information:

**Location:** West Greenbelt Bridge (Between Eagle Road and Glenwood Boulevard) to Remington Street

**Jurisdiction:** Garden City / Ada County

**Total length:** 2.5 miles

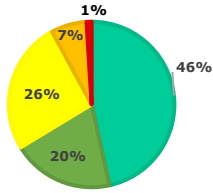
**Primary Surface:** Asphalt

## Condition Maps



# Greenbelt - Lucky Peak

Detailed Breakdown:



- 1 - Excellent
- 2 - Good
- 3 - Fair
- 4 - Poor
- 5 - Very Poor

Overall Grade:

**B (3.0)**

Trail Information:

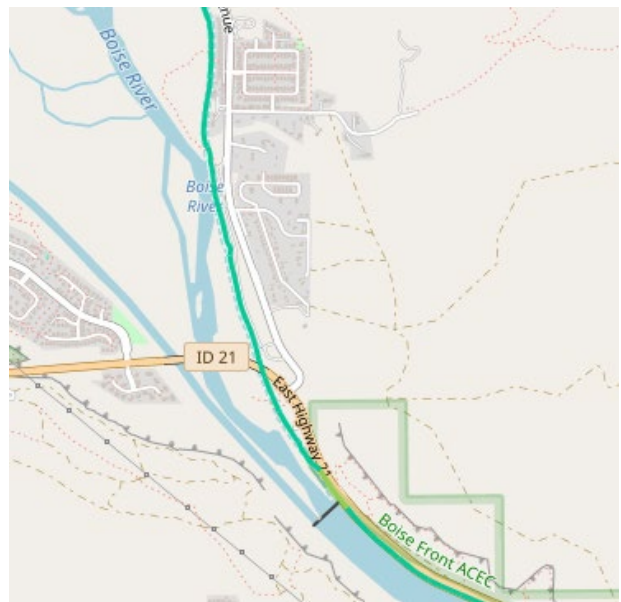
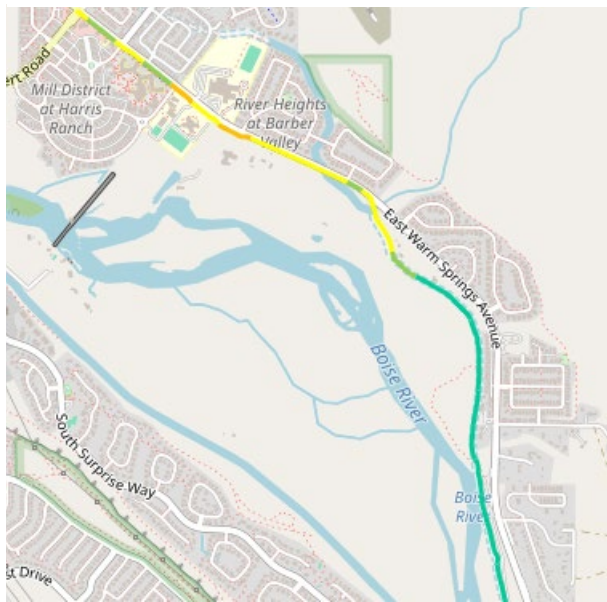
**Location:** Eckert Bridge to Lucky Peak

**Jurisdiction:** Boise and Ada County

**Total length:** 5.3 miles

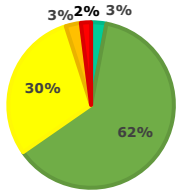
**Primary Surface:** Mixed

## Condition Maps



# Greenbelt - North

Detailed Breakdown:



- 1 - Excellent
- 2 - Good
- 3 - Fair
- 4 - Poor
- 5 - Very Poor

Overall Grade:

**C (3.5)**

Trail Information:

