

COMPASS
COMMUNITY PLANNING ASSOCIATION
of Southwest Idaho

COMPASS Resilience Improvement Plan

FINAL

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In collaboration with





Contents

Introduction	1
Background	1
About COMPASS	1
Policy and Planning Context.....	1
Resilience Improvement Plan Overview.....	2
Resilience Improvement Plan Stakeholders.....	2
Resilience Improvement Plan Development Methodology.....	4
Resilience Profile Components	4
Resilience Profile Development Process	5
Data Sources	8
Criticality Criteria Scoring.....	11
The COMPASS Resilience Profile	13
Assets	14
Criticality	17
Hazards.....	26
Using the Resilience Profile.....	32
Resilience Strategies and Case Studies	33
Wildfire.....	33
Flooding.....	34
Landslides.....	35
Extreme Heat	36
Next Steps.....	38
Further Study	38
Performance Tracking	38
Appendix A: Literature Review	A-1
Appendix B: Bibliography	B-1
Appendix C: Working Group Meeting Notes	C-1



Figures

Figure 1: Assets - Roads	14
Figure 2: Assets - Bridges and Culverts.....	15
Figure 3: Assets - Boise River Greenbelt.....	16
Figure 4: Overall Asset Criticality Scores	17
Figure 5: Asset Criticality - Passenger AADT.....	18
Figure 6: Asset Criticality - Activity Centers.....	19
Figure 7: Asset Criticality - Road Redundancy.....	20
Figure 8: Asset Criticality - Bridge Detour Length.....	21
Figure 9: Asset Criticality - Areas of Persistent Poverty	22
Figure 10: Asset Criticality - Transit Routes.....	23
Figure 11: Asset Criticality - Commercial AADT.....	24
Figure 12: Asset Criticality - Bike Facilities	25
Figure 13: Hazards - Wildfire.....	26
Figure 14: Hazards - FEMA National Flood Hazard	27
Figure 15: Hazards - BRMT 11,000 cfs Scenario	28
Figure 16: Hazards - BRMT 34,800 cfs Scenario	29
Figure 17: Hazards - Landslides	30
Figure 18: Hazards - Extreme Heat	31

Tables

Table 1: Asset Selection Process	6
Table 2: Criticality Criteria Selection Process	7
Table 3: Hazard Selection Process.....	8
Table 4: Criticality Criteria Normalization	11
Table 5: Criticality Criteria Weights.....	12
Table 6: Example Resilience Metrics	39
Table 7: Hazards Analyzed by Source.....	A-2



INTRODUCTION

Background

Natural hazards and extreme weather events present significant risks to transportation infrastructure, threatening the continuity of service and undermining long-term investments. In response, resilience planning has emerged as a strategic approach to safeguard assets and ensure reliable mobility during and after disruptive events. According to the Federal Highway Administration (FHWA), resilience is defined as “the ability to anticipate, prepare for, and/or adapt to changing conditions and/or withstand, respond to, and/or recover rapidly from disruptions.” The objective of resilience planning is to identify system vulnerability, prioritize critical infrastructure, and enhance regional capacity for response and recovery. Recognizing the value of this approach, the Community Planning Association of Southwest Idaho (COMPASS) has developed this Resilience Improvement Plan to support improved safety, minimized economic disruption, and accelerated recovery in Ada and Canyon Counties.

About COMPASS

COMPASS is the metropolitan planning organization for the Boise and Nampa urban areas in Idaho, serving Ada and Canyon Counties in the southwest region. Home to over 825,000 people, the region is characterized by a diverse and growing population, a dynamic economy, and evolving land use patterns. According to *Communities in Motion 2050* (CIM 2050), COMPASS’s most recent regional long-range transportation plan, the region is experiencing increased urbanization. Significant new development is expanding into previously rural areas, increasing demand on the region’s transportation network. Regional land use trends reflect a mix of high-density urban development and low-density suburban and rural expansion. Much of this new development is happening in areas with exposure to at least one of the region’s hazards, increasing the region’s overall risk. These trends point to the intensifying need for resilient infrastructure that can support both current and future demand.

The region’s climate and geography further increase the need for resilience. It is bounded to the northeast by the Boise foothills, and the Boise River flows northwest through the region before joining the Snake River at the western border with Oregon. The mountainous terrain and semi-arid climate contribute to a range of environmental challenges, including flooding, wildfires, and extreme heat events. This context underscores the importance of integrating resilience into transportation planning to ensure infrastructure investments remain effective and responsive to evolving regional needs.

Policy and Planning Context

Idaho has a growing history of resilience planning, with several initiatives underway or completed. The Idaho Transportation Department (ITD) is developing a Resilience Strategy, and both state and county-level Hazard Mitigation Plans provide foundational data on historical hazards and risk areas.

COMPASS itself has also previously explored resilience. In 2021, a Boise State University researcher published *Understanding Current Resilience Practices and Their Application to the Treasure Valley*, which identified planning gaps and best practices. The report supported development of the Transportation Resilience chapter of CIM 2050.



At the federal level, there are a variety of programs that offer funding for resilience planning and improvement efforts. FHWA has created the Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (PROTECT) program, which supports planning and implementation efforts to make surface transportation systems more resilient to natural hazards. The program emphasizes vulnerability assessments, criticality analysis, and integration with broader transportation planning efforts. Similarly, the Federal Emergency Management Agency (FEMA) administers the Building Resilient Infrastructure and Communities (BRIC) program, which focuses on proactive mitigation of natural hazard risks. The Resilience Improvement Plan has been developed in alignment with the requirements and recommendations of these programs and is intended to help COMPASS member agencies identify sites and project scopes that may be eligible for funding.

Resilience Improvement Plan Overview

This Resilience Improvement Plan consists of two primary components. The first is a **Resilience Profile** of Ada and Canyon Counties. The profile includes the results of a criticality analysis of the region's transportation assets, as well as a description of their potential exposure to natural hazards. The second element is a collection of **resilience improvement strategies**. This is a toolkit of ideas for local agencies to improve resilience, based on the specific context of the COMPASS Resilience Profile. The toolkit includes case studies of projects that have successfully implemented each approach.

In addition to the Resilience Improvement Plan, an accompanying online **web map** provides an interactive spatial analysis tool to display asset criticality and hazard risks, intended to help inform transportation infrastructure capital improvements in the region.

These resources are designed to be incorporated into decision-making processes by COMPASS, its members, and other partner agencies. COMPASS' goal is to ensure that resilience is embedded in transportation planning, investment prioritization, and project development across the region. Ultimately, the outcomes of this resilience planning process will include a deeper understanding of regional vulnerabilities, a selection of project ideas tailored to regional needs, and a stronger foundation for integrating resilience into all aspects of transportation decision-making.

Resilience Improvement Plan Stakeholders

High Street Consulting Group served as the prime consultant for the Resilience Improvement Plan, acting as the lead author and developer of the accompanying web map. High Street was supported by **Atlas Strategic Communications**. The consultant team's responsibilities included coordinating the research, reviewing literature and compiling findings, engaging key stakeholders, undertaking spatial analysis, selecting datasets, building the web map, and drafting the plan based on stakeholder input to ensure the final document met project objectives and reflected regional priorities.

A Resilience Improvement Plan **steering committee** provided high-level guidance and oversight throughout the planning process. This committee was composed of two COMPASS staff members and a representative from the Ada County Highway District (ACHD), offering strategic direction and ensuring alignment with organizational goals and local needs.

A **working group** consisting of representatives from COMPASS member agencies and subject matter experts contributed technical and regional insights. This group played a key role in sharing data, reviewing drafts, and providing feedback to strengthen the plan's recommendations. Their input was captured during three in-person working group meetings and via an online survey that



was also distributed to a broader group of stakeholders. For a full list of participating agencies, see Appendix C.

The Resilience Improvement Plan and web map are intended to be helpful resources to COMPASS and member agency staff, as well as a **broader group of stakeholders**, including constituents, community members, academics, advocacy groups, and others interested in regional transportation resilience.



RESILIENCE IMPROVEMENT PLAN

DEVELOPMENT METHODOLOGY

Resilience Profile Components

The resilience profile of the region’s transportation system incorporates three components: assets, criticality, and hazards. COMPASS selected the items in each component based on their significance to the region’s resilience and their feasibility for inclusion in the study. The following sections outline the purpose of each component and list the specific items they include. More information on each item is included in the later “Data Sources” section of this document.

Assets

“Assets” refer to individual pieces of the transportation infrastructure in Ada and Canyon Counties. These are the physical structures that are at risk of disruption, damage, or loss due to natural hazards. The assets selected for inclusion in the analysis are:

- Major roadways (arterials and above)
- Bridges and culverts
- The Boise River Greenbelt

These assets were selected based on their importance to connectivity in the region, their potential to be impacted by hazards, and the ability of COMPASS and its partners to implement improvements to them.

Criticality

“Criticality” refers to the relative importance of assets to the transportation network. Each asset in the profile is given a criticality score based on seven quantitative criticality criteria. These seven criteria are:

- Average daily traffic
- Proximity to community facilities
- Redundancy/detour length
- Connectivity for underserved communities
- Transit route coverage
- Freight volume
- Presence of active transportation

These criteria were selected based on their effectiveness in helping to define the importance of a specific transportation asset to the overall transportation system in the region, as well as the availability of suitable datasets.

Hazards

The profile also presents a description of the region’s potential exposure to four specific natural hazards:

- Wildfire
- Flood
- Landslide
- Extreme Heat



These hazards were selected based on their likelihood of occurring in Ada and Canyon Counties, their potential impact on the transportation system, and the ability for COMPASS to meaningfully increase resilience to them through capital investments.

Resilience Profile Development Process

The items included in each component of the Resilience Profile were selected from a group of candidates identified by an initial literature review, suggestions from the COMPASS steering committee that oversaw development of the Resilience Improvement Plan, and further background research. These lists of candidates were refined and narrowed down through additional research and discussions with the steering committee and the working group, comprised of representatives from COMPASS member agencies.

- **Literature review (August 2025):** The literature review primarily focused on identifying hazards that could affect Ada and Canyon Counties, as identified in previous resilience and hazard mitigation plans and studies completed at the local, county, and state levels.
- **First Working Group meeting (August 2025):** At their first meeting, the working group reviewed the findings of the literature review. They discussed which hazards should be studied and recommended potential data sources.
- **Survey (September 2025):** The working group and other stakeholders completed a survey where they ranked the hazards, criticality metrics, and assets based on importance.
- **Second Working Group meeting (October 2025):** At their second meeting, the working group reviewed the survey results and discussed which assets and criticality metrics should be included in the final resilience profile.
- **Dataset usability review (October/November 2025):** The development team for the Resilience Improvement Plan identified and reviewed available datasets that could be used to map or measure each item to determine their suitability for use in the final analysis.
- **COMPASS decision to include in final plan (November 2025):** Based on the results of the previous steps, COMPASS finalized the list of items to include across all three components.

Throughout the process, the Resilience Improvement Plan steering committee met regularly to provide feedback on findings. The multi-phased approach allowed for an iterative and highly collaborative decision-making process. The results reflect a broad consensus among stakeholders of the best approach with the data available. The following sections provide more detail on how the process was applied to each component of the profile.



Assets

COMPASS maintains datasets for a variety of assets in the region. Of these, seven were initially considered for inclusion in the resilience profile. Table 1 lists these assets, the stage at which they were discussed during the refinement process described above, the assets carried forward through each stage, and the reason for elimination for assets that were not carried forward.

Table 1: Asset Selection Process

Asset	Literature Review	1 st Working Group	Survey	2 nd Working Group	Data Review	Included in Final
Major Roadways/ Arterials (locally owned)	N/A*	N/A*	✓	✓	✓	✓
State and Federal Highways			✓	✓	✓	✓
Bridges and Culverts			✓	✓	✓	✓
Intelligent Transportation Systems (ITS)			✓	✓	Removed: Available data not aligned with capital project investments	
Transit Facilities			✓	Removed: Used as criticality measure for roadways		
Active Transportation			✓	Removed (except Greenbelt): Used as criticality measure for roadways	✓ (Greenbelt only)	✓ (Greenbelt only)
Other Local Roads			✓	Removed: Not eligible for federal funding		

*Assets were not considered during the literature review or the first working group meeting



Criticality

The criticality criteria include data about how assets are used, as well as information about how they fit into the surrounding network and community. Candidates were identified based on use in similar studies and working group feedback. Table 2 lists the nine criteria that were considered, the stage at which they were discussed during the refinement process described above, the criteria that were carried forward through each stage, and the reason for elimination of criteria that were not carried forward.

Table 2: Criticality Criteria Selection Process

Criticality Criteria	Literature Review	1 st Working Group	Survey	2 nd Working Group	Data Review	Included in Final	
Average Daily Traffic	N/A*	N/A*	✓	✓	✓	✓	
Proximity to Community Facilities			✓	✓	✓	✓	
Redundancy/ Detour Length			✓	✓	✓	✓	
Connectivity for Underserved Communities			✓	✓	✓	✓	
Transit Route Coverage			✓	✓	Discussed use as asset vs. criticality criteria	✓	✓
Freight Volume			✓	✓	✓	✓	✓
Presence of Active Transportation			✓	✓	Discussed use as asset vs. criticality criteria	✓	✓
Evacuation Route Status			✓	✓	✓	Removed: Suitable data unavailable	
Economic Importance			✓	✓	Removed: Redundant with average daily traffic		

*Criticality criteria were not considered during the literature review or the first working group meeting



Hazards

An initial list of 11 hazards with the potential to impact the area was identified during the literature review. Table 3 shows the 11 hazards, the stage at which they were discussed during the refinement process described above, the hazards that were carried forward through each stage, and the reason for elimination of hazards that were not carried forward.

Table 3: Hazard Selection Process

Hazard	Literature Review	1 st Working Group	Survey	2 nd Working Group	Data Review	Included in Final
Wildfire	✓	✓	✓	✓	✓	✓
Flood	✓	✓	✓	✓	✓	✓
Landslide	✓	✓	✓	✓	✓	✓
Extreme Heat	✓	✓	✓	✓	✓	✓
Earthquake	✓	✓	✓	Removed: Unlikely to impact study area; limited geographic variation of impact		
Extreme Weather	✓	✓	✓	Removed: Overlap with flooding; other impacts not addressed by capital projects		
Volcanic Eruption	Removed: Unlikely to impact study area					
Avalanche						
Drought	Removed: Limited transportation impacts					
Extreme Cold						
Dam Failure	Removed: Catastrophic impact beyond COMPASS scope					

Data Sources

Each item in the resilience profile was mapped or quantified by one or more data-backed measures in order to provide a consistent understanding of the assets, criticality criteria, and hazards. Data sources were selected based on findings from the literature and feedback from the working group, with the goal of identifying data that were readily available for the region and relevant to the intended analysis. The following sections detail the data sources used for each component and why they were selected.

Assets

COMPASS maintains internal datasets with information about transportation assets in the region. These asset datasets were used to map the three asset categories included in the resilience profile. In addition to spatial information, the datasets include other information that can be



helpful for understanding resilience. This information is included in the resilience profile web map, and in some cases was used in the criticality scoring. This additional information includes:

Roads

- Identifying information, including road name, functional classification, and county
- Responsible jurisdiction
- Usage statistics, including passenger and commercial average annual daily traffic (AADT), transit route presence, and bike facility presence

Bridges and Culverts

- The route carried by the asset and the milepost where it is located
- The feature the asset crosses (such as a river or highway)
- The county the asset is in
- Asset condition rating
- Bypass length, representing the additional driving distance required to detour around the bridge if it is unable to be used

The COMPASS bridge data also include information about the vertical clearance of some bridges, which the steering committee and working group felt could be helpful for resilience planning, especially with respect to flooding. However, this information is tracked primarily for use in maritime navigation and is only available for bridges that cross navigable bodies of water, namely the Boise River. Because of this limited scope, vertical clearance data were not included in the resilience profile.

Boise River Greenbelt

- Length and walking time
- Surface material (paved or unpaved)

Criticality

The data used to measure the criticality criteria were:

- **Average Daily Traffic:** COMPASS asset data include passenger AADT, which is the average number of passenger vehicles that use an asset each day. AADT is the industry standard for measuring traffic volume.
- **Proximity to Community Facilities:** As part of its CIM 2050 planning process, COMPASS designated certain areas as “Activity Centers.” These are areas, such as downtowns and shopping centers, which feature a mixture of land uses and have the highest densities in the region. These areas were chosen to represent the most important community facilities and to be consistent with CIM 2050 and other COMPASS planning efforts.
- **Redundancy/Detour Length:**
 - **Redundancy (roads):** The redundancy of road assets was calculated based on the number of other routes within 0.6 miles of a given road segment, based on the COMPASS asset location data.
 - **Detour Length (bridges and culverts):** Detour length (also known as bypass length) of a bridge is the additional driving distance required to detour around a bridge if it is unusable for any reason. The value is calculated by state Departments of Transportation and reported to the National Bridge Inventory. The measure was included in the Resilience Improvement Plan because it was already well



established, further aligning the Resilience Improvement Plan methodology with existing state and regional planning work.

- **Connectivity for Underserved Communities:** Underserved communities were represented by Areas of Persistent Poverty (APP), as designated by the U.S. Census Bureau at the census tract level. The APP designation is intended to identify communities that have experienced high rates of poverty for an extended period. The APP designation was chosen because it is commonly used at the federal level, allowing the findings to support future planning work and align with grant funding requirements.
- **Transit Route Coverage:** Transit coverage is represented by the presence of a Valley Regional Transit bus route that uses an asset, based on data provided by COMPASS.
- **Freight Volume:** COMPASS asset data also include commercial AADT, the average number of trucks and other commercial vehicles that use an asset each day. As with passenger traffic, AADT is the industry standard for measuring commercial traffic volume.
- **Presence of Active Transportation:** Active transportation is represented by the presence of a bicycle facility, based on data provided by COMPASS. These facilities include bike lanes, shoulder bike lanes, sharrows, and designated bike-friendly routes.

