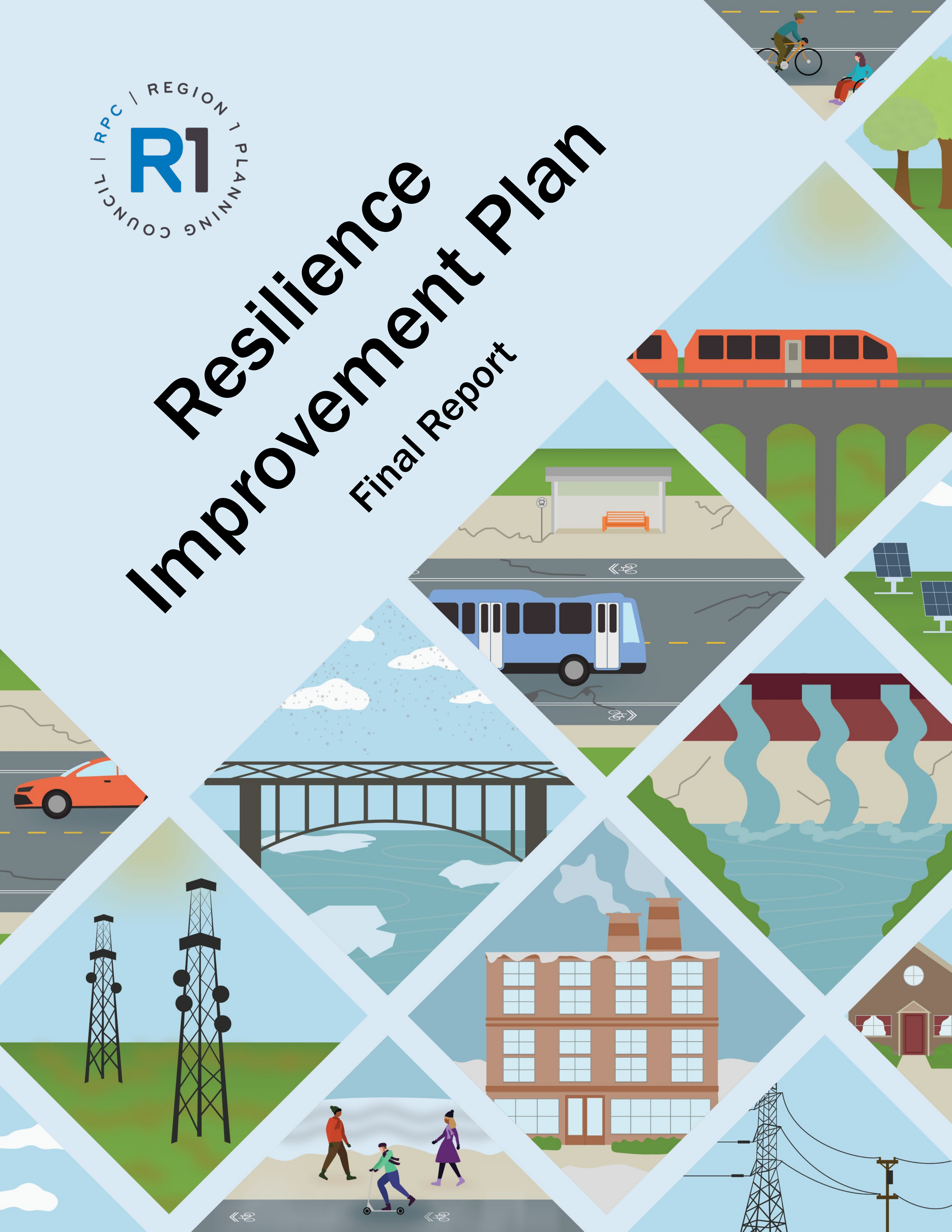
RPC | REGION 1 PLANNING COUNCIL

Resilience Improvement Plan

Final Report



Resilience Improvement Plan

Final Report | 6.26.2026

This document has been prepared by Region 1 Planning Council in collaboration with its member agencies, partnership organizations, and local stakeholders.

This report was prepared in cooperation with the following:

U.S. Department of Transportation

Federal Highway Administration

Federal Transit Administration

Illinois Department of Transportation

The contents, views, policies, and conclusions expressed in this report are not necessarily those of the above agencies.

AN ENGINE FOR COLLABORATION IN NORTHERN ILLINOIS

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About the MPO

By federal law, all urbanized areas with over 50,000 persons are required to have an organization that plans and coordinates decisions regarding the area's surface transportation system, known as a Metropolitan Planning Organization (MPO). The MPO is required to conduct a comprehensive, cooperative, and continuing (3-C) transportation planning process.

The five core functions of the MPO are to:

1. Establish a fair and impartial setting for effective regional transportation decision-making in the metropolitan area;
2. Evaluate transportation alternatives, scaled to the size and complexity of the region;
3. Maintain a long-range transportation plan covering a 20-year planning horizon;
4. Develop a four-year Transportation Improvement Program (TIP) and prioritize projects; and
5. Involve the public.

In the Rockford Region, the MPO transportation planning function is housed within Region 1 Planning Council (R1). Region 1 Planning Council is a special-purpose, regional government agency designated to coordinate intergovernmental collaboration. This regional model provides an efficient means to promote a well-informed, comprehensive dialogue that holistically addresses regional issues by fulfilling the needs of government entities for long-range planning, securing funding, and analyzing and providing data in support of regional projects and initiatives. Essential to fulfilling its purpose as a planning commission, R1 is a designated metropolitan planning organization (MPO), economic development district (EDD), geographic information system (GIS), and land bank authority (LBA).

Structure

The MPO is empowered by a cooperative agreement developed and mutually adopted by the cities of Belvidere, Loves Park, and Rockford; the counties of Boone and Winnebago, the Village of Machesney Park; Rockford Mass Transit District (RMTD); and the State of Illinois, acting through the Illinois Department of Transportation (IDOT).

The activities of the MPO are directed by a Policy Committee that consists of the top elected officials from the above entities plus the Deputy Director of IDOT Region 2 and the Chairman of the RMTD Board of Trustees. The Policy Committee receives technical recommendations and assistance from a 22-member Technical Committee comprised of planners and/or engineers from the above entities along with other local entities, such as the Chicago-Rockford International Airport, the Rock River Water Reclamation District, and various other local agencies.

Much of the day-to-day operations and technical work of the MPO is accomplished by a professional staff under the management of the MPO Director, in close coordination with the R1 Executive Director.

The planning process and activities are funded by annual planning grants from the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA), with 20 percent matching funds from IDOT through the State Planning Fund (SPF) and through local contributions from the six government agencies that comprise its Policy Committee membership.

RIP Working Group

The following individuals and organizations participated in the RIP Working Group:

- Boone County Conservation District
- Boone County Emergency Management Agency
- Boone County Highway Department
- Boone County Soil and Water Conservation District
- City of Belvidere Public Works
- City of Rockford Community Development
- Illinois Department of Transportation (IDOT)
- North Park Water District
- Ogle County Highway Department
- A3 Environmental Consultants (A3E)
- Rockford Fire Department
- Rockford Mass Transit District (RMTD)
- Rockford Police Department
- Winnebago County Emergency Services and Disaster Agency (ESDA)
- Winnebago County Highway Department

Part 1: Introduction

Escalating impacts of climate change, such as flooding, extreme heat, and increased storm severity, pose significant threats to transportation infrastructure.[i] The Resilience Improvement Plan (RIP) aims to increase transportation resilience against infrastructure and natural disasters in the Rockford Region. The following plan examines the current conditions of the region's transportation system, identifies potential hazards that may weaken transportation infrastructure, and provides recommended strategies and potential projects to mitigate the impacts of identified hazards in the region.

Background & Purpose

As extreme weather continues to intensify due to climate change, there is an urgent need for hazard mitigation and planning practices designed to support effective adaptation. The Rockford Region's transportation system faces increasing risks from flooding, extreme heat, and extreme cold. A proactive approach is needed to plan for, prevent, and minimize the damaging effects of climate change on transportation infrastructure.

Climate Change's Impact on Transportation

Climate change directly and indirectly impacts the transportation network, posing risks to infrastructure, safety, reliability, and long-term planning. Climate projections predict variations in precipitation levels, higher temperatures, and an increase in the frequency and intensity of extreme weather events including tornadoes, thunderstorms, heat waves, cold fronts, and severe flooding caused by heavy rainfall.[ii]

Climate Change:

The gradual alteration of global temperatures and weather patterns over time, caused by natural factors or human activities, like burning fossil fuels.[iii] Varied temperatures cause shifts in weather patterns, bringing more extreme weather events, altered precipitation patterns, and disruptions to seasonal cycles.[iv]

These hazards can lead to potential disruptions, damages, delays, or failures across transportation systems. For example, intense rainfall can cause severe flooding, which may disrupt the transportation network; flooding can impact traffic flow, delay construction projects, reduce the life expectancy of roads and highways, and damage or erode the soil and culverts that support infrastructure.[v] Frequent impacts to the transportation system can create higher maintenance costs, increased service interruptions, and reduced system resilience. If transportation infrastructure is not adapted to these impacts, it can lead to region-wide disruptions to the movement of people and goods and the overall reliability of the transportation network.

Transportation Network:

A system of infrastructure and interconnected routes that enable the movement of people, goods, and services within an urbanized area. The efficiency of this system, including factors like congestion and travel times, is vital for promoting sustainable and effective transportation.[vi]

What is a Resilience Improvement Plan (RIP)?

A Resilience Improvement Plan addresses the resiliency of surface transportation systems by identifying network vulnerabilities, hazard mitigation strategies, and potential projects that can support a robust and resilient transportation network.

Resiliency:

Resiliency refers to the ability of transportation systems to anticipate, and recover from environmental and human-induced impacts.[vii]

This type of plan is vital as concerns over climate change, natural disasters, extreme weather events, and infrastructure vulnerabilities continue to grow. This plan is developed alongside Region 1 Planning Council's (R1) regional partners and uses past data and future projections to determine what transportation infrastructure in the Rockford Region is under threat. The plan's hazard analysis results in a list of prioritized solutions to enhance the resilience of the region's transportation system.

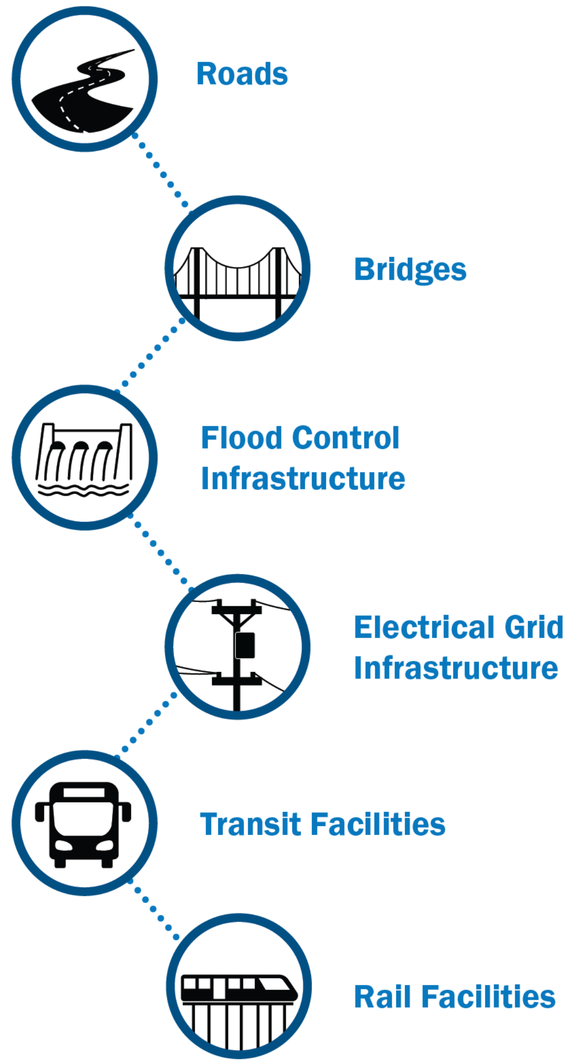
The RIP for the Rockford Region amplifies the need for a wide array of planning activities, resilience improvements, and enhancements to community well-being. By identifying immediate and long-term solutions and investments, the plan demonstrates a comprehensive approach to region-wide transportation resilience. This is supported by a risk-based assessment of transportation vulnerabilities to current and future weather events and man-made disasters.

This plan serves not only as a tool for guiding infrastructure resilience improvements, but also as a foundation for pursuing future funding opportunities, as they become available.

Why Transportation Resilience Matters:

Adopting a long-term perspective on transportation resilience is essential for continued and reliable access and mobility throughout a region. Decisions made now can affect transportation assets for many years. As the climate continues to change, upgrades to infrastructure and planning practices are essential. Shifting climate patterns can severely threaten the safety of residents and the efficiency of movement of people and goods.

Figure 1-1: Critical Infrastructure Assets Evaluated in the RIP



Source: Region 1 Planning Council

Federal Policy Context

Nation-wide transportation resilience projects gained momentum when the Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT) Program was established in 2021. Under the Infrastructure Investment and Jobs Act (IIJA) and administered by the U.S. Department of Transportation (USDOT), the program was designed to fund efforts that enhance the resilience of surface transportation systems against natural hazards such as climate change, sea level rise, flooding, extreme weather, and other disasters.[viii] Eligible activities included resilience planning, infrastructure improvements, development of community evacuation routes, and protection of vulnerable coastal assets.[ix] Under the PROTECT Program, states and Metropolitan Planning Organizations (MPOs) could voluntarily develop a Resilience Improvement Plan to enhance the overall resilience of the transportation network.[x]

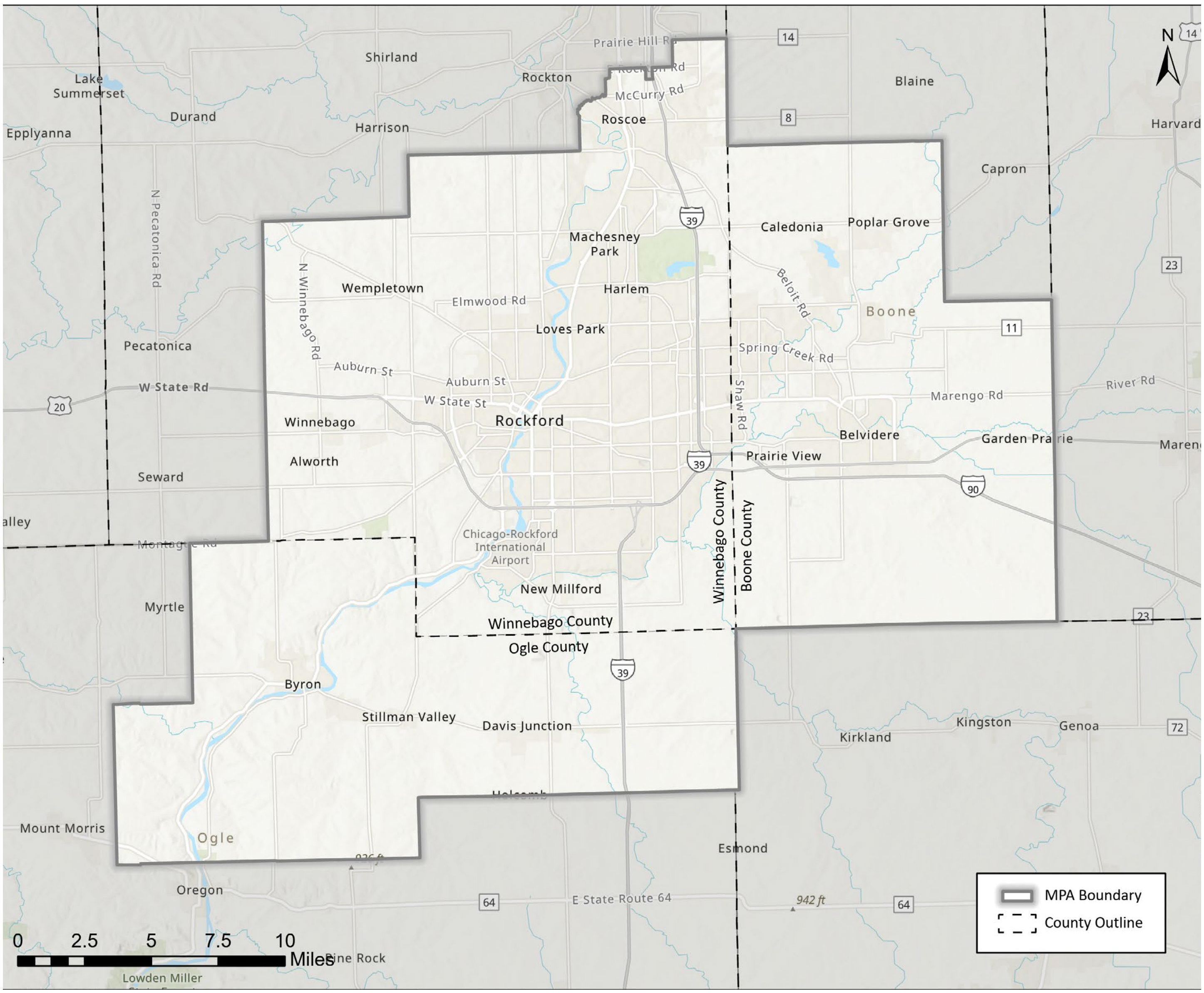
As of February 2025, the PROTECT Program is currently paused.[xi] While the future status of the program remains uncertain, local partners intend to continue advancing transportation resilience through other potential funding opportunities. If the PROTECT Program remains inactive, potential alternative funding sources are identified in Part 6: Implementation. Additional information on the PROTECT Program is provided in Appendix C.

Study Area

The RIP geographically encompasses the Rockford Metropolitan Planning Area (MPA), also referred to as the Rockford Region, which is the planning jurisdiction of the Rockford MPO. The MPA boundary is developed in partnership with local jurisdictions, local stakeholders, the state, and the MPO Policy Committee. The MPO helps coordinate transportation planning and improvement activities throughout the MPA. This is accomplished through communication and cooperation of Winnebago, Boone, and Ogle county officials serving on the MPO Policy Committee, MPO Technical Committee, and Alternative Transportation Committee.

The MPA boundary covers portions of Winnebago, Boone, and Ogle counties. In total, the MPA boundary encompasses approximately 682.32 square miles and serves 323,738 people per the U.S. Census Bureau's American Community Survey (ACS) 2023 5-year estimate. The RIP focuses primarily on the MPA boundary, although some of the data is sourced at the county level. The map below depicts the current MPA boundary.

Figure 1-2: Rockford Metropolitan Planning Area (MPA) Boundary



Source: Region 1 Planning Council

Plan Development

The development of this plan began in November 2024 and was completed in June 2026. Throughout the plan's development, coordinated efforts involved technical analysis, stakeholder collaboration, and community outreach; these steps helped ensure the RIP reflects local priorities and federal resilience planning guidance. To read more about the public and stakeholder engagement completed for the RIP, refer to Appendix A: Public & Stakeholder Engagement. The process was informed by current and projected climate risks, regional infrastructure conditions, and interagency coordination to ensure practical, data-driven recommendations.

To support effective resilience planning in the region, the following development process was undertaken:

Phase 0: Project Scoping

In this phase, the project's goals, objectives, and timeline were defined.

Phase 1: Risk Assessment

A thorough assessment of regional hazards, including infrastructure and natural disasters, was conducted. Hazards were assessed on urgency, frequency, and impact. This provided a clear understanding of the potential threats to the Rockford Region's transportation network and helped identify the region's resilience gaps and priorities.

During this phase, public and stakeholder engagement was conducted to rank the hazards based on level of threat. Engagement efforts involved a stakeholder workshop and a public survey hosted on Engage R1, the public engagement platform for the MPO.

Phase 2: Project Prioritization

Potential regional transportation resilience projects were identified and prioritized to address the most critical vulnerabilities first. These projects were provided and ranked by members of the RIP Working Group, which included local transportation and environmental stakeholders, civic leaders, and emergency response experts.

Phase 3: Plan Development

A comprehensive resilience plan was developed, highlighting actionable strategies and potential projects for enhancing the Rockford Region's transportation network. Once the plan was developed, the draft document was released for public comment.

Phase 4: Project Wrap-up

The final plan was reviewed and refined with stakeholder feedback. This phase ensured the plan was ready for implementation and set the stage for ongoing evaluation.

After the formal 30-day public comment period, final input was gathered and incorporated into the plan. The document was presented to the MPO Technical Committee and the MPO Policy Committee for recommendation and adoption, respectively.

Part 2:
Rockford Region Context

This chapter provides a comprehensive overview of the Rockford Region, highlighting the characteristics of its population, geography, and natural environment, as well as the regional transportation systems and infrastructure. It examines current conditions, including mobility trends, infrastructure quality, and emergency response capabilities, to provide a baseline for understanding regional resilience. The chapter concludes with an assessment of climate conditions and projected changes, which inform planning for future risks and adaptation strategies.

Community Analysis

This section details various characteristics of the region's population, including population size, age distribution, disability, and travel trends, which provide insight into a community's impact on the transportation network.

All data presented in this section is sourced from the U.S. Census Bureau's American Community Survey (ACS) 2022 5-Year estimates and represent the Rockford Metropolitan Planning Area (MPA), unless stated otherwise.

Demographics

The estimated population of the Rockford MPA was 323,738 as of 2023. Of those, 282,817 people, or 87 percent, live within the census-defined urbanized areas.[i] Winnebago County is home to the largest share of the MPA's population at 79.5 percent, approximately 258,443 residents. Boone and Ogle counties share the remaining portions of the region's population, at 15.5 percent (50,255 residents) and 5.0 percent (16,408 residents) respectively.

Age and disability influence how residents navigate in the Rockford Region. The largest age group within the region is children under the age of 18, comprising 23.5 percent of the population, and the second largest group is adults over the age of 65 at 17.7 percent. The number of residents over age 65 increased to 17.7 percent in 2022 from 12.9 percent in 2010, indicating an aging population. The number of residents in the region with a recorded disability is 47,800 as of 2023.

i As of the 2020 U.S. Decennial Census, the MPA consists of two census-defined urban areas – Byron, IL Urbanized Area and Rockford, IL Urbanized Area.

Travel Trends

The ways people travel informs how disruptions to the transportation network impact communities. Mode choice and vehicle availability are two factors used to assess travel trends and identify potential vulnerabilities within the transportation system.

The majority of employees in the Rockford Region travel to work via single-occupancy vehicles. In 2022, 80.2 percent of individuals drove to work alone, while 9.8 percent carpooled. A small portion of the population relies on active and alternative transportation: 1.0 percent of workers walked to work, 0.6 percent used public transportation, and 0.3 percent biked to work. The remaining 3.2 percent worked from home. While only a small portion of workers use alternative transportation, 8.3 percent of households do not have access to a vehicle. A majority of workers have access to at least two vehicles in their household.

Geography & Environment

The diverse landscape of the Rockford Region, located in northern Illinois, is shaped by four primary rivers: the Rock, Kishwaukee, Sugar, and Pecatonica. The Rock River, which flows through the heart of the region, serves as a defining natural feature for both the environment and the community, providing a vital water source for agriculture and industry. The Kishwaukee River joins the Rock River from the east, and the Sugar and Pecatonica rivers join from the west. The City of Rockford, the region's major urban center, is the fifth largest city by population in the state of Illinois. Surrounding the urban core is expansive farmland, primarily supporting corn and soybeans, which likewise defines the region.

The Rockford Region's geography is marked by a blend of agricultural land, wetlands, woodlands, and river ecosystems. These interconnected natural features not only support the local economy, agriculture, and biodiversity but also provide a rich environment for outdoor activities, conservation, and environmental education.

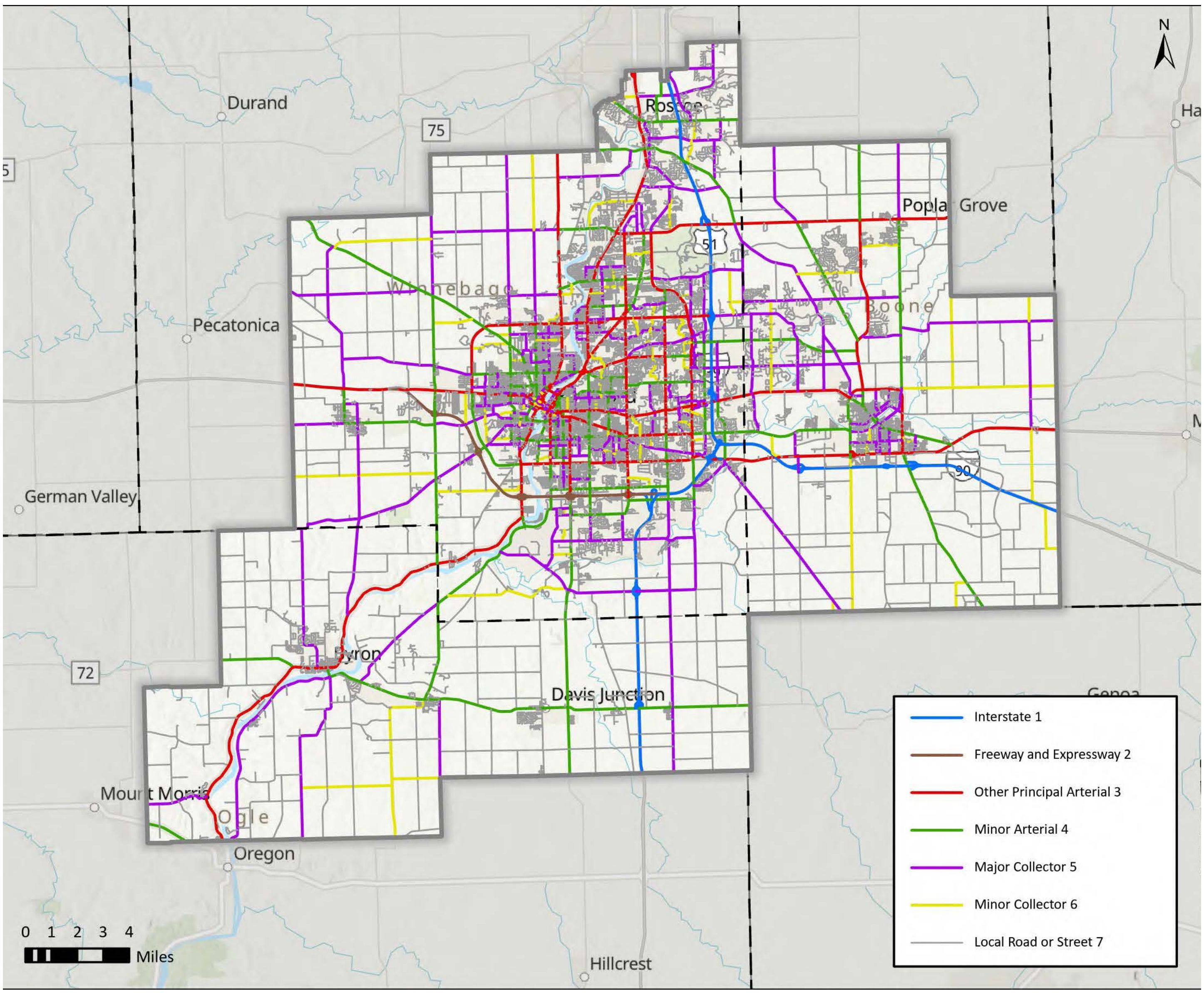
Transportation Infrastructure & Current Conditions

A robust transportation network facilitates the movement of people and goods through the Rockford Region. The condition of transportation infrastructure informs how resilient it is to natural and human hazards; evaluating the condition of roads, bridges, and other assets is essential for adequate management. The rate at which infrastructure degrades and the level of maintenance it requires depends on its type, age, and usage. This section provides an overview of the condition of the transportation system in the Rockford Region, including roadways, mass transportation, active transportation, and freight.