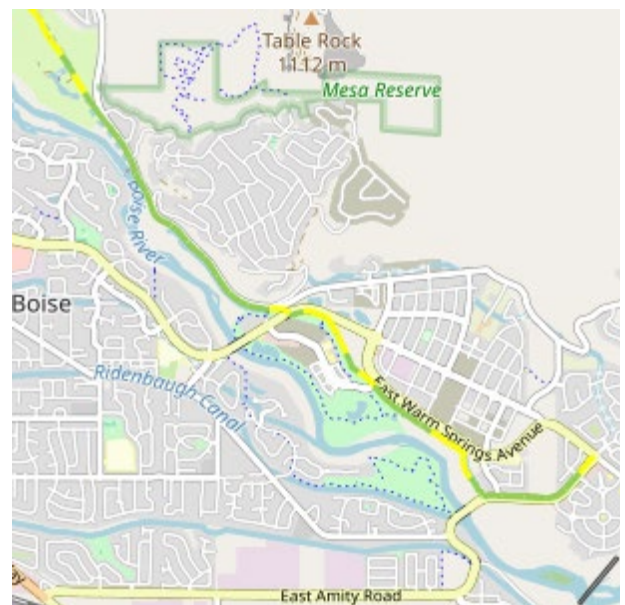
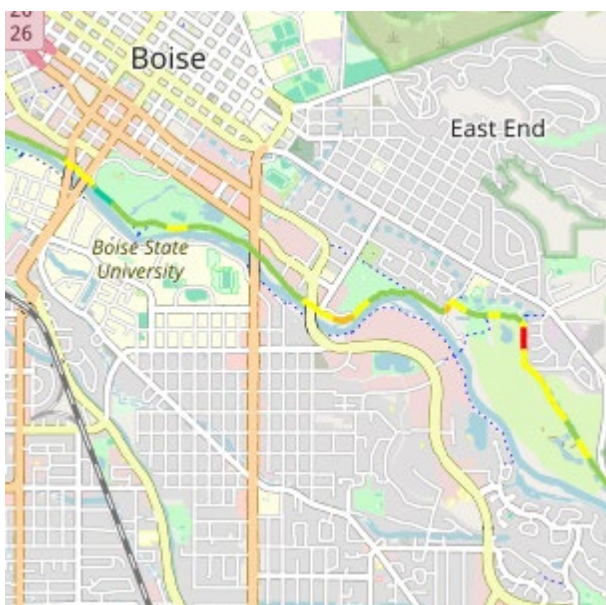
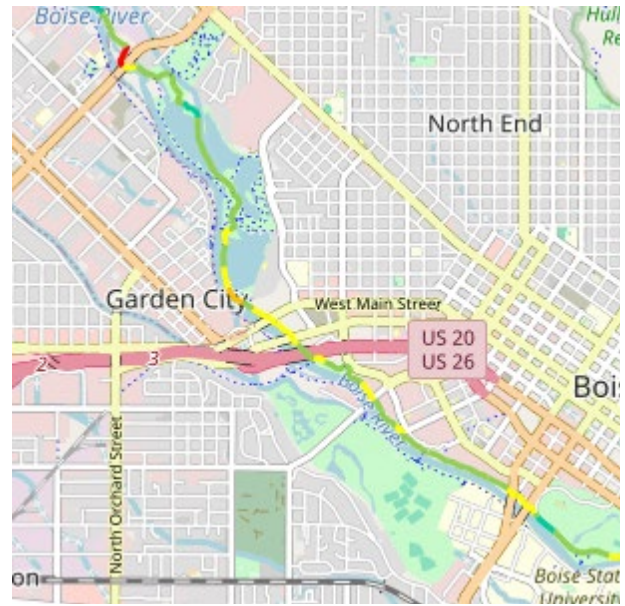
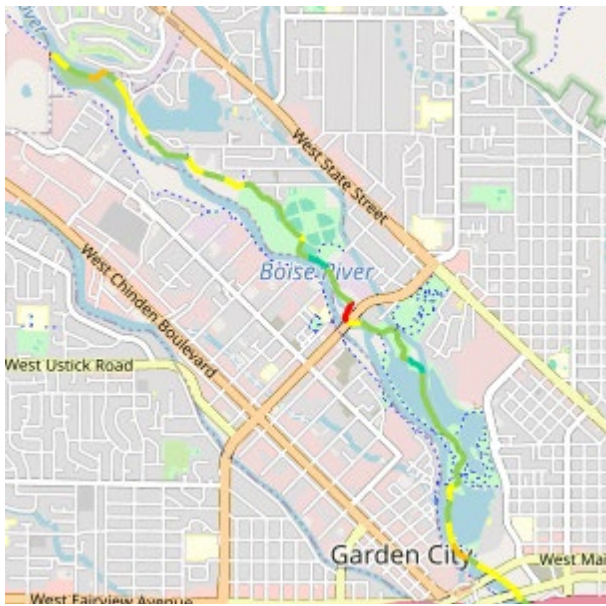
**Location:** North of the river from Remington Street to Warm Springs Avenue