Hazards

Unlike the assets and criticality criteria, the hazards included in the resilience profile are not unique to the region. Exposure data are available from a variety of sources, often national, and may be measured or modeled through a variety of approaches. For each hazard, these data sources were evaluated and discussed with the working group before determining the appropriate source for inclusion in the Resilience Improvement Plan. The data sources used in the Resilience Improvement Plan's analysis for each hazard were:

- **Wildfire:** Wildfire risk is represented by the U.S. Forest Service (USFS) Wildfire Hazard Potential (WHP) dataset. USFS defines WHP as “an index that quantifies the relative potential for high-intensity wildfire.” It uses data about vegetation and land cover to estimate the probability of an area experiencing wildfire. Other datasets, such as the USFS Wildfire Risk to Communities map and the FEMA National Risk Index, rely on WHP or similar data to assess exposure or impact to infrastructure. These datasets were not selected because their use would be duplicative (i.e., “double count”) of some aspects of the Resilience Improvement Plan development methodology. Furthermore, members of the working group suggested consideration of the wildland urban interface, the areas where development is intermixed with wildland vegetation, considered to be one of the highest risk areas for wildfires. However, the data were not included because the WHP incorporates similar inputs and provides a more comprehensive likelihood assessment.
- **Flood:** Flooding risk is represented in the analysis by two components. First are the national flood hazard maps published by FEMA. The literature review confirmed that these maps are the most frequently used tool for understanding flood risk caused by heavy precipitation and melting snow or ice. These maps show areas likely to be inundated by a flood (1% annual chance and 0.2% annual chance). Because of the ubiquity of the FEMA maps for understanding flood risk, both the 1% annual chance and 0.2% annual chance data are used in the resilience profile. The second component is the Boise River 2-D Model Tool (BRMT), compiled by Boise River Flood Control District 10. The BRMT uses data from LiDAR scans of the Boise River channel to model the expected flooding depths at a range of flow rates. Working group members suggested the inclusion of these data because they



felt they were more detailed and granular. Two flow rate scenarios were suggested. The first scenario, a flow rate of 11,000 cubic feet per second (cfs), represents the lowest flow rate where local roads begin to experience flooding, making it a good model for the most frequent types of flooding in the region. The second scenario, at 34,800 cfs, represents the maximum emergency output of the Lucky Peak Dam. This output would only be released to prevent dam failure and would represent the most severe flooding experienced in the region short of dam failure.

- **Landslide:** Landslide risk is measured by the Landslide Susceptibility Map published by the U.S. Geological Survey. The model uses a combination of historical landslide events and existing ground cover and slope to determine where future landslides are likely. This source is frequently cited in similar studies locally and at the state level, and working group members agreed that it was an appropriate measure to be included in the analysis.
- **Extreme Heat:** Extreme heat is measured in terms of surface temperature, using an urban heat island severity dataset from the Trust for Public Land. It uses satellite ground temperature data to identify areas within cities that are significantly warmer than the average for the city. While the working group noted that the data do not cover the entirety of Ada and Canyon Counties, they felt it was still important to include the extreme heat hazard as a useful tool for understanding increasing temperatures.

Criticality Criteria Scoring

Normalization

Because each of the criticality criteria is measured with different units, they must be transformed, or “normalized,” to the same scale to allow for meaningful comparison. The seven criteria have been normalized to a zero-to-one scale, where a score of one represents the highest level of criticality, as described in Table 4.

Table 4: Criticality Criteria Normalization

Criticality Criteria	Source Data (Range/Units if applicable)	Transformation/Calculation
Average Daily Traffic	Passenger AADT (0–132,500 vehicles)	Normalized to 0–1, based on the natural log of Passenger AADT capped at 95%.*
Proximity to Community Facilities	Activity Centers (locations)	1 if the asset overlaps an activity center, otherwise 0.
Redundancy (Roads)	Major Roads (locations)	Inverse of the count of other routes within a 0.6-mile radius, capped at 4, then normalized 0–1.
Detour Length (Bridges)	Detour Length (0–123 miles)	Normalized to 0–1, as detour length vs. highest detour length.
Connectivity for Underserved Communities	APP (locations)	1 if the asset overlaps an area of persistent poverty, otherwise 0.
Transit Route Coverage	Transit Routes (locations)	1 if the asset overlaps a transit route, otherwise 0.



Freight Volume	Commercial AADT (0–16,000 vehicles)	Normalized to 0–1, based on the natural log of commercial AADT capped at 95%.*
Presence of Active Transportation	Bike Facilities (locations)	1: Bike lane 0.75: Shoulder bike lane 0.5: Sharrow 0.25: Bike-friendly route 0: No bike infrastructure

*The natural log of AADT was used to reduce the impact of very large values from a limited number of routes, which resulted in low redundancy scores for most assets in the untransformed data.

Weighting

For each asset, an overall criticality score was calculated by combining the values of the applicable criticality criteria. However, the working group agreed that the seven criteria are not equally important to regional resilience. For this reason, the criteria are weighted by importance before being combined into the overall score.

The weights for each criterion were determined based on background research, as well as feedback from the steering committee and working group. At the third working group meeting, participants had the opportunity to participate in an exercise where they weighted the seven criteria by distributing 100 total points among them. Group discussion after the exercise indicated that most participants agreed redundancy and average traffic should be weighted the most heavily, followed by proximity to community facilities and commercial traffic volume. Based on this feedback and additional research, COMPASS chose to implement the suggested weights from the group exercise shown in Table 5.

Table 5: Criticality Criteria Weights

Criteria	Working Group Recommended Weighting
Redundancy/Detour Length	28
Average Daily Traffic	25
Proximity to Community Facilities	16
Freight Volume	14
Connectivity for Underserved Communities	6
Presence of Active Transportation	6
Transit Route Coverage	5



THE COMPASS RESILIENCE PROFILE

This section offers an overview of the region’s essential transportation assets, emphasizing their significance for connectivity, mobility, and resilience. In addition to describing the key assets, this section examines each asset’s criticality—their importance within the network—and assesses their vulnerability to various hazards. Maps showing the spatial analyses conducted are included to showcase the assets and their criticality, highlight areas with elevated hazard risk, and lay the groundwork for understanding both strengths and challenges across the regional transportation landscape. It is important to note that criticality scores are calculated independently of hazard exposure, meaning that criticality findings can be useful for planning efforts outside of resilience to hazard exposure.

The resilience profile components are presented on the pages that follow.

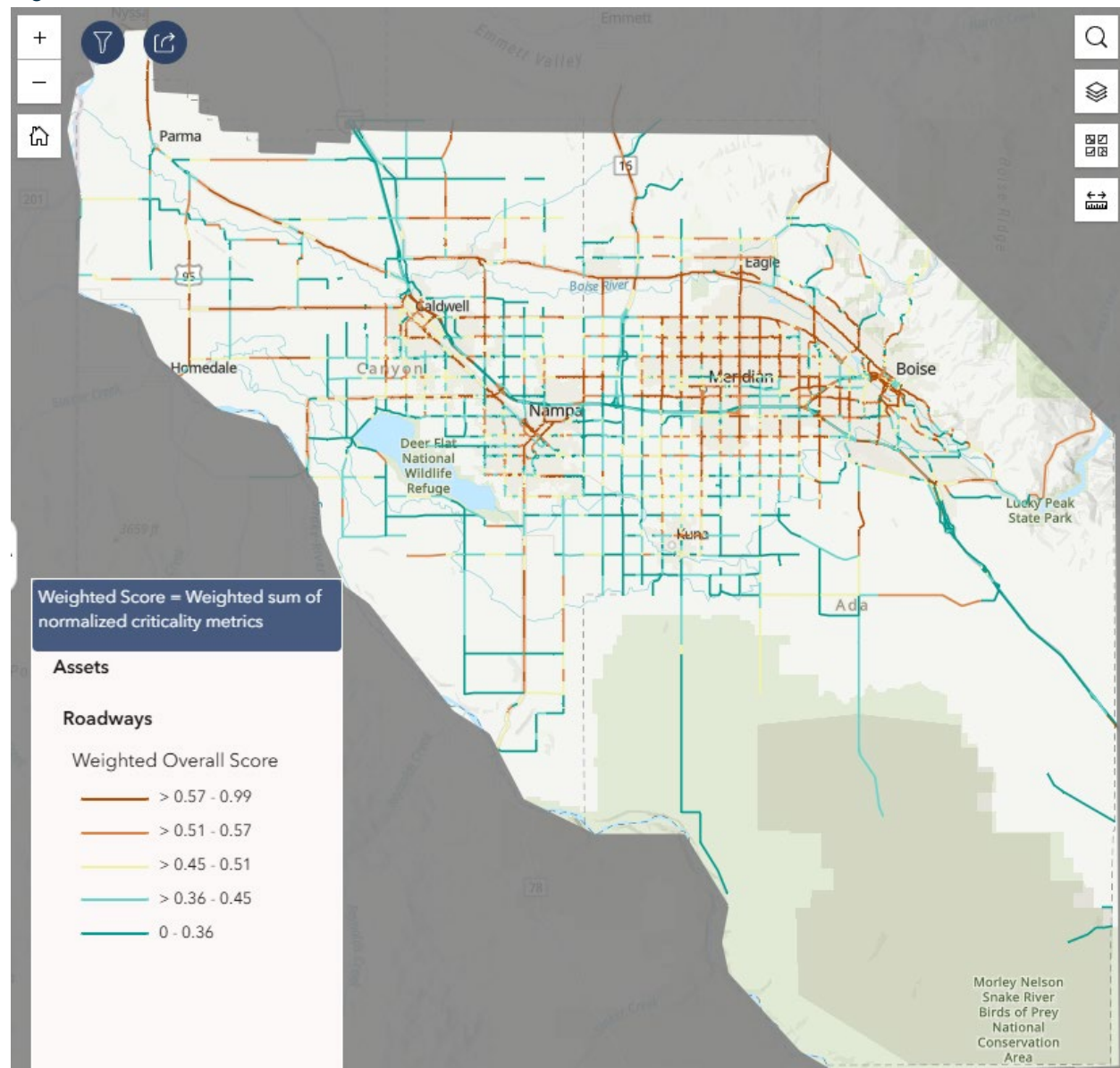


Assets

Roads

Figure 1 shows the roadway assets included in the analysis, color-coded by overall criticality score as explained in the Criticality section below. 943 miles of roadways are included in the analysis, comprising all interstates, state and national highways, and major and minor arterials. Interstate 84 (I-84) travels east-west through the region, crossing through the cities of Boise, Meridian, Nampa, and Caldwell, where it crosses the Boise River. Many other communities in the region are connected to I-84 by a network of national and state highways. Most of the arterials in urban areas are laid out in a grid. A few state highways and arterials serve less populated areas of the region, such as the foothills in northeastern Ada County.

Figure 1: Assets - Roads

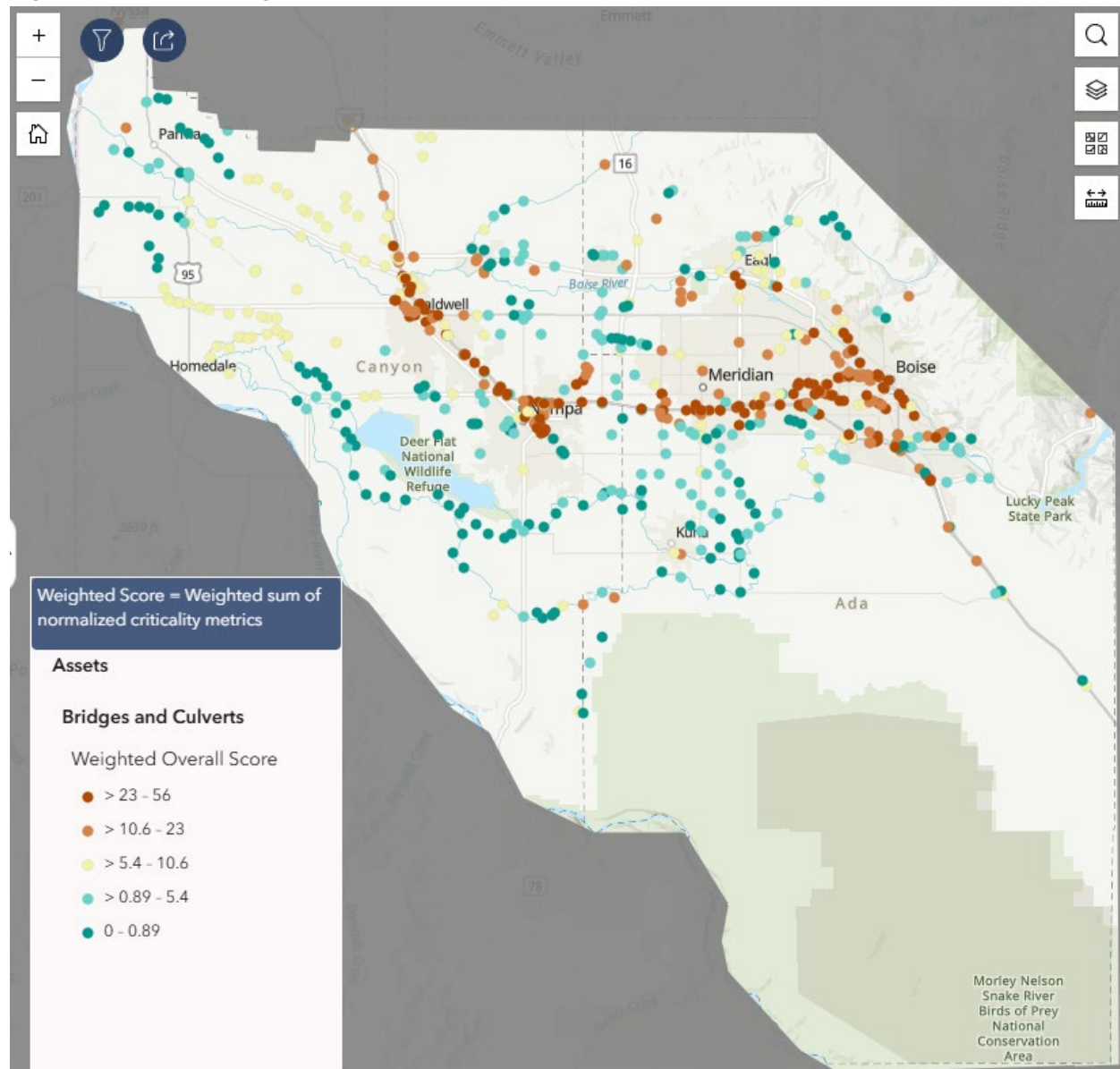




Bridges and Culverts

The profile includes 693 bridges and culverts, shown in Figure 2. Many of these assets cross over a body of water. The Boise River flows from east to west through the region, passing to the north of the most populated areas. I-84, as well as several state highways and major arterials, include bridges over the river and its tributaries. The region also features a large network of canals, which are frequently crossed by bridges. Other bridges cross features other than water, such as railroad lines or highways.

Figure 2: Assets - Bridges and Culverts

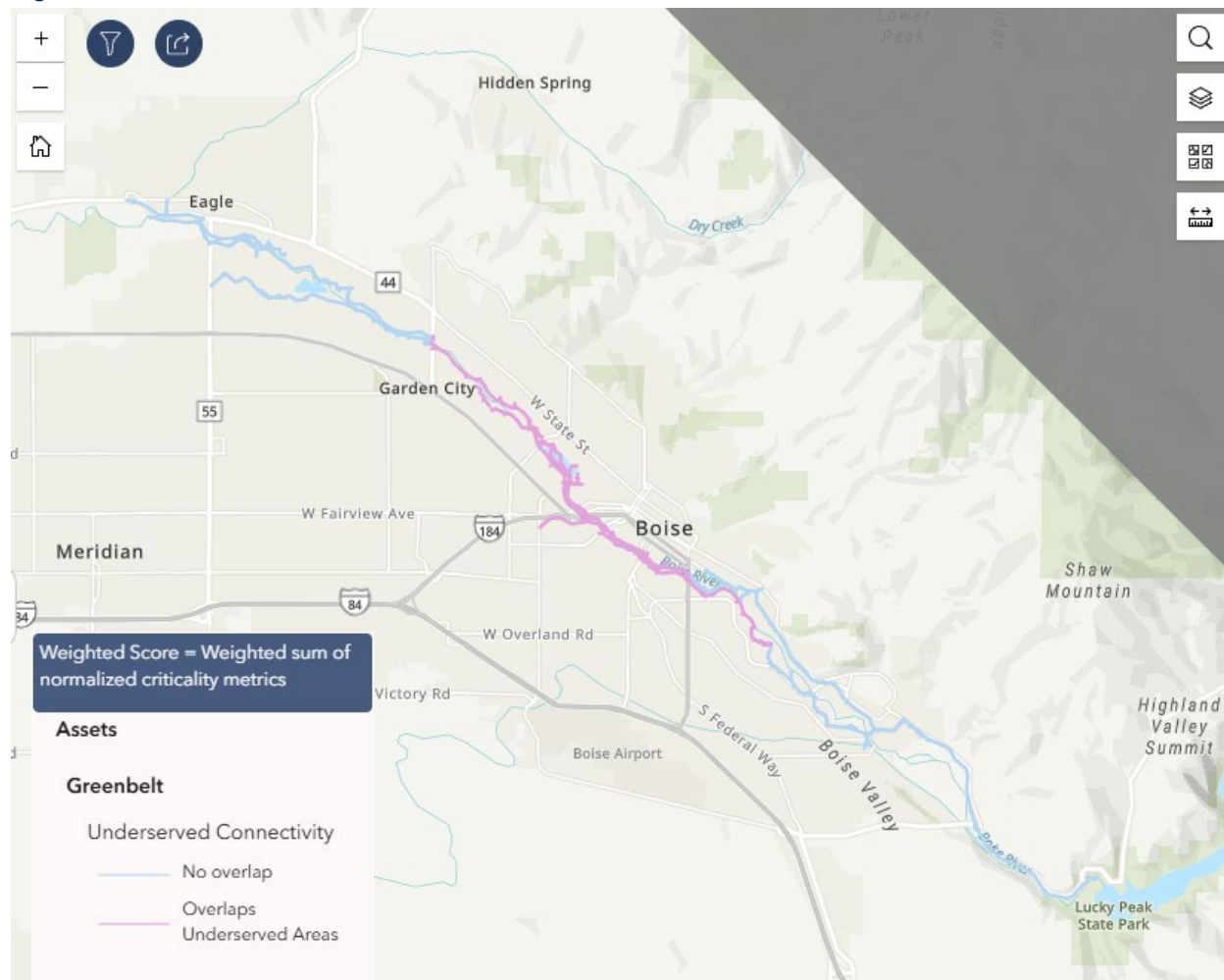




Boise River Greenbelt

The Boise River Greenbelt is a system of multi-use pathways connecting a series of parks along both banks of the Boise River. In addition to recreational opportunities, the trails provide important connections for active transportation users in the area. As shown in Figure 3, the corridor follows the river northwest from Lucky Peak State Park, through Boise and nearby communities, and ends west of Eagle, comprising a total of 52 miles of pathway.