Roadways

Roadways are the most visible component of the surface transportation system and are the primary means by which people and goods travel. Three major highways converge in the Rockford MPA: Interstate 90 (I-90), Interstate 39 (I-39), and U.S. Route 20 (US-20), which are supported by a network of state, county, township, and local highways and roads. The combined state, county, and local roadway network in the Rockford MPA encompasses 2,914 centerline miles.[i] In 2023, vehicles traveled 7,671,329 miles daily on its roadways.[ii]

Figure 2-1: MPA Transportation Network Map (2025)



Source: Illinois Department of Transportation

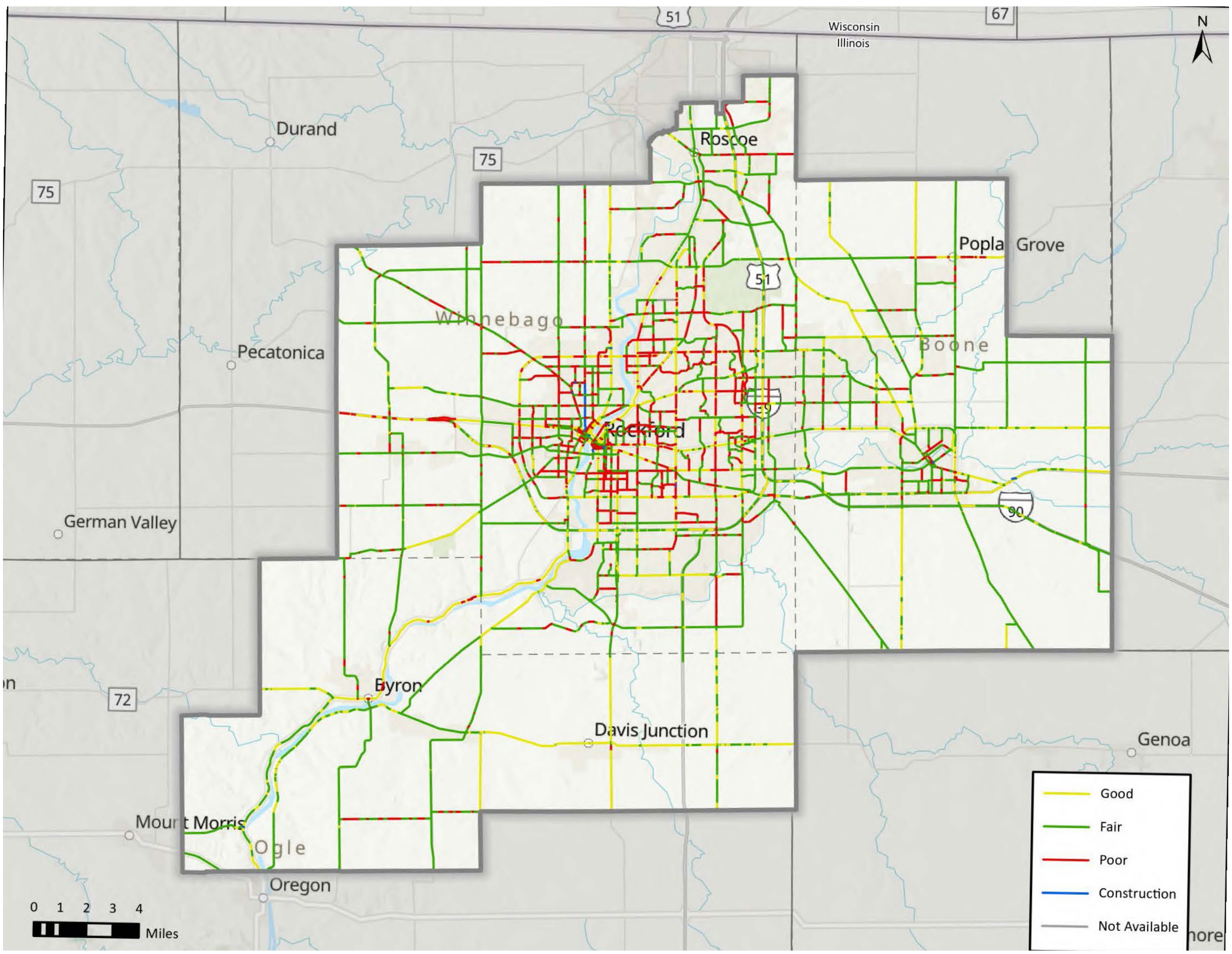
In the past, local agencies developed metrics and measurements to rate the condition of their respective assets, thus making comprehensive analysis of asset condition in the MPA difficult. However, in 2020, the Illinois Department of Transportation (IDOT) began collecting pavement condition for all roadways functionally classified as collector or above throughout the state on a two-year cycle. This allows all regional roadways to be evaluated and compared.

In 2022, 426 lane miles (21 percent of lane miles) in the MPA received an overall rating condition of good, 1,120 lane miles (55 percent) received a rating of fair, and 472 lane miles (23 percent) received a rating of poor. The remaining 1 percent of lane miles were missing an overall rating score.

IDOT also provides data regarding bridge condition. Of the 164 structures in the Rockford MPA, 42 received a condition rating of good, 114 received a condition rating of fair, and eight received a condition rating of poor. The average age of all bridges and structures in the Rockford Region is 45 years. The number of structures in poor or fair condition will continue to rise as assets age.

The current condition of the region's roadways and bridges is partially a result of deferred maintenance. In the past, transportation agencies adopted a "worst-first" approach to transportation investment, where the roads and structures in the poorest condition were prioritized. This resulted in fewer and larger road maintenance projects while other roads received little maintenance. There has been a transition in recent years to a "pavement preservation" approach, where maintenance is carried out more frequently in an attempt to prevent roads from deteriorating as quickly. However, roadway degradation has also been exacerbated in recent years by an increase in heavier vehicles, such as truck freight and larger personal vehicles (e.g., SUVs, pickup trucks). These heavier vehicles put more weight on the road surface and cause it to degrade faster, which means more frequent maintenance is required.

Figure 2-2: MPA Pavement Condition (2022)



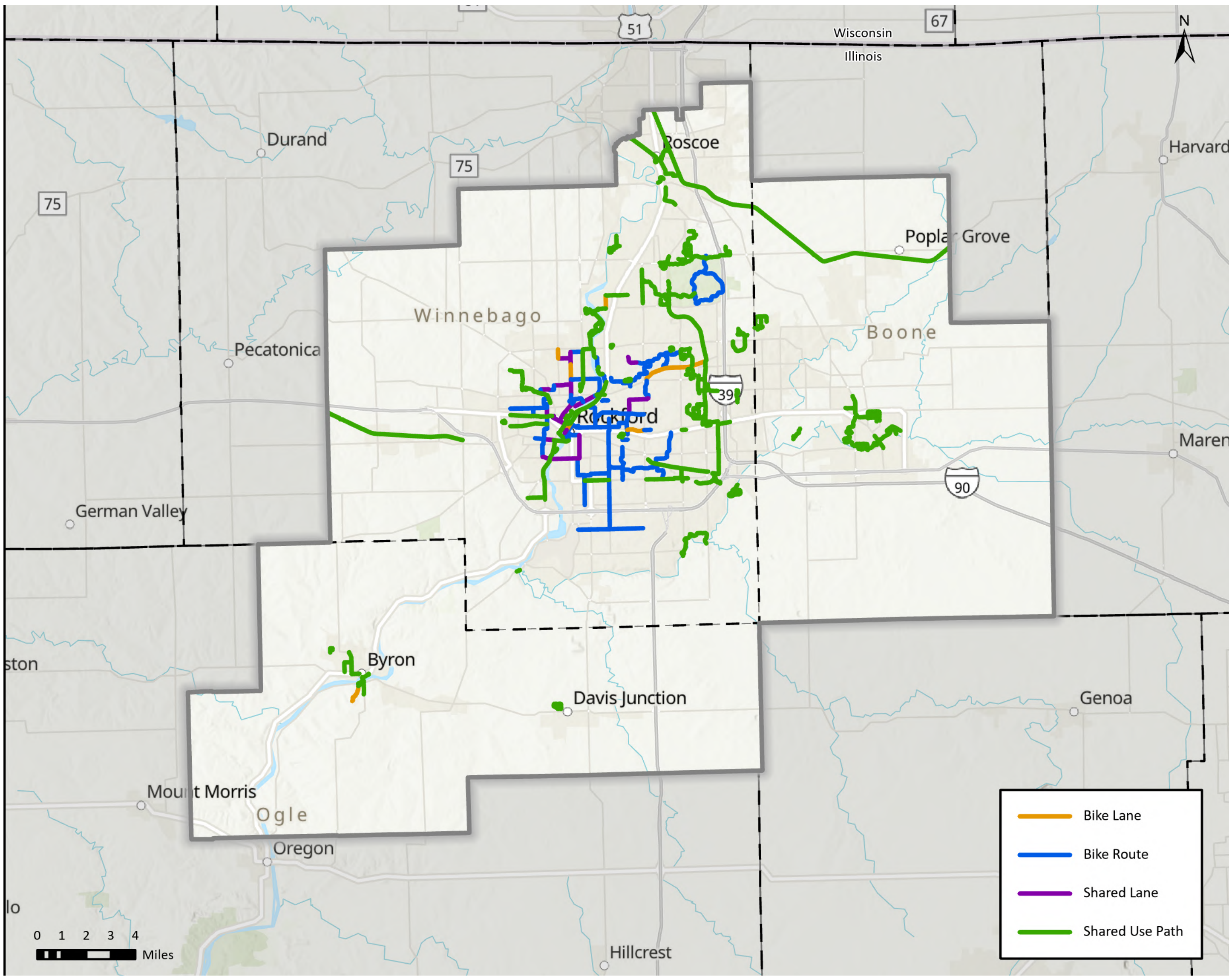
Source: Illinois Department of Transportation

Active Transportation

In the Rockford MPA, active transportation facilities can be grouped into three categories: on-street bicycle facilities, shared-use paths, and pedestrian facilities. Shared-use paths and sidewalks are dedicated active travel infrastructure, while on-street bicycle facilities share the roadway with motor vehicles. Winnebago County currently has 45.5 miles of on-street bicycle facilities. The portions of Boone and Ogle counties within the MPA do not have on-street bicycle facilities. The region has 124 miles of shared-use paths, and the Rockford Urbanized Area (UA) had approximately 1,233 miles of sidewalks. Figure 2-3 highlights the existing bicycle network across the MPA.

The region's shared-use paths are provided by a range of local bodies within the MPA, and there is currently no centralized process for assessing the condition of this infrastructure. Region 1 Planning Council (R1) is currently undertaking a "State of the Trails" report, which documents the current condition of the shared-use paths within the MPA with a specially designed "data bike." This project will serve as a resource for maintaining and upgrading the active transportation infrastructure in the region and ensure funding is directed to the most appropriate part of the network.

Figure 2-3: MPA Existing Bicycle Network

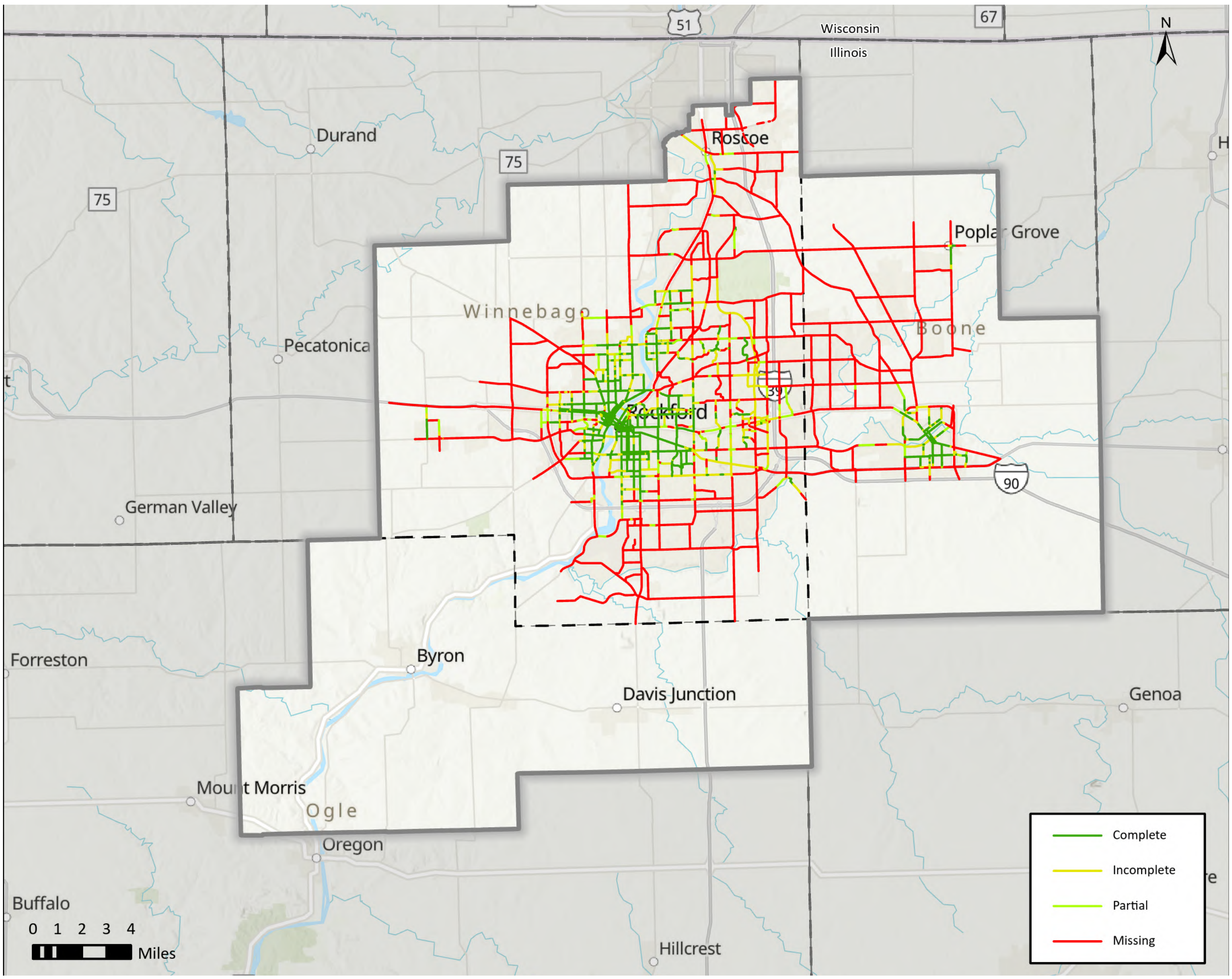


Source: WinGIS

Of the 576 centerline miles of streets in the Rockford UA, only 113.5 miles, or 19.7 percent, have "complete" sidewalks, where sidewalks are present on both sides of the street for the entirety of the street segment. Approximately 353.8 miles (61.4 percent) do not have sidewalks present. The remaining 109 miles (18.9 percent) only have sidewalks on one side of the roadway or have partial or incomplete sidewalks.

As part of the Bicycle and Pedestrian Plan, the MPO analyzed sidewalk coverage in the 2010 Rockford urbanized area. While the area includes about 1,230 miles of sidewalks, many are not continuous or on both sides of the street. Only 113.5 of 576 street miles have complete sidewalks, while most streets (over 60 percent) lack sidewalks entirely. Figure 2-4 illustrates sidewalk presence across the MPA.

Figure 2-4: MPA Presence of Sidewalks



Source: WinGIS

A composite score was established based on how well each major roadway (i.e., roads with a federal functional classification of collector or above) met certain roadway and pedestrian space characteristics. Characteristics included speed limit, traffic volume, number of lanes, truck route status, sidewalk presence, midblock crossings, presence of pedestrian signals, and crosswalk visibility. Only 1.6 percent of the roadways assessed had high suitability for pedestrians. 27.8 percent had a medium-high suitability, 45.1 percent had a medium suitability, and 25.5 percent had a low suitability. The high and medium-high pedestrian suitability areas were concentrated within the city center and adjacent neighborhoods.

Sidewalk pavements require less frequent maintenance than roadway pavements since there is less stress on the surface. However, the burden of sidewalk maintenance is often the responsibility of the owner of the adjacent plot, and therefore upkeep of sidewalks can depend upon the ability and desire of private individuals and businesses to maintain them. Many of the MPA's sidewalks are concrete slabs; over time, these can become uneven or cracked and therefore hazardous. Sidewalks are also more difficult to spot repair compared to bituminous surfaces such as asphalt or bituminous macadam (bitmac).

Photo Source: Region 1 Planning Council

Public Transportation

The Rockford MPA is served by four public transit agencies, including an urban fixed-route mass transportation provider – Rockford Mass Transit District (RMTD) – and demand-response service providers: Boone County Transit (BCT), Stateline Mass Transit District (SMTD), and Reagan Mass Transit District. Additionally, a collection of human service agencies fill specific transportation needs for their client bases. Collectively, these agencies coordinate to provide service to most of the MPA. In 2025, Winnebago County, in partnership with Reagan Mass Transit District, began providing services in the unincorporated portions of Winnebago County, the Village of Winnebago, and portions of the villages of Cherry Valley and New Milford, which have previously been unserved.

Public transportation within the Rockford MPA utilizes the public roadways, and no dedicated bus lanes or bus rapid transit (BRT) is currently available. RMTD operates a fleet of 41 fixed-route buses manufactured between 2013 and 2024, consisting of 27 hybrid-electric buses, six battery-electric buses, and eight diesel buses. In addition, the agency maintains a fleet of 41 paratransit vehicles, of which 33 are operated by RMTD and eight are assigned to SMTD service. RMTD's headquarters and vehicle depot are located at its downtown Rockford facility, which also serves as the system's primary bus transfer center.

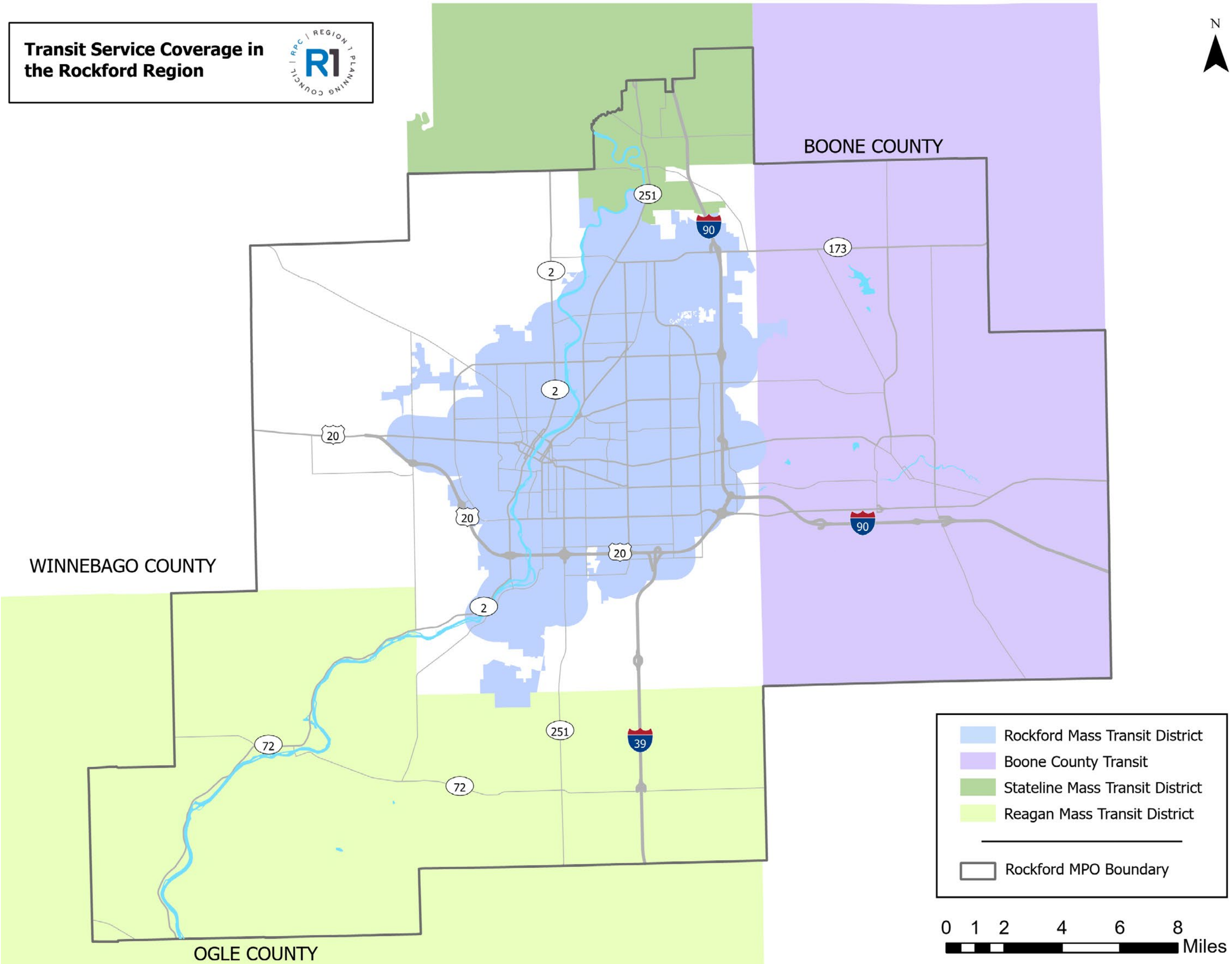
Fixed Route:

Fixed route services are buses than run along predetermined routes and schedules and are available to the general public.[iii]

Paratransit:

Paratransit services offer shared, demand-response transportation designed for individuals with disabilities who are unable to use fixed-route buses.[iv]

Figure 2-5: Regional Transit Service Coverage (2025)



Source: Region 1 Planning Council

Rail

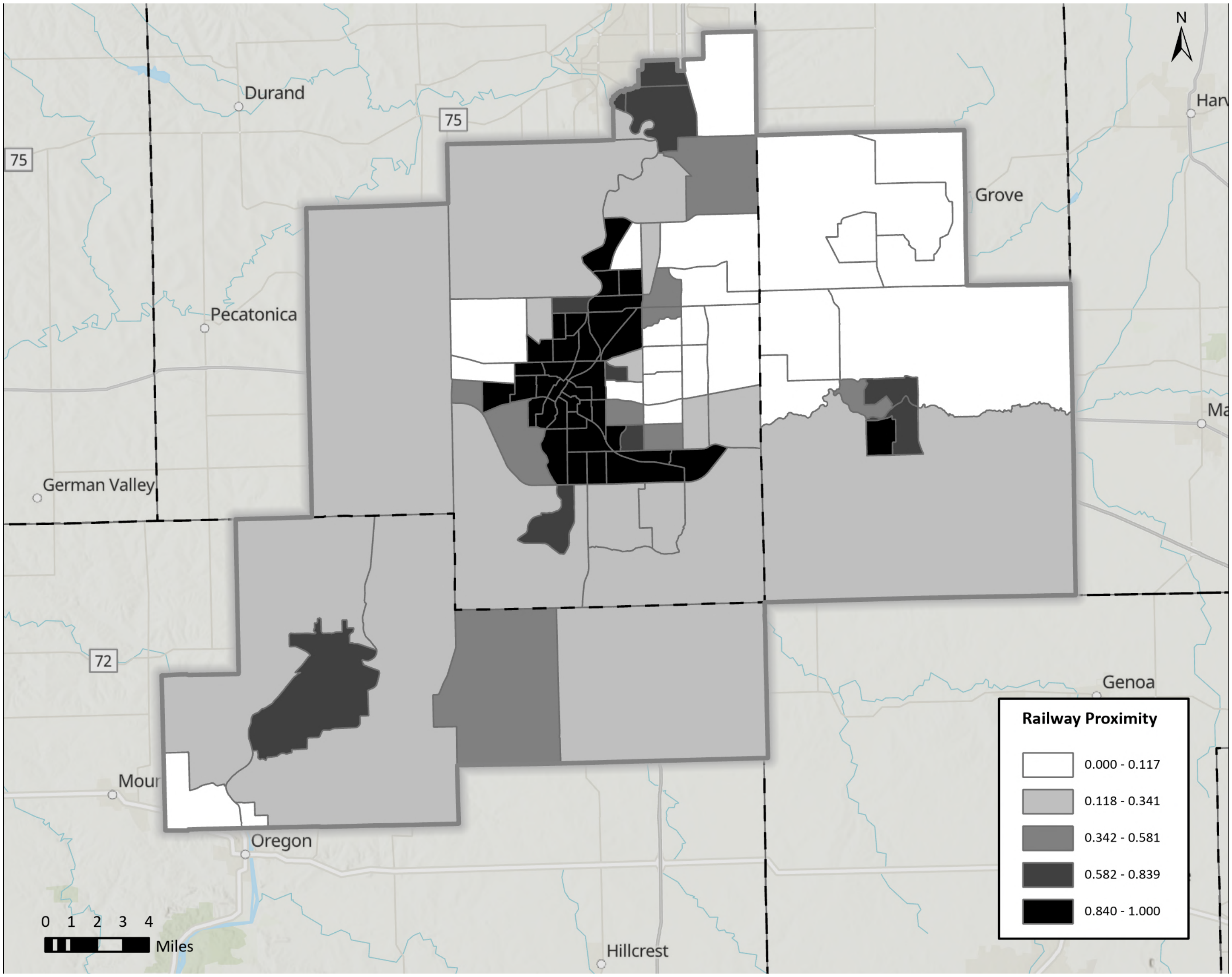
Within the MPA, there are 130.2 miles of railroad tracks. These rail lines connect the Rockford Region to economic hubs across the country, including Chicago, a major railroad center. Currently, three of the seven Class I railroads in North America operate in the Rockford MPA: Canadian National, Canadian Pacific, and Union Pacific. The Illinois Railway also operates within the region.

Short intercity rail service routes can be used as a fast, affordable alternative to automobile and air travel. IDOT is currently developing an intercity passenger rail service connecting Chicago and Rockford with stops in Elgin and Belvidere. Metra will operate the service on the Union Pacific railroad at speeds up to 79 miles per hour. Service is expected to begin in December 2027, following necessary track upgrades and the construction of passenger rail stations and platforms in Rockford and Belvidere.

No data is available regarding the condition of regional rail infrastructure. All rail infrastructure within the region is privately owned, and rail companies are not required to publicly disclose detailed information about the condition of their tracks or related assets. However, railway infrastructure in the area dates from the 19th century; given its age, it could have higher susceptibility to damage from hazards.

Figure 2-6 illustrates relative proximity within the MPA to railway infrastructure within the study area using a normalized index ranging from 0.000 (lowest proximity) to 1.000 (highest proximity). Darker shading indicates areas located closer to active rail corridors, while lighter shading represents areas farther from rail lines. Values are standardized rather than expressed in distance units, allowing for comparison across the study area.

Figure 2-6: MPA Railway Proximity (2025)



Source: Region 1 Planning Council

Current & Future Climate Trends

This section provides an overview of the Rockford Region's long-term weather patterns and key climate characteristics with a focus on average temperatures and precipitation trends. The climate of Rockford, Illinois, is considered temperate, with cold winters and warm summers, but it also experiences periodic extreme weather events like severe thunderstorms or snowstorms. However, climate impacts are projected to intensify, including higher temperatures and more severe storm events.

Understanding current conditions and future trends is essential for assessing the region's vulnerabilities and anticipating future impacts of climate change on the transportation system.

Weather & Climate:

The terms "climate" and "weather" are often used interchangeably, but they refer to two distinct concepts that describe atmospheric conditions on different timescales.[v]

Weather refers to the short-term atmospheric conditions in a specific place at a particular time. This includes daily fluctuations in temperature, humidity, precipitation, wind speed, and cloud cover.

Climate refers to the average of weather patterns over a much longer period within a particular region. This includes patterns of temperature, precipitation, and seasonal variations, as well as more extreme phenomena like droughts, heatwaves, or cold spells.

Climate projections predict how a region will react to climate change in the future. Projections are calculated using Global Climate Models: complex computer programs which use data from various factors that can affect the Earth's climate, such as water vapor, carbon dioxide, heat and the Earth's rotation, and the interactions between these factors and the hydrosphere, atmosphere and landmasses.[vi] Models can be adapted to consider a range of scenarios based upon various potential future emissions levels.

A summary of the projections presented in this section can be found in Table 2-1. Projections vary substantially with time period and emissions scenario. A low emissions scenario assumes a rapid movement away from fossil fuels over the coming decades; a high emissions scenario corresponds to a future still dependent on fossil fuels where carbon and methane emissions continue to rise throughout the century.[vii] Climate models predict weather conditions over a long period of time, and there is always a margin of error which increases the further in the future the model is attempting to predict.

Table 2-1: Summary of Annual Average Climate Projections in the Rockford Region

Climate Impact	Maximum Temperature		
Timeframe	Current (2010)	Near Term (2050)	Long Term (2100)
Low Emissions	59.3°F	63.1°F	64.6°F
High Emissions	59.3°F	64.4°F	69.5°F

Climate Impact	Precipitation		
Timeframe	Current (2010)	Near Term (2050)	Long Term (2100)
Low Emissions	34.77 in.	35.32 in.	36.34 in.
High Emissions	34.35 in.	35.96 in.	37.51 in.

Climate Impact	Extreme Heat		
Timeframe	Current (2010)	Near Term (2050)	Long Term (2100)
Low Emissions	3 days	11- 35 days	19- 43 days
High Emissions	3 days	11- 43 days	43- 75 days

Source: National Environmental Mapping and Applications Center (NEMAC)- The Climate Explorer

Temperature

Current

The average annual temperature in the area is approximately 49 degrees Fahrenheit (°F), with summer highs typically above 80°F and winter lows typically below freezing (34°F).[viii] [ix] The hottest months are typically July and August, with average highs in the mid-80s to low 90s (°F), though extreme heatwaves can push temperatures above 100°F during particularly hot summers. During heatwaves, the combination of high humidity and high temperatures can make it feel much warmer than the measured temperature.

The region also experiences cold winters. Average lows in January, the coldest month, typically hover around 15°F to 20°F, and average highs are often in the mid-20s (°F).