**Jurisdiction:** Garden City and Boise

**Total length:** 11 miles

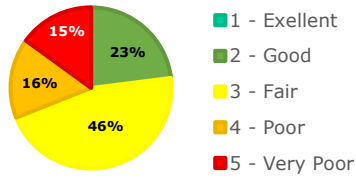
**Primary Surface:** Mixed

## Condition Maps



# Greenbelt - Northwest

Detailed Breakdown:



Overall Grade:

**C (5)**

Trail Information:

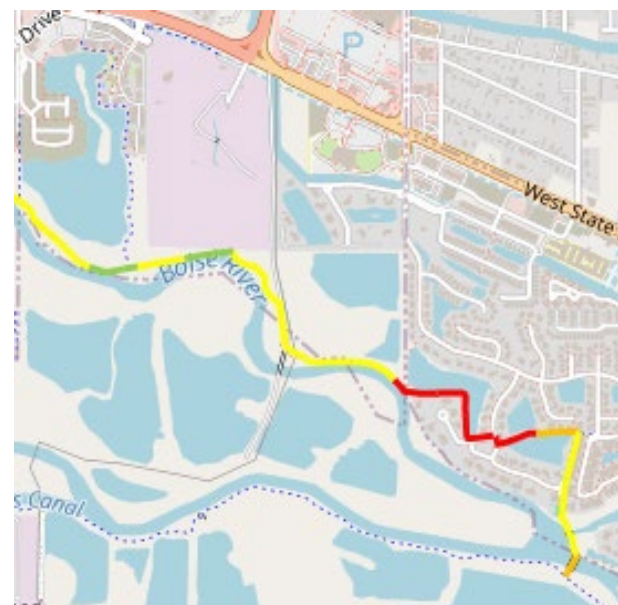
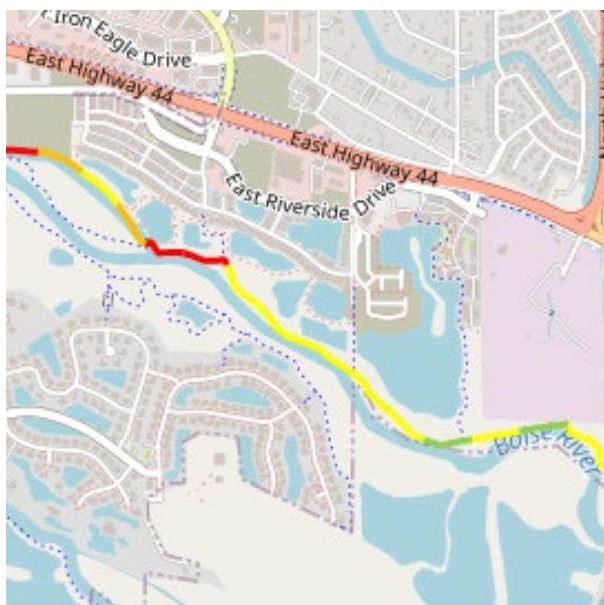
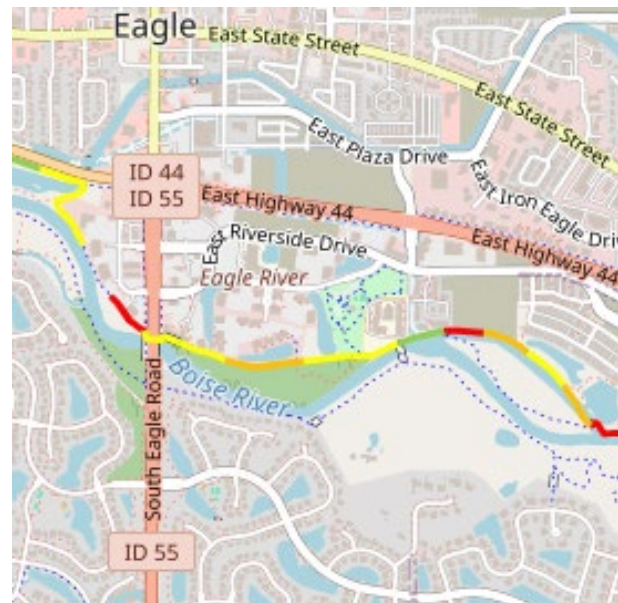
**Location:** West Greenbelt Bridge to City of Eagle State Highway 44 Pathway