Figure 3: Assets - Boise River Greenbelt

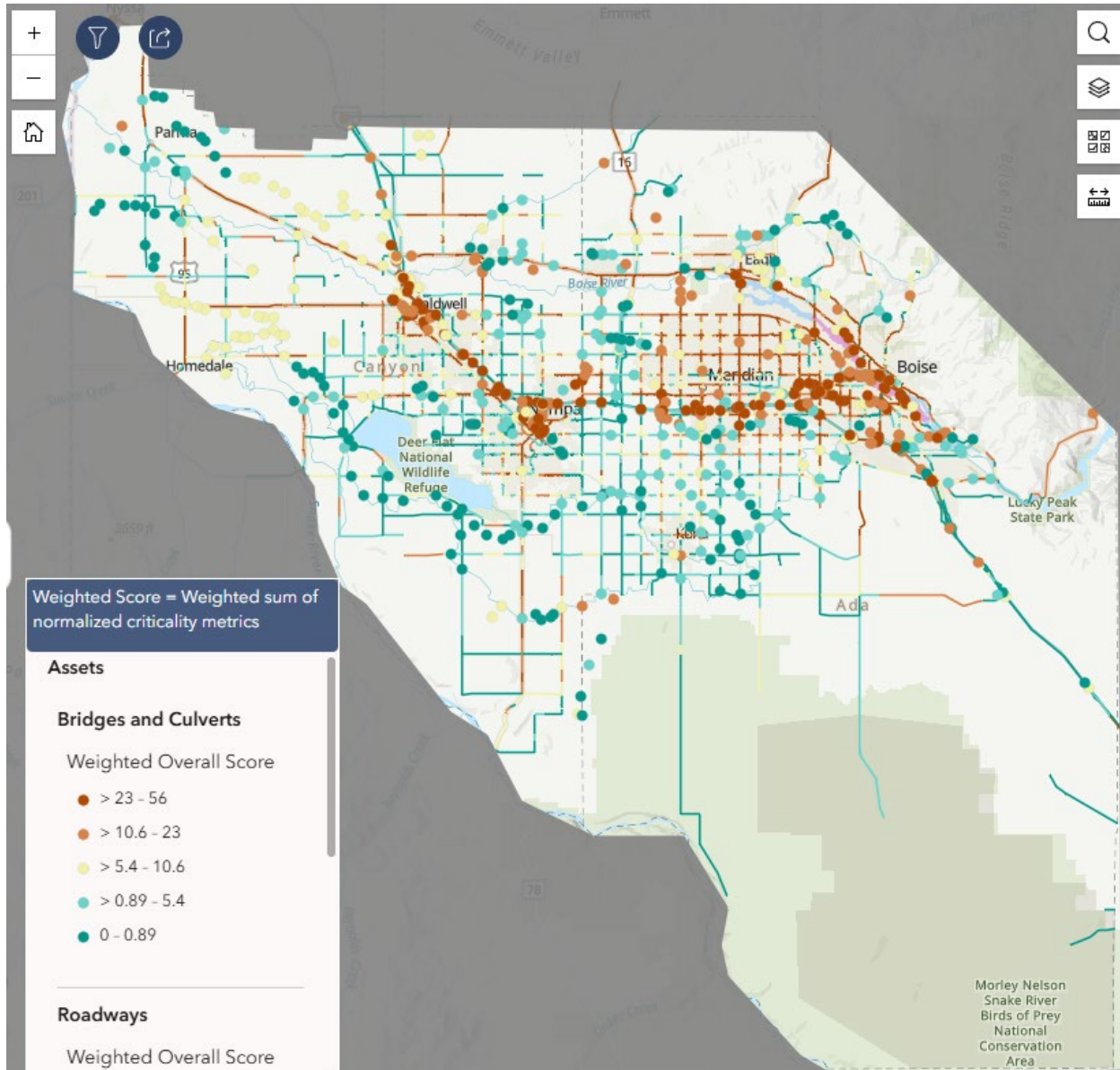




Criticality

Figure 4 shows the overall criticality score for all three asset categories. Predictably, most of the assets with the highest scores are found along the I-84 corridor near the largest population centers. This is driven by high usage levels (passenger and commercial AADT) and a higher likelihood of being near activity centers and bike and transit routes. Some routes in more remote areas, especially in the northeast, also have high scores. While AADT on these routes is lower than that of some urban corridors, the remote nature of these areas means there is very little redundancy for these routes, increasing their total score.

Figure 4: Overall Asset Criticality Scores



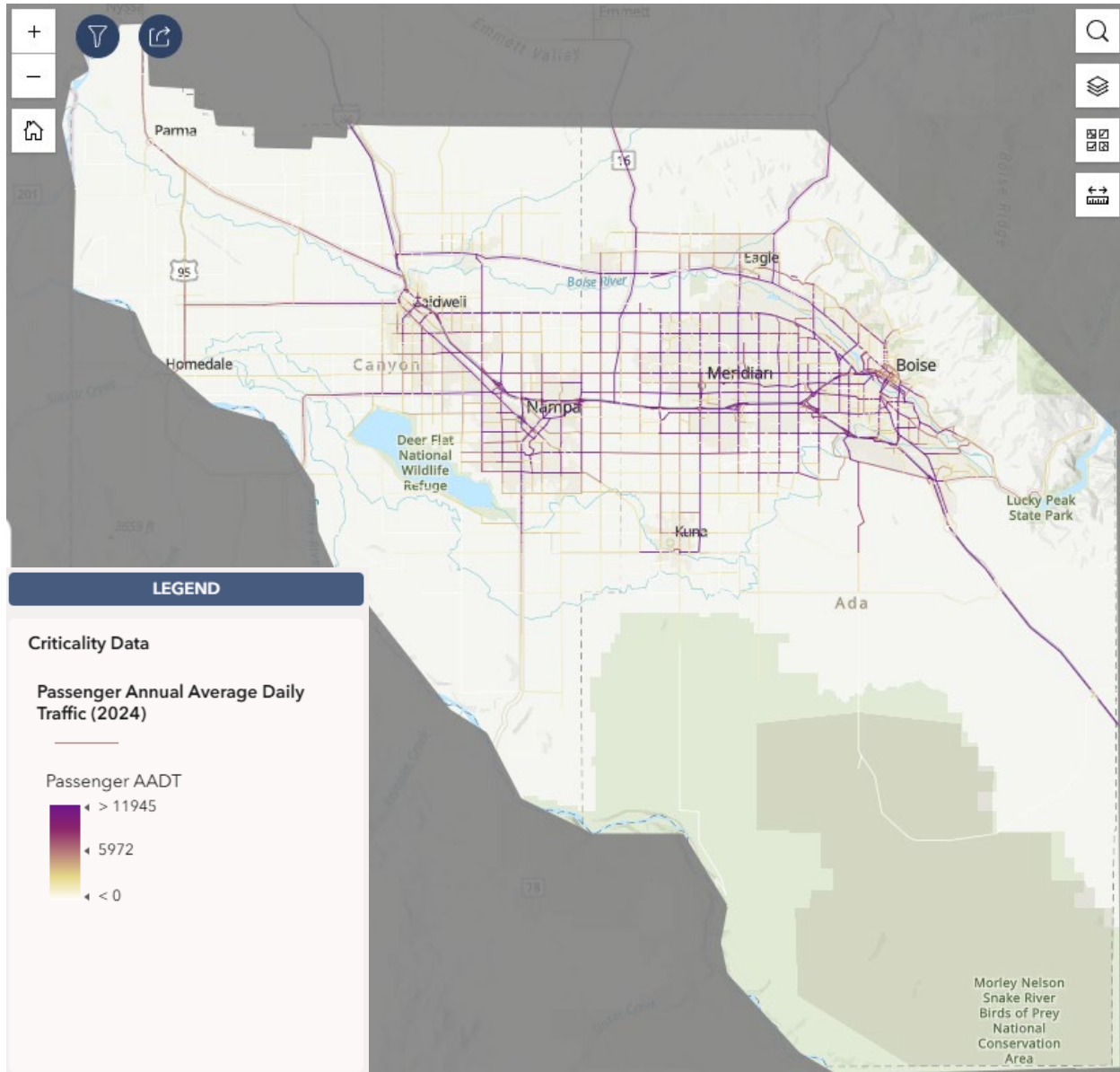
Information on each of the seven individual criticality criteria is provided in the sections that follow.



Average Daily Traffic

Figure 5 shows the passenger AADT levels for the roads included in the profile. The I-84 corridor serves as the primary east-west thoroughfare for the region, with some sections carrying as many as 130,000 vehicles per day. Several U.S. and state highways, as well as primary arterials near Boise, Meridian, and Nampa, experience between 10,000 and 20,000 daily trips.

Figure 5: Asset Criticality - Passenger AADT

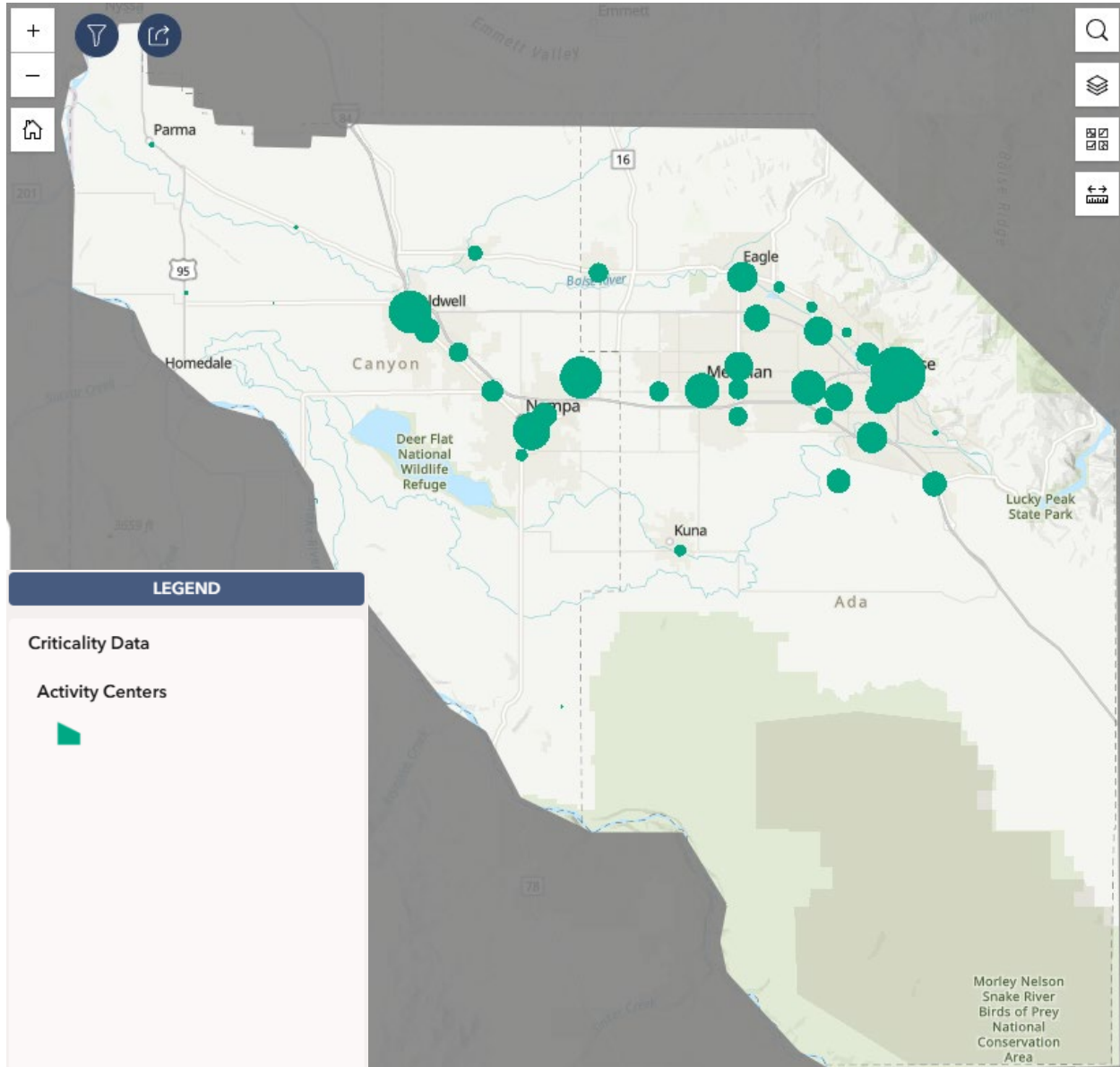




Proximity to Community Facilities

As part of its CIM 2050 planning process, COMPASS designated certain areas as “Activity Centers,” shown in Figure 6, based on projected population and employment growth. Most of the activity centers are grouped in the center of the region along the I-84 corridor, with a few further north along US-20 and SH-44. They feature downtown areas, as well as commercial nodes such as shopping centers. These areas feature a mixture of land uses and the highest densities in the region. Because of their central location, the activity centers also include many of the important medical and emergency response facilities that would be critical in the wake of a natural disaster.

Figure 6: Asset Criticality - Activity Centers





Redundancy/Detour Length

Figure 7 shows the redundancy scores for the road assets. The values are inverted, such that a redundancy score of one means the road has no alternatives in the vicinity and therefore has a higher criticality. Due to the denser layouts of urban areas, many of the arterials and much of the I-84 corridor tend to have more redundant routes. The highest scores are found on roads that serve the more remote communities in the foothills northeast of Boise. In some cases, these routes have no major alternatives, making them critical connections for nearby communities, especially in the event of evacuations. Figure 8 shows the detour length for the bridge and culvert assets. As with roads, assets in denser urban areas have more alternatives nearby.

Figure 7: Asset Criticality - Road Redundancy

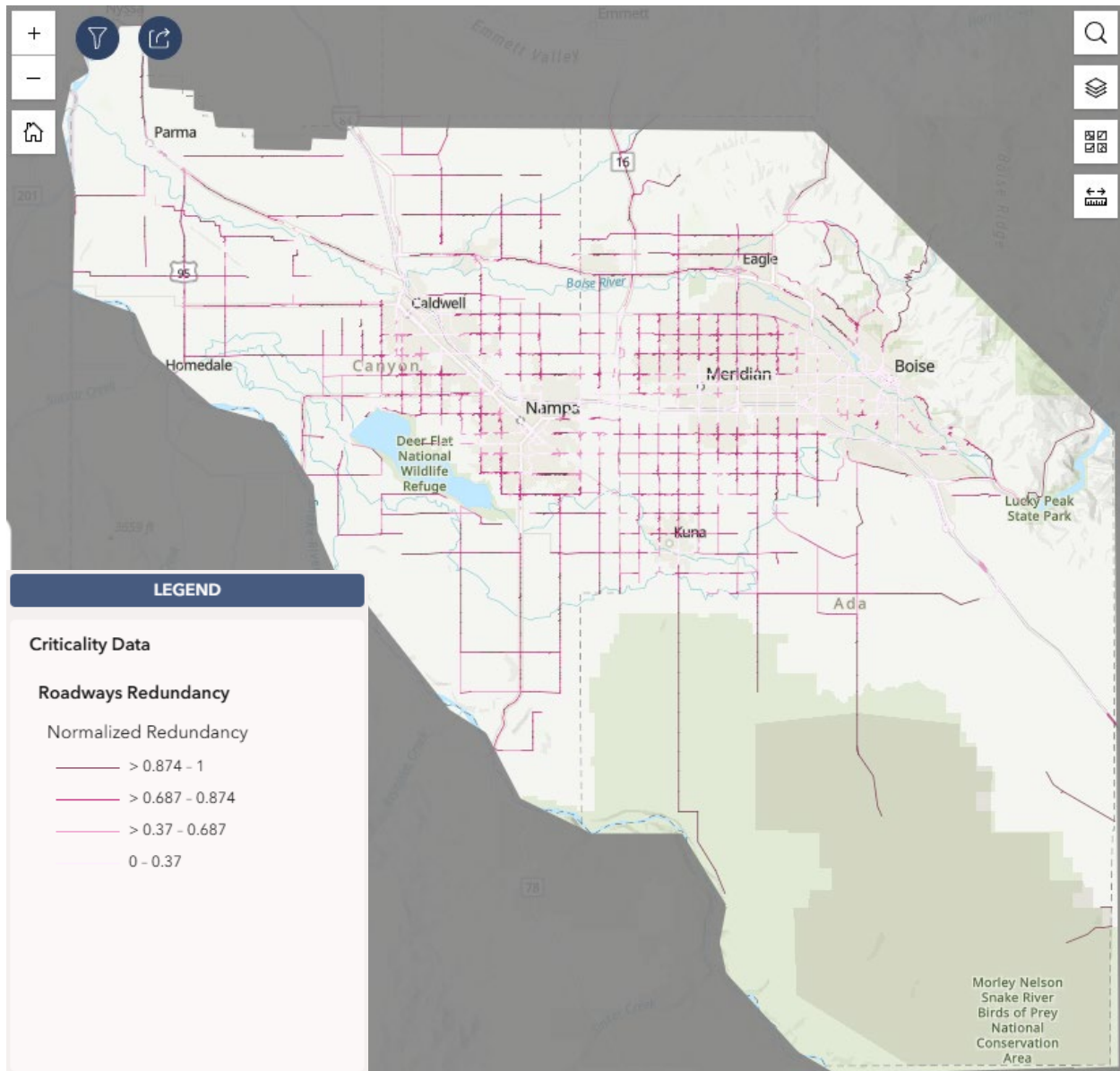
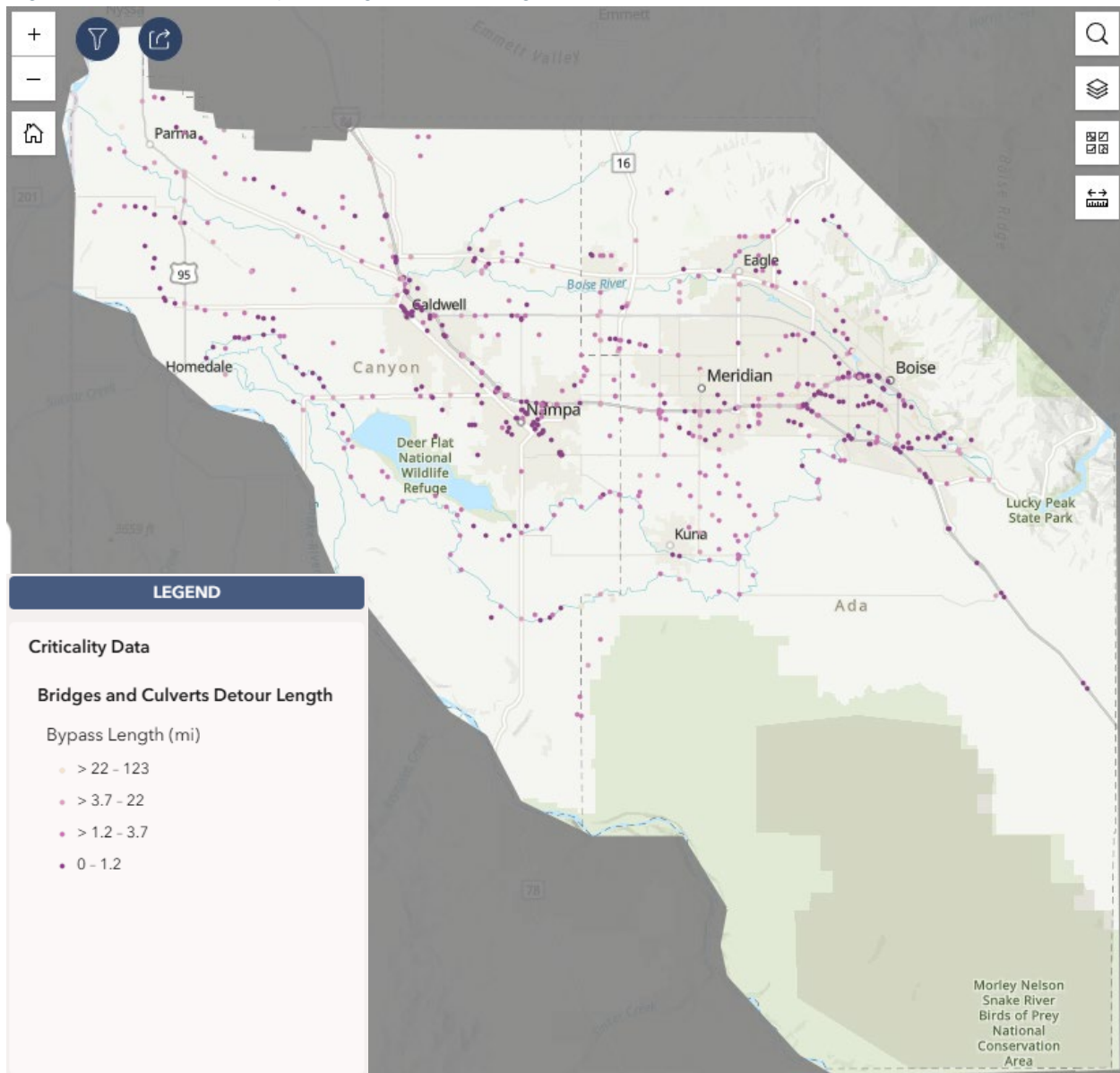