Figure 2-7: Rockford Region Weather

Rockford Region Warm Weather

Rockford Region Cold Weather

Source: GoRockford and Hidustan Times

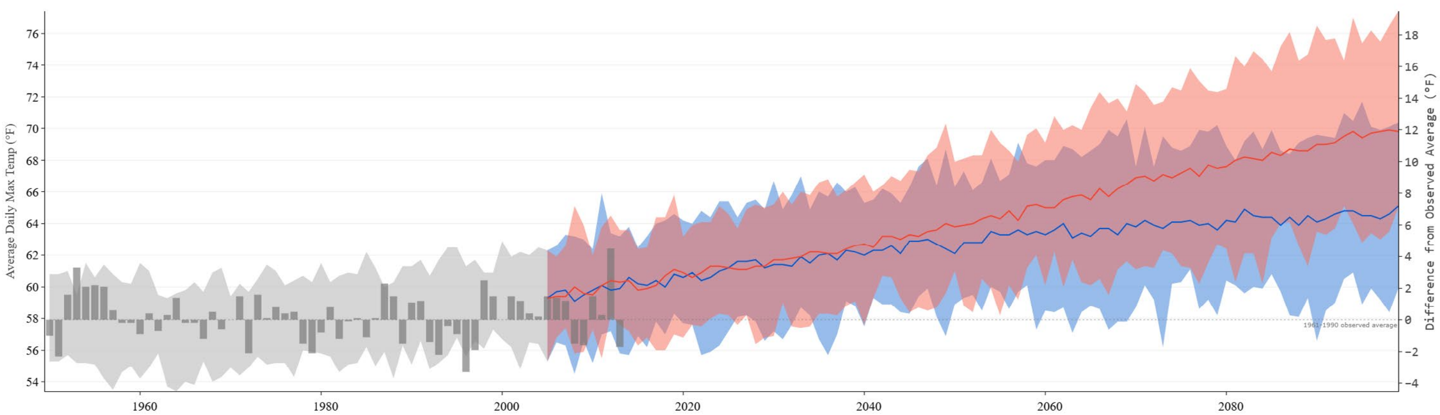
Future

As climate change progresses, the Rockford Region is anticipated to experience an increase in average annual maximum and minimum daily temperatures. The average annual daily maximum is the average of the highest temperatures recorded each day throughout the year; it provides a general idea of how hot temperatures reach during the day. The average annual daily minimum is the average of the lowest temperatures recorded each day, reflecting how cold it typically gets during the night or early morning hours.

Figure 2-8 and 2-9 display historic and projected average annual daily maximum and minimum temperatures, respectively, for Winnebago County under high and low emissions scenarios. The graphs include the 1961-1990 observed averages (57.9°F average maximum and 37.4°F average minimum) as reference lines.[x xi]

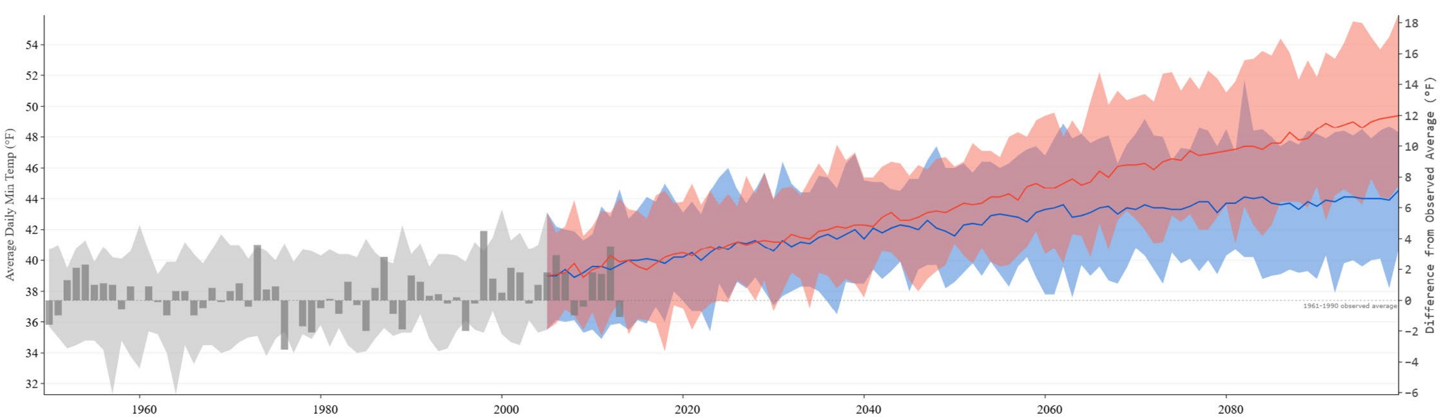
Projections for average temperature for 2050 and 2100 under high and low emissions scenarios can be seen in Table 2-1: Summary of Annual Average Climate Projections in the Rockford Region. By 2050, the average daily maximum temperature and the average daily minimum temperature are expected to increase by approximately 3 to 5°F; by 2100, they are expected to increase by approximately 5 to 10°F.

Figure 2-8: Winnebago County Average Daily Maximum Temperature Projections



Source: National Environmental Mapping and Applications Centers (NEMAC)- The Climate Explorer

Figure 2-9: Winnebago County Average Daily Minimum Temperature Projections



Source: National Environmental Mapping and Applications Centers (NEMAC)- The Climate Explorer

Precipitation

Current

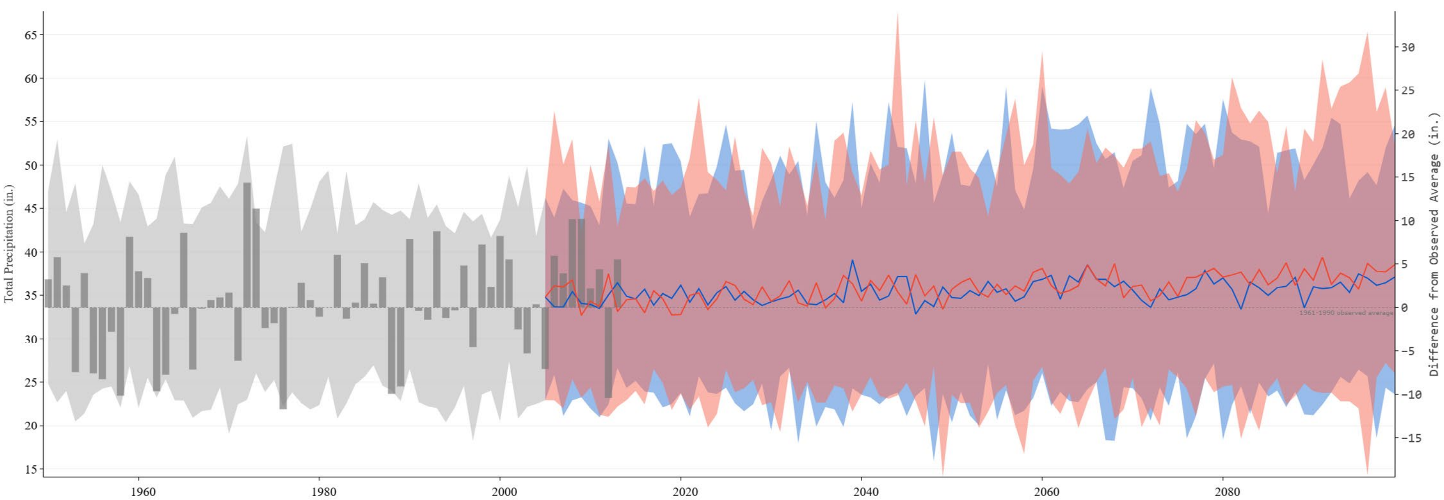
The region experiences a moderate amount of precipitation, fairly evenly distributed throughout the year, with annual rainfall averaging around 36 to 40 inches.[xii] The region's wettest months are typically May and June, when thunderstorms are more frequent, often bringing heavy downpours that can lead to localized flooding. Winter months generally see less frequent but significant precipitation, often in the form of snow; the region averages 30 to 40 inches of snow annually.[xiii] The heaviest snowfalls often occur between December and February.

Future

The Rockford Region is expected to experience increases in total annual precipitation as climate change escalates, with winter and spring accounting for the most substantial increases. Figure 2-10 illustrates historic and projected average annual total precipitation for Winnebago County under low and high emissions scenarios, including the 1961-1990 observed average (33.59 inches) as a reference line.[xiv]

Projections for average precipitation for 2050 and 2100 under high and low emissions scenarios can be seen in [Table 2-1: Summary of Annual Average Climate Projections in the Rockford Region](#). While projections for 2050 predict an additional 0.5 to 1.5 inches of precipitation annually, projections for 2100 indicate an additional 2 to 3 inches of precipitation from current levels.

Figure 2-10: Winnebago County Average Annual Total Precipitation Projections



Source: National Environmental Mapping and Applications Center (NEMAC)- The Climate Explorer

Recent Significant Weather Events

July 5, 2003 – Severe Thunderstorms

On July 5, 2003, a powerful storm with winds up to 104 miles per hour struck Rockford, causing widespread damage. The severe winds led to extensive power outages, affecting over 80,000 people, and resulted in the destruction of trees, power lines, and a TV tower. Total property damage was estimated at $5 million. The storm was part of a larger weather system that swept through northern Illinois, with the heaviest damage concentrated in Winnebago, Boone, and McHenry counties. This destruction was driven by a combination of strong atmospheric winds, an evolving supercell, and mid-level atmospheric changes.

August 7, 2007 – Flooding

On the morning of August 7, 2007, the region experienced heavy rainfall ranging from 3 to 7 inches. The heaviest rainfall occurred around Rockford, where nearly 7 inches fell on the southeast side, resulting in widespread flooding of homes and businesses. The most intense rain took place between midnight and 4 AM. Extensive flooding was reported along Keith Creek in southeast Rockford and in the Cherry Valley area. This flooding caused approximately $3.1 million in property damage.

February 2011 – Groundhog Day Blizzard

The Groundhog Day Blizzard of January 31 to February 2, 2011, brought severe snowfall, whiteout conditions, and strong winds to Boone, Ogle, and Winnebago counties, with a recorded 15 inches of snow falling after the three-day storm. The storm caused near-zero visibility, making travel extremely dangerous and leading to road closures across the region.[xv] The hardest-hit areas were Rockford and Belvidere, where snow accumulation and drifting made roads impassable. The storm caused significant disruptions for several days, including closures for schools, businesses, and government offices.

Summer 2012 – Heatwaves and Drought

The summer of 2012 saw a Midwest-wide heatwave and drought that impacted Boone, Ogle, and Winnebago counties.[xvi] Temperatures exceeded 100°F multiple times, with a peak of 105°F on July 7—the hottest reading in Rockford since 1936. Rockford experienced a rare stretch of temperatures over 100°F from July 4 to 7.[xvii] The heat caused severe crop damage, particularly in Boone County, and stressed local water resources.

April 2015 – Tornado Outbreak

The April 2015 tornado outbreak in the Rockford, Illinois area was a significant severe weather event that occurred between April 9 and April 11. On April 9, powerful tornadoes, including EF1- and EF2-rated storms, struck the region, causing widespread damage.[xviii] The tornadoes, with winds up to 135 miles per hour, damaged homes, trees, and power lines, leaving many without electricity and blocking roads with debris. The tornado outbreak resulted in approximately $170,000 in property damages.

January 2019 – Polar Vortex

The January 2019 polar vortex brought dangerously low temperatures, with wind chills between -30°F and -40°F across the region. Despite record-breaking lows of -31°F on January 31, there were no major reports of structural property damage;[xix] however, the extreme cold caused some residential heating systems to fail, leaving households temporarily without heat. Such disruptions pose a serious concern for public health and highlight vulnerabilities that are critical when considering community resilience to future extreme cold events. Residents also reported loud, cracking noises at night, caused by “cryoseism” or “frost quakes,” as water in the ground froze, expanded, and stressed rocks. Noises also came from contracting pipes and materials.[xx] This event highlighted the impact of Arctic air and the region’s vulnerability to extreme winter weather.

July 2024 – Flooding

The heavy rainfall events of July 2024 caused significant flooding in Winnebago County, particularly in the City of Rockford, where at least 224 properties suffered flood-related damage.[xxi] The storms produced a total of 4 to 6.5 inches of rainfall, leading to damage to roadways and structures. In addition, over 100 emergency water rescue calls were made, and one fatality was reported. The flash flood damage costs totaled approximately $3 million.[xxii]

Future Climate Impacts

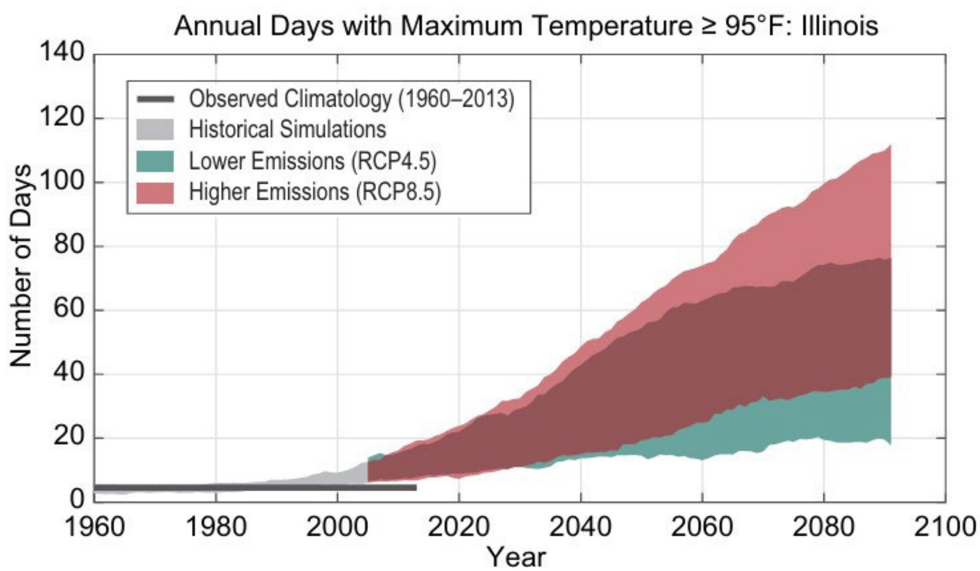
Based on rising temperature trends and changing precipitation patterns, the Rockford Region will be primarily impacted by two aspects of climate change: extreme heat and increased storm severity.

Frequent disruptions to the transportation system from extreme conditions can reduce infrastructure lifespan, increase maintenance costs, cause more dangerous travel conditions, and disrupt the movement of people and goods. For example, extreme heat can damage roadways by causing them to expand, melt, rut, crack, or buckle, depending on the material. Flooding, as a result of severe storms, can block roads, disrupt traffic, delay construction activities, physically stress and damage roadways, and erode infrastructural support such as soil or culverts. These consequences affect all modes of transportation, including roads, rails, air travel, and pedestrian infrastructure.[xxiii]

Extreme Heat

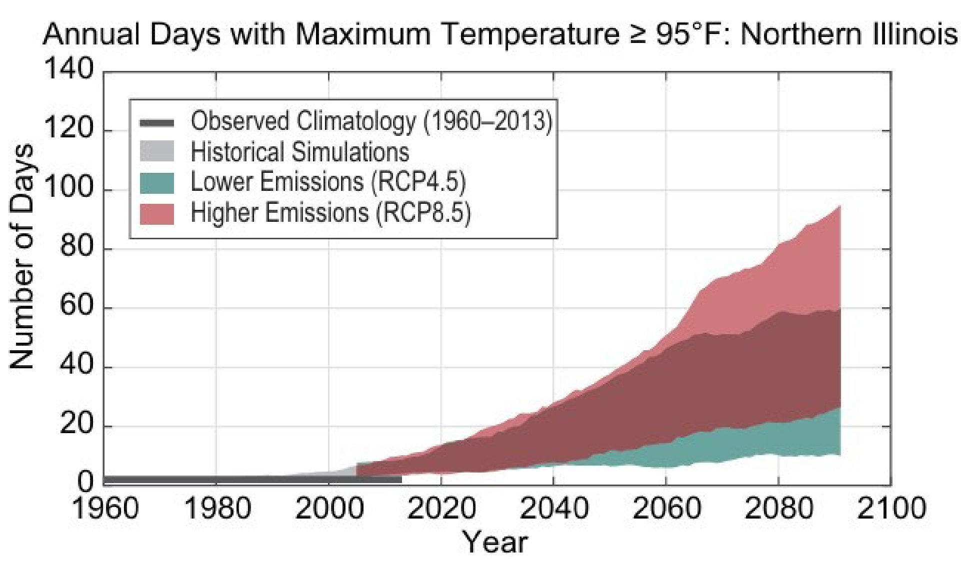
Climate projections indicate the Rockford Region will experience a moderate increase in extreme temperatures and extreme heat days. Extreme heat days, defined as days with a temperature of 95°F or higher, are projected to increase in Illinois by 8 to 40 additional days per year by 2050.[xxiv] By 2100, extreme heat days in northern Illinois are projected to increase by 5 to 90 days. Illinois currently averages three extreme heat days per year.[xxv]

Figure 2-11: Annual Days with Maximum Temperature ≥ 95°F in Illinois



Source: The Nature Conservancy

Figure 2-12: Annual Days with Maximum Temperature ≥ 95°F in Northern Illinois



Source: The Nature Conservancy

Extreme heat most severely impacts urban areas in the region with limited tree canopy, like downtown Rockford, due to the urban heat island (UHI) effect. Urban heat islands are defined as urbanized areas that experience higher temperatures due to the abundance of structural materials used in human development, like concrete, asphalt, brick, and steel, which retain heat at a higher rate than naturally occurring materials, like soil and vegetation.[xxvi] The UHI effect causes daytime temperature increases in urban areas to be 1 to 7°F higher than increases in rural areas.[xxvii]

For more information on how extreme heat will impact the Rockford Region, refer to Chapter 3 of the Climate Action Plan and the Vulnerability Assessment Technical Report, which identifies the region's exposure, sensitivity, and adaptive capacity to extreme heat.

Storm Severity

Storms in the Rockford Region often appear in the form of thunderstorms, ice storms, wind storms, tornadoes, and heavy rain events. Annual precipitation totals are projected to rise from 35 inches in 2010 to 37.5 inches by 2100. However, while the volume of precipitation will increase, the number of days without precipitation are projected to remain the same.[xxviii] This indicates an increase in the severity of intense periods of rainfall, which can lead to stormwater management concerns like flooding.

The frequency and intensity of storms are also projected to rise. Between 1980 and 2023, the National Oceanic and Atmospheric Administration (NOAA) recorded 116 severe storm disasters impacting the Rockford Region.[xxix] Climate models indicate that extreme storms may increase by up to 60 percent by 2100. Tornadoes, lightning, winter storms, and floods result in an average of 190 deaths and $2.46 billion in property loss annually in the Midwest alone.[xxx] Collectively, these statistics underscore the significant and ongoing impacts of severe storms.[xxxi]

Part 3:

Regional Emergency Response

Transportation infrastructure plays a crucial role in emergency response and ensuring that first responders can adequately deal with a threat or hazard. The faster emergency response vehicles can access the scene of an incident, the higher the chance that negative outcomes can be prevented or mitigated. As the majority of emergency response vehicles utilize public roadways, it is vital to integrate and maintain resilient infrastructure improvements, such as Emergency Vehicle Preemption (EVP) and flood-resistant drainage systems, to maintain posterity in emergency situations.

Emergency Vehicle Preemption (EVP):

Emergency Vehicle Preemption (EVP) systems help to provide faster response by identifying approaching emergency vehicles and changing traffic light sequence accordingly, meaning that the emergency vehicles are not required to slow down or stop as they approach the intersection .[i]

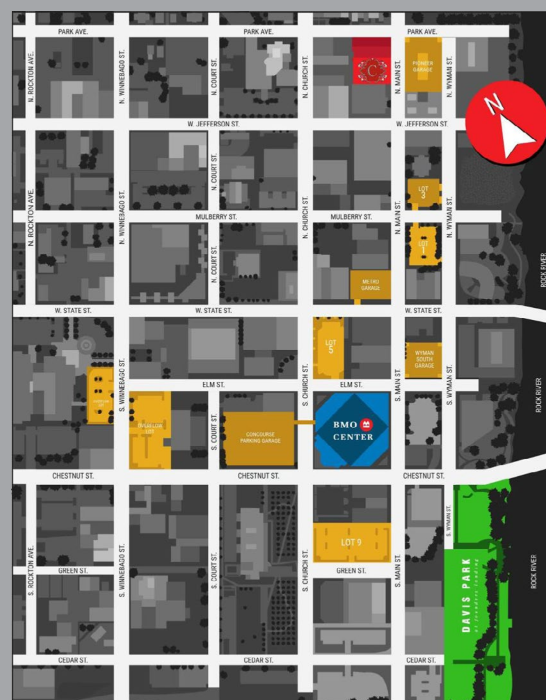
In the Rockford Region, weather-related emergency responses are generally a result of severe storms, flooding, tornados, or blizzards. This section assesses the region's capacity to support emergency response and identifies areas where improvements may be needed to strengthen key routes.

Capacity Concerns

The Rockford Region has an estimated population of 323,738 residents and houses many facilities that attract large crowds. When these venues are hosting events, the increase in both vehicle and pedestrian traffic can strain the surrounding roadway network. In the event of an emergency, infrastructure must be able to sufficiently accommodate a large influx of vehicles, and emergency responders must be able to reach their destination in a timely manner. Though there are many spaces in the Metropolitan Planning Area (MPA) that host occasional events, the following list highlights the region's traffic generators that regularly attract large crowds in order to identify areas in the roadway network most vulnerable to being overwhelmed.

BMO Center: The BMO Center is located at 300 Elm Street in Rockford. The facility holds a maximum capacity of 8,000 individuals for its events such as concerts, sporting events, and conventions.[ii]

Coronado Theater: The Coronado Theater is located at 314 North Main Street in Rockford and holds a total capacity of 2,309 individuals.[iii] The facility hosts public and private events, including concerts and other theater performances.



Downtown Corridors:

In downtown Rockford, barriers such as recurring congestion, restricted route access, and constrained mobility may pose challenges during emergency situations. In the event of an evacuation, State, Main, Court, and Winnebago Streets represent the most viable corridors due to their traffic-carrying capacity and their critical crossing over the Rock River and adjacent waterways.

Boone County Fairgrounds: Located at 8791 IL-76 in Belvidere, the Boone County Fairgrounds host numerous events throughout a year, the largest being the Boone County Fair, which attracts well over 220,000 visitors annually.[iv]

Photo Source: Region 1 Planning Council

CherryVale Mall: Though not an event venue, CherryVale Mall sees 2.88 million yearly shoppers, supplying nearby roads with steady traffic year-round. This is exacerbated during holiday months when the region also faces the risks of hazardous winter conditions.

Hard Rock Casino: The Rockford Hard Rock Casino opened in 2024 and is situated directly across the I-90 exit on East State Street in Rockford and garnered 1.4 million visitors in its first full year of operation (2025).[v] The casino is located in an area that sees consistent congestion; busy nights at the casino can contribute to difficulties navigating the surrounding roadway network.

Photo Source: Go Rockford

Local High Schools: The Rockford MPA is home to 13 high schools, which strain the roadway network daily as driving-age students arrive at and depart from campus, as well as during special events that attract crowds like sporting events, concerts, and graduation ceremonies.

Mercyhealth Sportscore One: Sportscore One is a 179-acre sporting complex west of the Rock River at 1288 Elmwood Road in Rockford that features eight softball diamonds, 17 soccer fields, two playgrounds, boat ramps and a recreation path.[vi] This facility holds numerous soccer and softball tournaments throughout the year and attracts visitors through its opportunities for various recreational activities.

Mercyhealth Sportscore Two: This Mercyhealth Sportscore location houses a 2,500-seat outdoor stadium, 26 soccer fields, seven turf fields, and two indoor sporting facilities, and hosts over 1.4 million people annually through youth sports tournaments and various trade shows.[vii]

Rockford International Airport: Located at 2 Airport Circle in Rockford, the airport serves both cargo and passenger traffic and is one of the nation's largest air cargo hubs.[viii] Cargo and passenger operations generate consistent truck and passenger vehicle activity on surrounding roadways, particularly US-20 and nearby interstate corridors.[ix]

Photo Source: WinGIS

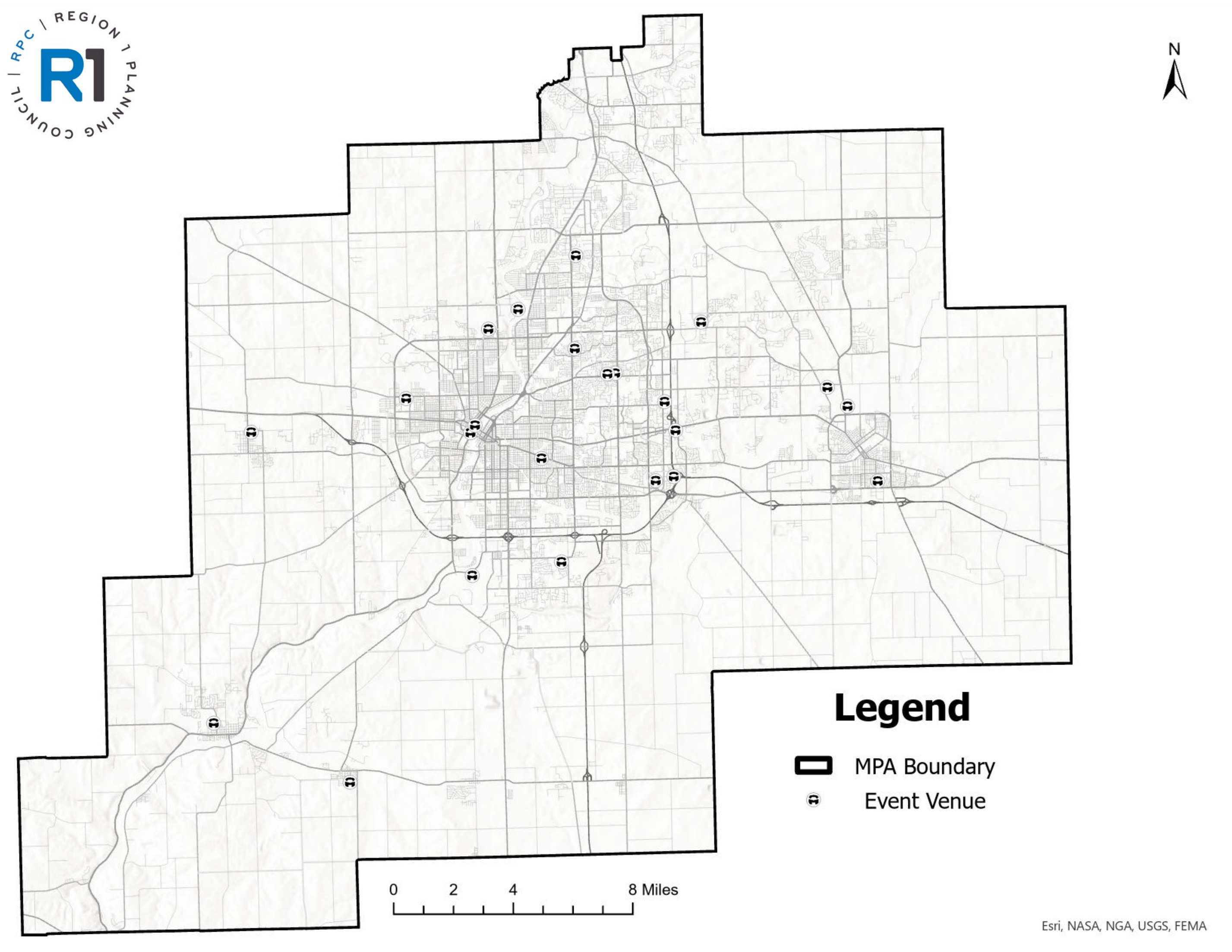
Six Flags Hurricane Harbor Rockford: Located at 7821 East State Street in Rockford, Hurricane Harbor is a seasonal water park that attracts large crowds during summer months. Park attendance days can generate substantial traffic volumes along East State Street and nearby interstate access points, particularly during weekends and holidays.

The high volume of traffic drawn to these facilities adds stress and wear to nearby roads. If an emergency were to occur when multiple locations were hosting events, the capacity of surrounding infrastructure could be overwhelmed, resulting in delayed response times. To address these concerns, key travel routes must be designed to be able to withstand congestion and allow emergency response crews to operate efficiently.

Regional Traffic Generators

Figure 3-1 identifies major traffic generators, including event venues and large institutional uses, throughout the MPA. These destinations attract substantial volumes of vehicles during peak events, which can place temporary strain on the surrounding roadway network.

Figure 3-1: MPA Traffic Generators Roadway Network



Source: Region 1 Planning Council

Key Routes

In order to facilitate efficient emergency response times, the flow of traffic along the region's transportation network must be free of disruptions or detours. Key routes are roads or sections of roads that are integral to maintaining traffic mobility and must be resilient to hazards in the case of a disaster or emergency event in order to ensure community well-being across the region.