**Jurisdiction:** Eagle and Garden City

**Total length:** 4.8 miles

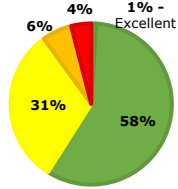
**Primary Surface:** Mixed

## Condition Maps



# Greenbelt - South

Detailed Breakdown:



- 1 - Excellent
- 2 - Good
- 3 - Fair
- 4 - Poor
- 5 - Very Poor

Overall Grade:

**B (3.8)**

Trail Information:

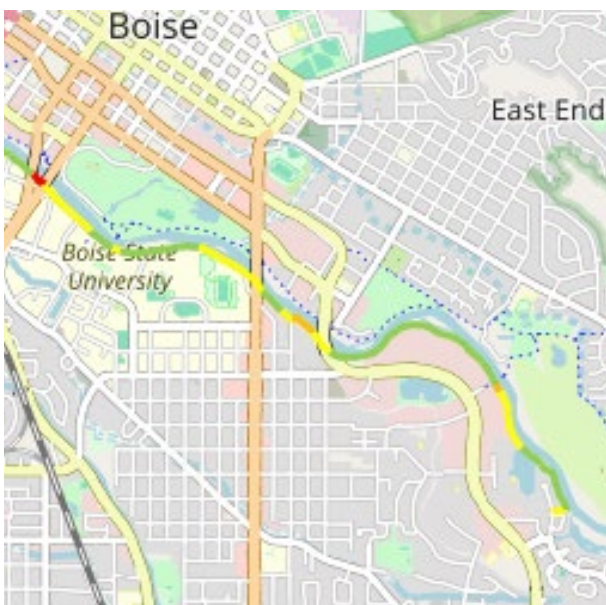
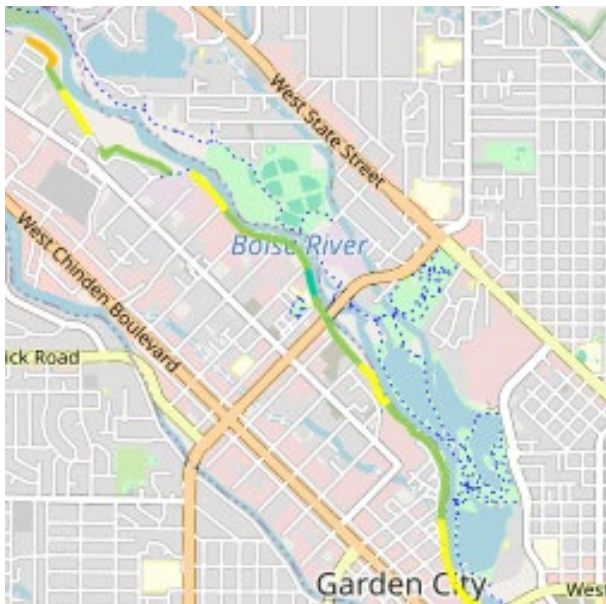
**Location:** South of the river from Remington Street to Eckert Bridge

**Jurisdiction:** Garden City and Boise

**Total length:** 9 miles

**Primary Surface:** Mixed (Asphalt and Concrete)

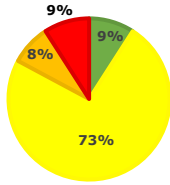
Condition Maps





# Indian Creek Pathway - Caldwell

Detailed Breakdown:



- 1 - Excellent
- 2 - Good
- 3 - Fair
- 4 - Poor
- 5 - Very Poor

Overall Grade:

**C (4.6)**

Trail Information:

**Location:** South of east Linden Street

**Jurisdiction:** Caldwell

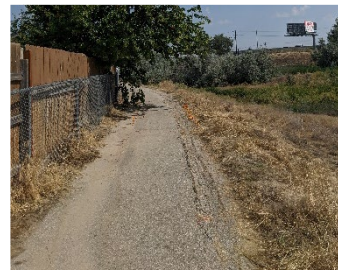
**Total length:** 2.8 miles

**Primary Surface:** Asphalt

## Condition Maps



## Trail Photos

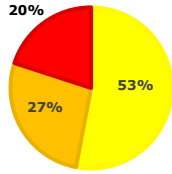


# Pioneer Pathway

Detailed Breakdown:

Overall Grade:

Trail Information:



- 1 - Excellent
- 2 - Good
- 3 - Fair
- 4 - Poor
- 5 - Very Poor

**D (6.9)**

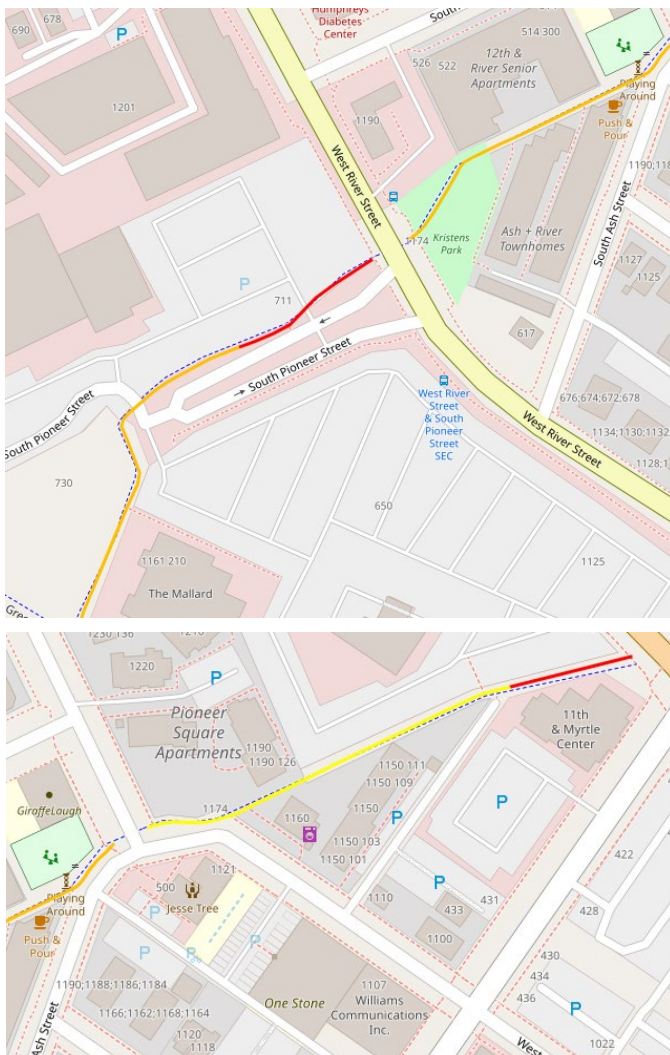
**Location:** Downtown connection to Greenbelt