Figure 8: Asset Criticality - Bridge Detour Length

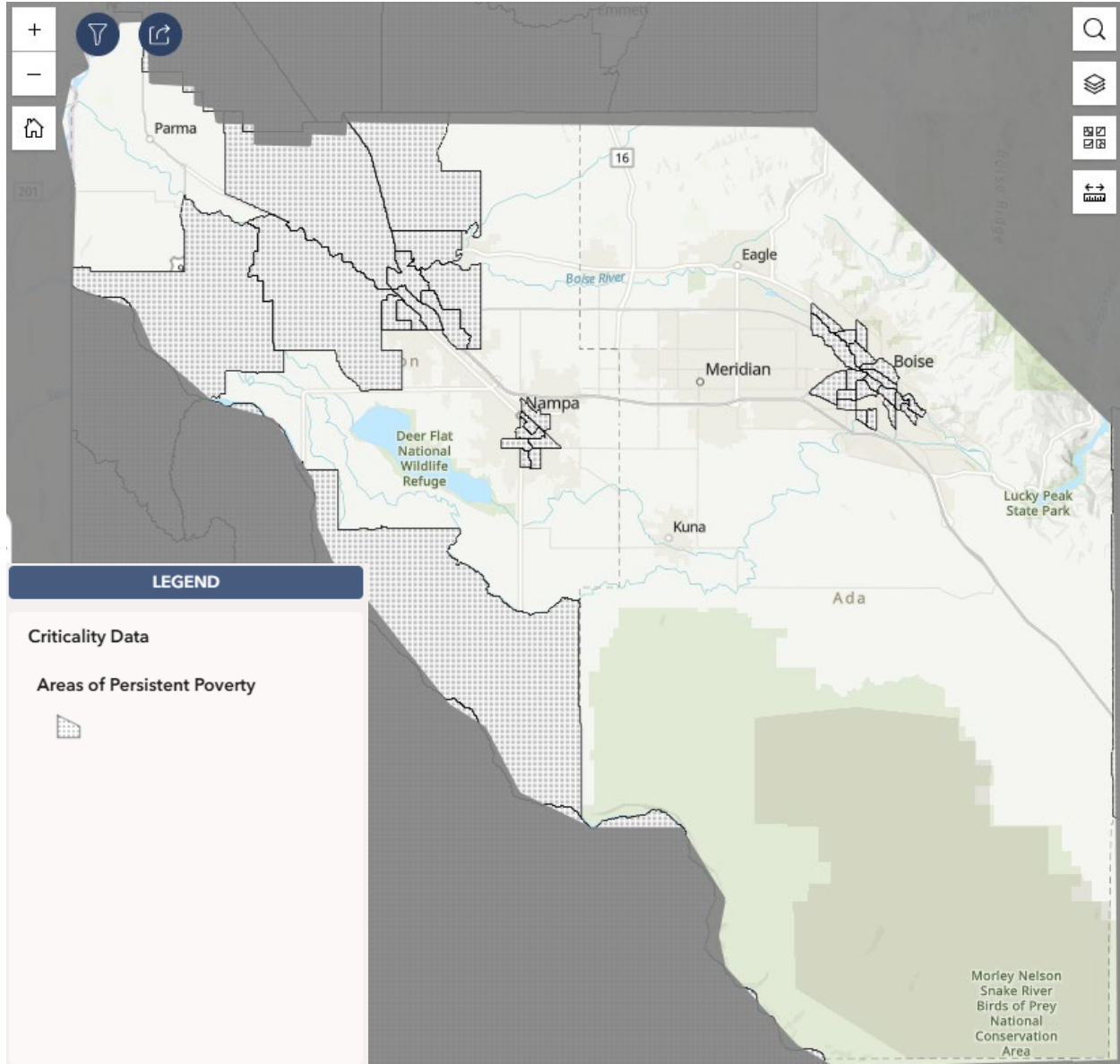




Connectivity for Underserved Communities

A total of 39 census tracts in Ada and Canyon Counties have been identified as APP. As shown in Figure 9, the tracts designated as APP are found in four clusters. Two clusters are found in urban areas, near Boise and Nampa. The other two are found in the predominantly rural areas in the northwest and south of Canyon County.

Figure 9: Asset Criticality - Areas of Persistent Poverty

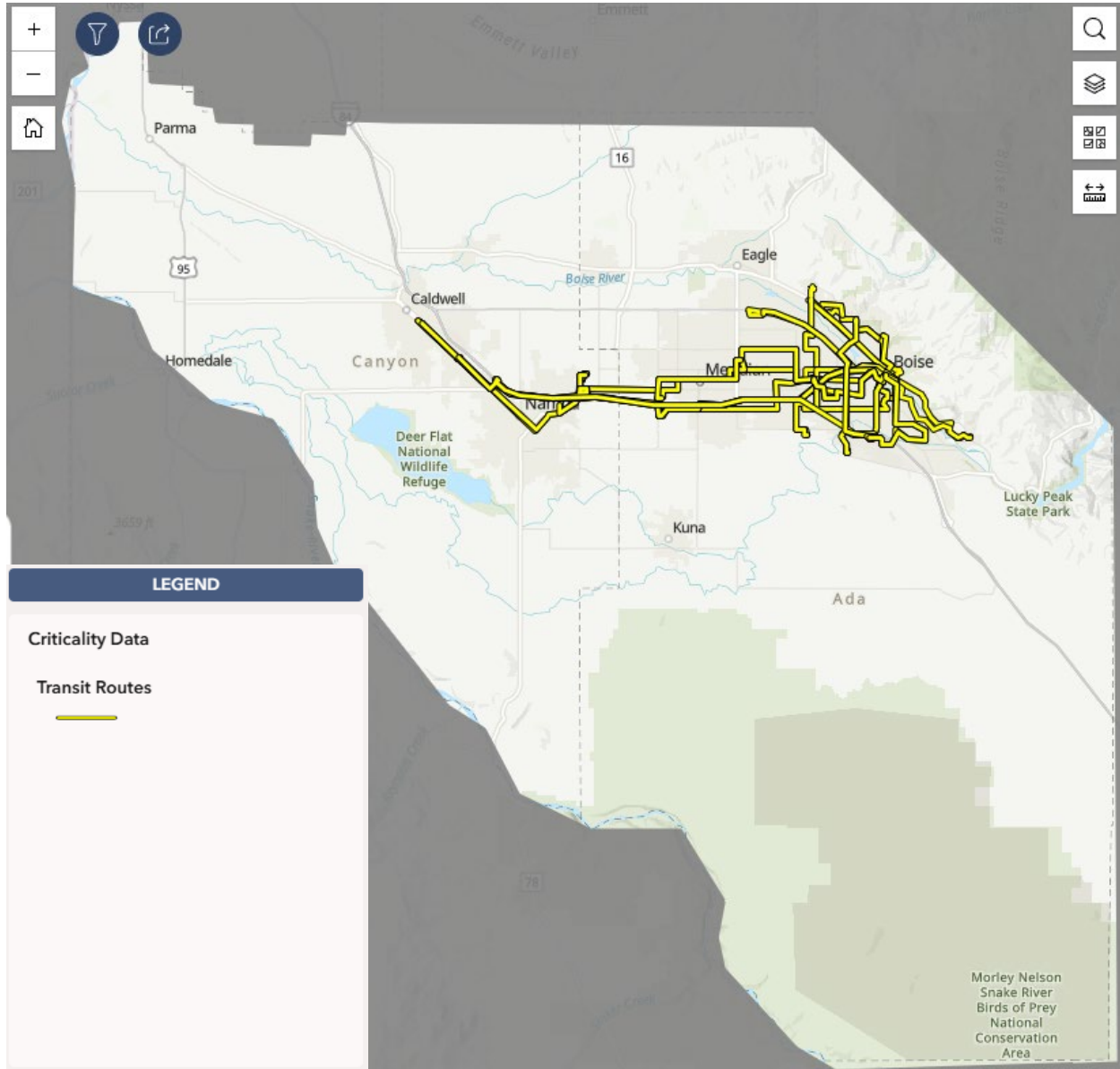




Transit Route Coverage

Scheduled bus service in the region is provided by Valley Regional Transit. As shown in Figure 10, most buses serve areas in and around Boise, with a few connections to Nampa and Caldwell to the west along I-84.

Figure 10: Asset Criticality - Transit Routes

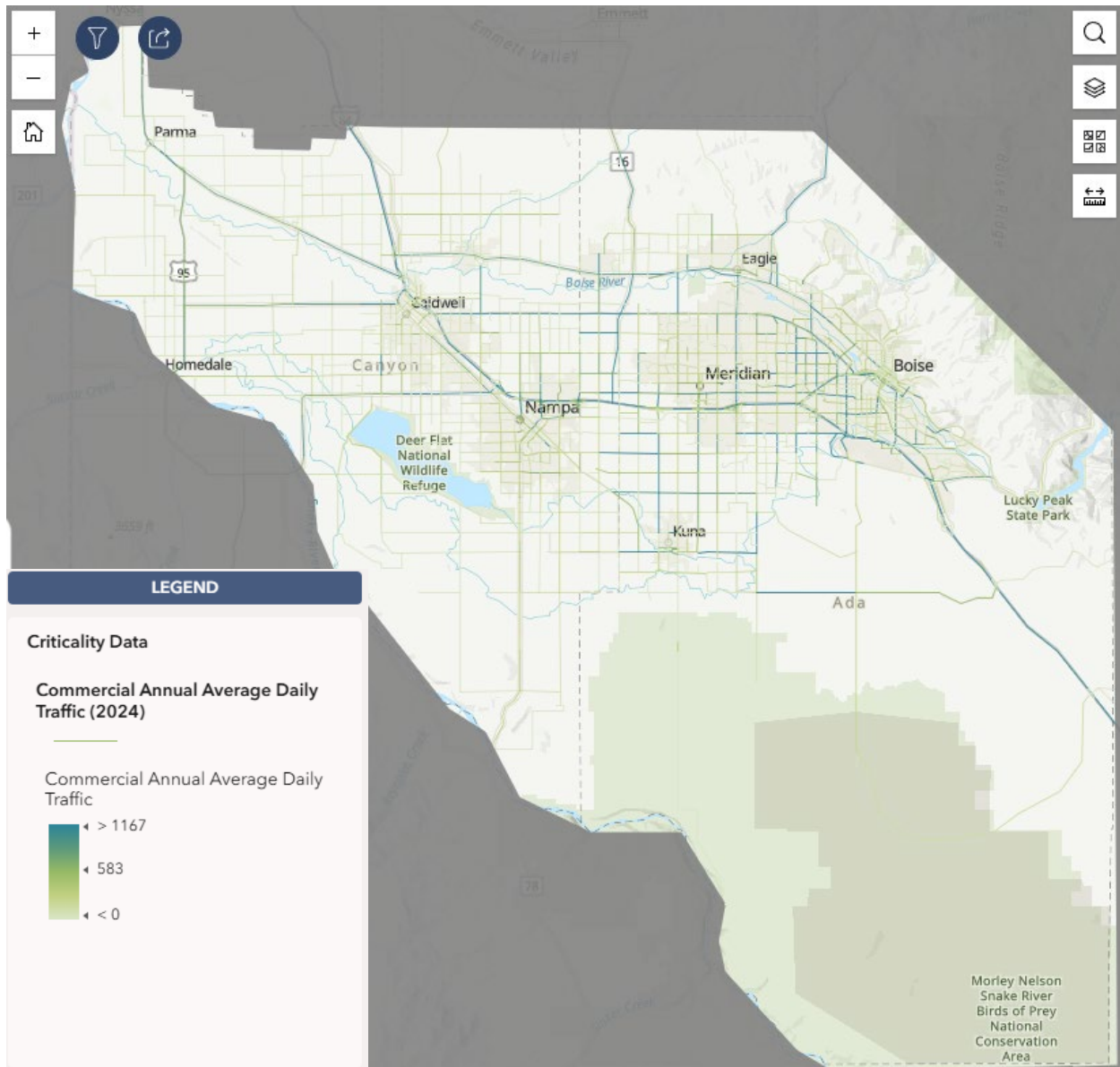




Freight Volume

Figure 11 shows the commercial truck AADT levels for the roads included in the profile. As with passenger traffic, the I-84 corridor is the most heavily used route for truck traffic in the region. Outside of that corridor, commercial traffic is concentrated on fewer U.S. and state highways and arterials than passenger traffic. SH-16 and SH-55 are important routes to the north, while SH-44 is an important secondary east-west route to the north of the Boise River.

Figure 11: Asset Criticality - Commercial AADT

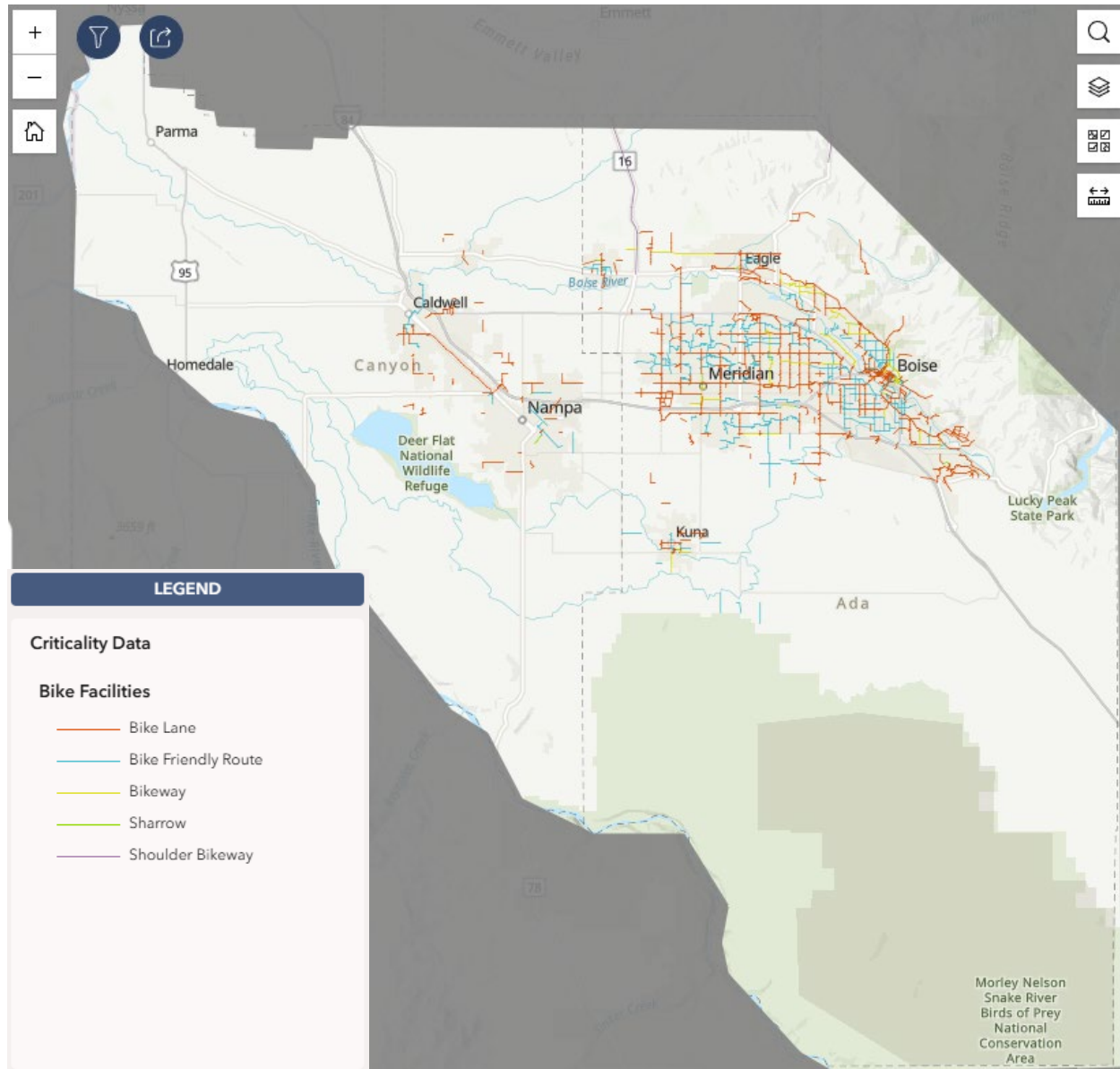




Presence of Active Transportation

The bike facilities included in the analysis include bike lanes, shoulder bike lanes, sharrows, and designated bike-friendly routes. As shown in Figure 12, most bike facilities are located within the boundaries of one of the region's cities, especially Boise, Meridian, and Eagle.