Key routes in this section were selected primarily based on their ability to carry heavy traffic, as measured by Annual Average Daily Traffic (AADT), and their connections with other significant routes, densely populated areas, emergency services facilities, river crossings, and traffic generators. For the purposes of this analysis, emergency service facilities are defined as hospitals and urgent care centers, fire stations, and police stations. A roadway's ability to carry traffic into, out of, and through the MPA was also considered. The following routes, categorized by cardinal direction, are considered regionally significant.

Key Route Selection Example:

Riverside Boulevard was selected as a key route due to meeting the following criteria:

- **High AADT of 25,700**
- **Service length of West Rockford to Belvidere**
- **Connections with seven emergency services facilities, a major waterway crossing, an event venue, and eight other regionally significant roads.**[x]

East/West Routes

- Airport Drive
- Bauer Parkway/Harlem Road
- Blackhawk Drive/IL-2
- Charles Street
- Harrison Avenue/US-20
- Hononegah/Elevator Road
- Kishwaukee Road
- Latham/Ralston/West Lane Road/IL-173
- Montague Street/Montague Road
- Riverside Boulevard
- Spring Creek Road/Auburn Street
- State Street/US-20 (Rockford)

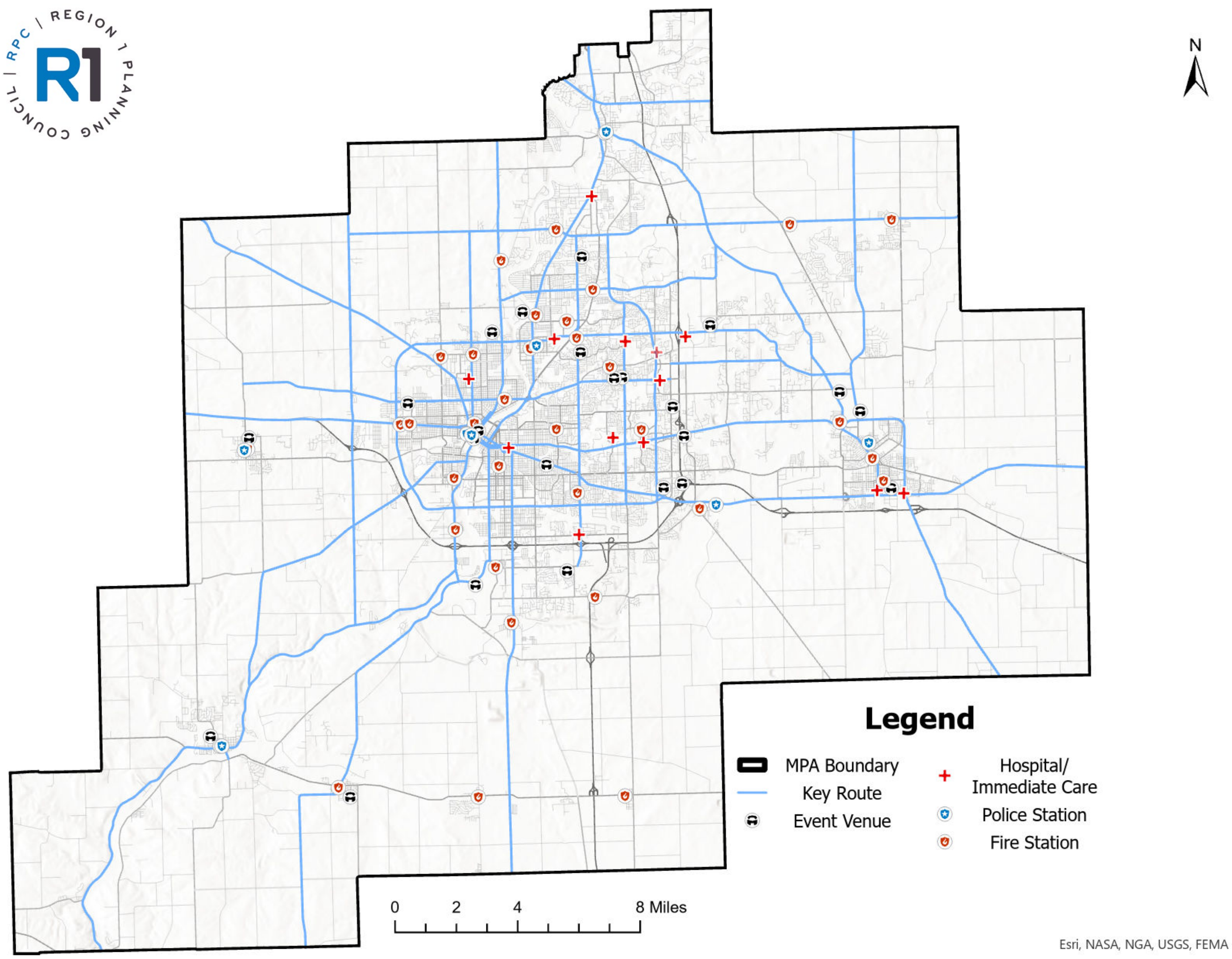
North/South Routes

- 11th Street/IL-251
- 2nd Street
- Alpine Road
- Beloit/Belvidere Road
- Marengo/Belvidere/Genoa Road
- IL-76
- Kennedy Hill Road
- Kilburn Avenue/Trask Bridge Road
- Kishwaukee Street
- Main Street/IL-2/Baxter Road
- Meridian Road/North Stillman Road
- Mulford Road
- North Rockton Avenue
- Perryville Road
- Rockton Avenue
- Springfield Avenue
- State Street (Belvidere)

Critical Infrastructure Along Key Routes

Key routes within the MPA are critical for supporting effective and efficient emergency response. These corridors provide primary connections between hospitals and immediate care facilities, police and fire stations, and major event venues that may generate concentrated traffic volumes. This map illustrates the routes that must remain operational to ensure timely response, coordinated service delivery, and regional resilience during both routine and large-scale emergency events. These critical connections are shown in Figure 3-2.

Figure 3-2: MPA Key Routes and Critical Infrastructure



Source: Region 1 Planning Council

High-Risk Flood Locations

During extreme weather and flooding events, it is essential that key infrastructure remains operational to support emergency response and to facilitate both the safe movement of people out of high-risk areas and the efficient movement of external aid into affected areas. In the Rockford Region, many roadways are vulnerable to flooding and are at a higher risk of incapacitation during severe weather, posing threats to the transportation network's traffic flow and emergency access.

The road segments in this section were selected based on their functional importance during emergencies and their ability to service the region while under stress. The criteria to determine these high-risk routes mirror those for designating key routes:

- AADT, which indicates a road's capacity to handle high volumes;
- Proximity to critical facilities such as hospitals, fire stations, or emergency service hubs; and
- Regional connectivity, particularly the ability to support evacuation or receive external aid.

These factors account for the variations in road type and traffic volume when identifying the roads crucial to mobility in the region. AADT numbers, when included in this report, were sourced from the Illinois Department of Transportation (IDOT).[xi]

To identify locations most at risk, a key routes map has been developed. This map, Figure 3-3: MPA High-Risk Flood Locations, overlays the identified road segments from this section with FEMA floodplain data, visually highlighting areas where flooding could significantly impact the transportation network.

Spring Brook Road

West of Mulford Road:

The section of Spring Brook Road directly west of Mulford Road falls in the Spring Creek floodplain. The traffic volume for this section of road is not high, with the AADT at 4,950 daily users. Rockford Fire Station #4 requires access to the Mulford and Spring Brook intersection for emergency event response on the Mulford corridor; this intersection is vital for ensuring appropriate emergency responses.

Mercy Way/North Lyford Road

Mercy Way leading to Javon Bea – Riverside:

Mercy Way and North Lyford Road lead to the southern entrance of Javon Bea Hospital and both fall within the Keith Creek floodplain. The AADT for this area, 1,150, is the lowest on this list. However, it is the only route that provides access to Javon Bea from the south.

Roxbury Road

Roxbury Road entrance to the OSF Medical Campus:

The OSF Medical Center is key to contributing to emergency efforts, as it has an emergency room and is centrally located in Rockford. Despite its low AADT of 3,900, Roxbury Road is vulnerable to flooding risks where it meets State Street, which, combined with serving as the main connection to a vital medical facility, requires it to be resilient against future weather events.

2nd Street

Between Ralston Road & Copper Drive:

A key north/south arterial route, 2nd Street connects to many east/west routes, including Ralston Road's Rock River crossing. The floodplain overlaps with around 400 yards of road prior to the Ralston Road intersection; the AADT for this section of road is 17,300 and is home to Harlem Roscoe Fire Station #2, making it crucial for maintaining traffic flow and expediting emergency responses.

Between Landstrom Road & River Lane:

This portion of 2nd Street is located north of both the Spring Creek interchange and the Auburn Street bridge, and has an AADT of 16,300. The Spring Creek floodplain covers both sides of the road; if it were to flood, traffic flow and river crossings could be severely impacted. This road is pivotal to moving traffic on both sides of the Rock River.

Kilburn Avenue

Between Collins Avenue & Custer Avenue:

Kilburn Avenue is on the edge of a large floodplain from the North Fork Kent Creek and travels from the northwest edge of the region to the southeast into downtown Rockford. This creates a direct route to Rockford Memorial Hospital, located east of Kilburn Avenue, as well as multiple schools in the area that could serve as shelters in times of emergency.

State Street (Rockford)

West of the Roxbury Road & State Street intersection:

This section of road falls in the same floodplain that covers Roxbury Road and has an AADT of 29,400, the highest on the list. It is a significant travel route for the region and serves as the main entry point to the OSF Medical Campus; this intersection is vital to both traffic flow and emergency personnel.

Between Warren Avenue & Lynmar Circuit:

The area between Warren Avenue and Lynmar Circuit falls in the Keith Creek floodplain and has an AADT of 23,800. This portion of State Street services some of the densest neighborhoods in the region and is essential for vehicular travel east/west.

Between Chestnut Street & Avon Street:

This section of State Street is located west of downtown Rockford and falls in the North Fork Keith Creek floodplain. The traffic volume for this road is 6,400 AADT and is the only rote that travels directly west from downtown Rockford. This corridor is essential for traffic flow moving out of the city.

Auburn Street

Between Central Avenue & Kilburn Avenue:

This section of Auburn Street, west of Kilburn Avenue, falls in the North Fork Kent Creek floodplain. Auburn Street connects to multiple major roads in Rockford, and travels both west from the city and east over the Rock River. This section of road is key for east/west vehicular travel.

Spring Creek Road

Intersection of Spring Creek Road & Reid Farm Road:

This intersection falls in the Keith Creek floodplain and has an AADT of 14,300. It serves as a connection to the Perryville Road north/south arterial route and is important for the efficient movement of traffic.

Between Highcrest Road & Camella Circuit:

East of the 2nd Street interchange, this section of Spring Creek Road falls in the Spring Creek floodplain and has an AADT of 16,300. Due to Spring Creek Road's connections to the Auburn Street bridge and 2nd Street, this corridor is crucial to the transport of both emergency crews and motorists around the region.

Charles Street

Between Chicago Avenue & East High School:

This section of Charles Street falls in the Keith Creek floodplain and is part of an arterial route that leads to the Swedish American Hospital and East High School in Midtown Rockford. This road is pivotal to emergency response teams accessing the southeast neighborhoods of Rockford and is frequently affected by flooding.

Alpine Road

Between Larson Avenue & East State Street:

This section of Alpine road has a high AADT of 24,500 and located in a small valley that falls in the Keith Creek floodplain, making it susceptible to flooding and traffic congestion.

North of the Alpine Road & Riverside Boulevard intersection:

The area north of the Alpine Road and Riverside Boulevard intersection falls in a large floodplain and has an AADT of 16,700. Due to Riverside Boulevard's connection to Javon Bea Hospital, this route is crucial for emergency service crews to reach residents north of the intersection.

Between Roosevelt Road & Story Book Lane:

This stretch of Alpine Road falls in the Willow Creek floodplain and has an AADT of 16,100. Harlem High School is also located in the area, making this corridor vital for both traffic flow and shelter access during emergencies.

Mulford Road

Between Mulford Village Drive & Strathmoor Drive:

This portion of Mulford Road is located north of the State Street and Mulford Road intersection and carries an AADT of 21,600. It falls in the Keith Creek floodplain and provides access to the back entrance of the OSF Medical Campus.

Between Rockford Arboretum & Gale Lane:

This portion of Mulford road carries an AADT of 17,400 and is located in a shallow basin between Guilford road and Spring Creek road. The area is at risk for flooding from Keith Creek. This arterial route is essential for connecting traffic and maintaining efficient routes for emergency response teams.

Perryville Road

Between Olde Creek Road & Spring Creek Road:

This portion of Perryville Road is impacted by the Keith Creek floodplain and carries an AADT of 22,800. It is also essential for traffic flow on Rockford's far eastside and connects users to key arterial roads and I-90. Perryville Road is equipped to handle high volumes traffic and is key to the safe movement of traffic across the MPA in cases of emergency.

State Street and Main Street (Belvidere)

Both located in the Kishwaukee River floodplain, State Street and Main Street are the only two bridge crossings in downtown Belvidere. As the main passageways through Belvidere, they are critical to both emergency response crews and residents.

South Main Street (Rockford)

This area is affected by both the Rock River and Kent Creek floodplains and has an AADT of 8,800. Located in it is one of two bridges that connect downtown and southwest Rockford. Maintaining this connection during emergencies is key for both emergency services and residents.

Harrison Avenue

Between Marshall Street and 20th Street:

This portion is located at a low point in the stormwater irrigation system and carries an AADT of 16,300. Harrison Avenue is an arterial route that runs through southern Rockford and has connections to both I-90 and US-20. This section of road is crucial for keeping traffic flowing in and out of Rockford during emergencies.

Beltline Road

Located in the center of the Rock River floodplain, Beltline Road is a low-elevation bridge that serves as the primary access route to the Rockford International Airport.

Blackhawk Drive/IL-2

Blackhawk Road is the main corridor through Byron. It is an extension of IL-2, which travels directly next to the Rock River from Rockford to Byron.

North Kennedy Hill Road

North Kennedy Hill Road is another key connection between Winnebago and Ogle counties. At its intersection with IL-2, it is located directly next to the Rock River floodplain.

Beloit Road

Beloit Road serves as a major connection route between Belvidere and northern Boone and Winnebago counties. It has two points within the Beaver Creek and Pierce Lake floodplains: near Swanhills Golf Course and the Argyle Road intersection, respectively.

US-20

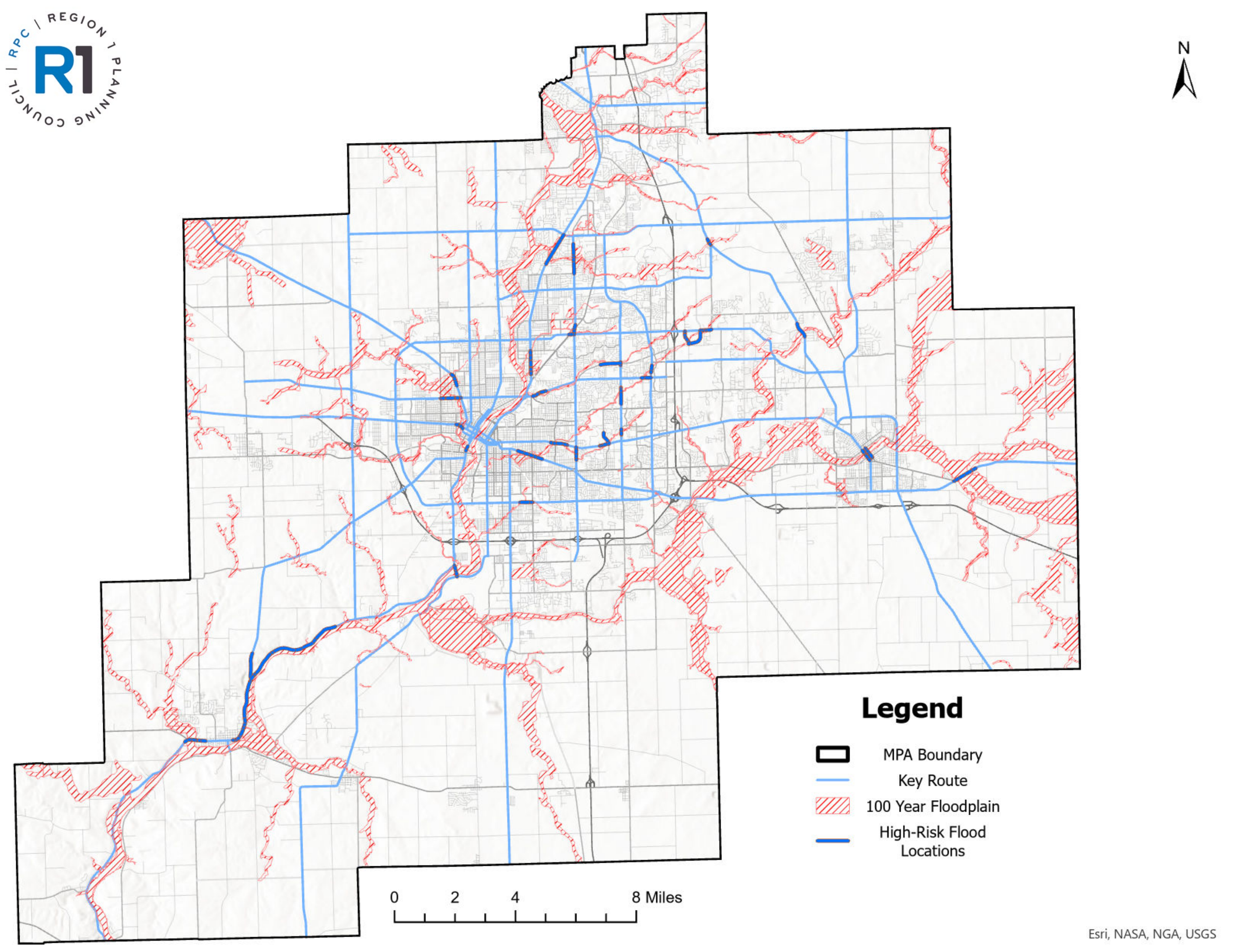
Between Logan Avenue and Epworth Road:

West of Belvidere, a 0.75 mile stretch of US-20, falls within the Coon Creek floodplain. US-20 is the primary route connecting western Boone County and Belvidere.

High-Risk Flood Locations Along Key Routes

To evaluate flood risk within the MPA, the updated 2024 FEMA floodplain map was overlaid with the identified key routes to determine where important corridors intersect with mapped flood hazard areas, as shown in Figure 3-3. This map highlights the full network of key routes, the extent of the floodplain, and specific segments classified as high-risk flood locations. These segments represent areas where roadway functionality may be compromised during extreme weather events, underscoring the importance of maintaining resilient infrastructure as the frequency and intensity of such events continues to increase.

Figure 3-3: MPA High-Risk Flood Locations



Source: Region 1 Planning Council

Part 4: Hazard Profiles & Risk Assessment

Infrastructure Hazards

The Rockford Region is exposed to a range of infrastructure-related hazards that may disrupt transportation infrastructure and operations due to system failures, technological incidents, or human-caused events. These hazards can occur independently or be triggered or exacerbated by natural hazards, aging infrastructure, or operation disruptions. Infrastructure hazards may affect roadway and bridge integrity, transit operations, freight movement, and emergency response, with resulting public safety and economic impacts.

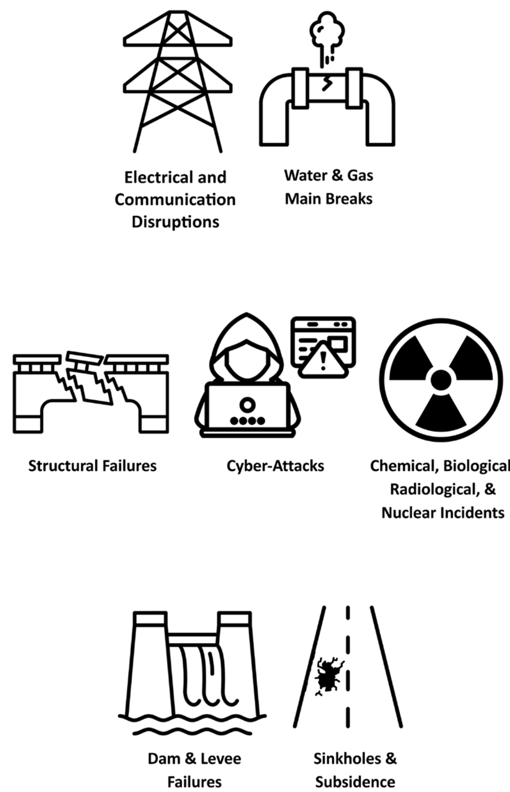
Hazard Assessment & Prioritization

The Rockford Region is vulnerable to a variety of infrastructure hazards that may directly or indirectly affect transportation systems. Infrastructure hazards anticipated to impact transportation infrastructure in the region include chemical, biological, radiological, and nuclear (CBRN) incidents, cyber-attacks, dam and levee failures, electrical and communication disruptions, sinkholes and subsidence, structural failures, and water and gas main breaks.

Infrastructure hazards were evaluated using a two-step process. First, available federal, state, and regional data sources were reviewed, including infrastructure condition assessments, regulatory classifications, historical incident reports, and system dependency analyses. Unlike the natural hazards discussed in the Natural Hazards section of Part 4, which include Illinois Emergency Management Agency (IEMA) risk analysis scores, there is no single source of numeric risk scores for all locally relevant infrastructure hazards. Most federal guidance is qualitative or scenario-based rather than numeric, and local data from utilities, public works, and planning departments provide the most accurate assessment of regional conditions. Second, hazards were prioritized by the Resilience Improvement Plan (RIP) Working Group to reflect regional context, infrastructure vulnerabilities, and stakeholder input.

Additional information about the RIP Working Group and the public and stakeholder engagement process is available in Appendix A: Public & Stakeholder Engagement. Hazard profiles in this section are presented in order of priority according to the RIP Working Group.

Figure 4-1: Regional Infrastructure Hazards



Source: Region 1 Planning Council

During working group sessions, stakeholders engaged in activities led by Region 1 Planning Council (R1) designed to assess each hazard individually based on their likelihood and potential impact to the Rockford Region's transportation systems. Through these structured exercises, the group developed a prioritized list tailored specifically to the unique risks facing the Rockford Region. The table below offers the prioritized ranking of hazards, with additional columns including further information. Table 4-1 summarizes the infrastructure hazard risk evaluation and prioritization results for the Rockford Region.

Table 4-1: Infrastructure Hazard Ranking and Impact Classification

Infrastructure Hazard Prioritization Ranking	Hazard	Category	Impact Classification	Physical Impact on Transportation Infrastructure	Operational/ Mobility Impact	Systemic/ Cascading Impact
1	Electrical and Communication Disruptions	Technological/ Human-caused	Indirect	Minimal physical damage	Loss of traffic signals, ITS, tunnel systems, electrified transit, EV charging	Major interdependency risk with power utilities; impacts emergency response
2	Water & Gas Main Breaks	Infrastructure Failure	Direct	Roadway undermining, pavement collapse, sinkholes	Road closures, detours	Utility service interruptions affecting nearby communities
3	Structural Failures (bridges, buildings)	Infrastructure Failure	Direct	Direct damage to critical structures; potential collapse	Long-term closures, major rerouting	Freight, commuter, and emergency response delays
4	Cyber Attacks	Technological/ Human-caused	Indirect	No physical damage	Disruption of ITS, traffic management centers, transit operations	System-wide shutdowns or reduced efficiency
5	CBRN Incidents	Human-caused/ Hazardous Materials	Direct and indirect	Potential contamination of infrastructure	Closure of corridors; evacuations	Public health impacts, hazmat containment issues
6	Dam & Levee Failures	Infrastructure Failure	Direct	Flooding of roads, bridges, rail lines	Widespread corridor closures	Long-term recovery, community displacement
7	Sinkholes & Subsidence	Infrastructure/ Geologic	Direct	Pavement collapse, damage to roadbeds	Lane reductions, closures	Long-term maintenance burden

Source: Region 1 Planning Council – RIP Working Group Rankings

Infrastructure Hazards Profiles

The RIP identifies seven infrastructure hazards that may affect the Rockford Region's transportation systems: chemical, biological, radiological, and nuclear (CBRN) incidents, cyber-attacks, dam and levee failures, electrical and communication disruptions, sinkholes and subsidence, structural failures, and water and gas main breaks. Each hazard profile defines the hazard, describes its occurrence or presence in the region, and evaluates its potential impacts on transportation infrastructure and operations.

Hazard profiles are presented in order of the RIP Working Group priority. Local data included in the hazard profiles are generally reported at the county level for Boone, Ogle, and Winnebago counties, unless otherwise specified for the Metropolitan Planning Area (MPA). The analysis reflects documented incidents, infrastructure condition data, and regulatory classifications as recent as January 2026. Each hazard profile references applicable technical sources as context for risk and impact assessment.

Each Infrastructure Hazard Profile is organized into three sections: first defining and describing the hazard and its key components, followed by relevant regional data and recent examples within the MPA, and concluding with a discussion of how the hazard directly and indirectly affects the regional transportation system. This structure ensures consistency across profiles while clearly linking each hazard to transportation system performance and resilience.

1. Electrical and Communication Disruptions

Cell Tower Disruptions

Cell towers are physical structures equipped with wireless communication devices that transmit radio signals, enabling nearby users to access cellular networks for phone calls, text messaging, GPS navigation, and other mobile internet services.[i] These towers are a critical part of mobile communication systems that support both everyday travel and emergency operations.

Cell towers are vulnerable to natural disasters, high winds, ice storms, lightning strikes, physical damage, and failures in supporting systems such as electricity and cooling. Wireless signals may also be affected by atmospheric disturbances during severe weather events.[ii] In addition, towers without sufficient backup power or fuel for generators may fail during prolonged electrical outages. As reliance on internet-based transportation services increases, disruptions to cellular infrastructure can have greater consequences.[iii]

Photo Source: Hologram

Transmission Line Disruptions

Transmission lines are high-voltage electrical lines that transport electricity from power plants to substations and distribution systems serving homes, businesses, and critical infrastructure.[iv] They are a central component of the electrical grid.

Transmission line disruptions occur when lines are damaged or otherwise unable to carry electrical current. Causes may include severe weather, falling trees, equipment malfunction, vehicle collisions, or wildlife interference. Power outages, also referred to as blackouts, occur when a portion of the electrical grid loses power. Widespread electrical failures can create cascading impacts across the grid, potentially disabling communication systems, data centers, and transportation infrastructure that lack backup power.

Climate change has increased the frequency and intensity of extreme weather events, placing additional strain on aging electrical infrastructure and contributing to more frequent service disruptions.[v]

Photo Source: CNN

Cell towers vs. Transmission lines:

Cell towers send wireless signals so people can make calls, use GPS, and access the internet. Transmissions lines carry electricity that powers homes, businesses, traffic signals and the cell towers themselves.

Regional Data

Cell Towers

The MPA is home to approximately 27 cell tower structures, distributed across the region.[vi] This distribution ensures that cellular coverage is generally accessible; however, there may be service gaps in rural or less-developed areas, such as recreational spaces, farmland, and parks.[vii]

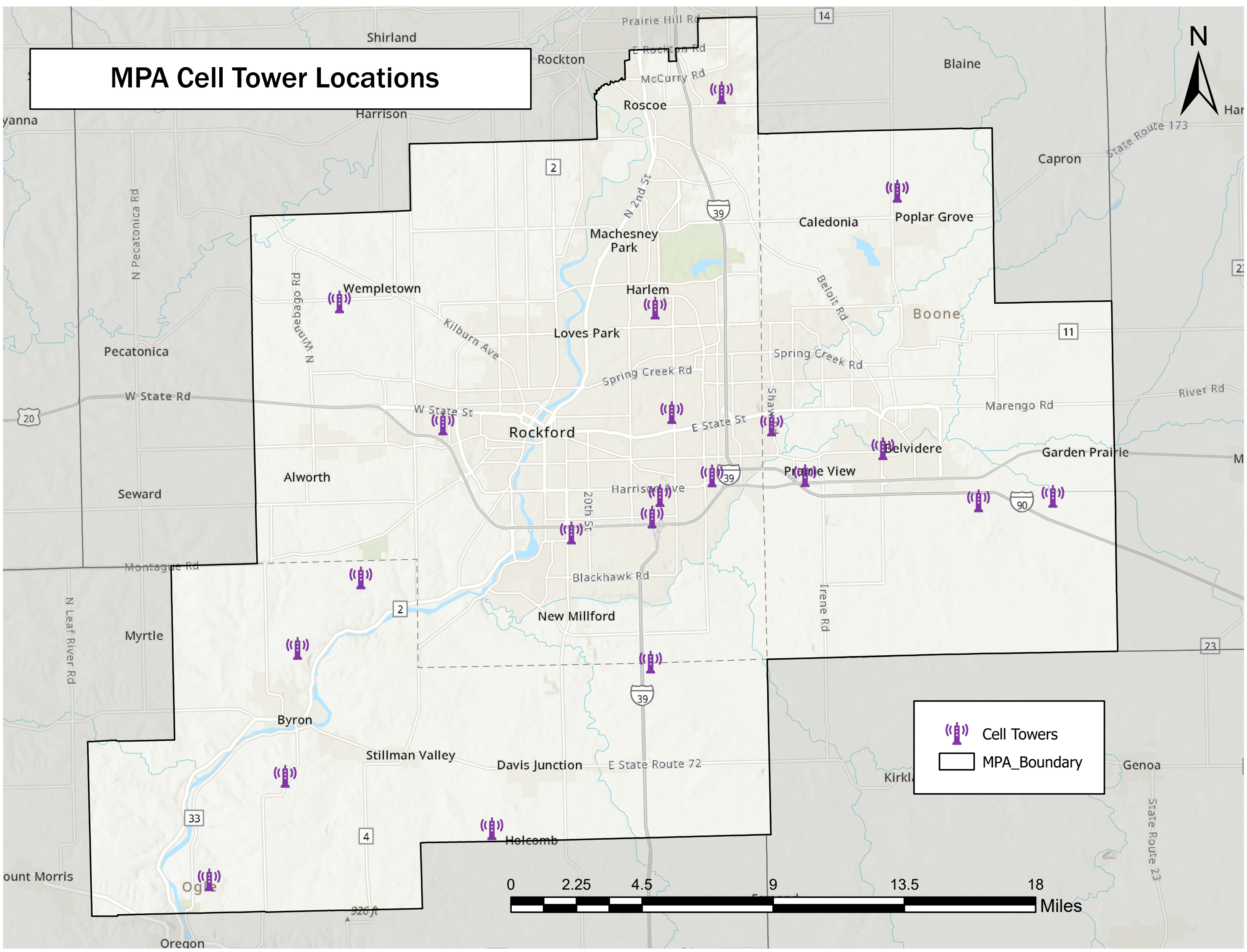
Figure 4-2 shows existing towers within the MPA and highlights potential service gaps that could impact transportation operations during outages.