**Jurisdiction:** Boise

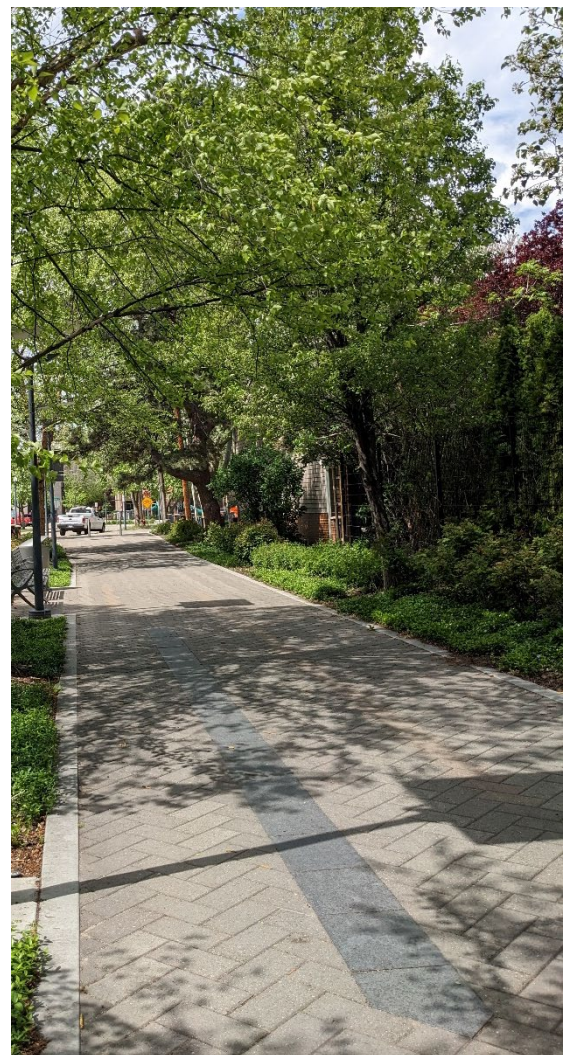
**Total length:** 0.35 miles

**Primary Surface:** Pavers

Condition Maps

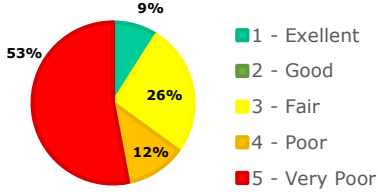


Trail Photo



# Rotary Ponds Pathway

Detailed Breakdown:



Overall Grade:

**D (6.8)**

Trail Information:

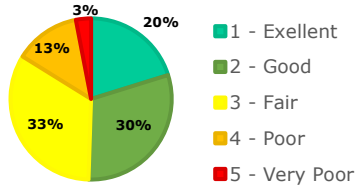
**Location:** Rotary Pond  
**Jurisdiction:** Caldwell  
**Total length:** 1.01 miles  
**Primary Surface:** Asphalt

Condition Map



# Stoddard Pathway

Detailed Breakdown:



Overall Grade:

**C (3.7)**

Trail Information:

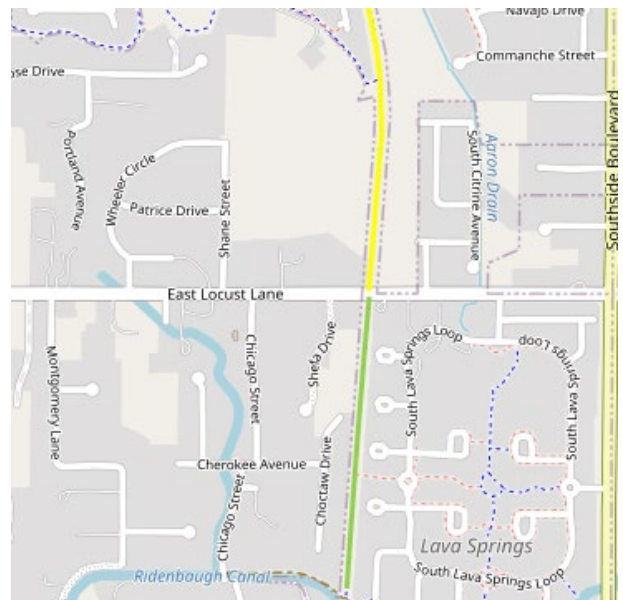
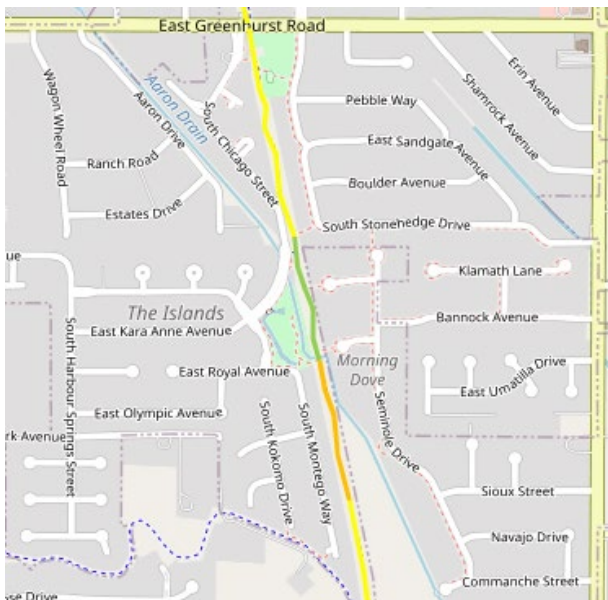
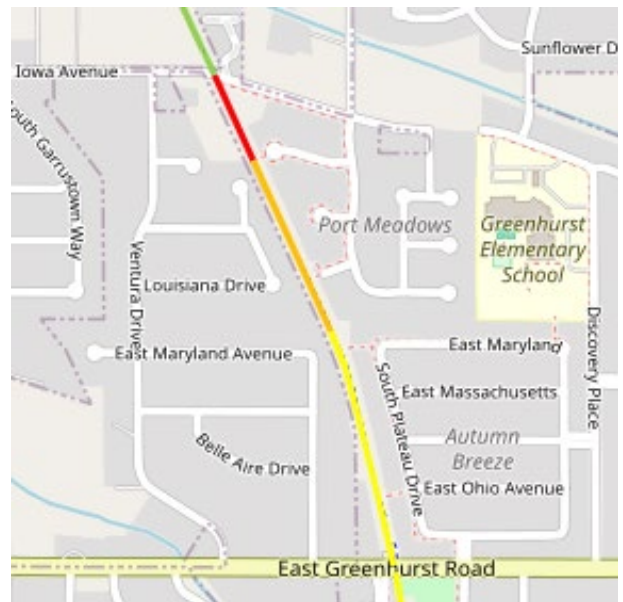
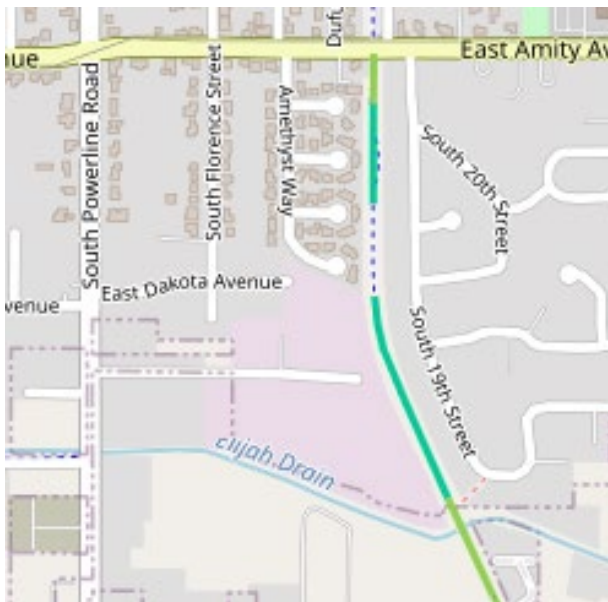
**Location:** East Iowa Avenue to ½ mile south of east Locust Lane