Figure 12: Asset Criticality - Bike Facilities



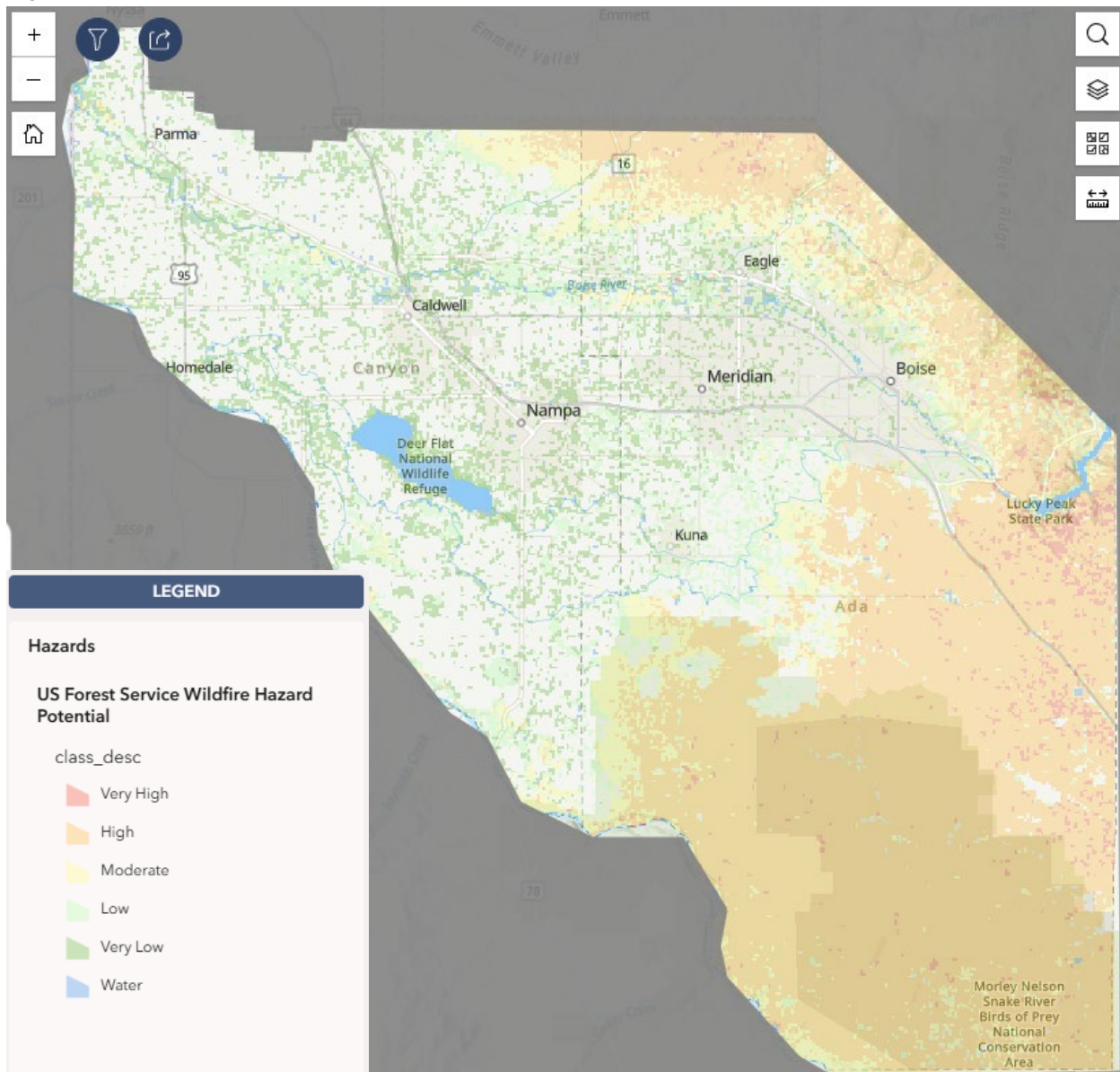


Hazards

Wildfire

Wildfire hazard (Figure 13) in the region is present primarily outside of the major urbanized areas. The highest hazard is found in remote rural areas in eastern Ada County. While sparsely populated today, population growth is anticipated, and one of the region's most important transportation corridors, I-84, passes directly through the area. Moderate- to high-hazard areas exist in the foothills northeast of Boise and Eagle. Several key state highways, including SH-16, SH-55, and SH-21, also pass through this area.

Figure 13: Hazards - Wildfire





Flooding

Figure 14 presents the flood hazard areas due to heavy precipitation and melting snow or ice according to FEMA's National Flood Hazard Maps. Most of Ada and Canyon Counties are within the 0.2% annual chance floodplain. The 1% annual chance floodplain affects a much smaller portion of the region, primarily centered on the Boise River. Several small Boise River tributaries near the Cities of Middleton, Eagle, Nampa, and Meridian contribute to the 1% annual chance floodplain. The 1% annual chance floodplain also intersects or passes close to major transportation corridors, including I-84, US-20, SH-16, and SH-44 in several locations across the region.

Figure 14: Hazards - FEMA National Flood Hazard

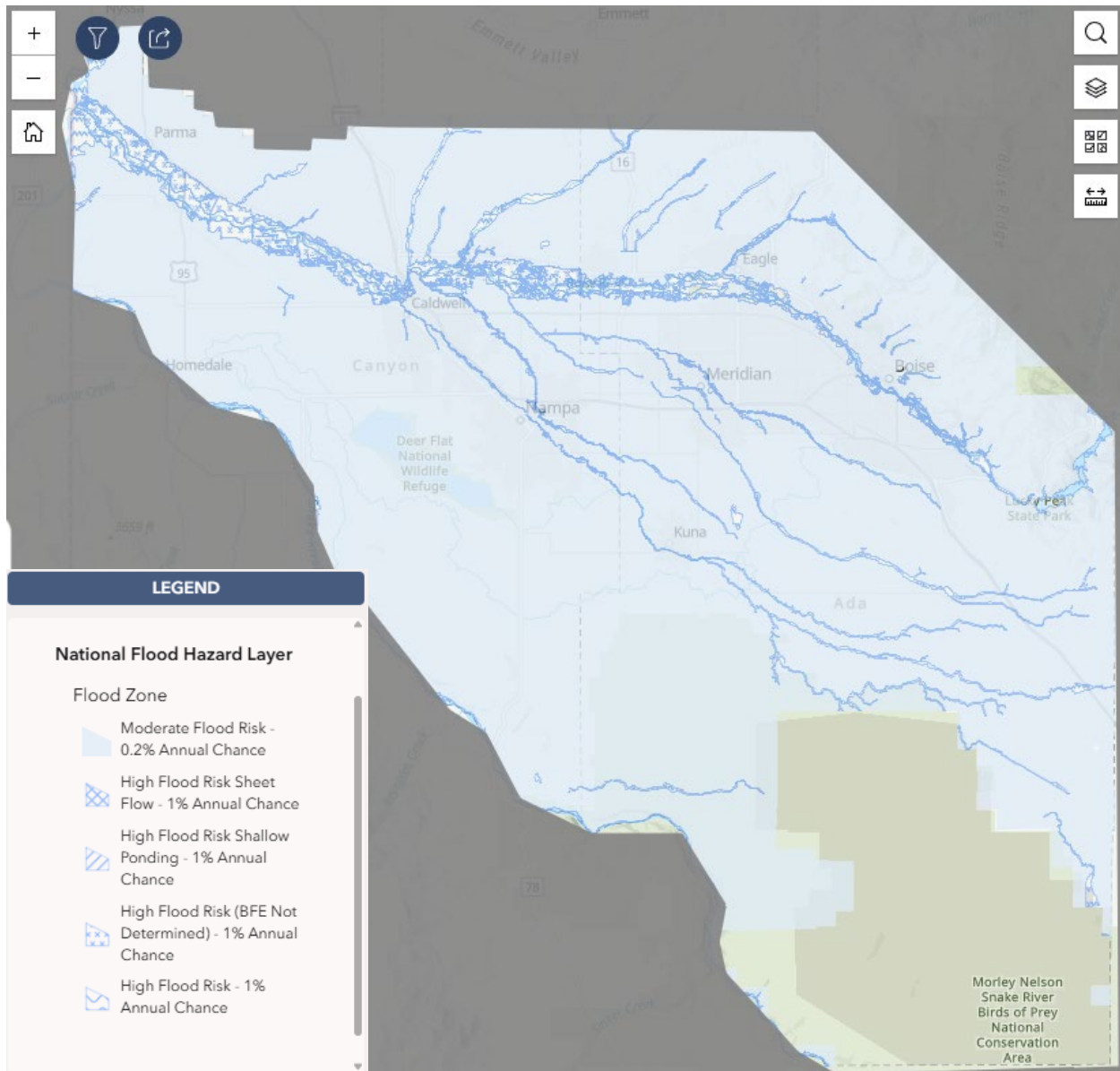




Figure 15 shows the 11,000 cfs model from the BRMT tool, representing the lowest flow rate where flooding begins to impact surface streets and leads to evacuations. Flooding in this scenario is generally limited to roads and bridges that already cross the Boise River and nearby local streets. In contrast, Figure 16 shows the 34,800 cfs scenario, representing the maximum output of the Lucky Peak Dam. Flooding in this scenario extends much further from the river's natural channel, impacting large portions of the communities nearby.

Figure 15: Hazards - BRMT 11,000 cfs Scenario

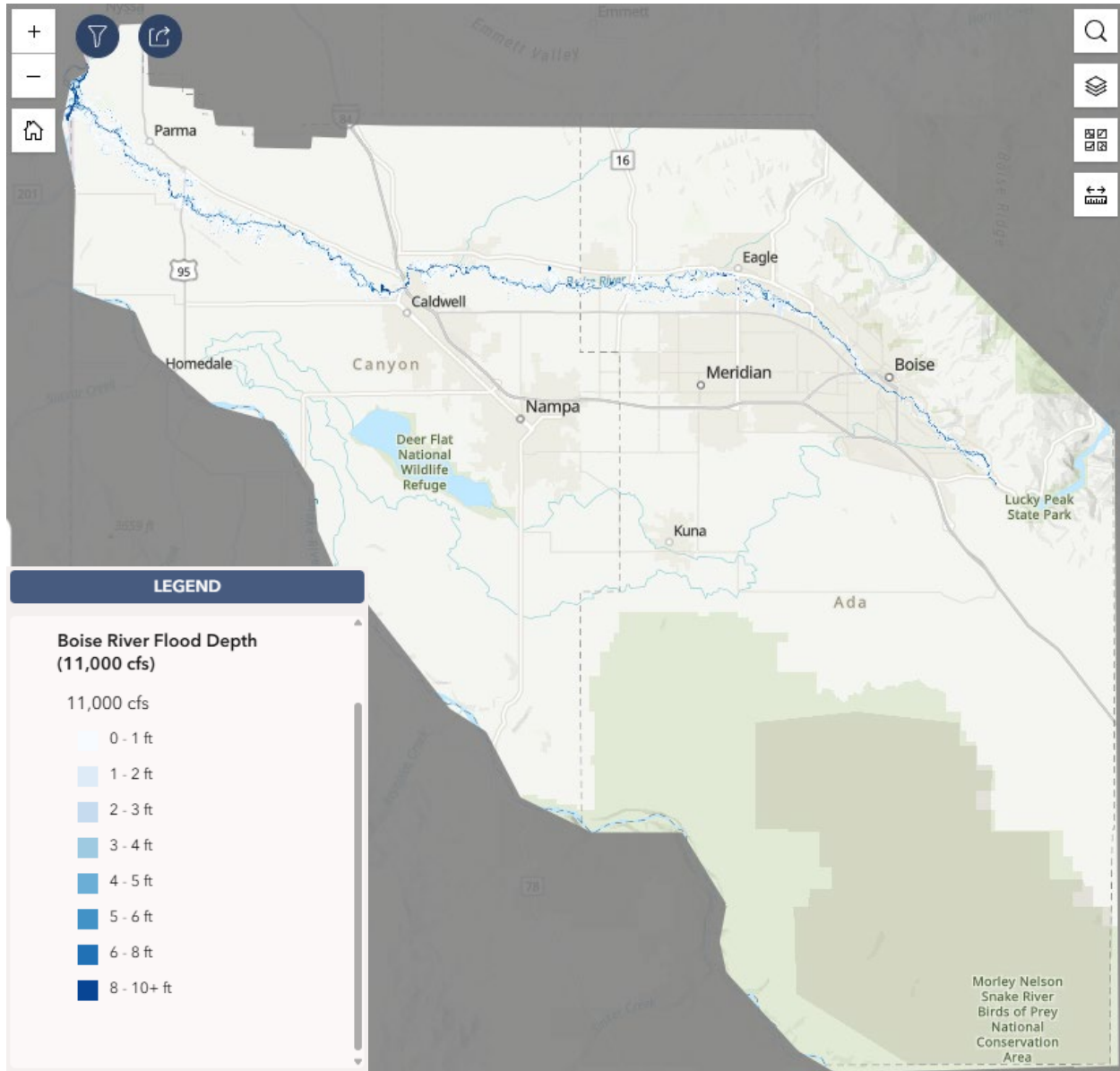
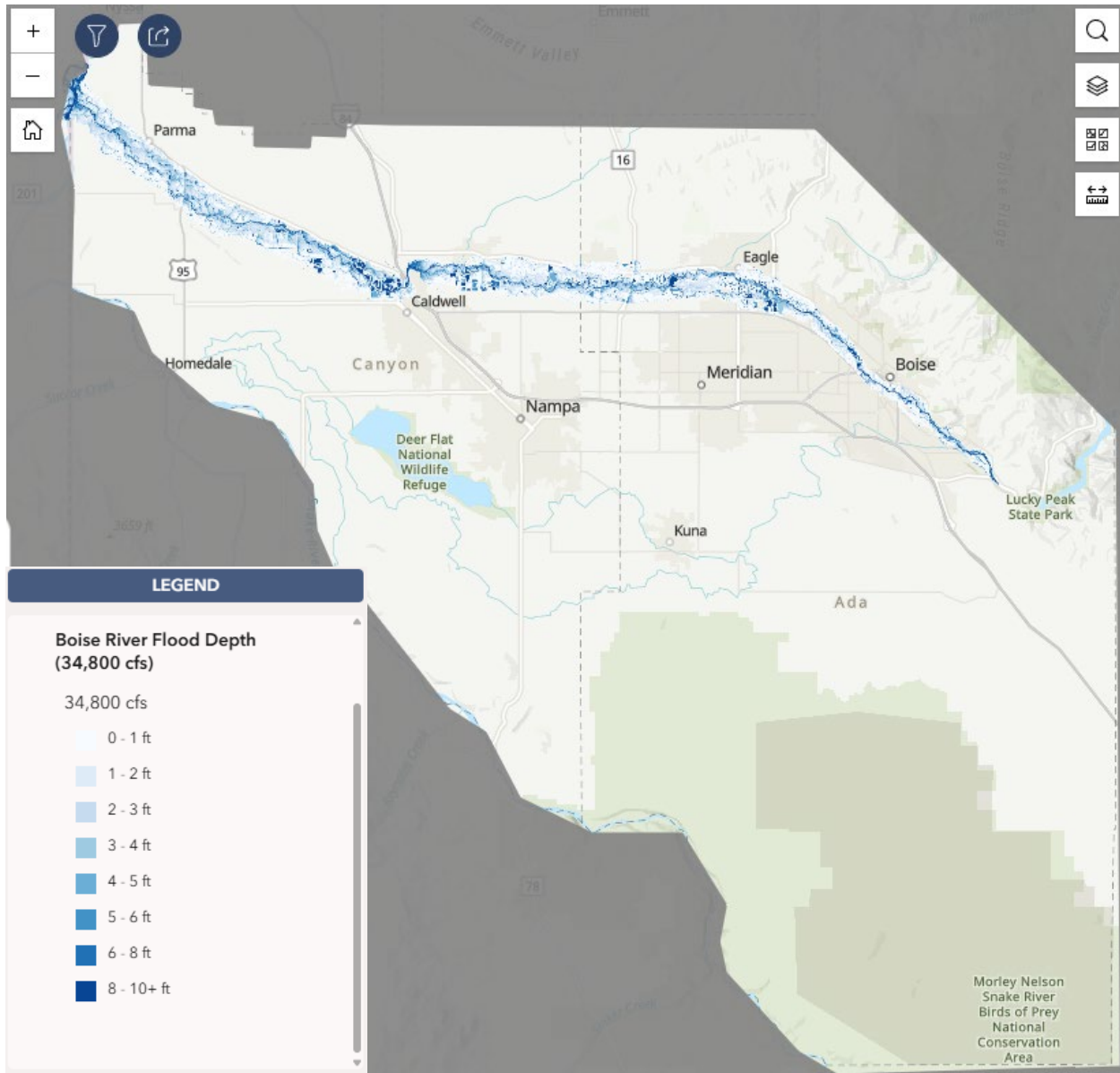