The region has experienced several telecommunications disruptions in recent years:

- **January 2022:** A widespread cable and internet outage occurred when a fiber cable was cut between Rockford and Freeport, affecting Comcast customers.[viii]
- **March 12, 2025:** Comcast customers in Belvidere experienced connection issues.[ix]

Internet outages are typically monitored in 24-hour increments by providers and can be tracked through company outage maps. Issues with Comcast Xfinity's network performance and general service have been reported in downtown Rockford, as highlighted on their regularly updated outage map.[x] Although occasional outages occur, many disruptions go unreported, with most being resolved within a short time frame.[xi]

Figure 4-2: MPA Cell Tower Locations



Source: Illinois Department of Commerce

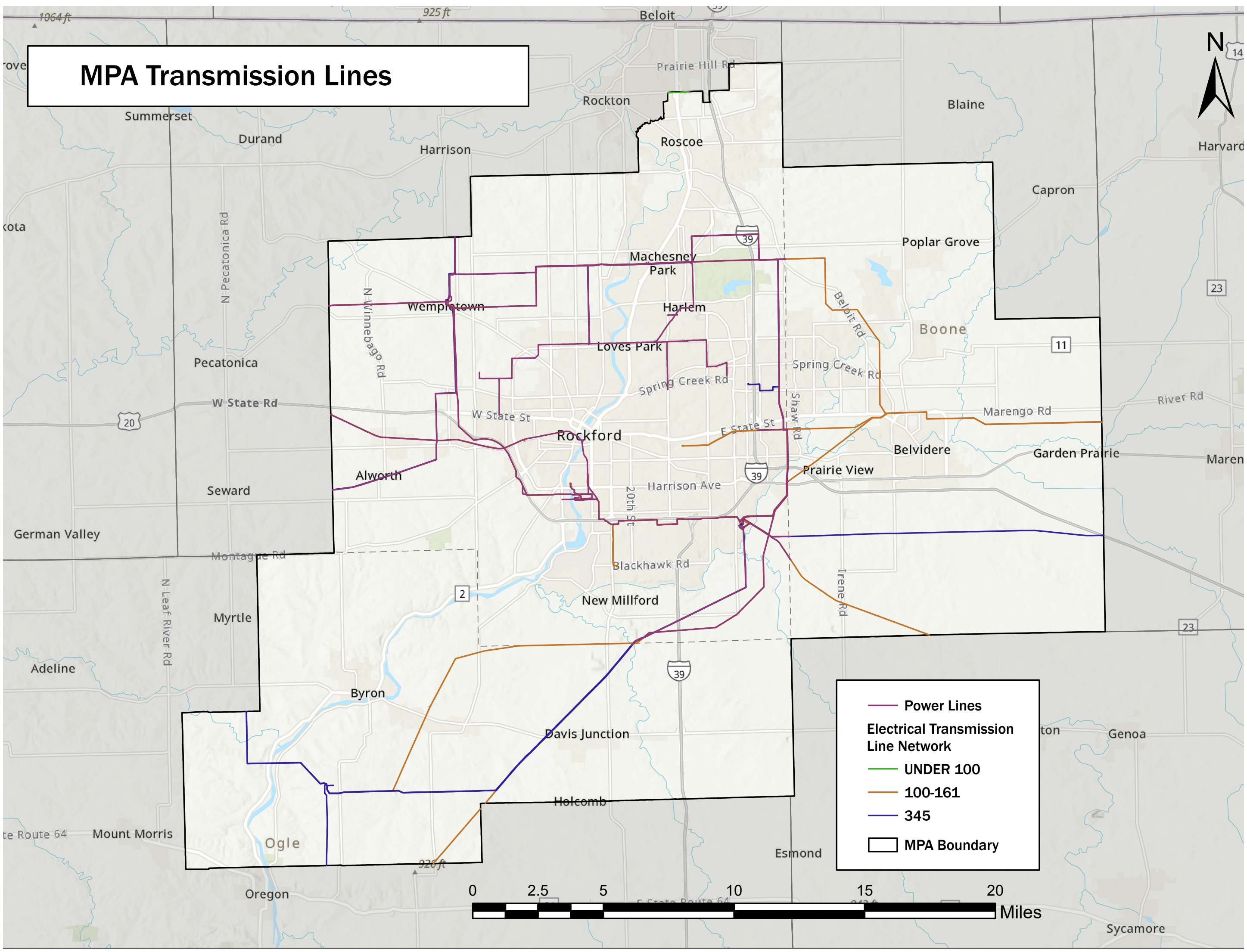
Transmission Lines

The MPA is served by transmission lines operating at voltage levels including 100-161 kilovolts (kV), 345 kV, and other classifications.[xii] High-voltage transmission lines (typically 230 kV and 500 kV) play a crucial role in regional power distribution and long-distance electricity transmission.[xiii]

Recent regional electrical disruptions include:

- **January 2012:** A power outage at the Byron nuclear power plant temporarily disrupted facility operations.[xiv]
- **November 2022:** A mylar balloon contacted a power line near Nicholas Conservatory & Gardens, causing a transformer explosion and localized outage affecting approximately 250 people in downtown Rockford.[xv]
- **June 2024:** Multiple downed power lines near I-90 and the Hard Rock Casino led to traffic control changes and temporary road closures near Lyford Road, Bell School Road, and East State Street.[xvi]
- **July 18, 2024:** Severe thunderstorms with wind speeds up to 101 miles per hour caused widespread outages affecting approximately 1,900 customers across Boone, Lee, Ogle, Stephenson, and Winnebago counties. ComEd reported 144 outages that day.[xvii]

Figure 4-3: MPA Electrical Transmission Lines



Source: Felt Mapping Platform

Transportation System

Electrical and communication disruptions can create delays, congestion, and safety risks by affecting signals, lighting, transit operations, and communication systems essential to mobility and emergency response.

Transportation systems depend on cellular networks for GPS navigation, real-time routing, ride-sharing platforms, public transit tracking, mobile ticketing, traffic management communication, and emergency dispatch. Disruptions can limit access to real-time information, delay travelers, interrupt ride-sharing services, and hinder first responder coordination.[xviii][xix] During major incidents, network congestion can further restrict communication and increase safety risks.

Transmission line failures can disable traffic signals, roadway lighting, rail crossings, and public transit systems, often resulting in congestion and increased crash risk.[xx] Airports may experience delays due to impacts on check-in, air traffic control, and baggage systems, while electric vehicle charging station outages can disrupt long-distance vehicle travel. Since telecommunications infrastructure relies on grid power, electrical outages can also trigger cascading communication failures, compounding risks to the transportation system.

2. Water & Gas Main Breaks

Water Main Breaks

A water main break occurs when a crack or hole in the underground pipe allows water to escape and surface. The pressurized nature of these pipes results in continued water flow after a leak appears until it is repaired.[xxi]

Municipal water distribution systems are complex networks of large transmission lines that feed smaller distribution pipes leading to residents' homes. These breaks can be caused by a variety of factors, including excavation work, aging pipes, significant pressure changes from temperature shifts, ground settling, or corrosive soils that eat away at the pipes over time.[xxii]

Photo Source: Denver Water

Gas Main Breaks

A gas main break occurs when an underground pipeline transporting natural gas fractures or ruptures and releases gas into the environment. Gas pipelines deliver natural gas from supply systems into homes and heating systems.[xxiii]

Gas main breaks are often a result of bad installation jobs, physical damage, extreme temperatures, corrosion from excessive moisture, or other harmful elements.[xxiv] Any gas-related incident, regardless of its size, can have serious consequences for public health and safety and infrastructure sustainability.[xxv]

Photo Source: Elegrow Technology

Regional Data

Water

The MPA has experienced at least eight reported water main breaks from February 2016 to October 2024, including both major and minor instances.

Two significant regional events include:

- **February 2016:** The City of Rockford experienced a water main rupture in its downtown district caused by an old pipe, originally installed in 1911. The rupture took over 24 hours to be repaired and forced a portion of Market Street to close.[xxvi]
- **April 18, 2024:** The City of Rockford experienced a significant water main break that closed the Chestnut Street bridge for hours and resulted in mass traffic disruptions.[xxvii] The Winnebago County Courthouse, the Winnebago County Juvenile Justice Center, and several other facilities were shut down.[xxviii]

Gas

The MPA has experienced at least five reported gas main break events from June 2017 to September 2024. Natural gas infrastructure in the region is privately owned and operated by Nicor Gas, and detailed information regarding system condition and maintenance is not publicly available.

Some significant events are described below:

- **May 2023:** A gas leak led to the closure of part of Auburn Street in Rockford. The westbound lanes near the Illinois 251 cloverleaf interchange were shut down due to a utility emergency caused by the gas leak.[xxix]
- **September 2024:** The Cherry Valley Police responded to a damaged gas line on Harrison Avenue and South Mall Drive, forcing a shutdown of westbound traffic from Mill Road to South Mall Drive. During this event, U.S. Route 20 off-ramps for westbound traffic were closed down as well.[xxx]

Gas Line Explosion:

In December 2009, the NDK America, Inc. plant in Belvidere, Illinois experienced a gas line explosion, resulting in a fatality at a nearby highway rest area along Interstate 90 due to flying debris. The explosion caused the surrounding community to experience reverberations, resembling a small earthquake.[xxxi]

Transportation System

Water and gas main breaks can significantly disrupt the transportation system by damaging roadways and causing road closures. These impacts to the transportation network create delays and congestion for both vehicles and pedestrians in the affected area and demands costly repairs.[xxxii]

When a water main breaks, large volumes of water can flood streets, making driving hazardous and potentially damaging road surfaces. Road closures or lane restrictions due to flooding or repairs can further hinder traffic flow, causing delays and congestion. Pedestrian safety may also be compromised due to dangerous conditions such as slippery sidewalks.[xxxiii]

Gas main breaks, on the other hand, require large-scale evacuations, severely disrupting traffic flow. These events often complicate the ability of emergency responders to access the area, especially if the incident creates a potential fire hazard. Gas leaks can also disrupt public transportation routes, leading to delays or rerouting of buses and trains.[xxxiv]

3. Structural Failures

Structural failure refers to the collapse or malfunction of critical structures, including bridges, buildings, and other essential structures, when they are unable to function as intended according to their design and construction specifications.[xxxv] Several factors can contribute to structural failures, and these can be categorized into human-induced and natural causes. Key contributors to these failures include unanticipated structural or design-related issues, failure during construction process, poor maintenance, and material degradation over time.

Additional factors include overloading (the disregard of weight restrictions), vehicle collisions, and hydraulic issues resulting from flooding and poor water flow management, leading to soil erosion around bridge foundations.[xxxvi] These causes are influenced by factors such as regional economic conditions, the structure type, material choices, and the age and usage of the infrastructure.

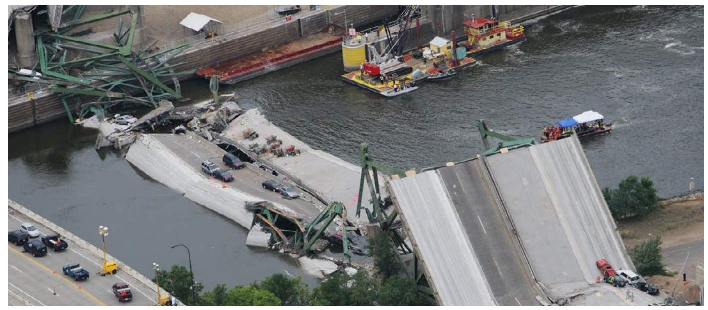


Photo Source: MPR News

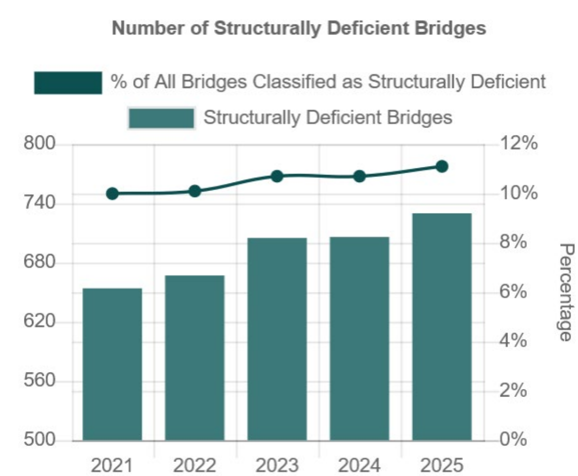
Regional Data

Bridges

The MPA spans Illinois Congressional Districts 16 and 17. As of December 2025, approximately 11.1 percent of bridges in District 16 and 9.5 percent in District 17 are classified as structurally deficient, indicating that at least one key structural element of the bridge is in poor or worse condition.[xxxvii]

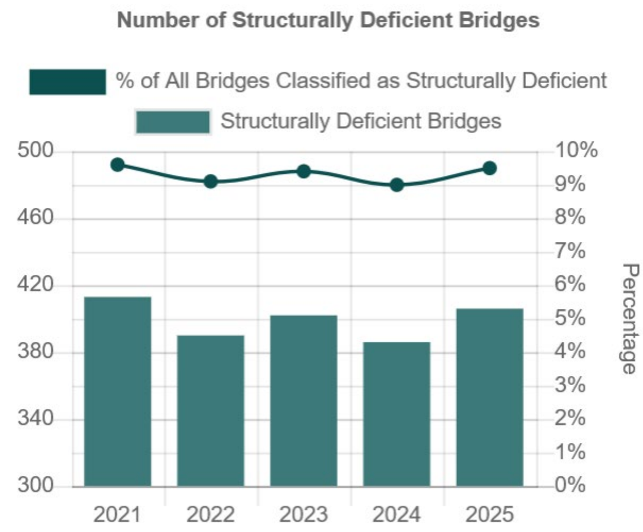
The Federal Highway Administration (FHWA) maintains a public database of bridge ratings, the National Bridge Inventory (NBI), which evaluates various components of each bridge's structure.[xxxviii] Bridges are rated as "good," "fair," or "poor": 31 out of 467 bridges in Winnebago County, 11 out of 109 bridges in Boone County, and 20 out of 377 bridges in Ogle County are classified as poor.[xxxix]

Figure 4-4: IL Congressional District 16 Structurally Deficient Bridges



Source: American Road & Transportation Builder Association

Figure 4-5: IL Congressional District 17 Structurally Deficient Bridges



Source: American Road & Transportation Builders Association

Buildings

While no public database currently tracks building failure incidents in Illinois, internal research has identified several occurrences, including:

- **May 2017:** A house built in 1907 partially collapsed during demolition, with debris falling onto the Whitman Street bridge and temporarily disrupting traffic.[xl]
- **March 2023:** Boone County experienced a structural collapse at the Apollo Theatre in Belvidere. During a concert, severe storms with wind gusts up to 50 miles per hour caused the roof to collapse and resulted in one fatality and 28 injuries.[xli] This event caused major debris in the street, leading to emergency response and road closures.[xlii]
- **May 2024:** A structural failure occurred at a newly constructed addition to Hennig Inc., resulting in injuries to three crane operators.[xliii]

Transportation System

Structural failures can significantly harm the transportation system by causing major traffic flow disruptions, potentially isolating communities, and increasing travel times. When critical infrastructure such as bridges or buildings collapses, it often leads to the need for detours, which can reroute vehicles onto inadequate roads, creating potential safety risks due to congestion on alternative routes.[xliv] These failures can act as obstructions in the transportation network, causing widespread disruptions and significant delays.

In areas with limited alternative routes, the consequences of a bridge or building failure can be even more severe, potentially stranding communities and delaying access to critical services. Bridge failure can lead to immediate traffic stoppage that causes significant congestion and delays. When this occurs, traffic must be rerouted to alternative routes, which can overload smaller roads not designed for heavy volumes of traffic.[xlv] Heavy traffic on detour routes can be hazardous, as these roads may not be designed to handle large volumes of vehicles or heavy trucks. Additionally, vehicles that exceed size limitations may be unable to navigate smaller roads, causing further disruptions to the flow of goods and services.[xlvi]

4. Cyber-Attacks

Cyber-attacks refer to intentional attempts by individuals or groups to infiltrate the information systems of an organization or infrastructure with the goal of theft, disruption, or damage.[xlvii] These attacks can take various forms, such as malware, phishing, ransomware, or unauthorized access to sensitive networks. One common type of cyber-attack is the Distributed Denial of Service (DDoS) attack, which floods systems with internet traffic to force them offline.[xlviii]

The Cybersecurity and Infrastructure Security Agency (CISA) reports that cyber threats targeting critical infrastructure sectors, including transportation, are growing more sophisticated and frequent.[xlix] Cybersecurity threats to organizations can originate from various sources, including criminal groups, hackers, terrorist organizations, and malicious insiders. Cyber-attacks on the communication or transportation layers of intelligent transportation systems (ITS) can cause significant disruptions to traffic flow, leading to system outages or misdirected vehicles.[l]

> **Intelligent Transportation Systems (ITS):**
>
> **Intelligent Transportation Systems (ITS) incorporate advanced technologies into transportation infrastructure to enhance safety, efficiency, and mobility. Typically, ITS are organized into three layers: Transportation, communication, and institutional.[li]**

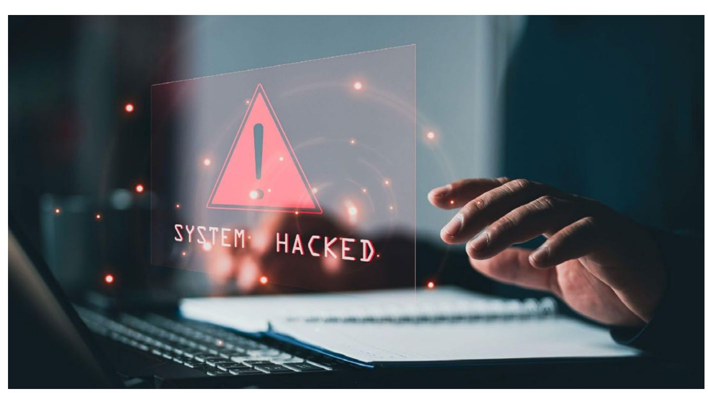


Photo Source: Schechter Shaffer & Harris

Regional Data

To date, no cyber-attacks have been reported that have had a direct impact on transportation infrastructure in the region. Such incidents are generally reported to local law enforcement and federal agencies, including the Cybersecurity and Infrastructure Security Agency (CISA) and the Department of Transportation's Transportation Security Administration (TSA).[lii]

There have been two notable cyber-attack events in the MPA:

- **October 2019:** Rockford Public Schools experienced a ransomware cyber-attack that disrupted district information technology (IT) systems and digital services.[liii]
- **December 2023:** A data breach at Rockford Gastroenterology Associates exposed electronic health records.[liv]

However, it is important to note that cyber incidents are not always identified or classified specifically as "cyber-attacks." Depending on the nature of the disruption, events may be reported under broader categories, such as system malfunctions, software failures, or communication outages. Cyber-attacks often remain unreported due to concerns over security, liability, and vulnerability.[lv]

The region may be a potential target for attempts to disrupt domestic supply chains due to its proximity to the Chicagoland area, which is a central rail hub for the United States and the primary interchange point between western and eastern railroads. As the Rockford Region continues to integrate its rail networks with Chicago and as rail providers adopt more advanced technologies, the threat of cyber-attacks may grow.[lvi]

Transportation System

Cyber-attacks on the transportation sector can potentially disrupt or shut down entire systems and services, including booking platforms for air or rail travel; compromise sensitive data; endanger the safety of staff and passengers; and significantly impact supply chains in healthcare, agriculture, mining, and trade. DDoS attacks on transportation service providers such as railways and airports have already been documented in other countries; these attacks are linked to industries such as mining and oil and resulted in breached systems, stolen data, and published sensitive data online.[lvii]

Cyber-attacks can affect airport security systems as well as interfere with daily operations by grounding planes and causing delays for travelers. Additionally, cyber-attacks can be linked to electrical grid failures, impacting internal networks and transportation systems, including traffic signal management and planning.[lviii]

5. Chemical, Biological, Radiological and Nuclear (CBRN) Incidents

Chemical, biological, radiological, and nuclear (CBRN) materials are hazardous materials (HAZMAT) that pose significant risks to human health and public safety.[lix] CBRN threats may stem from deliberate misuse or unintended releases, including those occurring during industrial accidents or natural hazard events.[lx]

The hazards posed by CBRN materials can vary, as listed below:

- **Chemical:** Toxic substances which have the ability to harm or kill people, animals, and plants that are often dispersed through the air, water, or food supply.
- **Biological:** Biological agents such as bacteria, viruses, or parasites that threaten the health of living organisms by causing disease or death.
- **Radiological:** Exposure to radioactive materials, which can lead to radiation sickness, increase the risk of cancer, and contaminate the environment.
- **Nuclear:** Nuclear incidents involve the detonation of a nuclear device, leading to widespread devastation.[lxi]

Photo Source: National Environmental Trainers

CBRN Incident vs. HAZMAT Incident:

A CBRN incident is typically associated with intentional malicious acts and potential widespread impact, while a HAZMAT incident typically involves localized accidental releases of hazardous materials.[lxii]

Regional Data

Few large-scale HAZMAT incidents have been reported at a fixed site or during transport in Winnebago County. Some minor releases have resulted in local emergency responders and HAZMAT teams needing to stabilize incidents to prevent further harm to Winnebago County residents.[lxiii]

Some notable HAZMAT events across Boone and Ogle counties include:

- **January 2012:** A unit at the Byron nuclear power plant shut down following a power loss, and a transformer released a small amount of tritium, a radioactive isotope of hydrogen. The incident posed no public health threat, was resolved within two days, and was classified by the Nuclear Regulatory Commission as an "unusual event."[lxiv]
- **May 2019:** Boone County experienced an ammonia leak which occurred at a local restaurant near downtown Belvidere. Emergency responders across multiple agencies were deployed to the scene.[lxv]
- **June 14, 2021:** The Chemtool plant in Rockton was destroyed by a chemical explosion and fire after a scissor lift struck a valve or pipe, releasing mineral oil.[lxvi] Nearby roads were closed to ensure emergency responders had access to the site, and approximately 1,000 residents within a one-mile radius were evacuated for four days to allow emergency response access.[lxvii]

Between 2008 and 2017, the Illinois Environmental Protection Agency (IEPA) recorded 109 HAZMAT incidents in Ogle County. Of these, 38.5 percent were linked to fixed facilities, while the remaining 61.5 percent were related to transportation incidents. On average, Ogle County experiences approximately 11 HAZMAT incidents annually.[lxviii]

Figure 4-6: Map of Excavation 1-Mile Radius during the Chemtool Incident

Source: WinGIS

Transportation System

Incidents involving CBRN materials or hazardous materials (HAZMAT) can occur during the transportation or storage of substances at nuclear power plants, research facilities, hospitals, or industrial centers.[lxix] When these incidents occur, they can significantly affect various transportation systems, including roadways, railroads, bridges, airports, and public transit.[lxx]

CBRN materials are most commonly transported by truck, but they may also be moved by rail, air cargo, or waterway. The mode of transportation depends on factors such as the type and volume of the material, the origin and destination, and the urgency of delivery, exposing multiple transportation modes to potential risk.[lxxi]

Photo Source: AMU Edge

Transportation incidents involving CBRN materials, such as vehicle overturns, inadequate inspections, improper loading or overfilling, train derailments, or collisions, can lead to the release of hazardous substances. These events often disrupt traffic flow along affected routes and, in some cases, create cascading impacts that extend beyond the initial site.[lxxii] For example, a jet fuel spill at an airport can halt nearby roadway traffic and delay flight operations.

Additionally, incidents at fixed facilities that store or handle CBRN materials can affect surrounding transportation networks. Such events may require evacuations, restrict access to key routes, and overwhelm emergency corridors, further compounding transportation disruptions.

6. Dam & Levee Failures

Dams

A dam is a barrier constructed across a waterway to store, control, or divert water.[lxxiii] Dam failures occur due to structural collapses, breaches, or other failures that cause downstream flooding. Dam failures may result from natural events, human-caused events, or a combination. These man-made structural failures are usually considered technological hazards; however, they are often caused by prolonged periods of rainfall and flooding.[lxxiv]

Photo Source: Planetizen

Levees

A levee is a man-made structure, usually an earthen embankment, constructed to contain, control, or divert the flow of water to reduce the risk of temporary flooding.[lxxv] Levees are designed to provide a specific level of protection dependent on the conditions of the area. Levee failures or overtopping typically occurs during larger flood events. Levees also deteriorate over time, requiring regular maintenance and periodic upgrades to retain a levee's level of protection.

Photo Source: NBC News

Regional Data

The Illinois Emergency Management Agency (IEMA) provides comprehensive data and risk analyses on regional infrastructure and hazards, including dams, levees, and other critical systems, which inform local and regional planning efforts. The RIP addresses both infrastructure and natural hazards, with all Natural Hazard Profiles in the Natural Hazards section of Part 4 incorporating a comparable IEMA risk analysis to assess potential impacts on the Rockford Region.

Dams

In Illinois, dams are categorized according to the degree of adverse incremental consequences of a failure or incorrect operation. This system categorizes dams into low, significant, and high hazard potential based on the probable loss of human life and the impacts on economic, environmental, and lifeline interests.

- **Low Hazard Potential:** Dams where failure or incorrect operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the owner's property.
- **Significant Hazard Potential:** Dams assigned the significant hazard potential classification are those dams where failure or incorrect operation results in no probable loss of human life but can cause economic loss, environmental damage, disruption of lifeline facilities, or can impact other concerns.
- **High Hazard Potential:** Dams assigned the high hazard potential classification are those where failure or incorrect operation will probably lead to loss of human life.

In the Rockford MPA, there are 18 dams with six possessing significant hazard potential, according to the State of Illinois.[lxxvi] [lxxvii] Table 4-2 includes a list of all dams in the region and their hazard potential classification. While there are no recorded dam failures in the Rockford Region, the Alpine Dam in Rockford did not meet federal design standards and experienced structural issues in 2007, leading to a multimillion-dollar dam rehabilitation project.[lxxviii]

Table 4-2: Dam Hazard Potential

County	Dam Name	Functional Classification	Hazard Potential Classification
Boone	Belvidere Dam	Dam	Low
Boone	Candlewick Lake Dam	Dam	High
Ogle	Walnut Pond Dam	Dam	Low
Winnebago	Page Park Dam	Levee	High
Winnebago	Olson Lake Dam	Dam	Low
Winnebago	Elliot Golf Course Dam	Dam	Significant
Winnebago	Cherry Valley Lower Dam	Dam	Low
Winnebago	Levings Lake Dam	Dam	High
Winnebago	Pierce Lake Dam	Dam	High
Winnebago	Lakewood Hills Lake Dam	Dam	Significant
Winnebago	Pebble Creek Dam	Dam	High
Winnebago	Alpine Dam	Dam	High
Winnebago	Harrison Park West Detention Dam	Dam	Significant
Winnebago	Fordam Station Dam	Dam	Low
Winnebago	Rock River Water Reclamation District Excess Flow Basin Dam	Dam	High
Winnebago	Harrison Park East Detention Pond Dam	Dam	Significant
Winnebago	Spring Lake Dam	Dam	Significant
Winnebago	Kiowa Crossing Dam	Dam	Significant

Source: Illinois Emergency Management Agency

Levees

The location and condition of levees within the state are primarily inventoried in the National Levee Database (NLD), which includes the FEMA accreditation status. The three levels of accreditation are:

- **Accredited Levee System:** Meets the design, data, and documentation requirements of 44 CFR 65.10.
- **Provisionally Credited Levee (PAL) System:** Previously accredited as providing base flood hazard reduction on an effective Flood Insurance Rate Map (FIRM), and for which FEMA is awaiting data and/or documentation that will show compliance with 44 CFR 65.10.
- **Non-Accredited System:** Not providing base flood hazard reduction on an effective FIRM.