**Jurisdiction:** Nampa

**Total length:** 2.8 miles

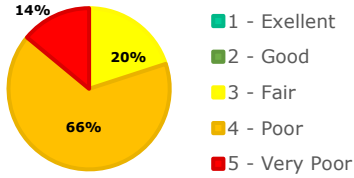
**Primary Surface:** Asphalt

## Condition Maps



# Surprise Pathway

Detailed Breakdown:



Overall Grade:

**D (6.2)**

Trail Information:

**Location:** South of East Amity Road north of State Highway 21

**Jurisdiction:** Boise

**Total length:** 2 miles

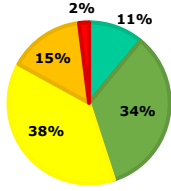
**Primary Surface:** Asphalt

## Condition Map



# Wilson Creek Pathway

Detailed Breakdown:



- 1 - Excellent
- 2 - Good
- 3 - Fair
- 4 - Poor
- 5 - Very Poor

Overall Grade:

**C (4.0)**

Trail Information:

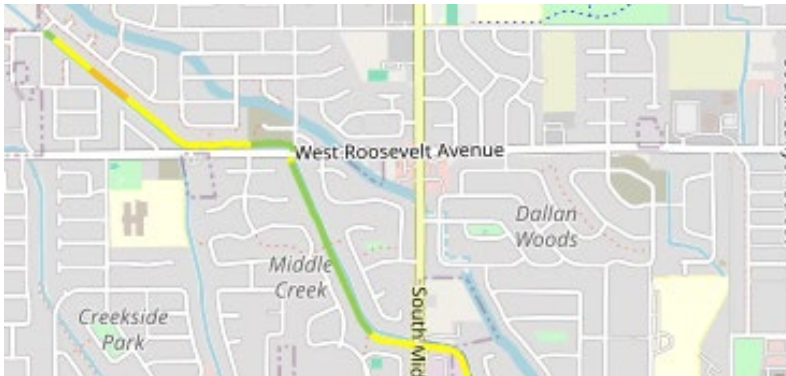
**Location:** Follows the Wilson Drain from Sunnyridge Road to Roosevelt Avenue