Figure 16: Hazards - BRMT 34,800 cfs Scenario

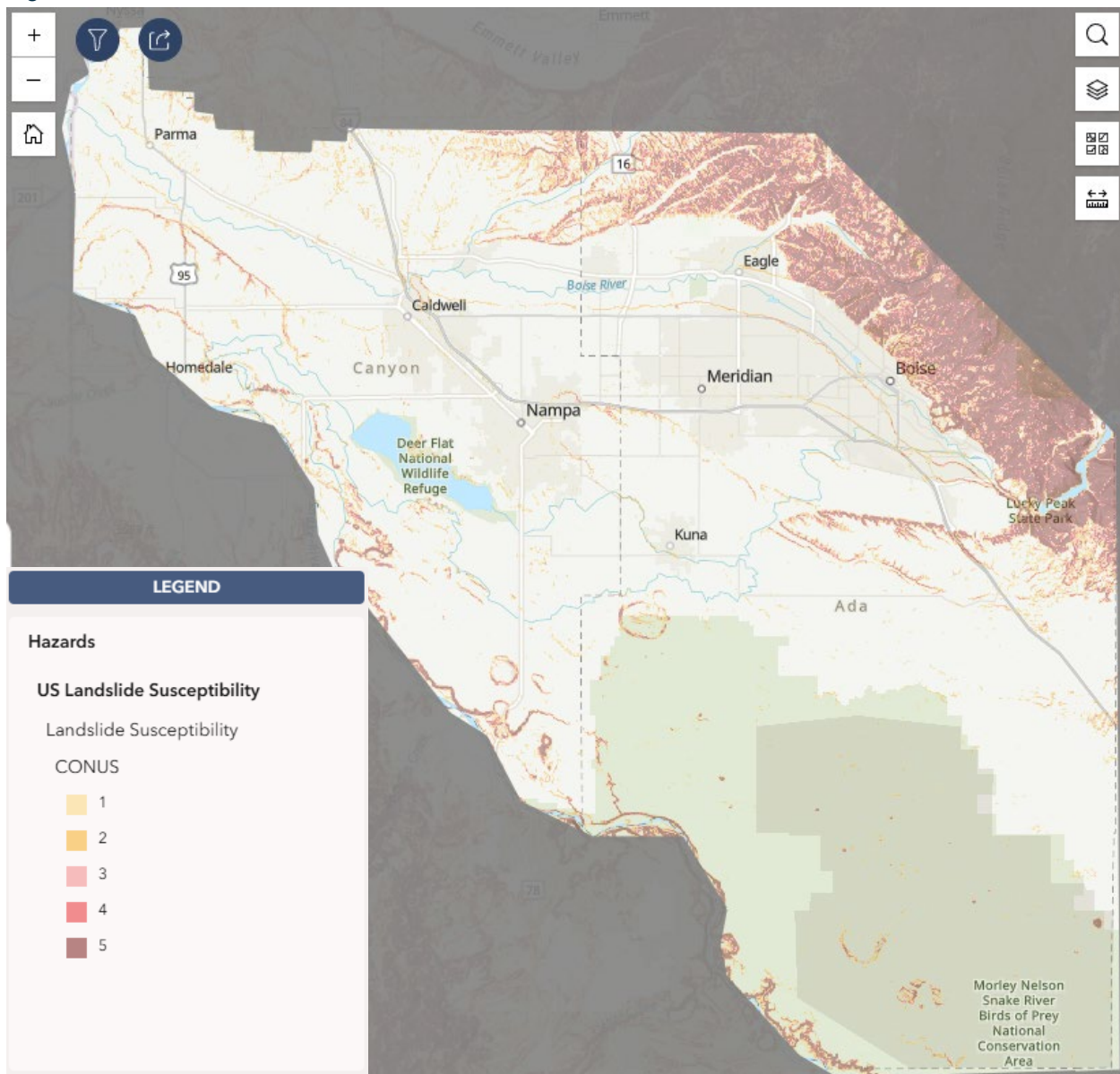




Landslides

Figure 17 shows landslide susceptibility in the region. The largest areas of impact are in the foothills northeast of Boise, where roadway damage or blockage due to a landslide event has the potential to cut off access to nearby communities. Several smaller hazard areas also exist in the area, including along I-84 in southeast Ada County, and along many of the creeks and canals throughout the region.

Figure 17: Hazards - Landslides

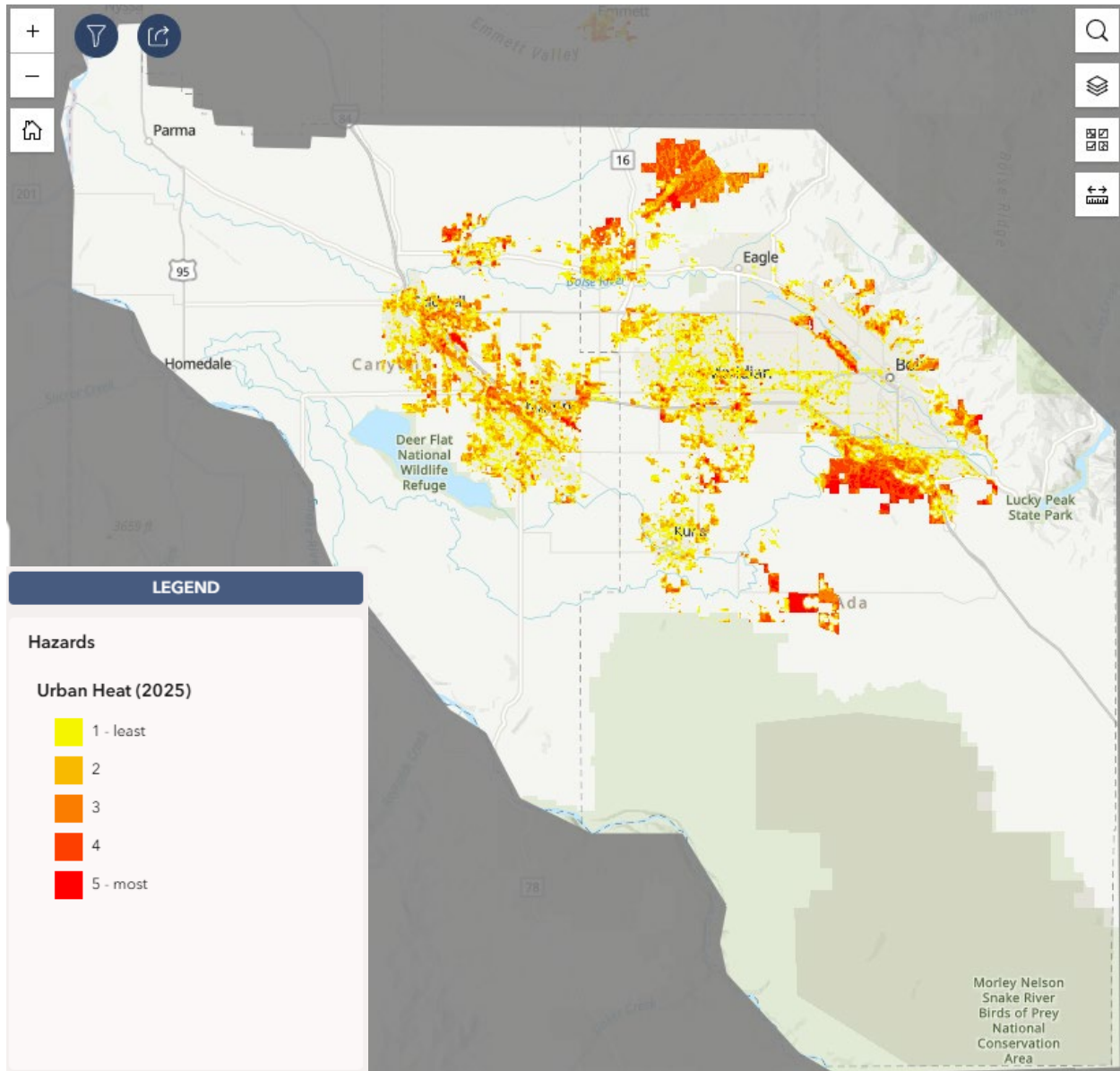




Extreme Heat

The urban heat island effect is observed primarily in built-up urban areas (Figure 18). The strongest effect can be seen in places with large areas of unshaded paved spaces, such as shopping centers and industrial areas.

Figure 18: Hazards - Extreme Heat





Using the Resilience Profile

An interactive web map showcasing the various elements of the resilience profile can be accessed via the COMPASS website. The map is designed to be a flexible tool for users to explore hazards and criticality in the region. Agencies interested in using the tool for improving resilience in their area can start by identifying assets or locations of interest. Clicking on an asset provides more information about the asset, its overall criticality score, and each of the component criteria. Users can then toggle the hazard layers to understand the likelihood of each hazard impacting the area where the asset is located. Insights from the profile can inform efforts to improve the resilience of existing projects and to identify projects and locations for future projects as part of long-range planning efforts. The following sections provide more ideas for how users can use the information from the profile to improve resilience.

Criticality

The asset criticality scores developed for the resilience profile are designed to help agencies understand which assets are most significant to regional mobility and enable them to think more comprehensively about transportation resilience. This information can support agencies' planning, programming, and operations in a variety of ways:

- Identifying the most important corridors or locations for further, more detailed vulnerability assessments.
- Prioritizing maintenance activities and resilience-focused improvement projects in the most important areas.
- Informing emergency preparedness planning.

Hazards

While the hazard risk maps do not indicate the probability of failure or the expected severity of damage for a given asset, they can help determine where the likelihood of exposure to each hazard is higher, especially at the regional scale. Agencies can use the maps to:

- Understand the hazards most likely to impact specific assets or project sites, and the types of disruption or damage they can cause.
- Identify hotspots where multiple hazards overlap with critical assets.
- Guide decisions about project engineering and design based on expected hazard exposure.



RESILIENCE STRATEGIES AND CASE STUDIES

This section outlines example strategies to enhance the resilience of transportation assets. Each strategy includes a real-world case study example. The strategies and case studies are intended to serve as a toolkit of scalable techniques for improving resilience, mostly focused on capital improvements, but also covering some maintenance and operations activities. In addition to standalone projects, agencies can also use these techniques to augment projects they are already planning, including those listed in the regional transportation improvement program for Ada and Canyon Counties, to boost resilience outcomes and ensure investments address site-specific needs. Not every strategy is appropriate for every location; selection should be based on the asset type, dominant hazards, budget, and site-specific conditions. The strategies are aligned with the goals of many resilience funding programs, including PROTECT, BRIC, and local match funding programs from ITD.

Wildfire

Hardening

- **What's Included:** Use of fireproof or heat-resistant materials in new construction, or the replacement of less resistant materials in existing assets. Examples include replacing plastic culverts with corrugated steel pipe (CSP) or burying them deeper to reduce exposure; replacing wooden signposts and guardrails near roadways with metal or other inert materials; and replacing timber and other flammable materials when repairing or rebuilding bridges.
- **Target Assets:** Culverts, bridges, guardrails, signposts.
- **Benefits:** The goal of hardening is to prevent or reduce direct damage to assets from fire. This allows assets to continue to function during emergencies and reduce the cost and duration of post-fire recovery.
- **Case Study:** In [Douglas County, Washington](#), a bridge built in 1953 with timber abutments was severely damaged by wildfires in 2020. To replace it, county engineers designed a new bridge with more resilient concrete and steel abutments.¹

Landscape Design

- **What's Included:** Design of roadside landscaping to include a vegetation-free buffer and use of native, fire-tolerant species.
- **Target Assets:** Road and trail corridors.
- **Benefits:** Vegetation-free buffers protect road users from flames, allowing the corridor to serve as a safe evacuation route as well as a fire break to reduce spread. Fire-resistant plants can survive higher temperatures without drying out and creating excess fuel for fires. As cars are a frequent source of ignition for roadside fires, these measures can also help prevent fires from starting in the first place.
- **Case Study:** A [study completed by the California Department of Transportation](#) summarized a wide range of roadside design strategies used in seven states, including vegetation-free zones, use of inert materials, and appropriate vegetation material.²

¹ https://www.ncwlife.com/news/douglas-county-concludes-upper-pearl-hill-bridge-replacement-project/article_34d0948e-c333-487e-b91e-d373664d5228.html

² <https://dot.ca.gov/-/media/dot-media/programs/research-innovation-system-information/documents/preliminary-investigations/pi-0235a-a11y.pdf>



Early Detection and Intelligent Road Corridors

- **What's Included:** Deployment of fire detection sensors and ITS infrastructure in high-risk areas and designated evacuation routes.
- **Target Assets:** Road and trail corridors.
- **Benefits:** Cutting-edge fire sensors can alert first responders of nearby fires faster and with less human input than existing methods. Similar sensor arrays can be integrated with existing or planned ITS and Transportation Systems Management and Operations infrastructure to help first responders track fires and direct evacuations.
- **Case Study:** A [pilot program in Gilpin County, Colorado](#) deployed 100 sensors on power poles across the county. The system has already detected at least three active fires.³

Post-Fire Effects

- **What's Included:** Projects that increase resilience to common secondary impacts from wildfire, including landslides and flash flooding.
- **Target Assets:** All.
- **Benefits:** Areas where vegetation and topsoil have been burnt can become much more prone to landslides and flooding. For this reason, it is often important to emphasize resilience to those hazards in fire-prone areas (using the strategies explored in the following sections), even in areas that are not otherwise at risk.
- **Case Study:** In 2010, multiple heavy rain events struck an area of [central Arizona](#) shortly after it had been burned by wildfire, resulting in significant flooding and erosion along a five-mile section of US-89. After repairing the road, the Arizona Department of Transportation incorporated additional drainage channels and retention facilities, which have been successful in reducing flooding on the highway.⁴

Flooding

Drainage Improvements: Green Infrastructure

- **What's Included:** Nature-based measures that manage stormwater on site. Examples include street trees, bioswales, rain gardens, vegetated channels, and permeable pavements.
- **Target Assets:** Road and trail corridors.
- **Benefits:** Green infrastructure is designed to improve on-site management of stormwater. Natural systems improve infiltration and spread the impact of acute precipitation events over time, reducing the load on conventional stormwater infrastructure. Vegetation can help stabilize slopes that may have been denuded by wildfires. Ancillary benefits include improvements to water and air quality, water table recharge, soil health, and cooling.
- **Case Study:** [The Indianapolis Cultural Trail](#) is an eight-mile network of mixed-use trails in Downtown Indianapolis, IN. The project includes a variety of nature-based stormwater improvements, including 25,000 square feet of bioswales and 500 trees.⁵

Drainage Improvements: Grey Infrastructure

- **What's Included:** Installation or expansion of conventional drainage assets, including culvert expansion, expansion and realignment of drainage channels, and detention ponds.
- **Target Assets:** Road and trail corridors.

³ <https://coloradosun.com/2024/09/20/new-ai-sniffs-out-fires-in-colorado/>

⁴ https://www.fhwa.dot.gov/programadmin/er/er_case_arizona_schultzfire.pdf

⁵ https://www.environment.fhwa.dot.gov/Pubs_resources_tools/publications/newsletters/jul18nl.pdf



- **Benefits:** Increased stormwater system capacity reduces overtopping and washouts, and prevents clogging caused by debris and intense storm events.
- **Case Study:** The city of [Golden, CO](#) implemented extensive improvements to Lena Gulch to reduce flooding and erosion. The project increased the capacity of the channel to accommodate runoff from a 100-year storm. Improvements included the installation of larger culverts and the realignment and stabilization of the stream channel.⁶

Bridge and Road Elevation

- **What's Included:** Increasing bridge and roadway elevation above expected flood levels, either through roadway grading, adding bridges, or realigning corridors to higher elevations.
- **Target Assets:** Roads, bridges, trails.
- **Benefits:** Higher elevation reduces the likelihood of flooding and overtopping, leading to fewer closures and less damage to assets.
- **Case Study:** The [state of Minnesota](#) implemented a \$50 million statewide flood mitigation program after the state experienced significant flooding in 2010. The program funded a variety of projects, including the construction of bridges and corridor realignment to elevate roadways out of the 1% annual chance floodplain to reduce flooding.⁷

Landslides

Slope Stabilization

- **What's Included:** Measures to reduce slope failure risk and control erosion. Examples include soil nailing, earthwork, retaining walls, vegetation stabilization, and drainage improvements. Site-specific details will inform which strategies are most effective.
- **Target Assets:** Roads, bridges, and trails adjacent to slopes.
- **Benefits:** Slope stabilization aims to prevent landslide events, reducing the likelihood of roadway burial or damage. This can prevent closures, improve safety, and reduce maintenance and repair costs.
- **Case Study:** The city of [Pittsburgh, PA](#) recently completed an extensive landslide remediation project in the Mt. Washington area. The neighborhood is situated on a steep hillside and frequently experienced landslides that blocked or damaged roadways. The project focused on three sites, employing a variety of stabilizing strategies to minimize further events.⁸

Asset Protection

- **What's Included:** Structures that protect assets from falling debris, including rockfall fences, catchment ditches, rock sheds, and barriers or berms.
- **Target Assets:** Roads, bridges, and trails adjacent to slopes.
- **Benefits:** Rather than attempting to prevent landslides, asset protection measures aim to limit their impact on infrastructure. Effective protection measures can prevent costly damage from debris and reduce emergency closures.
- **Case Study:** In 2020, the Grizzly Creek fire burned a large area of [Glenwood Canyon in Colorado](#) and triggered significant rockfall activity along portions of I-70. Based on the

⁶ <https://storymaps.arcgis.com/stories/643e1501acac44549129c9397bc46c61>

⁷ <https://www.adaptationclearinghouse.org/resources/minnesota-dot-flood-mitigation-program.html>

⁸ <https://www.pittsburghpa.gov/News-articles/Homepage/Mayor-Ed-Gainey-and-the-City-of-Pittsburgh-Celebrates-Completion-of-Mt.-Washington-Landslide-Remediation-Projects>



results of debris flow modeling, the Colorado Department of Transportation installed a series of rockfall fences, designed to reduce damage from small and medium rockfall events and reduce closures.⁹

Roadway Elevation and Realignment

- **What's Included:** Raising roadway profiles above known or projected erosion and debris deposition zones. This can be accomplished by regrading or adding structures (bridges or viaducts) for debris to pass beneath, or by realigning corridors to higher ground.
- **Target Assets:** Roads, bridges, multi-use trails.
- **Benefits:** Increasing elevation can protect corridors from blockage and damage from falling debris by providing space for debris to pass under the road. This can also protect roads and trails at risk of cracking or movement due to erosion beneath the pavement. In some cases, realignment to higher or more stable ground can also reduce risk.
- **Case Study:** In 2020, heavy rain in [northern Alabama](#) triggered landslides beneath a 400-foot section of U.S. Highway 231, causing the roadway to settle by four feet, with significant cracking and bulging of pavement. Instead of repairing the road in place, Alabama Department of Transportation engineers determined that elevating the highway onto two bridges was a more cost-effective method of preventing further damage from erosion than stabilizing the slope.¹⁰

Extreme Heat

Trees and Shade Structures

- **What's Included:** Expansion of urban and roadside tree canopy and/or installation of shade structures in locations where users experience heat exposure, especially at transit stops and along pedestrian corridors.
- **Target Assets:** Sidewalks, trails, transit stops.
- **Benefits:** Trees and other shade sources can significantly reduce the urban heat island effect and improve temperatures and air quality at the ground level. Studies have shown that trees and effective shade structures can reduce air temperatures by as much as 10 degrees, creating a safer environment for transit riders, pedestrians, and other users of active transportation. Shade can also reduce damage to pavement from extreme temperatures.
- **Case Study:** [Las Vegas, NV](#) regularly experiences extreme temperatures. To combat this, the city has set a goal of planting 2,000 trees per year through 2050.¹¹

Cool Pavement

- **What's Included:** Pavement treatments and materials designed to reflect more solar energy than traditional materials.
- **Target Assets:** Paved roads, bridges, and trails.
- **Benefits:** Cool pavement products aim to reduce the amount of solar energy absorbed by traditional road materials like asphalt. This can significantly reduce surface temperatures and roadway damage from extreme temperatures. They may also offer improvements to air temperatures.