There are three non-accredited levee systems in the region, all located within the City of Rockford. There are no recorded levee failures in the Rockford Region.

Transportation System

Dam and levee failures are infrequent but occasionally follow periods of intense rainfall and/or flooding in the region. The largest impact of these failures is the quick release and flow of water to areas they were intended to protect, such as transportation systems. Flooding can damage or wash away roads or bridges, making them unsafe for travel.

Floodwater can obstruct travel networks, causing delays in the movement of goods or people. Floodwater can also carry debris and other hazards, making it difficult for emergency responders to access affected areas. Floodwater can damage or disrupt utilities such as power, water, and sewer systems, leading to outages, contaminated water supplies, and other health hazards.

7. Sinkholes and Subsidence

Land subsidence occurs when the ground's underlying support disappears or erodes gradually, leading to the collapse of the surface above. Most subsidence is human-induced, driven by activities such as groundwater pumping, aquifer compacting, drainage of organic soils, underground mining, hydro compaction, natural compaction, and thawing permafrost.[lxxix]

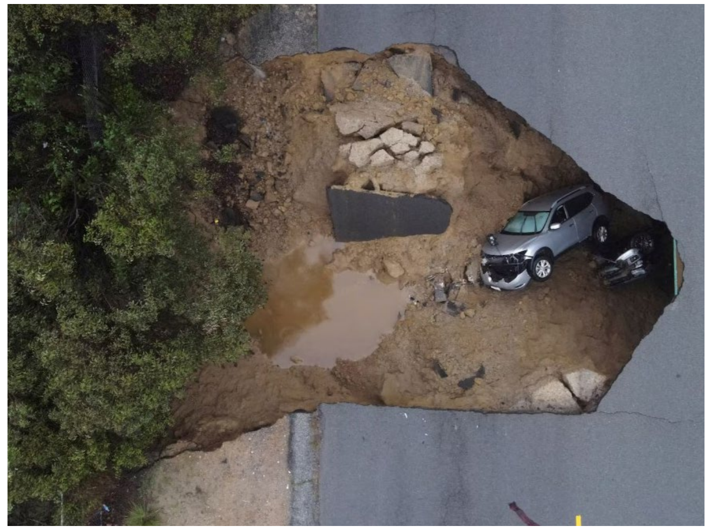


Photo Source: Reuters

Subsidence often leads to the creation of sinkholes, which are cavities in the ground that form when water erodes the underlying rock layer. Sinkholes can also result from the collapse of mines or from developments that compromise the structural integrity of the rock beneath. When water collects in these compromised areas, especially following heavy rainfall, it can accelerate the collapse.[lxxx]

Areas situated above or adjacent to karst topography are particularly vulnerable to subsidence and the formation of sinkholes. Karst landscapes develop when water, through rainfall or snowmelt, seeps into broken bedrock.

Table 4-3: Dam/Levee Failure Risk Analysis

County	Historical Probability	Population	Population Change	Severity of Impact	Social Vulnerability	Potential Exposure	Overall Risk (numeric)	Overall Risk (category)
Boone	3	2	3	3	4	3	18	Low
Ogle	3	2	3	3	4	3	18	Low
Winnebago	3	3	3	3	6	3	21	Low

Source: Illinois Emergency Management Agency

As the water moves through the fractures in the rock, it gradually dissolves and widens the cracks, which can cause the soil above to sink or collapse.[lxxxi] Karst landscapes are common in northern Illinois and are especially prevalent in Ogle County within the MPA.[lxxxii]

Figure 4-7: Karst Landscape at Starved Rock State Park

Source: Live and Let Hike

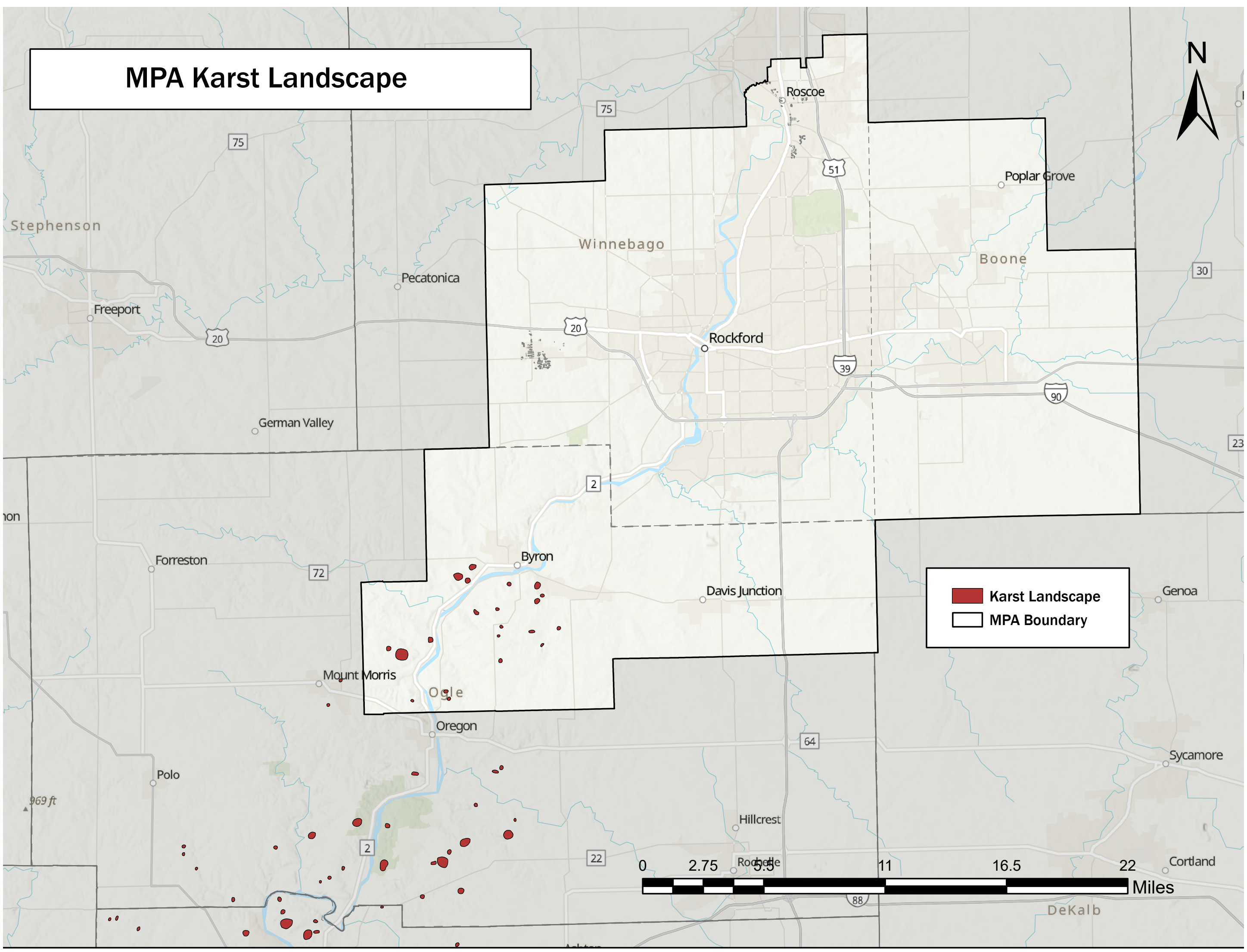
Karst:

Karst refers to geological landscapes shaped by thin layers of soil over limestone or other soluble rock, often featuring numerous sinkholes interspersed with sharp ridges or uneven hills.[lxxxiii]

Regional Data

In the Rockford Region, karst topography exists in Winnebago, Boone, and Ogle counties, with central Ogle County having the most prevalent karst topography and the highest occurrences of sinkholes.[lxxxiv] Sinkholes found in Northern Illinois are generally small, typically round, and measure only a few tens of feet in diameter.[lxxxv]

Figure 4-8: MPA Karst Landscape



Source: Illinois State Geological Survey

Significant regional sinkhole incidents include:

- **2023:** Rockford experienced several sinkhole incidents, prompting emergency repairs. Repairs were made to 15th and 18th Streets over Keith Creek, where old limestone and mortar retaining walls had failed, causing erosion and sinkholes. Another repair was needed on Trainer Road over Madigan Creek due to similar erosion issues.[lxxxvi]
- **Summer 2024:** Heavy rainfall caused two sinkholes to form at UW SwedishAmerican Hospital.[lxxxvii] During the repairs, ambulances were redirected to a different hospital entrance, disrupting hospital operations.[lxxxviii]
- **June 2025:** A resident discovered a sinkhole on a road near a popular neighborhood park in Rockford's Keith Creek neighborhood that was large enough for an individual to fall in and be unable to escape.[lxxxix]

Transportation System

Sinkholes can cause severe damage to transportation infrastructure, including roadways and buildings.[xc] The creation of sinkholes introduces water quality issues by allowing surface waters to infiltrate aquifers, potentially contaminating underground drinking water supplies.

Subsidence poses significant risks to surface transportation infrastructure, potentially causing the partial or complete collapse of roadways, bridges, and other structures. Infrastructure located on or near karst landscapes or former mining sites is particularly at risk. As the ground subsides, affected roadways and structures may become impassable, requiring rerouting or closure. The severity of these disruptions depends on the importance of the infrastructure to the broader transportation system.

Natural Hazards

The Rockford Region experiences significant variability in weather and climate conditions due to its geographic location, even on a day-to-day basis. This variability is often associated with natural hazards that disrupt the region's transportation system, affect public health, and cause economic impacts. This section identifies the natural hazards relevant to the Rockford Region and evaluates likelihood, severity, and potential effects on transportation infrastructure and operations.

IEMA Risk Analysis

Natural hazards were assessed using risk analysis scores developed by the Illinois Emergency Management Agency (IEMA). The IEMA risk analysis provides a consistent, statewide methodology for evaluating natural hazards based on historical occurrence, population exposure, and potential consequences. These scores were considered by the RIP Working Group during the development of the Rockford Region's natural hazard prioritization; however, the working group did not determine or dictate the final prioritization at the local or regional level.

IEMA risk scores are calculated using the following variables:

- **Historic Hazard Occurrence:** Frequency of events from 1996 to 2022. Counties with high numbers of hazard occurrences in the past may also experience hazards more frequently in the future.
- **Population:** Current population data was gathered from the 2021 U.S. Census Bureau population estimates. Counties with smaller populations generally have less overall potential for loss of life or infrastructure, while counties with larger populations have higher potential.
- **Population Growth:** As population increases in a county, there are more people to be exposed to a hazard, increasing risk.
- **Population Exposure:** Determined through GIS analysis and qualitative information provided by the National Weather Service. Hazards that affect more people contribute more to a county's overall risk score.
- **Severity of Impact:** Determined by examining the worst-case scenario based on past hazards, including data on injury, fatality, and damage estimates.
- **Social Vulnerability:** The susceptibility of a community to adverse impacts caused by natural hazards. Determined by analyzing each county's socioeconomic status, household characteristics, racial and ethnic minority, and housing type and transportation.[xci]

Lower risk scores indicate hazards with lower likelihood and/or lower potential impact on the transportation system, while higher scores indicate hazards that are more likely to occur and/or result in significant transportation system impacts. Table 4-4 summarizes the IEMA risk analysis results for natural hazards evaluated in the RIP.

According to IEMA risk analysis scores, flooding represents the highest overall natural hazard risk to the Rockford Region's transportation system. Several hazards, including thunderstorms, drought, and extreme temperatures, are likely to occur but generally result in less severe transportation impacts. In contrast, hazards such as earthquakes have the potential for significant damage, although the likelihood of such events occurring is relatively low.

Table 4-4: Natural Hazard IEMA Risk Ranking

Hazard	Boone	Ogle	Winnebago	IEMA Total Risk
Flooding	27	27	38	92
Extreme Temperatures	27	27	30	84
Thunderstorms	27	28	29	84
Winter & Ice Storms	26	26	29	81
Drought	21	21	24	66
Earthquakes	18	18	21	57

Source: Illinois Emergency Management Agency

Hazard Assessment & Prioritization

The Rockford Region is exposed to a range of natural hazards that may directly or indirectly affect the transportation system. Natural hazards anticipated to impact transportation infrastructure in the region include drought, earthquakes, extreme temperature, flooding, thunderstorms, and winter and ice storms.

Natural hazards were evaluated using a two-step process. First, a standardized technical risk analysis was conducted using IEMA risk analysis scores. Second, hazards were prioritized by the RIP Working Group to reflect regional context, infrastructure vulnerabilities, and stakeholder input. Additional information about the RIP Working Group and the public and stakeholder engagement process is available in Appendix A: Public & Stakeholder Engagement. Hazard profiles in this section are presented in order of RIP Working Group priority.

During working group sessions, stakeholders engaged in activities led by R1 designed to assess each hazard individually based on their likelihood and potential impact to the Rockford Region's transportation systems. Through these structured exercises, the group developed a prioritized list tailored specifically to the unique risks facing the Rockford Region. Table 4-5 summarizes the infrastructure hazard risk evaluation and prioritization results for the Rockford Region.

Table 4-5: Natural Hazard Ranking and Impact Classification

Natural Hazard Prioritization Ranking	Natural Hazard	Impact Classification	Physical Impact on Transportation Infrastructure	Operational/Mobility Impact	Systemic/Cascading Impact
1	Winter & Ice Storms	Direct	Pavement icing, freeze-thaw damage, frost heave.	Reduced mobility, crashes, closures.	Strain on maintenance crews and emergency responders.
2	Flooding	Direct	Roadway inundation, culvert failures, shoulder washouts.	Closures, detours, travel delays.	Impacts to stormwater systems and adjacent property.
3	Thunderstorms (tornadoes, hail, lightning)	Direct and indirect	Debris impact, downed trees, damaged signals, pavement washouts.	Flight delays, roadway blockages, reduced visibility.	Power outages, fire starts, communication failures.
4	Extreme Temperatures	Direct and indirect	Heat buckling, frost heave, material failure.	Road restrictions, slower travel, equipment failures.	Increased maintenance needs, utility impacts.
5	Drought	Indirect	Soil shrink-swell affecting pavements; reduced water levels at crossings.	Dust, reduced visibility in agricultural areas; shipping disruptions.	Agricultural supply chain impacts.
6	Earthquakes	Direct	Potential damage to bridges, overpasses, culverts.	Temporary closures for inspection.	Regional economic impact despite low probability.

Source: Region 1 Planning Council- RIP Working Group Rankings

Natural Hazard Profiles

The RIP identifies six natural hazards that may affect the Rockford Region's transportation systems: winter and ice storms, flooding, thunderstorms, extreme temperature, drought, and earthquakes. Each hazard profile defines the hazard, describes its occurrence in the region, and evaluates its potential impacts on transportation infrastructure and operations.

Hazard profiles are presented in order of RIP Working Group priority. Local data included in the hazard profiles are generally reported at the county level for Boone, Ogle, and Winnebago counties unless otherwise specified for the MPA. The data accounts for all recorded events as recent as December 2025. Each hazard profile also includes the corresponding IEMA risk analysis score as a technical reference.

Each Natural Hazard Profile is organized into three sections: first defining and describing the hazard and its key components, followed by relevant regional data and recent examples within the MPA, and concluding with a discussion of how the hazard directly and indirectly affects the regional transportation system. This structure ensures consistency across profiles while clearly linking each hazard to transportation system performance and resilience.

1. Winter & Ice Storms

A winter storm is a combination of heavy snow, blowing snow, and dangerous wind chills.[xcii] Precipitation falls as snow when the air temperature remains below freezing throughout the atmosphere.

An ice storm is a storm that results in the accumulation of at least 0.25 inches of ice on exposed surfaces.[xciii] An ice storm can be caused by sleet or freezing rain, as defined below:

- Sleet occurs when snowflakes only partially melt when they fall through a shallow layer of warm air. These slushy drops refreeze while falling through a deep layer of freezing air above the surface, reaching the ground as frozen raindrops that bounce on impact.
- Freezing rain occurs when snowflakes descend into a warmer layer of air and melt completely. The melted snowflakes instantly refreeze upon contact with anything at or below 32 degrees Fahrenheit (°F), creating a glaze of ice on the ground, trees, power lines, and other objects.

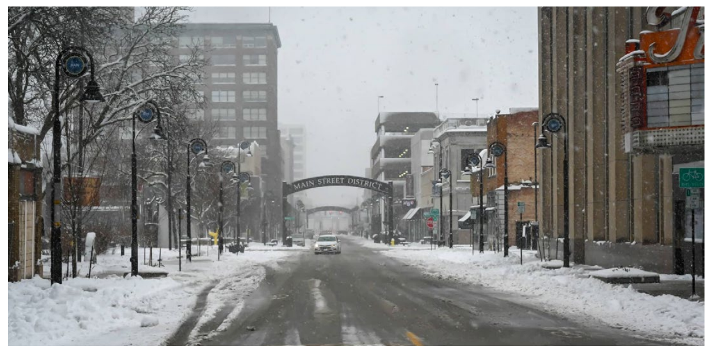


Photo Source: Rock River Current

Regional Data

According to IEMA, there has not been a winter without at least one winter storm in the past century in Illinois.[xciv] Since 1950, there have been 91 recorded winter storms and 15 recorded ice storms. A complete breakdown of each county's risk ranking score for winter and ice storms can be found in Table 4-6.

Table 4-6: Winter and Ice Storms IEMA Risk Analysis

Winter Storm

County	Historical Probability	Population	Population Change	Severity of Impact	Social Vulnerability	Potential Exposure	Overall Risk (numeric)	Overall Risk (category)
Boone	9	2	3	3	4	9	30	High
Ogle	9	2	3	3	4	9	30	High
Winnebago	9	3	3	3	6	9	33	High

Ice Storm

County	Historical Probability	Population	Population Change	Severity of Impact	Social Vulnerability	Potential Exposure	Overall Risk (numeric)	Overall Risk (category)
Boone	6	2	3	3	4	3	21	Low
Ogle	6	2	3	3	4	3	21	Low
Winnebago	6	3	3	3	6	3	24	Medium

Source: Illinois Emergency Management Agency

Transportation System

The ice accumulation caused by freezing rain and ice storms can be particularly damaging to infrastructure and disruptive to the transportation network. Potholes commonly form in the region as its rapidly fluctuating temperatures cause a freeze-thaw cycle, where melting snow and ice leak into cracks on the road and expand as the water freezes again, creating larger fractures.[xcv] The weight of ice, heavy snow, and strong winds can topple trees and cause branches and power lines to break, leading to power outages and hazardous conditions with fallen debris on transportation routes. Winter and ice storms can also cause widespread transportation disruptions, including flight cancellations, road closures, and delays in rail and public transportation services.

Another threat of winter storms is the creation of black ice, which is a deadly driving hazard. Black ice refers to patchy ice on roadways or other transportation surfaces that cannot easily be seen; bridges and overpasses are particularly dangerous as they freeze before other road surfaces.[xcvi]

2. Flooding

Flooding occurs when water overflows onto land that is typically dry.[xcvii] This happens when water levels rise in existing waterways like rivers, streams, or drainage ditches, leading to the inundation of normally dry areas. Two types of flooding events occur in the Rockford Region: riverine flooding and flash flooding.

Flash flooding is a unique flooding event caused by heavy or excessive rainfall over a short period, typically less than six hours. These floods are characterized by powerful torrents that surge through riverbeds, urban streets, or mountain canyons, sweeping away everything in their path. Flash floods can develop within minutes or a few hours after intense rainfall. They can also happen even without rainfall, such as when a levee or dam fails, or when there is a sudden release of water due to a debris or ice jam.[xcviii]

A riverine flood is defined as when rivers or streams exceed the capacity of their channels to accommodate water flow, overflowing into normally dry land.[xcix] Riverine floods are generally caused by heavy rainfall, dam and levee failure, rapid snowmelt, or ice jams, and occur over longer periods than flash floods. Standing water can linger for days or weeks, disrupting daily life.

Photo Source: Rockford Register Star

Regional Data

Illinois has a history of severe flooding events, with every county in the state having at least one federally declared flooding disaster since 1965.[c] Riverine floods can occur at any time of year but tend to occur most frequently between January and July; flash floods are most common in summer and spring months.[ci] Since 1950, there have been 95 flooding events and 75 flash flooding events in the region. Table 4-7 highlights each county's risk of flooding, according to physical and social indicators. Winnebago County is one of only four counties in the state that are considered "Very High" risk of flooding.

Table 4-7: Riverine and Flash Flooding IEMA Risk Analysis

Riverine

County	Historical Probability	Population	Population Change	Severity of Impact	Social Vulnerability	Potential Exposure	Overall Risk (numeric)	Overall Risk (category)
Boone	6	2	3	3	4	9	27	Medium
Ogle	6	2	3	3	4	9	27	Medium
Winnebago	6	3	3	9	6	9	36	Very High

Flash Flooding

County	Historical Probability	Population	Population Change	Severity of Impact	Social Vulnerability	Potential Exposure	Overall Risk (numeric)	Overall Risk (category)
Boone	6	2	3	3	4	9	27	Medium
Ogle	6	2	3	3	4	9	27	Medium
Winnebago	9	3	3	9	6	9	39	Very High

Source: Illinois Emergency Management Agency

Transportation System

Flooding can cause increases in vehicle crashes, delays, traffic, and route closures that affect roadways, highway traffic, freight transportation, and emergency services.[cii] Roadway infrastructure can be particularly vulnerable in part because roads and bridges can be washed away, making recovery efforts more difficult.[ciii] Normal operations for transit operators, railroads, and airlines can be delayed or canceled until floodwaters recede. Additionally, those who walk, bike, or take public transit are impacted when floodwaters disrupt or cut off normal routes.

3. Thunderstorms

Severe thunderstorms are weather events characterized by frequent lightning accompanied by either hail that is at least 1 inch in diameter or wind speeds of at least 58 miles per hour.[civ] In Illinois, severe thunderstorms most commonly occur during the spring and summer months but can occur at any time.

Tornadoes

A tornado is a violent rotating column of air extending from a thunderstorm to the ground. Tornadoes are formed from a change in wind direction, increase in wind speed, and increase in height that creates an invisible, horizontal spinning effect in the lower atmosphere during the development of a thunderstorm.[cv] This rising air within the thunderstorm updraft tilts the rotating air from horizontal to vertical. Damage from a tornado is a result of the high wind speeds and wind-blown debris.

Photo Source: Rockford Register Star

Hail

Hail is precipitation in the form of irregular lumps of ice. Most thunderstorms have hail, but not all thunderstorms produce hail that lands on the ground. Hail occurs when updrafts in thunderstorms carry raindrops into extremely cold areas of the atmosphere where they freeze into ice.[cvi] These balls of ice are large frozen raindrops that range from the size of a pea to a grapefruit.

Photo Source: Rockford Register Star

Lighting

Lightning is a high-current electric discharge appearing as a "bolt" that is most commonly produced by thunderstorms. Lightning discharges can happen within and between thunderstorm clouds. Within a second, the bolt of lightning reaches a temperature approaching 50,000°F.[cvii] Thunder is the rapid heating and cooling of air near the lightning.

Photo Source: Rockford Register Star

Regional Data

While difficult to identify through climate models, tornados are a growing risk for northern Illinois as the Midwest documents increasing trends for tornado occurrences.[cviii] Experts believe this can be attributed to Tornado Alley beginning to shift east towards the Southeast and Midwest in recent years.[cix] Peak tornado frequency in the Rockford Region is between April and June, but tornadoes can occur at any point in the year. Tornadoes often occur in the afternoons and evenings with 50 percent occurring between 3 PM and 7 PM. Since 1950, there have been 77 tornadoes in the MPA.

The entire region is at risk for hail, ranking as "Medium" risk under IEMA's risk analysis scoring. Table 4-8 breaks down each county's risk analysis for hail. From 1950 to 2025, there have been 362 hail events in the Rockford Region.

Lightning occurs most frequently during the summer, although thunderstorms can happen at any time of year. Table 4-8 shows the IEMA risk analysis for lighting in each county of the region.

Transportation System

Thunderstorms, tornadoes, lightning strikes, and hail can severely damage infrastructure such as roadways, buildings, and power lines. This can lead to disruption in power services, emergency response, transit networks, and damages that can be costly. Lightning is also a known risk for aircraft.[cx] Hail can cause severe damage to aircraft, homes, and cars, in the form of dents, broken windows, and roof damage.[cxi] Although roads are typically left undamaged from tornadoes, all forms of transportation may still be impacted, as debris removal and maintenance are required following tornado events.

Table 4-8: Tornado, Hail, and Lighting IEMA Risk Analysis

Tornado

County	Historical Probability	Population	Population Change	Severity of Impact	Social Vulnerability	Potential Exposure	Overall Risk (numeric)	Overall Risk (category)
Boone	6	2	3	9	4	6	30	High
Ogle	9	2	3	9	4	6	33	High
Winnebago	6	3	3	6	6	6	30	High

Hail

County	Historical Probability	Population	Population Change	Severity of Impact	Social Vulnerability	Potential Exposure	Overall Risk (numeric)	Overall Risk (category)
Boone	9	2	3	3	4	9	30	High
Ogle	9	2	3	3	4	9	30	High
Winnebago	9	3	3	3	6	9	33	High

Lightning

County	Historical Probability	Population	Population Change	Severity of Impact	Social Vulnerability	Potential Exposure	Overall Risk (numeric)	Overall Risk (category)
Boone	6	2	3	3	4	3	21	Low
Ogle	6	2	3	3	4	3	21	Low
Winnebago	6	3	3	3	6	3	24	Medium

Source: Illinois Emergency Management Agency

4. Extreme Temperature

Extreme heat events occur as a result of above-normal temperatures and high humidities. Extreme heat for a region is temperatures that hover 10°F or more above the average high temperature for several days to several weeks.[cxii] Extreme heat is driven by changing weather patterns caused by convection currents that redistribute heat within the atmosphere.

Extreme cold is a weather phenomenon that occurs when a cold air mass moves into an area and brings unusually cold temperatures for an extended period of time. Typically, a cold wave is defined as a rapid and significant drop in temperature over a 24-hour period, with the resulting temperatures significantly lower than the average for the time of year.[cxiii] In Illinois, extreme cold warnings are issued when wind chills of -30°F or colder are expected or when actual air temperature drops to 15°F or colder.

Regional Data

Extreme temperature is one of the climate impacts most anticipated to affect the Rockford Region. As of 2025, there have been 15 recorded extreme heat events and 35 extreme cold events in the region. Table 4-9 shares the IEMA risk assessment for extreme heat and extreme cold in the Rockford Region.

Transportation System

Extreme heat can cause the surface of roads to deform as pavement expands in the heat. The pavement pushes off the ground at its weak spots when there is no place to expand or where cracks have weakened the pavement, particularly in poor drainage areas. The risk for road buckling is greatest when the temperature is over 90°F for extended periods. Airport runways are also vulnerable to asphalt degrading from extreme heat, and some airplanes cannot operate in extremely high temperatures; smaller regional aircraft cannot fly safely if temperatures exceed 118°F.[cxiv] Extreme heat can also cause rail lines to buckle and lead to derailments. When water supplies are depleted during extreme heat–induced droughts, the ground can sink as more groundwater is removed; this can damage infrastructure, including roads, buildings, and water pipes, and can form sinkholes.

Cold weather can also cause aging critical infrastructure and systems to fracture and fail. Damage to buildings, bridges, and roadways can occur if not designed to withstand extreme cold temperatures.[cxv] Extreme cold events can cause power outages due to an increased demand for electricity to heat buildings. The freezing, icy, and snowy conditions associated with extreme cold events can also lead to dangerous road and rail conditions, increasing collisions and crashes on roads and damaging transportation infrastructure.

Table 4-9: Extreme Cold and Heat IEMA Risk Analysis

Cold Wave

County	Historical Probability	Population	Population Change	Severity of Impact	Social Vulnerability	Potential Exposure	Overall Risk (numeric)	Overall Risk (category)
Boone	6	2	3	3	4	9	27	Medium
Ogle	6	2	3	3	4	9	27	Medium
Winnebago	6	3	3	3	6	9	30	High

Heat Wave

County	Historical Probability	Population	Population Change	Severity of Impact	Social Vulnerability	Potential Exposure	Overall Risk (numeric)	Overall Risk (category)
Boone	6	2	3	3	4	9	27	Medium
Ogle	6	2	3	3	4	9	27	Medium
Winnebago	6	3	3	3	6	9	30	High

Source: Illinois Emergency Management Agency

5. Drought

A drought is a period of well-below-average precipitation that spans from a few months to a few years.[cxvi] During a period of drought, the soil moisture does not meet regional needs, directly impacting agricultural and water systems.