**Jurisdiction:** Nampa

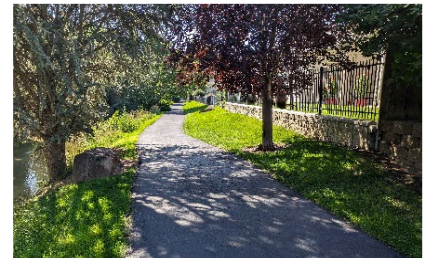
**Total length:** 4 miles

**Primary Surface:** Asphalt

## Condition Maps



## Trail Photos



## Future Goals

COMPASS' objective is to achieve comprehensive coverage of pavement conditions across the entire pathway network, laying the groundwork for establishing a baseline assessment. To that end, COMPASS has established a target of full coverage every two years to monitor evolving trends within the region. In addition, we intend to leverage the data from the Bike and Pedestrian Counter<sup>4</sup> program, which collects data on usage patterns of cyclists and pedestrians, to empowering us to identify high-traffic areas, discern peak usage times, and evaluate the pathways' impact on the overall network. Integrating these two datasets allows us to identify opportunities where improvements can be made.

Currently, limitations in the current system restrict the data bike technician's ability to customize colors and aesthetics in the maps featured in the report cards. To enhance accessibility, COMPASS staff will focus on creating visually accessible maps for future reports.

COMPASS will continue to collaborate with its member agencies and Active Transportation Workgroup to explore opportunities for maintaining existing pathways, integrate new pathways into the network, and foster ongoing cooperation to enhance the Treasure Valley's active transportation infrastructure.

## Conclusion

The Data Bike program has emerged as a pivotal tool in fulfilling its primary intent – the assessment of off-street pathway conditions in Ada and Canyon Counties, Idaho. Through meticulous data collection and analysis, COMPASS has provided municipalities with a comprehensive understanding of pathway conditions, laying the groundwork for informed decision-making for maintenance prioritization and infrastructure improvements.

The substantial coverage achieved in 2023 marks a significant step toward establishing a baseline for future trend analysis. The program's emphasis on quantifying pathways conditions through the TRI will provide municipalities with a nuanced evaluation, fostering a targeted approach to address segments in need of improvement.

The Data Bike program's future goals align with its initial intent – to attain thorough pathway network coverage every two years. This strategic vision not only ensures ongoing monitoring of evolving trends but also sets the stage for collaborative initiatives with municipalities and COMPASS' Active Transportation Workgroup. Together, these efforts aim to integrate new pathways into the network, fostering a sustained and cooperative approach to enhancing active transportation infrastructure in the region.

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<sup>4</sup> <https://compassidaho.org/bicycle-and-pedestrian-counters/>

The program's success in assessing pathway condition not only contributes to immediate maintenance decisions but also paves the way for a future where active transportation infrastructure is continually improved, ensuring the well-being and accessibility of the communities it serves in Ada and Canyon Counties.



# Appendix

## **Bicycle and Pedestrian Organizations in Ada and Canyon Counties**

COMPASS would like to extend our gratitude to the workgroups, non-profits, and advisory committees whose dedicated efforts have fostered a safe and supportive environment for active transportation users across the two-county region.

Active Transportation Workgroup – COMPASS

ADA Advisory Committee – Ada County Highway District

Caldwell Pathways and Bike Routes – Advocacy Group

Canals Connect Communities Coalition (CCCC) – Advocacy Group

Bicycle Advisory Committee – Ada County Highway District

Bike and Pedestrian Advisory Committee – City of Nampa

Boise Bicycle Project (BBP) – Non-profit and Advocacy Group

Foundation for Ada-Canyon Trails Systems (F.A.C.T.S.) – Non-profit

Meridian Transportation Commission – City of Meridian

Pedestrian Advisory Group – Ada County Highway District

Ridge to Rivers – Park and Recreation, City of Boise

Safe Routes to School Program – Ada and Canyon Counties

Treasure Valley Cycle Alliance (TVCA) – Non-profit

Walk and Ride Eagle – Advocacy Group