⁹ https://www.fhwa.dot.gov/programadmin/er/er_case_colorado_grizzlycreek.pdf

¹⁰ https://www.fhwa.dot.gov/programadmin/er/er_case_alabama_us231.pdf

¹¹ <https://www.npr.org/2025/06/09/nx-s1-5340363/las-vegas-climate-change-solution-trees>



- **Case Study:** In 2020, the city of [Phoenix, AZ](#) began a cool pavement pilot program. They found that it reduced surface temperatures by up to 12 degrees and could ultimately reduce roadway maintenance costs. The city has since applied over 140 miles of cool pavement.¹²

¹² <https://www.phoenix.gov/administration/departments/streets/initiatives/pavement-maintenance/cool-pavement-program.html>



NEXT STEPS

Further Study

This Resilience Improvement Plan presents a holistic assessment of the critical transportation assets in Ada and Canyon Counties and the natural hazards that may impact them, with the goal of enabling COMPASS and its members to make informed, risk-based decisions about resilience improvements.

Future work on this topic may include developing additional **high-quality asset data**, such as for ITS infrastructure, bridge elevation, and evacuation routes. These datasets would broaden the scope of future analyses, providing a more holistic understanding of resilience in the region. Working group members also recommended that future work on this topic emphasize the use of **locally generated data**, arguing that local agencies with first-hand understanding often have important insight that may not appear in state and national datasets.

Similarly, this Resilience Improvement Plan relies primarily on hazard exposure data based on present or historical conditions. Future analyses could build on this work by incorporating **models and projections of future exposure**. Climate and weather patterns are changing over time, and modeled projections can provide important insights into how hazards impacting the region are expected to change.

Finally, during the Resilience Improvement Plan development process, working group members identified specific planning needs that were beyond the scope of the development effort, but which would be valuable for future study. First, members of the working group felt that further analysis should be carried out in relation to the **failure of the Lucky Peak Dam**. Second, working group members noted that the region does not have a cohesive **evacuation plan**. Evacuation planning related to regional transportation system resilience could include identification of designated evacuation routes; analysis of land uses and community needs on each side of the river; locations of emergency evacuation shelters; and goods movement to meet community needs during emergencies. Lastly, working group members consistently raised the need for improving **operational resilience from winter weather events or storms**.

Performance Tracking

To support ongoing evaluation and continuous improvement, COMPASS may wish to establish clear performance metrics related to resilience improvements. Identifying and tracking hazard-specific indicators over time would help quantify the benefits from completed resilience projects as well as changes in hazard impacts. Table 6 shows example metrics, but COMPASS will need to refine and update them based on available data and the measurability of each item. Once finalized, long-term tracking will help create a picture of resilience improvements in the region.



Table 6: Example Resilience Metrics

All Hazards	<ul style="list-style-type: none">▪ Observed annual natural hazard-related closure hours for transportation assets in the region.▪ Average duration (hours/minutes) of closure/disruption of transportation asset after a natural hazard-related closure.▪ Number of assets repeatedly requiring repair due to hazard impacts.▪ Percent change in travel time reliability after disruption event.
Wildfire	<ul style="list-style-type: none">▪ Number of wildfire-related events that impact transportation assets.▪ Cumulative length of corridors closed or damaged by fire per year.
Flooding	<ul style="list-style-type: none">▪ Number of observed roadway overtopping or inundation events.▪ Average duration of road closure due to flooding events.
Landslides	<ul style="list-style-type: none">▪ Number of landslide-related events that impact transportation assets.
Extreme Heat	<ul style="list-style-type: none">▪ Percent change in total area of high heat island severity.



APPENDIX A: LITERATURE REVIEW

This literature review, conducted in late 2025 during the development of the COMPASS Resilience Improvement Plan, helped identify natural hazards most relevant to Ada and Canyon Counties. Six sources proved to be most helpful to this effort:

- Idaho Transportation Department (ITD) Resiliency Strategy (In Development)
- State of Idaho Hazard Mitigation Plan
- Ada County Multi-Hazard Mitigation Plan
- Canyon County All-Hazard Mitigation Plan
- Boise Climate Adaptation Assessment
- Impacts of Climate Change on Idaho’s Infrastructure

Table 7 summarizes the types of hazards included in the resilience and hazard mitigation plans reviewed. 16 hazards are included in at least one of the sources. Six of these hazards were identified as most relevant to the COMPASS region. These hazards were selected for detailed analysis based on their frequency, severity, and potential impact on transportation infrastructure. These are:

- Wildfires
- Floods
- Landslides
- Earthquakes
- Extreme heat
- Extreme weather

The following hazards are less relevant to the region and relate less to the Resilience Improvement Plan, and are therefore not covered further in this literature review:

- Volcanic eruptions and avalanches
 - Unlikely to affect Ada and Canyon Counties
- Droughts and extreme cold
 - Limited transportation impacts
- Thunderstorms, heavy precipitation, lightning, straight-line winds, winter storms, hail, and tornadoes
 - Combined into “extreme weather”
- Dam failure
 - Included in floods



Table 7: Hazards Analyzed by Source

	Wildfires	Floods	Landslides	Earthquakes	Extreme Heat	Thunderstorm/Heavy Precip	Drought	Avalanche	Dam/Canal Failure	Lightning	Straight-Line Wind	Winter Storms	Hail	Tornadoes	Extreme Cold	Volcanic Eruptions
ITD Resiliency Strategy (In development)	X	X	X	X				X ¹³								
State Hazard Mitigation Plan	X	X	X	X		X	X	X	X ¹⁴	X	X	X	X	X		X
Ada County Hazard Mitigation Plan	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X
Canyon County Hazard Mitigation Plan	X	X	X	X	X	X	X		X	X	X				X	
Boise Climate Adaptation Assessment	X	X			X	X	X									
Impacts of Climate Change on Idaho's Infrastructure	X	X	X		X			X								
Count	6	6	5	4	4	4	4	3	3	3	3	2	2	2	2	2

¹³ The ITD Resiliency strategy includes avalanches in its chapter on landslides

¹⁴ The State of Idaho Hazard Mitigation Plan includes dam failures in its chapter on floods



Wildfires

Description

Wildfires are an increasingly frequent occurrence across the western United States and are one of the most significant hazards facing Ada and Canyon Counties. The term is generally used to refer to “an unplanned fire caused by lightning or other natural causes, by accidental (or arson-caused) human ignitions, or by an escaped prescribed fire” (IOEM, 2023). Fires pose a serious hazard due to their scale and the damage they produce. Once started, fires can be very difficult to control, often traveling quickly and producing smoke that can damage air quality hundreds of miles away.

Regional Context

Idaho’s wildlands are home to two primary ecosystems that are vulnerable to wildfires: forests and rangeland. Populated areas near these fire-prone ecosystems are especially vulnerable. This boundary area is known as the “wildland-urban interface” (WUI). Structures in this area are often in close proximity to vegetation, a major fuel source, resulting in ideal conditions for fire to spread.

The WUI has grown considerably over recent decades amid the region’s strong population and economic growth, increasing the risk to communities. Today, many areas of Ada and Canyon Counties are considered to be in the WUI area. As more of the WUI is developed, the risk will increase. Ongoing shifts in the area’s climate may also increase the risk, as warmer, drier conditions result in additional fuel.

Transportation Impacts

The primary transportation impact from wildfires is direct damage to infrastructure. In addition, fires in populated areas frequently require evacuations, so emergency plans must account for fire risk when designing evacuation routes and communication plans. Wildfires also create smoke, which makes breathing difficult and can cause illness, especially for vulnerable populations (IOEM 2023). This can be very dangerous for people who frequently walk or bike. They also alter the topography of burned areas and can increase the risk of landslides and flooding.

Data Sources

Existing plans have used several metrics to assess hazard levels. In addition to whether an area is included in the WUI, analyses often incorporate metrics on an area’s likelihood to burn, the anticipated behavior of a fire in that area, and the magnitude of impacts. Risk data has been published by the Federal Emergency Management Agency (FEMA) and the U.S. Forest Service. Some approaches also use climatology to incorporate the role of weather in fire risk, both spatially and temporally.

Floods

Description

There are many types of flooding, each with their own causes and effects. Riverine floods occur when the water in a stream or river escapes its banks. This is usually the result of sustained rainfall over a large area, which causes flooding in small streams, eventually flowing into larger rivers. This can present two hazards: inundation, in which water and debris flow through normally dry areas, and channel migration, in which erosion causes a change in the normal course of the river.

Stormwater runoff flooding is a result of drainage issues. Heavy rain events can overwhelm the capacity of stormwater systems and ground infiltration. This results in flooding, usually outside of



natural floodplains. This type of flooding is most prevalent in urbanized areas due to their use of impervious ground cover.

Flash flooding is “a rapid and extreme flow of high water into a normally dry area, or a rapid water level rise in a stream or creek above a predetermined level, beginning within 6 hours of the causative event” (Ada County EMCR, 2022). The causative events can vary, and flash flooding can occur in conjunction with other types of flooding.

Some sources also treat dam failure as a type of flooding, while others treat it as one potential cause of riverine and flash flooding. Failures can be caused by overtopping of the structure by the reservoir, structural deficiencies, mechanical failures, and seismic activity. While rare, these events have the potential to be extremely damaging. The risk posed by these events is determined by the height of the structure, the volume of water in the reservoir, and the distance to developed areas.

Regional Context

Ada and Canyon Counties are regularly impacted by flooding. The Boise River flows through the region’s most populated areas. The river’s flow is regulated by upstream dams, but riverine flooding is still possible. The river is fed by multiple tributaries in the Boise Foothills, which are highly susceptible to flooding during intense rain events. Historically, Ada County has experienced floods large enough to cause property damage every three to seven years (Ada County EMCR, 2022).

There are many dams in the area that pose a potential hazard. The Idaho Department of Water Resources rates dams as low, significant, or high hazard, based on the potential impacts (not likelihood) of a failure. There are six dams in Ada and Canyon Counties rated as high hazard (IOEM, 2023). In addition, much of the agricultural land in Canyon County is served by canals, which can also flood due to heavy rain, structural failure, or blockages.

Urbanized areas in the region also regularly experience flooding due to drainage issues.

Transportation Impacts

Flooding of all kinds can have serious impacts on transportation systems. Roads and bridges can be blocked by floodwater. Stormwater runoff, which is caused by impervious surfaces such as roads, is especially likely to block roads. Riverine and flash floods, which tend to be fast-flowing and carry debris, can also cause damage to roads, bridges, and vehicles. Flooded rivers also cause increased bridge scour, leading to increased maintenance needs.

Data Sources

The most frequent tool for understanding riverine flood risk is a series of flood hazard area maps published by FEMA. These maps include outlines of areas likely to be inundated by a 1% annual chance (100-year) and 0.2% annual chance (500-year) event. Stormwater runoff events are studied based on historical occurrence. Dam failure risk is less well documented, although some sources use Hazus, a hazard modeling program published by FEMA, to model hypothetical events.

Landslides

Description

Landslides are masses of earth and debris moving down a slope. They can be initiated by a variety of events, including storms, earthquakes, fires, and land modification. The primary contributing factor to landslide risk is slope; most slides occur on slopes between 30 degrees and 41 degrees (IOEM, 2023). Other important conditions include soil material, bedrock geology,



vegetation, and climate. Many events can create or exacerbate these conditions. Soil saturation due to heavy rain and rapid snowmelt are the most common contributing factor. Erosion by rivers, weakening of soil and removal of vegetation by wildfires, vibrations from earthquakes, and excess weight from structures can also increase the likelihood of landslides. Slides are sometimes classified by the type of movement and material involved, as well as the velocity.

Regional Context

Landslides are frequent in Idaho, although most are small and cause minimal damage. In the study area, most landslides have occurred in the Boise Foothills in northern Ada County. While no fatalities have been reported, five events in the area have been reported to cause property damage since 1959. Most local landslides occur in late winter when the water table is high. Water is nearly always a factor, and human influence (usually in the form of disturbance due to development) has contributed to over 80 percent (Ada County EMCR, 2022). Precipitation in the region is trending towards fewer, more intense events (IOEM, 2023). This pattern is likely to increase the risk of landslides. As drier overall conditions increase the chance of drought and wildfire, which can remove vegetation and reduce the soil's ability to absorb water, extreme rainfall events will be more likely to disrupt weaker soil, causing landslides and mudslides.

Transportation Impacts

Landslides primarily disrupt transportation by blocking or damaging roads and bridges. Even a moderate slide can leave enough material on a street to make it impassable. This is especially dangerous if the route is important for evacuations or is isolated and difficult to route around. For example, in July 2020, a landslide on US-95 south of Riggins, ID “closed almost all north-south Idaho traffic for several days” (Vos, J., 2021). In the worst case, such an event could leave some areas entirely cut off.

Data Sources

Many plans measure landslide risk using ground slopes generated from digital elevation model data. FEMA's National Risk Index also provides a risk level for many threats, including landslides, at the census tract level. Finally, the Idaho Geological Survey published a landslide inventory, with data on all recorded landslides in the state. While not predictive, this data can inform decisions about areas that experience risk for landslides. In some cases, plans that do not have access to specific landslide risk data use severe storm frequencies as a proxy, as most landslides in southwest Idaho are associated with such storms (Canyon County Sheriff's Office, 2021).

Earthquakes

Description

An earthquake is “the vibration of the earth's surface that follows a release of energy in the earth's crust generated by a sudden dislocation of crust segments” (Canyon County Sheriff's Office, 2021). Crust segments undergo stress from several sources, causing them to move and stretch. When the stress exceeds the strength of the rock, they break and shift into a new position. This sudden movement generates vibrations, known as seismic waves. While the initial earthquake usually lasts a few seconds, the shockwaves travel across the surface of the earth over several minutes.

Earthquakes can be measured by how much energy is released, known as magnitude, or by the impact on structures, known as intensity. A given event has a single magnitude, but the intensity varies based on geography and distance from the epicenter.



Regional Context

Idaho is among the most seismologically active states. It experiences hundreds of events each year, although most are too small to feel. On average, Idaho experiences an earthquake strong enough to damage buildings every 10 years (IOEM, 2023). In the Boise area, seismologists have calculated that there is a greater than 50% chance of a midrange or greater intensity event (strong enough to cause light to moderate building damage) in any 50-year period (Canyon County Sheriff's Office, 2021).

Transportation Impacts

Earthquakes can have a variety of impacts. During an event, structures are subjected to shaking. This is generally most dangerous for unsecured objects and older structures. Ground displacement can also occur, where crust sections move laterally and/or vertically during an event. This frequently disrupts roads and utilities, as sections can become partially or completely impassable.

Earthquakes can also disrupt soil and rock at the surface. This can cause landslides and avalanches in areas that are prone to them, with impacts ranging from blocked roads to damaged or destroyed structures (see **Landslide** section). Certain soil types are also susceptible to liquefaction, where shaking causes soil particles to float freely in groundwater. This can result in previously solid ground losing structural integrity, causing roads and buildings to sink. Much of the area near the Boise River is especially susceptible to liquefaction due to the soil type present there (Ada County EMCR, 2022; Canyon County Sheriff's Office, 2021).

Data Sources

Earthquakes are extremely difficult to predict. However, the U.S. Geological Survey (USGS) publishes the Seismic Hazard Long-Term Model, which maps seven levels of earthquake risk. USGS also publishes seismic hazard maps, which give the expected intensity at various probability levels based on soil type and geography. These data are frequently used to inform building codes in high-activity areas (IOEM, 2023). Some sources also use ShakeMaps, which map the expected intensity of shaking caused by an earthquake with a specified magnitude and epicenter. Finally, liquefaction risk is measured using soil type data available from the National Earthquake Hazards Reduction Program.

Extreme Heat

Description

Extreme heat is defined as summertime conditions featuring temperatures and humidity that are much higher than average. Because these two conditions both affect how hot it “feels,” they are commonly combined using the heat index metric. Prolonged exposure to conditions in excess of 80 degrees can increase the risk of heat disorders, while heat index readings above 100 degrees are considered dangerous, even in the shade (Ada County EMCR, 2022). The duration of an extreme heat event also impacts its severity. Studies of past events show a significant increase in heat-related illnesses when high temperatures last more than two days (Canyon County Sheriff's Office, 2021).

Regional Context

Extreme heat events are common in the study area. Based on historic weather readings taken in Nampa, ID, there is a 90 percent chance the area will experience 100-degree temperatures at least once in a given summer (Canyon County Sheriff's Office, 2021). Historic trends, as well as climate projections, also suggest that the frequency of these events is increasing (Klopfenstein, 2021). Much of the region is also affected by the “urban heat island effect,” in which asphalt and



concrete absorb heat during the day and slowly release it at night. This causes higher nighttime surface temperatures relative to nearby, less developed areas. Temperatures in the higher-elevation areas of the study area are typically 5 to 10 degrees cooler than the valley, so the lower areas are at higher risk of experiencing extreme heat (Canyon County Sheriff's Office, 2021).

Transportation Impacts

The most dangerous impacts of extreme heat are on human health. This makes it very dangerous for individuals who walk, bike, or use transit as their primary mode of transportation. This is especially true for vulnerable populations, including children, the elderly, and those with chronic illnesses.

Heat also has the potential to impact transportation infrastructure. It can degrade and soften road surfaces and cause damage to bridges.

Data Sources

The heat index is the primary indicator of extreme heat risk used by the reviewed sources. High-resolution data for historical and projected temperatures is available in the Multivariate Adaptive Constructed Analogs dataset from the Climatology Lab at the University of California, Merced.

Extreme Weather

Description and Regional Context

Extreme weather (sometimes "severe weather") can include a variety of events, including thunderstorms, extreme precipitation, straight-line winds, lightning, hail, winter storms, and tornadoes. Many severe weather patterns can include more than one of these events. Such events are common across Idaho; Ada and Canyon Counties can expect to experience at least some of them on an annual basis, although not all will result in significant damage or disruption.

Transportation Impacts

The potential impact of these events on transportation systems varies based on the nature and severity of the event. Physical damage to assets from extreme weather is rare. Hail, wind-blown debris, and dangerous road conditions are unlikely to seriously damage pavement or bridges, though they may lead to damage to transit vehicles or other, smaller assets. Tornadoes do have the potential to damage or destroy roads and bridges but are uncommon in southwest Idaho.