- Agricultural drought refers to a period when soil moisture is inadequate to meet the demands for crops to initiate and sustain plant growth.
- Hydrological drought is a period of below-average streamflow and depleted reservoir storage.

Regional Data

Drought severity is determined by the degree of precipitation deficiency, the duration, and the size of the affected area. The Rockford Region is classified by the U.S. Drought Monitor (USDM) as "D2: Severe Drought"; the USDM drought classifications are identified in Table 4-10. D2 is currently the highest drought classification within Illinois, indicating the region is at a higher risk of drought compared to the rest of the state.

Numerous droughts have occurred in the Rockford Region, with the most significant occurring in 1988, 2012, and 2021. The longest drought duration in Illinois lasted 55 weeks beginning on April 6, 2021, and ending on April 19, 2022.[cxvii] The six-month period from March to September 2021 was the driest on record in Rockford, half an inch drier than the same period in 1988 and over 2 inches drier than in 2012.[cxviii] The Illinois State Climatologist calculated and compared the monthly total precipitation from the 1988, 2012, and 2021 droughts in Figure 4-9.

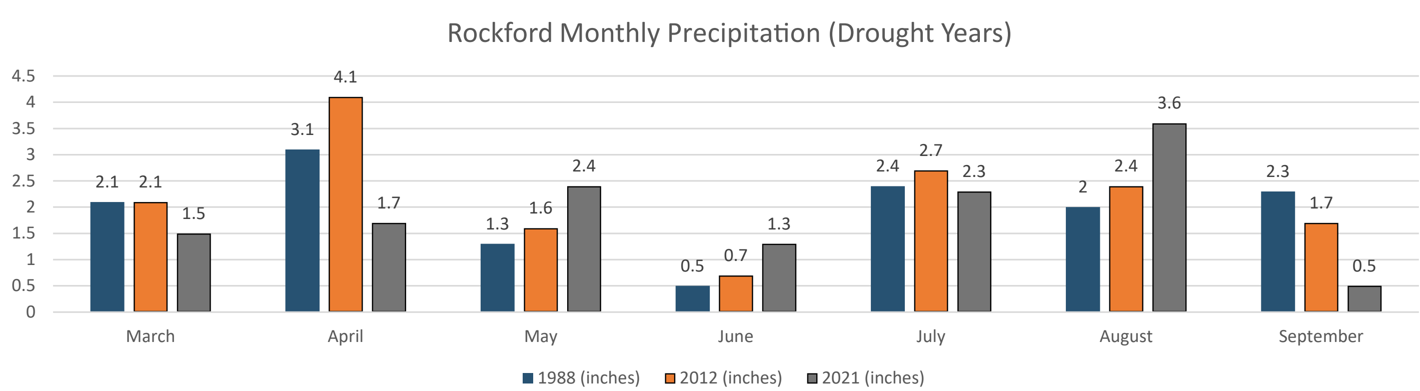
IEMA risk assessment for droughts in the Rockford Region is shared in Table 4-11.

Table 4-10: USDM Drought Classification

Category	Description	Example Percentile Range for Most Indicators	Values for Standard Precipitation Index and Standardized Precipitation - Evapotranspiration Index
None	Normal or wet conditions	30.01 or Above	-0.49 or above
D0	Abnormally Dry	20.01 to 30.00	-0.5 to-0.79
D1	Moderate Drought	10.01 to 20.00	-0.8 to-1.29
D2	Severe Drought	5.01 to 10.00	-1.3 to-1.59
D3	Extreme Drought	2.01 to 5.00	-1.6 to-1.99
D4	Exceptional Drought	0.00 to 2.00	-2.0 or less

Source: U.S. Drought Monitor

Figure 4-9: Severe Precipitation Events



Source: Illinois State Climatologist

Table 4-11: Drought IEMA Risk Analysis

County	Historical Probability	Population	Population Change	Severity of Impact	Social Vulnerability	Potential Exposure	Overall Risk (numeric)	Overall Risk (category)
Boone	6	2	3	3	4	3	21	Low
Ogle	6	2	3	3	4	3	21	Low
Winnebago	6	3	3	3	6	3	24	Medium

Source: Illinois Emergency Management Agency

Transportation System

Drought can disrupt local agriculture and tourism economies, and increase the risk of fire, flash floods, and possible landslides and debris flow.[cxix] Droughts can damage underground pipelines and above-ground infrastructure due to shrink-and-swell cycles associated with periods of drought when soils dry out and shrink and wet periods when soils expand. During a drought, land degradation can occur as moisture continues to exit the soil, leading to the damage and deformation of roads and rail infrastructure.[cxx]

6. Earthquakes

Earthquakes are caused by a sudden slip on a fault, which is a fracture in the Earth's crust where movement has occurred in the past.[cxxi] When a slip occurs, energy is released and travels through Earth's crust, causing the shaking that is felt during an earthquake. Earthquakes can be dangerous and potentially lead to widespread damage and loss of life. In Illinois, structures built on thick, loose sediments of river flood plains are more likely to be damaged than structures on glacial till or bedrock.

Earthquakes can also trigger other natural hazards such as landslides and secondary impacts, including hazardous waste spills or leaks, fires, and dam or levee ruptures.

Regional Data

Magnitude and intensity are terms used to describe the severity of an earthquake, as defined below.

- **Magnitude:** A measure of the seismic energy released from the earthquake. It is calculated from measurements of the ground vibrations recorded by seismographs.
- **Intensity:** A measurement of the effects brought about by an earthquake, using observations of people in the area affected. Intensities are based on descriptive reports identified in the Modified Mercalli Intensity Scale (Table 4-12), rather than calculations from instrument readings.

As of 2025, there are no recorded earthquake events originating in the Rockford Region. However, there have been 18 earthquakes occurring within 63 miles of the region since 1970.[cxxii]

Transportation System

Strong earthquakes can collapse buildings and infrastructure, disrupt utilities, and trigger landslides, avalanches, flash floods, fires, and tsunamis.[cxxiii] When an earthquake occurs in a populated area, it may cause death, injury, and extensive property damage. An earthquake might damage essential facilities, such as fire departments, police departments, and hospitals, disrupting emergency response services in the affected area.

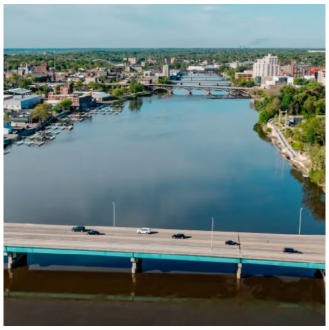
As a major transportation hub in the Midwest, damages caused by earthquakes to the region's bridges, roadways, and rail would have severe impacts on the surrounding transportation network. Many of the region's bridges are aging and need repair, and a major earthquake could cause further damage or collapse.[cxxiv] Damaged bridges and roadways would make it difficult for emergency responders and residents to travel. A major earthquake could also damage rail infrastructure, disrupting rail traffic.

Strong earthquakes may also require mass relocation; however, relocation may be impossible in the short-term aftermath of a significant event due to damaged transportation infrastructure and public communication systems.

Table 4-12: Modified Mercalli Intensity Scale

Intensity	Shaking	Description/Damage
I	Not felt	Not felt except under ideal conditions.
II	Weak	Felt only by a few people at rest, especially on upper floors of buildings.
III	Weak	Noticeable indoors; slight movement of objects.
IV	Light	Felt by many; minor disturbance to objects.
V	Moderate	Felt by nearly everyone; small items displaced; minor damage.
VI	Strong	Felt by all; some heavy objects moved; slight structural damage.
VII	Very Strong	Minor to moderate damage, especially to poorly built structures.
VIII	Severe	Considerable damage; partial structural collapse possible
IX	Violent	Severe structural damage; buildings shifted or partially collapse.
X	Extreme	Major destruction of buildings and infrastructure.

Source: U.S. Geological Society



Part 5:
Strategic Direction

Vision & Goals

In order to achieve and sustain regional resilience across all aspects of the Rockford Region's transportation system, the Resilience Improvement Plan (RIP) establishes the following goals:

Short-term goals:

- Identify and prioritize projects that improve the resilience of surface transportation facilities to the identified hazards.
- Incorporate resilience strategies into existing processes and procedures.

Medium-term goals:

- Secure funding sources for prioritized projects.
- Implement projects that improve the resilience of surface transportation facilities to the identified hazards.
- Encourage and increase the use of emergency communication systems.

Long-term goals:

- Build a transportation system that is prepared for, can withstand, and is able to recover from the identified hazards.
- Maintain safe and effective transportation throughout the region.
- Ensure continued access to homes, businesses, essential services, and critical facilities.

Achieving these goals requires an ongoing approach and partnership among local governments and stakeholders throughout the region. The RIP Transportation Resilience Toolbox identifies specific strategies and countermeasures for agencies to help address and mitigate hazards' impacts on the region's transportation system.

Transportation Resilience Toolbox

The four properties of resilience convey the essence of a resilient transportation system: robust, redundant, resourceful, and responsive. The Rockford Region's transportation system should be: Robust, Redundant, Resourceful and Responsive.

The Transportation Resilience Toolbox is a planning resource designed to prioritize and identify mitigation and adaptation measures for each hazard identified in this plan. It outlines specific strategies and countermeasures to reduce risks and adapt the Rockford Region's transportation system to the impacts of these hazards. As detailed in Part 4: Hazard Profiles & Risk Assessment, hazards are ranked in order of highest to lowest level of threat, with Tier 1 hazards posing the most significant risks and serving as the primary focus of the toolbox. While the strategies outlined enhance robustness, resourcefulness, and responsiveness, they do not specifically focus on redundancy, as the hazards identified in each tier can be effectively addressed without duplicating or replacing critical system elements.

It is important to note projects enhancing the safety of transportation system users should receive increased consideration, regardless of hazard tier.

Table 5-1: The Four R's of Resilience

The Four R's of Resilience	Definition
Robust	Strong enough to withstand predictable stressors and demand without degrading or losing function.
Redundant	Capable of being replaced while satisfying all functional requirements of system elements in the event of disruption.
Resourceful	Equipped with monetary, physical, technological, and informational resources that are available and employable in the process of recovery.
Responsive	Able to prioritize and achieve goals in a timely manner to minimize losses, recover functionality, and avoid future disruption.

Source: IOWA DOT and Region 1 Planning Council

Tier 1 Hazards

Tier 1 identifies strategies and countermeasures to enhance resilience against the highest-priority hazards that currently impact, or are projected to threaten, the Rockford Region's transportation system. The hazards covered in this tier include: flooding, winter and ice storms, thunderstorms, and electrical grid disruptions. Proactive measures should be taken to address these hazards and their impacts.

Strategies for Tier 1 hazards focus on strengthening infrastructure, improving operational readiness, and safeguarding public safety. For flooding, measures include expanding stormwater capacity, elevating or reinforcing roads and bridges in flood-prone areas, restoring wetlands and riparian corridors, and implementing monitoring systems to anticipate changing conditions. Winter and ice storms and thunderstorms are addressed through proactive pre-staging of equipment and materials, roadway design improvements, snow and ice mitigation techniques, and debris management to maintain safe travel routes. Electrical grid disruptions are mitigated with backup energy sources, such as generators and solar arrays, to ensure critical transportation facilities remain operational. Collectively, these strategies enhance the system's robustness, responsiveness, and resourcefulness, ensuring the Rockford Region can anticipate, withstand, and recover from the highest-priority standards.

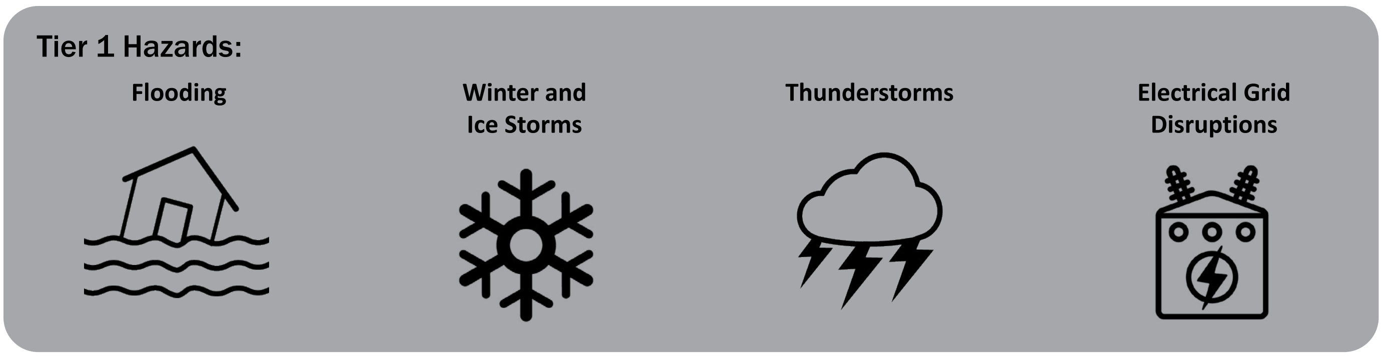


Table 5-2: Tier 1 Strategies

Hazard	Asset	Action
Flooding	Bridges, Culverts, Roads	Develop a regional Flood Operations Plan to support the response to future flood events.
Flooding	Roads	Install green infrastructure best management practices (e.g., bioretention ponds, bioswales, rain gardens, and permeable pavement).
Flooding	Bridges, Culverts, Roads	Increase the capacity of stormwater infrastructure (i.e., enlarge culverts and storm sewer systems, upgrade bridge deck and road drainage systems, replace culverts with bridges, naturalize & meander channels).
Flooding	Bridges, Culverts	Conduct routine maintenance of bridge openings, culverts, and storm sewers to remove debris and sediment.
Flooding	Bridges, Culverts	Install sensor systems along or within assets to monitor for water level and changing climate conditions.
Flooding	Roads, Bridges	Install signage alongside commonly flooded travel routes to alert traffic during flood events.

Hazard	Asset	Action
Flooding	Roads	Increase the shoulder width, or improve the type of shoulder, to mitigate the impacts of flowing water across roadways in low-lying areas.
Flooding	Channels, Roads	Vegetate and slope banks in channels to help slow erosion and reconnect floodplain areas to the main channel flow.
Flooding	Roads	Evaluate adding floodplain culverts, elevating roadways and bridges, and reinforcing roadway embankments in floodplains and chronically flooded areas.
Flooding	Channels	Restore inland wetlands and riparian corridors to trap sediment, pollution, and store floodwater.
Thunderstorms	Facilities	Ensure municipal- and county-owned structures and signs are designed to withstand high wind events.
Thunderstorms, Winter & Ice Storms	Roads	Develop or refine guidance or policies on clearing and trimming trees with the potential to fall on the roadway.
Thunderstorms, Winter & Ice Storms	Roads, Bridges, Culverts	Develop a plan to pre-stage assets in support of debris and vegetation removal following extreme weather events.
Thunderstorms, Grid Disruptions	Facilities	Plan for and install solar arrays for traffic control and essential transportation facilities as a backup energy source.
Thunderstorms, Grid Disruptions	Facilities	Purchase backup generators to provide energy during major tornadoes or windstorms.
Flooding, Winter & Ice Storms, Thunderstorms	Roads	Improve roadway design, redesign, and reconstruction to accommodate increased precipitation events.
Flooding, Winter & Ice Storms, Thunderstorms	Communications	Plan for operational impacts of severe weather and continue to enhance communication of rapid weather changes to the public.
Winter & Ice Storms	Communications, Roads, Bridges	Develop regional guidance or policies for pre-staging winter operations assets in advance of storms.

Hazard	Asset	Action
Winter & Ice Storms	Roads	Install engineered or natural snow fencing to serve as windbreaks from blowing and drifting snow.
Winter & Ice Storms	Roads, Bridges	Anti-icing applications –use brine to prevent ice formation on roadways.
Winter & Ice Storms	Roads	Add median crossovers at key locations to allow for improved snowplow operations during winter events.
Winter & Ice Storms	Roads	Research the best materials, uses, and products for ice mitigation/ melting.
Winter & Ice Storms	Roads	Ensure sufficient ice-melting material supply and implement equipment calibration/updates to efficiently distribute ice-melting materials.
Winter & Ice Storms	Roads	Develop sensible salting workshops and educational opportunities.

Tier 2 Hazards

Tier 2 identifies strategies and countermeasures for resilience against the moderate-priority hazards impacting and threatening the Rockford Region's transportation system. The hazards covered in this tier include: extreme temperatures, drought, dam and levee failures, water and gas main breaks, and structural failures. Both proactive and reactive measures should be considered for implementation to respond to these hazards and their impacts when they occur.

Strategies for Tier 2 hazards focus on protecting infrastructure, maintaining service continuity, and reducing impacts on users during moderate-priority events. Extreme temperatures and drought are addressed through environmental and design measures, such as planning shade trees, providing covered or heated transit facilities, and using heat- and salt-resistant materials to reduce stress on roads, bridges, and sidewalks. Structural failures, water and gas main breaks, and aging utility infrastructure are managed through regular inspections, renewal programs, compliance with excavation safety hazards, and improved notification systems for affected users. Dam and levee risks are mitigated through routine inspection, maintenance, and removal of poorly maintained private facilities. Together, these actions enhance the robustness, resourcefulness, and responsiveness of the Rockford Region's transportation system against moderate-priority hazards.

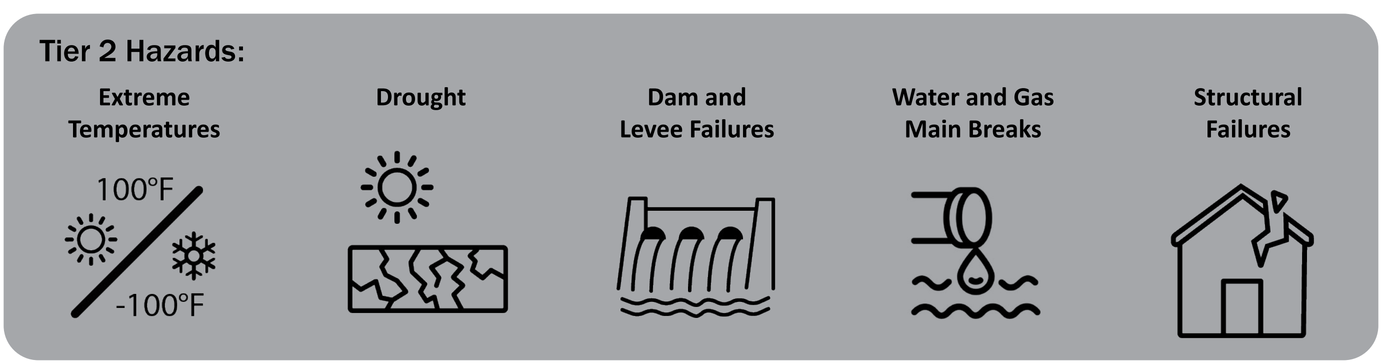


Table 5-3: Tier 2 Strategies

Hazard	Asset	Action
Extreme Temperatures	Bus Stations, Bus Stops, Sidewalks, Roads	Consider regional practices or strategies to reduce the impacts of excessive heat and cold on vulnerable transportation users (e.g., covered & heated bus shelters, shade trees, etc).
Extreme Temperatures, Drought	Roads, Sidewalks, Bus Stations	Plant shade trees in the right-of-way and to shade assets.
Extreme Temperatures, Structural Failure	Bridges, Roads	Use thermal expansion joints to reduce pavement buckling during extreme temperature events.
Extreme Heat	Roads, Bridges, Parking Lots	Implement heat-resistant and salt-tolerant materials, including heat-resistant asphalt, concrete, or painted roadways.
Drought	Roads, Bridges	Develop regulations or waivers to ease the transport of water, livestock feed, crops, etc., during drought conditions.
Water & Gas Main Breaks	Water Mains, Gas Mains	Ensure regular inspections and safety checks for water and gas mains.
Water & Gas Main Breaks	Water Mains, Gas Mains	Ensure shut-offs are added or up-to-date.
Water & Gas Main Breaks, Structural Failure	Water Mains, Gas Mains, Bridges	Incentivize renewal programs for aging infrastructure.
Water & Gas Main Breaks, Structural Failure	Gas Mains, Water Mains	Ensure excavating companies operate in compliance with the Joint Utility Locating Information for Excavators (JULIE).
Water & Gas Main Breaks	Water Mains	Deploy or improve existing notification systems for utility providers and impacted residents of water main breaks.
Dam & Levee Failure	Retention Ponds	Ensure and record yearly inspection and maintenance of private retention ponds.
Dam & Levee Failure	Dams, Levees, Retention Ponds	Remove privately operated and maintained facilities that are unkempt.

Tier 3 Hazards

Tier 3 identifies strategies and countermeasures for resilience against the lowest-priority hazards that may impact or threaten the Rockford Region's transportation system in the future. The hazards covered in this tier include: cyber-attacks, sinkholes and subsidence, and chemical, biological, radiological, and nuclear (CBRN). These hazards should be monitored, and mitigation efforts should be deployed when and where appropriate.

Tier 3 strategies focus on monitoring, preparedness, and early response to lower-priority hazards. Sinkholes and subsidence are addressed through advanced detection technologies, soil stabilization, and regular inspections. Cybersecurity risks are mitigated with redundant systems and offline protocols, while CBRN hazards are managed through emergency alerts, public education, and safe transport procedures. Together, these measures enhance the system's resourcefulness and responsiveness in addressing emerging threats.

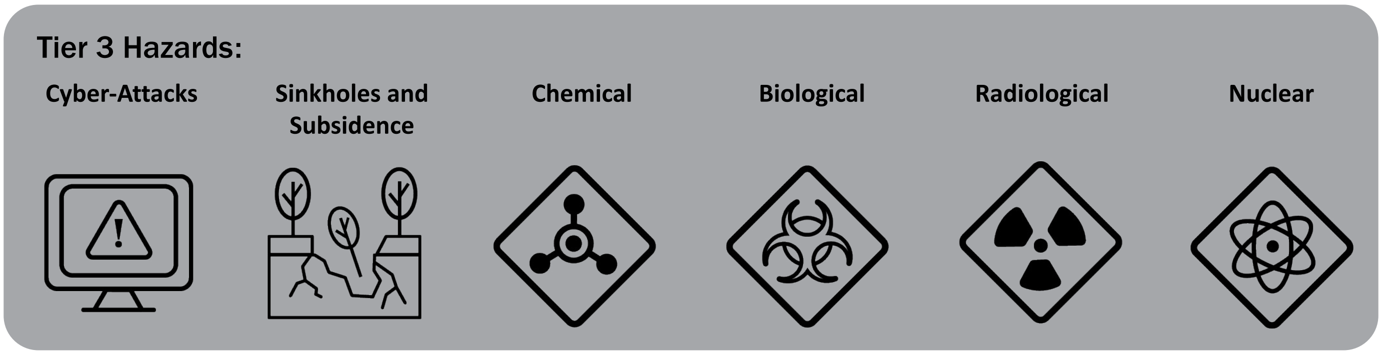


Table 5-4: Tier 3 Strategies

Hazard	Asset	Action
Sinkholes & Subsidence	Roads	Explore the use of LiDAR and Advanced Ground Penetrating Radar (GPR) technology to detect and map subsurface cavities beneath roads.
Sinkholes & Subsidence	Roads	Implement soil stabilization measures in karst landscapes and sinkhole-prone areas.
Sinkholes & Subsidence	Culverts, Roads	Ensure roadway culverts and structures are inspected and repaired when needed.
Cyber Attacks	Facilities	Develop redundant backup systems across multiple platforms to ensure data availability and protection.
Cyber Attacks	Facilities	Develop offline system protocols and best practices in case of a cyber-attack event.
CBRN Incidents	Communications	Utilize a quick alert notification system for emergency services in the event of release.
CBRN Incidents	Communications	Distribute emergency scenario protocols and education materials to residents.
CBRN Incidents	Communications	Install radiation detectors on emergency response vehicles to identify potential radiation sources.
CBRN Incidents	Communications, Roads	Implement robust safety procedures and policies for transporting CBRN materials in the region.

Part 6: Implementation

Implementation Considerations

The Resilience Improvement Plan (RIP) provides a comprehensive, data-driven framework to enhance the Rockford Metropolitan Planning Area's (MPA) transportation network resilience against climate-related and man-made hazards. This plan can serve as a guiding reference for identifying and prioritizing future transportation and infrastructure projects that are eligible for resilience-related funding at the federal and state levels.

The RIP includes a detailed analysis of regional vulnerabilities and strategies, a list of potential funding sources, and an inventory of potential projects. These resources are critical for assisting municipal and regional governments in preparing competitive applications for resilience funding. This plan supports more effective investment in adaptive transportation systems by aligning local infrastructure priorities with state and federal resilience initiatives.

Collaboration & Communication

Successful implementation of the RIP is dependent on regional collaboration and transparent communication. Resilience planning is most effective when it incorporates the diverse perspectives and expertise of stakeholders across multiple sectors, including county and city departments, transportation and infrastructure agencies, emergency services, conservation and ecological organizations, and utility providers.

Ongoing collaboration ensures that implementation efforts reflect the region's needs and values. Open communication channels can support effective public messaging, make education about the plan's efforts more accessible, and coordinate actions that lead to more impactful outcomes. The regional strategies, outlined in Part 5: Strategic Direction, provide guidance and serve as a framework for addressing the region's transportation network and infrastructure needs.

To translate this vision into measurable progress, coordinated and collective action is essential. Collaboration helps distribute responsibilities among partners that bring unique resources and capabilities, which can strengthen the overall ability to implement the plan. These partnerships also improve access to funding, technical expertise, and innovation, which are all are vital components for effective and sustained implementation.

Education & Outreach

A resilient region benefits from informed and engaged communities. Local governments are more likely to invest in infrastructure and resilience improvements if they are backed by community support. Enhancing public understanding of transportation resilience can contribute to the effectiveness and long-term impact of related investments. When communities and municipalities are aware of how infrastructure improvements support quality of life, economic stability, and public safety, they are better positioned to participate in and support resilience initiatives.

The RIP integrates engagement throughout the planning process, with input primarily from local stakeholders whose voices helped shape the plan's priorities and approach (see Appendix A). Stakeholder and public engagement efforts do not end with adoption of the plan. Continued dialogue and inclusive participation remain essential during implementation, especially when making decisions about project prioritization, when developing adaptation strategies and when pursuing funding opportunities.

As outlined in Part 5: Strategic Direction, strengthening the resilience of the regional transportation network will remain a core focus during implementation. By maintaining clear and consistent communication with community members and stakeholders across multiple public and private sectors, local leaders can ensure that implementation stays grounded in community needs and values.

Resilience Project Opportunities

Resilient transportation infrastructure has become a priority of the Rockford Metropolitan Planning Organization (MPO), Region 1 Planning Council (R1), as impacts of climate change intensify and cause increasing levels of harm to the Rockford Region's transportation network. Hazards such as flooding, thunderstorms, and extreme heat are becoming more frequent and severe as climate change progresses, putting the region's transportation network at risk. As the impacts of climate change escalate, it is essential that transportation projects within the Rockford MPA increasingly focus on strengthening the resilience of the transportation infrastructure.

This section highlights a selection of key transportation projects from local municipalities and regional partners that present opportunities to incorporate hazard mitigation and adaptation strategies. Although many of the projects were not originally developed with resilience as a primary focus, they offer the potential to enhance the Rockford Region's transportation network's ability to withstand climate-related and man-made hazards. Adaptation measures might include flood mitigation upgrades, evacuation route improvements, elevating roadways and bridges, strengthening communication systems, or establishing emergency hazard alert systems. The projects listed in this section are ideal applicants for resilience-funding opportunities, including the Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT) Program, which is currently inactive as of February 2025 but may be reinstated in the future.[i] More information on the PROTECT Program can be found in Appendix C.

Potential Projects

A comprehensive list of transportation projects has been compiled, including initiatives with regional significance and potential relevance to resilience objectives. These projects may be considered for future funding through the PROTECT Program, should it become available again.

The projects were sourced from local Capital Improvement Plans (CIPs), relevant Metropolitan Transportation Plan (MTP) and Transportation Improvement Program (TIP) projects, and materials provided by partner agencies. While many projects do not currently include explicit resilience components, they could become eligible with the integration of appropriate adaption strategies.

The full project list is available in Appendix B.

Alternative Funding Sources

To supplement the currently inactive PROTECT Program, the following federal and state funding sources have potential to support resilience-related planning and infrastructure projects, if receiving applications:

Federal Funding Opportunities

Federal Emergency Management Agency (FEMA):

Building Resilient Infrastructure and Communities (BRIC)

- **Overview:** Provides funding for pre-disaster hazard mitigation projects to reduce community risks from natural hazards. Supports infrastructure upgrades, flood control, and comprehensive disaster preparedness efforts.[ii]
- **Timeline:** FEMA cancelled the FY 2024 BRIC funding opportunity in early April 2025. In replacement, FEMA is developing a program which sets clear mitigation goals, speeds up funding obligation, and aligns with state and local needs.[iii]
- **Eligible Applicants:** Local governments.