Far more likely are impacts to mobility and reliability. Thunderstorms and winter weather can reduce visibility and cause dangerous road conditions, especially for pedestrians and at night. High winds can damage trees and power lines, creating debris that blocks roads. This can be especially dangerous in emergency scenarios. Debris on important highways can hamper evacuation efforts. Damage to the communication infrastructure can also hamper emergency warning and coordination efforts.

Data Sources

Notably, extreme weather events are often the cause of several of the other hazards examined in this report. Lightning and downed power lines can cause wildfires in dry conditions, while extreme precipitation can lead to flash flooding and landslides. For this reason, assessment of extreme weather risk often uses the same data sources and techniques as those hazards (floodplains, fire risk areas, etc.).



Conclusion

The literature review and hazard identification conducted for the COMPASS Resilience Improvement Plan provide a foundational understanding of the region’s most pressing transportation vulnerabilities. By synthesizing insights from federal, state, and local sources, this analysis has identified six key hazards—wildfires, floods, landslides, earthquakes, extreme heat, and extreme weather—that pose the greatest risk to Ada and Canyon Counties.



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APPENDIX C: WORKING GROUP MEETING NOTES

Working Group Meeting #1 Summary

Date: August 21, 2025

Time: 2:00 PM to 3:10 PM

Location: Hybrid (In-person and Microsoft Teams)

I. Attendees

In-Person Participants:

- Austin Miller and Olivia Vielstich McKinnon (COMPASS)
- Rebecca Phillips (ACHD)
- Luke Roberts (Ada County)
- KJ Wills (Boise Police Department)
- Stephen Hunt (Valley Regional Transit)
- Damon Fordham (High Street)
- Doug Self and Nicole Criner (Atlas Strategic Communications)

Online Participants:

- Alice Beattie (High Street)
- Bre Brush (City of Boise)
- Nichoel Baird-Spencer (City of Eagle)
- Pahl Lorrie (IMD)
- Ryan Alcorn (US Bureau of Reclamation)
- Paul “Crash” Marusich (Ada County Emergency Management & Community Resilience)
- Ester Ceja (ITD)
- Tyre Holfeltz (Idaho Department of Lands)
- Sarah Wilson (University of Idaho)
- Mark Zirschky (Boise River Flood Control District #10)

II. Meeting Objective

The objectives of Working Group Meeting #1 were to:

- Provide a project overview.
- Introduce the concept of transportation system resiliency.
- Summarize the RIP development process.
- Present the most prominent hazards that were found during the literature review.
- Discuss the hazards and possible data sources with the group.

III. Presentation Summary

Austin opened the meeting and summarized the agenda. He gave a project overview, including the key milestones for Working Group engagement. Participants introduced themselves, and then Austin gave an overview of the regional resiliency context, a brief history of resilience planning, and COMPASS’s Resilience Improvement Plan development process. Damon then gave a summary of the literature review results and walked the group through a discussion of the six most prominent hazards uncovered in the literature review:



- Wildfire
- Flood
- Landslides
- Earthquakes
- Extreme Heat
- Extreme Weather

IV. Discussion Summary

Wildfire

- No discussion.

Flood

- Crash offered a Boise River model with 15 flow scenarios based on 2019 LIDAR.
- Mark: Future planning for development needs to consider adequate access to the river corridor to effectively manage the river channel for flood prevention; the information that Crash is referencing is located on boiseriver.org on the FCD10 website.
 - FCD10 is currently working with USACE to update the LiDAR in the Boise River Management Tool.
- Stephen noted data on hazard impacts to vulnerable populations, especially mobile home communities along the Boise River in Caldwell.
- Dry Creek and Foothills flooding identified as a recurring issue (City of Boise would have information on this).
- Ryan described emergency action planning related to flooding.
- Luke referenced Boise's maintenance of Cottonwood Creek and other historic blowouts.
- Stephen: In Caldwell, there is recurring flooding at some of the mobile homes on the north side of the city.
- Crash warned that dam failure could split Ada County, isolating medical services.
- Ada County has Level II HAZUS data for flood and earthquake.
- The south channel near Eagle and Linder Roads may need elevation to meet 100-year flood standards.
- Luke also provided the following datasets:
 - Treasure Valley Groundwater Flow Model:
<https://idwr.idaho.gov/water-data/projects/treasure-valley/>
 - The USGS Inundation mapper:
https://fim.wim.usgs.gov/fim/?site_no=13206000

Landslides

- Tyre raised the question of whether debris flow falls under flood classification; BSU has historical data from a debris flow project a few years ago.
- Crash: Landslide vs. flood has been an issue for citizens regarding insurance. The concern is water running down burnt soil—insurance asks if it is cake or a shape coming down the hill. If it is a cake, then it is a flood; if it is a shape, then it is a landslide/rockfall.
- Group discussed the need to differentiate rockslides from landslides for planning and insurance clarity.
- The Idaho Geological Society has mapped out potential slide areas that may be helpful based on geologic survey soil maps.



Earthquakes

- Nichoel said Boise State University monitors seismic activity.
- Squaw Butte is the nearest fault.
- HAZUZ modeling exists but might need to be updated.
- RCS might have information that may be useful.
- The Idaho Geological Society might have information that may be useful.
- Rebecca (ACHD) will follow up with ACHD maintenance on available data.

Extreme Heat

- National Weather Service (NWS) and NOAA identified as primary data sources.

Extreme Weather

- The extreme weather hazard can include thunderstorms, downed trees, heavy precipitation, straight-line winds, lightning, hail, winter storms, and tornadoes.
- Stephen noted data on snowplow routes and emphasized the need to include pedestrian and bike infrastructure in winter planning.
- Need for better reflective lane materials during snow/heavy rain was raised.
- Extreme weather can be linked to flooding and debris in rivers but should be viewed independently.
- ACHD has a Winter Operations Plan with priorities.

Other Hazards

- KJ Wills flagged large underground geothermal systems that periodically fail, causing multi-day road closures.
- Dam failure and debris flow are raised as distinct hazards requiring further exploration.
- Stephen: Snow and the impacts it has on public transportation in the Treasure Valley.

V. Next Steps

- A survey will be distributed to gather input from the working group and other stakeholders; the working group is tasked with forwarding it to colleagues who may be able to contribute, as input from experts is a priority.
- Rebecca will follow up with ACHD on available hazard data.
- ACHD's Winter Operations Plan will be reviewed for prioritization strategies.
- Luke noted that ACHD and Idaho Power are key responders and likely have relevant datasets.
- Next meeting is scheduled for October (date and time to be determined).



Working Group Meeting #2 Summary

Date: October 14, 2025

Time: 10:00 AM to 11:30 AM

Location: Hybrid (In-person and Microsoft Teams)

I. Attendees

In-Person Participants:

- Austin Miller (COMPASS)
- Rebecca Phillips (ACHD)
- Dr. Brittany Brand (Resilience Institute, Boise State University)
- Stephen Hunt (Valley Regional Transit)
- Luke Roberts (ACHD)
- Jason Van Gilder (City of Middleton)
- Alice Beattie (High Street Consulting)
- Doug Self and Nicole Criner (Atlas Strategic Communications)

Online Participants:

- Olivia Vielstich McKinnon (COMPASS)
- Mark Zirschky (Boise River Flood Control District #10)
- Sarah Wilson (University of Idaho/Dept. of Lands)
- Lorrie Pahl (IOEM)
- Kyle Wills (Boise Police)
- Nichoel Spencer (City of Eagle)
- Matt Ricks (City of Nampa)
- Jenah Thornborrow (City of Garden City)
- Matt Konvalinka (Boise Police)
- Damon Fordham (High Street Consulting)
- Matt Hawkins (High Street Consulting)

II. Meeting Objective

The objectives of Working Group Meeting #2 were to:

- Provide a project overview.
- Summarize the results of the stakeholder survey question about asset classes.
- Discuss asset criticality, possible metrics, and relevant survey responses with the group.
- Review the hazards and data sources, based on the survey and discussion from the previous meeting.

III. Presentation Summary

Austin opened the meeting and reviewed the project objectives. Alice Beattie outlined the meeting agenda, and then participants introduced themselves. Alice then provided a summary of the asset categories to be included in the analysis, along with relevant stakeholder survey responses. Alice then led a discussion about asset criticality metrics and hazard data being considered for the analysis, based on the literature review and feedback from the first working group meeting and the stakeholder survey.



IV. Discussion Summary

Assets

- Jason Van Gilder shared that, in the context of a major disaster (such as Hurricane Katrina), the priority would be getting people and aid in and out of the region, rather than providing access to local amenities. He felt that in this context, highways, railroads, and freight corridors are critical assets for supply chain resilience.
- Jason also raised concerns about fuel supplies and gas lines as overlooked assets in disaster scenarios. He said that Middleton has approximately a one-week supply of gas reserves for Public Works and Police operations.
- Alice clarified that this plan is to address smaller, recurring natural disasters. A region-wide catastrophe event would be beyond the scope of the project.
- Austin clarified that, while assets like oil supplies and gas lines fall outside the project scope, relevant data could be shared with member agencies.

Criticality

- Jason emphasized prioritizing assets that support life-saving services (hospitals, food, water) over parks or schools.
- Supply chain resilience and emergency response logistics were emphasized, with freight volume discussed as a potential proxy measurement. The group agreed that freight volume should be higher in the criticality prioritizations.
- Participants noted that the region's network makes north/south movement much easier than east/west, and recommended redundancy as an important metric.
- Alice shared a map of economic centers previously identified by COMPASS.
 - Austin emphasized that, despite having that list compiled, they were interested in feedback and additional ideas.
 - The group felt that it was unclear what the metric added to overall criticality, as access to these areas would be measured by vehicle miles traveled (VMT), which is already included.
- Alice also shared the stakeholder survey results regarding underserved communities.
 - Dr. Brand asked how data would be used to evaluate impacts on underserved populations; for example, to balance levels of investment, or to ensure that those areas have emergency access.
 - Stephen Hunt questioned how active transportation and transit infrastructure overlap when evaluating equity.
- Stephen Hunt suggested thinking about transit as a “bonus” to relevant road assets, rather than its own asset category, as most of the transit in the region uses roads. This idea could lend itself to the consideration of transit as a criticality consideration, rather than an asset class.
- One participant noted that freight and evacuation routes are likely to overlap, except in more remote valleys.

Hazards

- Several parts of the discussion focused on the scale of events that the plan would include. Some participants focused on large-scale disasters, while others suggested it was more important to consider the most frequent events.



- Austin clarified that the primary focus had been on the smaller, more frequent events that would have differing impacts within the COMPASS area.
- Alice presented exposure maps for each hazard based on data sources identified so far, and asked the group if the results matched their expectations:
 - *Wildfires*: A few participants noted that the map showed potential, rather than risk, and noted that other sources may have more data about risk. Alice clarified that the asset and criticality portions of the RIP process would also help account for this.
 - *Flooding*: The group felt the FEMA flood maps were reasonable, although one participant suggested considering bridges' level of design in the flooding analysis, as some may be more resilient than others.
 - *Landslide*: The group felt the USGS data was reasonable, but they suggested that Ada County may have access to additional, more advanced data.
 - *Earthquakes*: The group noted that the area is rarely subject to significant earthquakes and that, despite what the soil maps show, liquefaction is not likely. Based on this input, the project team will reconsider the inclusion of earthquakes as a hazard.
 - *Extreme Heat*: The group discussed the Trust for Public Land data at length, as many felt that parts of it did not make sense. The group also questioned the impact of extreme heat on transportation and was unclear what types of capital projects would address it. Some additional input following the meeting seemed to confirm the accuracy of the heat island data, but the question of the impact of extreme heat on capital projects remains.
- Dr. Brand recommended exploring drought as an additional hazard, citing potential damage to bridges and railroads.

V. Next Steps

- Today's feedback will be incorporated into asset and hazard analysis.
- The Resilience Improvement Plan team will email participants for hazard data validation and feedback.
- Austin will present a summary to the COMPASS Board of Directors.
- The next Working Group Meeting will focus on prioritization strategies.
- Target completion of the Resilience Improvement Plan is March 2026.



Working Group Meeting #3 Summary

Date: January 15, 2026

Time: 10:00 AM to 11:30 AM

Location: Hybrid (In-person and Microsoft Teams)

I. Attendees

In-Person Participants:

- Damon Fordham (High Street Consulting)
- Austin Miller (COMPASS)
- Olivia Vielstich McKinnon (COMPASS)
- Brent Moore (COMPASS)
- Doug Self (Atlas Strategic Communications)
- Ashley Hauger (Atlas Strategic Communications)
- Rebecca Phillips (ACHD)
- Jason Van Gilder (City of Middleton)

Online Participants:

- Alice Beattie (High Street Consulting)
- Matt Hawkins (High Street Consulting)
- Ahjung Kim (High Street Consulting)
- Crash Marusich (Ada County Emergency Management)
- Sarah Wilson (University of Idaho/Dept. of Lands)
- Kyle Wills (Boise Police)
- Nichoel Baird-Spencer (City of Eagle)
- Matt Ricks (City of Nampa)
- Jenah Thornborrow (City of Garden City)
- Hallie Hart (City of Caldwell)
- Meg McCarthy (ACHD)

II. Meeting Objective

The objectives of Working Group Meeting #3 were to:

- Provide a project overview.
- Summarize the hazards, assets, and criticality criteria selected for use in the final RIP analysis.
- Demonstrate the functionality of the resilience web map and discuss Working Group feedback.
- Discuss if and how the criticality criteria should be weighted.

III. Presentation Summary

Damon opened the meeting, and the participants introduced themselves. Damon reviewed the project objectives and timeline. He reviewed the hazards, assets, and criticality criteria selected for inclusion in the final analysis, and the group briefly discussed those items. Damon then provided a demonstration of the resilience web map tool. After participants had a few minutes to explore the tool on their own, they discussed its functionality, with a particular focus on the accuracy of the criticality scores. Finally, Damon led an exercise that allowed participants to weigh the importance of the criticality criteria.



IV. Discussion Summary

Review: Asset, Hazard, & Criticality Selection Process

- Jason Van Gilder asked about detour route length, noting that if a major bridge is washed out, there is a chance the next closest bridge may not have adequate capacity, or may also be washed out. Alice clarified that the detour length value from the national bridge inventory dataset and that cascading impacts would be difficult to quantify for this project.
- Crash asked why dam failure was removed from the Hazard Selection Process.
 - Damon answered that because it would have such major region-wide impact, it was beyond the scope of projects that COMPASS works to address.
 - Crash clarified that data from the National Dam Safety site is available. Multiple participants agreed that evacuation planning based on that data could be beneficial for the area. Austin offered to follow up on the subject of evacuation route planning, with the potential for COMPASS to consider a separate follow-up project.
 - High Street agreed to review the spatial data to see how it may be represented on the map. It may not inform capital planning for cities and agencies but would give stakeholders an additional visual reference layer.
- Crash also discussed the decision to use the 11,000 cubic feet per second (cfs) Boise River lidar data for flooding. While that flow rate would impact surface streets and lead to some evacuations, the Lucky Peak dam can discharge at much higher rates. He suggested using the 34,800 cfs layer to model those potential impacts.
- Jason asked about wildfire data, specifically the wildland-urban interface, and whether risk in the suburban areas is reflected, not just in the remote foothills. Alice clarified that the data shown is “Wildfire Hazard Potential” from the Forest Service, which we consider to be the best dataset to represent wildfire risk.
- Jason and Crash felt that local data sources may be more accurate than national datasets. Alice indicated that the dataset was chosen because it shows wildfire risk across the entire valley.

COMPASS Resilience Improvement Plan Web Map Tool Demo

- Jason asked about the decision to include the urban heat layer and how it was calculated. Damon and Alice explained that it shows where certain areas of cities are hotter than the average temperature for the city as a whole. It’s a relative measure and will probably focus on areas that have more pavement or less tree cover. While users will likely use other hazards more, the urban heat map was also included because it can be useful in planning for bus stops and other infrastructure.

Individual Interactive Demo Questions/Discussion

- Jason asked about how assets were scored for proximity to activity centers, and Alice explained that it was a binary score based on whether the asset was located inside a designated activity center. Jason also wanted to clarify that activity centers represent the downtown population, not necessarily hospitals, emergency staging areas, or shelter facilities. Alice and Austin agreed, although they pointed out that there was likely to be significant overlap.



- Austin asked for the group's thoughts on redundancy and AADT. He pointed out that if a particular bridge is damaged, even with low AADT, it might still be critical for people to access, so redundancy may be a more important criterion to consider.
 - Nichoel agreed, citing the example of residents in the foothills. A low AADT does not necessarily mean that the asset matters less if people do not have other connectivity options.
 - Jason also agreed that, while not perfect, redundancy is a higher priority criterion.
- Nichoel noted that the black/purple/teal color scheme is difficult to read, and the differentiation when scaling makes it harder.
 - Damon shared that the team had already discussed this issue and plans to explore other color scheme options.
 - Alice also provided instructions on how each person may change the default base map.
- The group discussed the potential of adding certain other criteria.
 - Some participants suggested asset condition, but Austin shared that COMPASS has issues in the past with pavement condition measurement because it is difficult for the MPOs to provide consistent data throughout the region. Many agreed that condition should not be a high priority for this study but could be looked at in the future.
 - Jason suggested showing AADT relative to bridge capacity (e.g., one lane bridge with a high AADT). Rebecca agreed that the data would be helpful if available.

Weighting Exercise

- Participants completed an interactive exercise that allowed each of them to distribute 100 points among the criticality criteria based on how they should be weighted in the final analysis. The average score for each criterion was:
 - 28 - Redundancy/Detour Length
 - 25 - Average Daily Traffic (Passenger)
 - 16 - Proximity to Community Assets
 - 14 - Freight Volume
 - 6 - Connectivity for Underserved Communities
 - 6 - Presence of Active Transportation
 - 5 - Transit Route Coverage
- Overall, the group felt strongly that some amount of weighting was needed.
- Crash also suggested including bridge deck elevation and first responder facilities. He noted that most of the region's medical facilities are south of the river, which would be susceptible to catastrophic dam failure. If there is a fire station in Hidden Springs, for example, that area only has three roads in and out. If they need assistance out there, access is limited.
 - Damon noted that when redundancy criteria are weighted more heavily, the criticality score for those roads would increase.
 - Alice said it should be easy to include bridge deck elevation in the asset information pop-up if data are available.

V. Next Steps

- High Street will review feedback from today's meeting and implement a weighting methodology and other refinements.



- In the coming months, the project team will analyze the location of funded projects relative to the regional resilience profile to inform project prioritization.
- Information about the final working group meeting will be shared with the group when finalized.