Federal Highway Administration (FHWA):

Surface Transportation Block Grant Program (STBG)

- **Overview:** Offers flexible funding for a wide range of transportation infrastructure projects, including roads, bridges, tunnels, pedestrian and bicycle facilities, and transit capital investments. Can support various resilience capital improvements.[iv]
- **Timeline:** Annual funding cycles with project programming typically coordinated through state departments of transportation and metropolitan planning organizations (MPOs).
- **Eligible Applicants:** MPOs, local governments, transportation agencies.

Federal Transit Administration (FTA):

Emergency Relief Program

- **Overview:** Provides financial assistance to repair or replace public transportation infrastructure damaged by emergencies such as floods, hurricanes, and tornadoes. Funds can also be used for protective measures to reduce future disaster impacts.[v]
- **Timeline:** Available following a federally declared disaster or emergency event.[vi]
- **Eligible Applicants:** Public transportation agencies, local transit authorities.

United States Department of Transportation (USDOT):

Rural Surface Transportation Grant Program

- **Overview:** Supports transportation projects in rural areas that improve connectivity, safety, and economic development. Eligible projects include highway and bridge improvements, access to freight or agricultural hubs, and high-risk road safety enhancements.[vii]
- **Timeline:** Remains active and is part of the larger Bipartisan Infrastructure Law. Its most recent round of funding closed on May 6, 2024, and the next round of funding has yet to be announced.[viii]
- **Eligible Applicants:** Local governments, regional transportation planning organizations, other public entities in rural areas.

United States Environmental Protection Agency (EPA):

Community Change Grants Program (CCGP)

- **Overview:** Program under the Inflation Reduction Act (IRA) that supports community-led projects that enhance climate resilience, reduce pollution, and strengthen local capacity. Funded initiatives include the creation of green corridors, permeable sidewalks, stormwater-capturing tree pits, and resilience hubs offering emergency support services and heat-island mitigation.[ix]
- **Timeline:** The EPA terminated the CCGP in spring 2025. The future status of the program, including whether it will be reinstated or a replaced in some form, is currently unclear.
- **Eligible Applicants:** Community-based organizations in collaboration with local governments. Priority is given to disadvantaged communities.[x]

State Funding Opportunities

Illinois Department of Transportation (IDOT):

Illinois Transportation Enhancement Program (ITEP)

- **Overview:** Supports community-based projects that improve accessibility, mobility, and environmental aspects of infrastructure. Eligible activities include bike and pedestrian pathways, streetscape improvements, and other enhancements.[xi]
- **Timeline:** The most recent call for projects opened in September 2023 and closed in December 2023. The next cycle will begin in August 2026.[xii]
- **Eligible Applicants:** Local governments, regional planning commissions, transit agencies.

Illinois Environmental Protection Agency (IEPA)

Illinois Green Infrastructure Grant Opportunities (GIGO)

- **Overview:** Funds green infrastructure projects that manage stormwater by mimicking or enhancing natural hydrology. Supports best management practices (BMPs) such as permeable pavements, bioswales, and rain gardens, which are helpful for flood mitigation and water quality improvements.[xiii]
- **Timeline:** Typically issued annually in spring, with awards announced in the fall.[xiv]
- **Eligible Applicants:** Local units of government, public institutions.

Appendix A:

Public & Stakeholder Engagement

Introduction

The Resilience Improvement Plan (RIP) for the Rockford Metropolitan Planning Area (MPA) incorporated public and stakeholder input throughout plan development. To ensure meaningful public involvement and determine the appropriate level and method of engagement was afforded in all three rounds, the RIP followed the participation process outlined in Region 1 Planning Council's (R1) Public Participation Plan (PPP).

The process is as follows:

- Define what the purpose of the project is.
- List and describe what deliverables or the desired outcomes of the project are. The anticipated deliverables or outcomes of the plan will inform following steps below.
- Describe the purpose of public engagement for the project. This question will inform the expected level(s) of participation: Inform, consult, involve, or collaborate.
- Identify which members of the public or stakeholders who should be engaged.
- Identify the strategies that can be used to engage the public, described in the PPP.
- Describe how success of the public engagement will be measured.
- Define how to measure the success of the project.

RIP Working Group

To ensure this RIP reflects both expert insights and community needs, a dedicated RIP Working Group was formed. From February 2025 to August 2025, the group convened four times to engage with key local stakeholders, including professionals directly involved in emergency response, transportation infrastructure management, and climate adaptation efforts across the Rockford Region. Their collective expertise and collaboration were instrumental in shaping the direction of this plan and strengthening the relevance and applicability of its recommendations.

The following organizations participated in the RIP Working Group:

- Boone County Conservation District
- Boone County Emergency Management Agency
- Boone County Highway Department
- Boone County Soil and Water Conservation District
- City of Belvidere Public Works
- City of Rockford Community Development
- Illinois Department of Transportation (IDOT)
- North Park Water District
- Ogle County Highway Department
- A3 Environmental Consultants (A3E)
- Rockford Fire Department
- Rockford Mass Transit District (RMTD)
- Rockford Police Department
- Winnebago County Emergency Services and Disaster Agency (ESDA)
- Winnebago County Highway Department

Figure A-1: RIP Working Group Engagement Timeline

Engagement Rounds

As the climate continues to change and impact the transportation network, it was essential to include the public and stakeholders throughout the entire planning process. In alignment with this process, a variety of outreach techniques were used to proactively engage the general population and stakeholders in the planning area. The most appropriate participation strategies and techniques for each round of engagement were carefully considered, selected, and implemented.

As a result, R1 implemented a public outreach strategy that involved a total of three rounds of engagement, including:

- **Round 1:** Risk Assessment
- **Round 2:** Project Identification and Prioritization
- **Round 3:** Public Comment

Each of these engagement rounds are further detailed below.

Round 1: Risk Assessment

The first phase of the RIP focused on identifying key transportation-related hazards, ranking these hazards according to regional significance, and establishing foundational goals to inform the overall plan. This process served to guide the development of strategies, prioritize resilience projects, and support long-term planning efforts in the region.

Transportation Resilience Needs Survey

As part of this effort, a regional public survey was distributed through the Engage R1 platform to collect initial feedback from stakeholders and the general public. The survey was open from March 3, 2025 to May 15, 2025, and asked participants to rank a range of natural and infrastructure-related hazards based on their perceived risk and relevance to the region. Responses were primarily collected from local industry professionals, municipal staff, emergency responders, and residents with firsthand knowledge of regional conditions.

Results were categorized into two main groups (Infrastructure and Natural Hazards) and informed the prioritization of resilience strategies throughout the Rockford MPA.

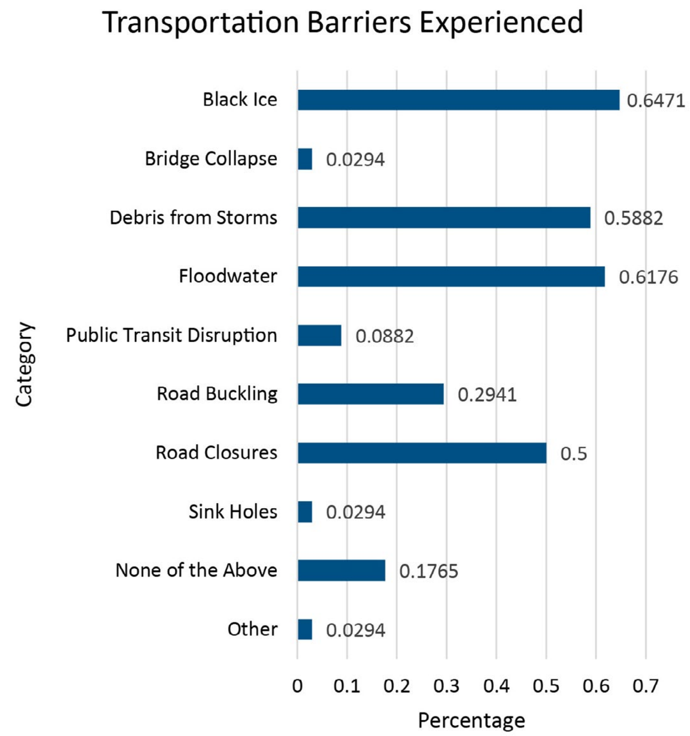
Survey Results

Hazard Ranking

The following are several ranking from the survey, completed by both the public and stakeholders.

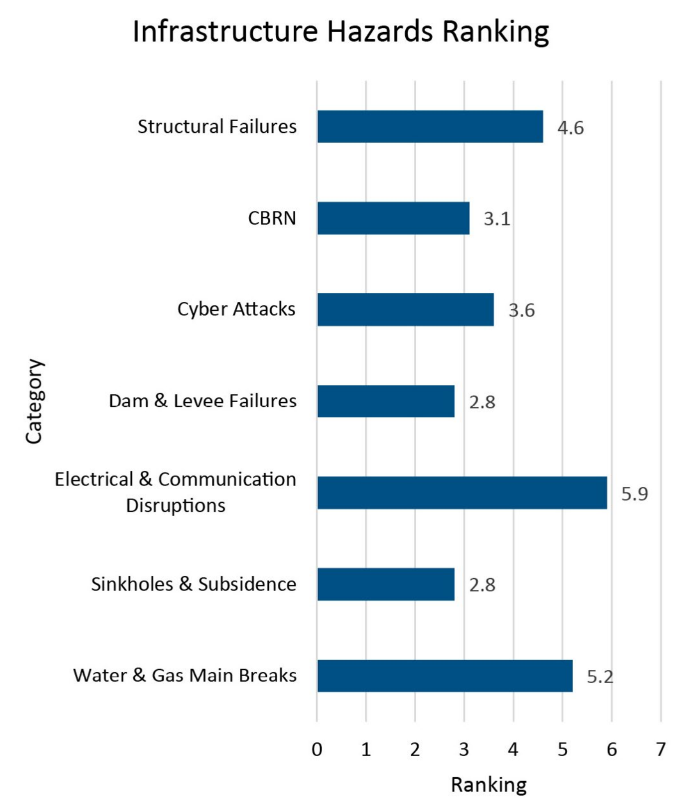
Transportation barriers experienced as a result of weather and natural disasters in the Rockford Region:

Figure A-2: Transportation Barriers Experienced



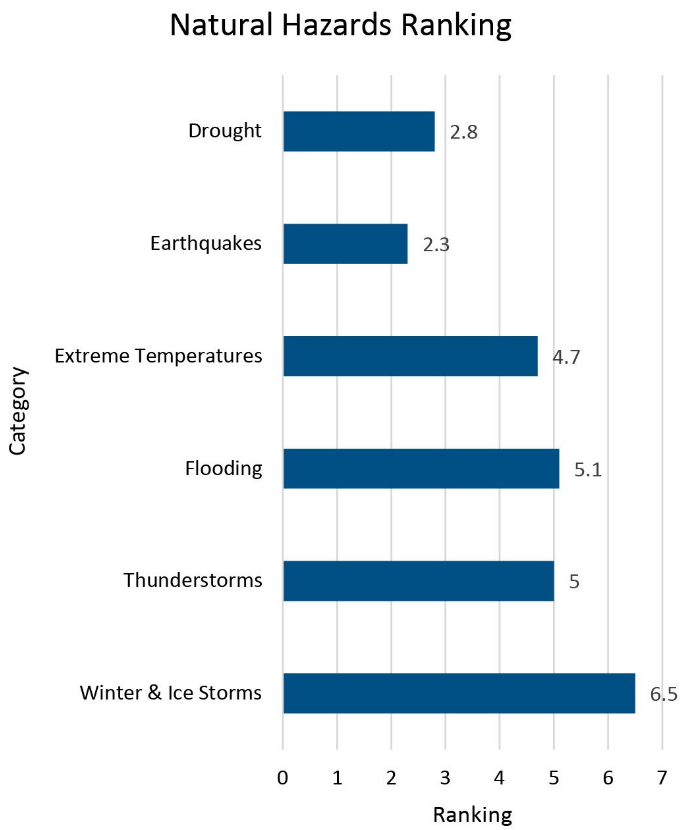
Ranking of infrastructure hazards in order of concern while traveling in the Rockford Region:

Figure A-3: Infrastructure Hazards Ranking in Order of Concern



Ranking of natural hazards in order of concern while traveling in the Rockford Region:

Figure A-4: Natural Hazards Ranking in Order of Concern



The following are the ranked hazards in their finalized list based on the survey results.

Infrastructure Hazards

Table A-1: Infrastructure Hazards Ranked

Ranking	Hazard
1	Electrical and Communication Disruptions
2	Dam & Levee Failures
3	Water & Gas Main Breaks
4	Bridge Vulnerabilities
5	Cyber Attacks
6	Sinkholes and Subsidence
7	Chemical, Biological, Radiological, and Nuclear Incidents (CBRN)

Natural Hazards

Table A-2: Natural Hazards Ranked

Ranking	Hazard
1	Flooding
2	Extreme Temperatures
3	Thunderstorms
4	Winter & Ice Storms
5	Drought
6	Earthquakes

Comments Received

Comments received from the Transportation Resilience Needs Survey are in Table A-3.

Table A-3: Round 1 Public Comments Received

Date	Comment
5-Mar-25	Storm water drainage in underserved areas of the city needs immediate attention. Flooded basements and streets bring down property values and create packets of devalued property within those areas.
8-Mar-25	Infrastructure design focused on automobile accident prevention with priority on auto vs. bike and auto vs. pedestrian potentially could be included as a resiliency concern. Also, potentially tangential- what would it take to double the usage of our mass transit system?
10-Mar-25	Resiliency means having many forms of transportation when one has less options then another. This means having the ability to ride a bike, walk, or find a bus stop in case my car is unreliable. One of the most ways we can be more reliant is filling in the many gaps of sidewalk all over the city.
7-Apr-25	Rainfall events are intensifying and this issue is being addressed by new design criteria for rainfall intensity standards used in calculating storm water run-off (Bulletin 70 {old standard} vs. Bulletin 75 {new standard}); however, this only "right-sizes" infrastructure going forward and not what is currently in service. By the new standard, much of the existing bridges, culverts, etc. are undersized.

The feedback gathered during this phase was critical in shaping the plan's hazard prioritization. The ranking of these hazards will support local and regional stakeholders in preparing for climate change impacts, enhancing emergency preparedness, and identifying critical infrastructure needs in the Rockford Region. These findings also serve as a foundational reference for future funding applications and strategic planning efforts across the region.

Round 2: Project Identification and Prioritization

The second round of the process was the identification and prioritization of regionally-specific transportation projects with the potential to be considered for future resilience funding. This phase was centered on identifying and prioritizing transportation resilience projects using a data-driven, performance-based evaluation framework. This approach ensures that selected projects align with the region's most pressing needs and can compete effectively for future funding opportunities.

Potential Projects List

R1 staff internally developed an initial list of potential projects, with a focus on identifying initiatives that could qualify for resilience-related funding programs, including the Federal Highway Administration's PROTECT Program. Although the program has been temporarily paused, the project selection process remains relevant, as the identified projects may still qualify for alternative federal or state funding opportunities.

The RIP Working Group reviewed and refined the draft project list, incorporating stakeholder feedback. The final outcome is a comprehensive, regionally representative list of transportation resilience projects.

The full project list can be viewed in Appendix B, and is intended to serve as a resource for local government, agencies, and partners when pursuing resilience-related funding opportunities. Whether a project appears directly on this list or shares similar characteristics, the prioritization framework and project inventory are designed to support ongoing adaptation efforts and investment in resilient infrastructure across the region.

Round 3. Public Comment

The goal of the third and final round of public engagement was to present and gather feedback on the draft document. To conclude the development process of the plan, R1 engaged a broad spectrum of residents, civic and community groups, elected officials, and technical staff from the region utilizing many of the same strategies of the first two rounds of public engagement.

The final round of public engagement was held for a 30-day comment period, from April 28, 2026 to May 27, 2026. Outreach techniques during this round were conducted both in person and online using the following methods:

- Updating the RIP Engage R1 webpage;
- Posting on the R1 social media accounts;
- Distributing press releases; and
- Presenting updates at committee meetings.

Comments Received

During the RIP public comment period, 1 written response was received in total. Copies of the submitted comments are included in Table A-4. Comments were reviewed and incorporated where appropriate into the plan.

Table A-4: Round 3 Public Comment Received

Date	Comment
21-May-26	WOOOO great plan!! Way to go, keep it up :)

Appendix B:

Resilience Project Opportunities

Table B-1: Round 3 Public Comment Received

Resilience Improvement Plan

Resilience Project Opportunities

Active Transportation Projects

Resilience Relevance: Supports emissions reduction and public health through active lifestyles; improves connectivity and provides alternative routes for evacuation.

Project Title	Entity	Location/ Limits	Category	Date(s)	Pre-Funding Estimated Cost	Funding Source
E Riverside Blvd	City of Loves Park	East Riverside Blvd	Bicycle Facilities	TBD	N/A	Sales Tax
Forest Hills Rd	City of Loves Park	Forest Hills Rd	Bicycle Facilities	TBD	TBD	TBD
Harlem Rd	City of Loves Park	Harlem Rd	Bicycle Facilities	TBD	TBD	TBD
Long Prairie Trail Rehab Project	Boone County Conservation District	Boone/ McHenry County Line to Stone Bridge Trail	Bicycle/ Pedestrian	TBD	$3,800,000	TBD
McDonald Rd Multi-Use Path Extension	Village of Roscoe	Rambouillet Ridge to Porter Park	Bicycle/ Pedestrian	TBD	$875,000	TBD
Nimtz Rd	City of Loves Park	Nimtz Rd	Bicycle Facilities	TBD	TBD	TBD
Perryville Path Extension	Winnebago County	Willowbrook Rd to McDonald Rd	Shared-use Path	2026	$700,000	ITEP State. County's share in 2026-27.
Pierpont Ave and W State St Sidewalk	City of Rockford	South side of W State St from Elm St to Pierpont Ave	Sidewalk	Fall 2027 Completion	$338,000	TAP
River Ln	City of Loves Park	River Ln	Bicycle Facilities	TBD	TBD	TBD
Riverside Path	Winnebago County	Perryville Rd to Bell School Rd	Shared-use Path	2027-28	$900,000	TAP fed funds thru MPO. Engineering, ROW & Construction. County's share in 2027-28.

Project Title	Entity	Location/ Limits	Category	Date(s)	Pre-Funding Estimated Cost	Funding Source
Riverside Path Engineering	Winnebago County	Perryville Rd to Bell School Rd	Shared-use Path	2027-28	$100,000	Possible TAP fed funds thru MPO for construction starting in 2027.
Roscoe Rd Multi-Use Path	Village of Roscoe	Old River to Main St	Bicycle/ Pedestrian	TBD	$8,815,359	TBD
Windsor Rd	City of Loves Park	Windsor Rd	Bicycle Facilities	TBD	TBD	TBD

Bridge Projects

Resilience Relevance:	Enhances neighborhood connectivity for emergency response and evacuation; increases structural stability to withstand severe storms and flooding.

Project Title	Entity	Location/ Limits	Category	Date(s)	Pre-Funding Estimated Cost	Funding Source
1st and 2nd St Bridges over Union Pacific Railroad	City of Rockford	1st and 2nd St Bridges	Bridge Structure	Fall 2028 Completion	$3,150,000	TBD
8th Ave Bridge over Keith Creek Replacement	City of Rockford	8th Ave Bridge	Bridge Structure	Fall 2026 Completion	$3,225,000	STBG
11th St Bridge Replacement	City of Rockford	Over Keith Creek	Bridge Replacement	TBD	$3,000,000	TBD
15th Ave Bridge over Rock River Replacement	City of Rockford	15th Ave Bridge	Bridge Structure	Fall 2029 Completion	$20,940,773	IL Special Bridge Program
Appleton Rd	City of Belvidere	US-20 Eastbound Ramps to Kishwaukee River Bridge	Bridge; Grade Separation	TBD	$33,074,000	TBD
Bauer Pkwy Bridge over Rock River- Deck rehab	Winnebago County	Bauer Pkwy	Bridge Rehab	2029	$1,150,000	ISP bridge fed funds. Engineering & Construction. County's share in 2029-30.
Clifford Bridge Replacement	City of Loves Park	East of Garden Plain	Bridge Replacement	TBD	$1,200,000	TBD
Corbin St Bridge Replacement	City of Rockford	Over Kent Creek	Bridge Replacement	TBD	$2,600,000	TBD
Cunningham Rd Bridge over RR (Repair)	Winnebago County	Cunningham Rd Bridge	Bridge Repair	2027	$350,000	Section loss repair. Local funds to be used.

Project Title	Entity	Location/ Limits	Category	Date(s)	Pre-Funding Estimated Cost	Funding Source
Latham Rd Bridge Replacement (Rock River)	Winnebago County	Latham Rd Bridge	Bridge Replacement	2030+	$14,000,000	Possible ISP bridge fed funds. Engineering & Construction.
Riverside Bridge over Rock River	City of Loves Park	Bridge over the Rock River	Bridge Rehab	TBD	$40,000,000	TBD
Roscoe Rd Bridge over Rock River	Winnebago County	Roscoe Rd Bridge	Bridge Rehab	2026-27	$3,800,000	Fed bridge funds; Rehab; Construction & CE. County's share in 2026-27.
Roscoe Rd Bridge over Rock River (Engineering)	Winnebago County	Roscoe Rd Bridge	Bridge Engineering	2026-27	$200,000	Federal bridge funds for construction starting in 2026 ($1.94 million).
Winnebago St over Kent Creek, Canadian National Railroad, and Canadian Pacific Railroad Bridge Rehab	City of Rockford	Over Kent Creek, CN RR, and CP RR	Bridge Rehab; Preservation	TBD	$700,000	TBD
Woodstock Rd Bridge	Boone County	Woodstock Rd over Picasaw Creek	Bridge Replacement	TBD	$2,215,000	TBD

Capacity Projects

Resilience Relevance: Improves access to critical facilities and evacuation routes; allows integration of climate-resilient design and supports emergency response.

Project Title	Entity	Location/ Limits	Category	Date(s)	Pre-Funding Estimated Cost	Funding Source
9th St Two-Way Conversion	City of Rockford	Charles St to Whitman St	Capacity – New	TBD	$35,242,592	STBG, Rebuild Illinois
Activate Church & Main	City of Rockford	Cedar St to John St	Capacity – Widening	TBD	$9,000,000	TBD
Latham Road & Ralston Road Widening & Reconstruction	Winnebago County	Old River Rd to IL-251	Capacity – Widening	TBD	$7,850,000	STBG
Love Road Reconstruction	Village of Roscoe	Rockton Rd to McCurry Rd	Capacity – New	TBD	$14,865,000	TBD
Townhall/Spring Creek Extension	Boone County	IL-76 to US-20	Capacity – New	TBD	$19,000,000	STBG
Willowbrook Road Reconstruction	Village of Roscoe	McCurry Rd to Rockton Rd	Capacity – Widening	TBD	$16,872,000	TBD

Intersection Projects

Resilience Relevance:	Optimizes traffic flow and safety during disruptions; supports reliable movement for emergency vehicles and public access.

Project Title	Entity	Location/ Limits	Category	Date(s)	Pre-Funding Estimated Cost	Funding Source
Baxter Rd & Harrisville Rd Intersection	Winnebago County	Baxter Rd & Harrisville Rd Intersection	Intersection	TBD	$2,000,000	TBD
Bell School Rd/Olde Creek Rd Intersection	Winnebago County	Bell School Rd Intersection	Intersection	2029-30	$1,600,000	Possible CRP fed funds thru MPO. Engineering & Construction. County's share in 2029-30.
E Riverside Blvd and McFarland Rd	City of Loves Park	E Riverside Blvd	Intersection	TBD	TBD	TBD
Major Intersection Emergency Vehicle Preemption Purchase & Repairs	Village of Machesney Park	10 intersections	Roadway & Intersection	TBD	$52,182	CRP
Mulford Rd/Riverside Blvd Intersection Improvements	Winnebago County	Mulford Rd & Riverside Blvd Intersection	Intersection	2029-30	$3,200,000	STBG/HSIP fed funds. County's share in 2029-30.

Preservation Projects

Resilience Relevance:	Maintains infrastructure condition to withstand climate hazards; extends asset life and reduces recovery time after extreme events.

Project Title	Entity	Location/ Limits	Category	Date(s)	Pre-Funding Estimated Cost	Funding Source
Elmwood Rd Resurfacing	Winnebago County	Owen Center Rd to IL-2	Preservation	TBD	$1,600,000	TBD
Harrison Ave	Winnebago County	Mulford Rd to 1/3 mile west of Perryville Rd	Preservation	TBD	$1,200,000	TBD
Harrison Ave Reconstruction	City of Rockford	Rock River to Kishwaukee St (IL-251)	Preservation	TBD	$20,000,000	TBD
Riverside Blvd	Winnebago County	Material Avenue to RennHart Hills Rd/Sage Rd	Preservation	TBD	$12,554,000	STBG
Riverside Reconstruction	City of Loves Park	Riverside Bridge to N 2nd St	Preservation	TBD	$3,000,000	TBD

Project Title	Entity	Location/ Limits	Category	Date(s)	Pre-Funding Estimated Cost	Funding Source
S Perryville Rd Rehabilitation	Winnebago County	Harrison Ave to E State St	Preservation	TBD	$7,257,000	STBG
Willowbrook Rd Reconstruction	Village of Roscoe	Village limits (0.5 mi north of Rockton Rd) to McCurry Rd	Preservation	TBD	$16,872,000	TBD

Roadway Projects

Resilience Relevance: Improves roadway function through optimization, traffic conversion, and road rightsizing; supports bicycle/pedestrian access for safe alternative mobility.

Project Title	Entity	Location/ Limits	Category	Date(s)	Pre-Funding Estimated Cost	Funding Source
Activate Church St & Main St	City of Rockford	Cedar St to John St	Capital Roadway	2026 Construction	$9,000,000	Sales Tax; State/Fed
Argyle Rd & Riverside Blvd	City of Loves Park	Paladin Rd east to just past Argyle Rd	Roadway	TBD	$2,000,000	TBD
Burden Rd Improvements	Village of Machesney Park	IL-173 to Forest Hills Rd	Roadway	TBD	$3,550,000	TBD
Central Ave	Winnebago County	Auburn to Riverside Blvd	Roadway	2027	$1,700,000	Fed funds thru MPO.Recon-figuration, path, drainage. County's share in 2027-28.
Cunningham Rd	Winnebago County	Meridian Rd to Morgan St	Roadway	2028	$1,000,000	STR fed funds. In-house engineering.
Forest Hills Rd Improvements	Village of Machesney Park	IL-251 to Hutchins Rd	Roadway	TBD	$9,520,000	TBD
Harrison Ave Rehab	Winnebago County	Mulford Rd to west of Perryville Rd	Roadway Rehab	2027	$1,100,000	MFT. In-house engineering.
Old River Rd	Winnebago County	Roscoe Rd to IL-75	Roadway	2026-27	$2,500,000	STU fed ($2 million). County's share in 2026-27. In-house engineering.
Perryville Rd- Rehab	Winnebago County	E State St to Riverside Blvd	Roadway	2028	$5,600,000	MFT & other local funds. Rehabilitation. In-house engineering.

Project Title	Entity	Location/ Limits	Category	Date(s)	Pre-Funding Estimated Cost	Funding Source
Riverside Blvd, Material - Sage	Winnebago County	Riverside Blvd	Roadway	2026-27	$720,000	Ph 2 Eng & ROW. STBG funds for construction in 2027 ($4.45 million).
Riverside Blvd/Forest Hills Rd/Alpine Rd	Winnebago County	Riverside Blvd/ Forest Hills Rd/ Alpine Rd	Roadway	2026-27	$13,000,000	STBG fed thru MPO ($9.447 million). Construction & CE. County's share in 2026-27.
S Perryville Rd, Harrison Ave-E State	Winnebago County	S Perryville Rd	Roadway	2027	$280,000	Ph 1 Engineering. STBG funds for construction in 2027 ($4.45 million).
S Perryville Rd	Winnebago County	Harrison Ave to E State St	Roadway	2027-28	$2,700,000	STBG fed funds thru MPO. Construction & CE. County's share in 2027-28.

Stormwater & Drainage Projects

Resilience Relevance: Reduces flood risks through stormwater management, green infrastructure, and projects like Keith Creek channel widening.

Project Title	Entity	Location/ Limits	Category	Date(s)	Pre-Funding Estimated Cost	Funding Source
Bond Ave Storm Sewer	Rockford Township	Bond Ave	Drainage Improvement	2030+	$600,000	No funding identified yet. Engineering & Construction. Located N of Auburn St.
Drainage Improvement-Madigan Creek	Winnebago County	Madigan Creek	Drainage Improvement	2025	$1,965,000	IEMA 319 grant; Local funds supplemented by others.
Keith Creek Flood Park	Region 1 Planning Council, Northern Illinois Land Bank	Nelson School site between 14th and 15th St, above 6th Ave	Natural Flood Mitigation	TBD	TBD	Region 1 Planning Council funds; Northern IL Land Bank funds; LCI Foundation (contributions from LCI stakeholders).

Project Title	Entity	Location/ Limits	Category	Date(s)	Pre-Funding Estimated Cost	Funding Source
Roscoe Rd	Winnebago County	Chicory Ridge to Rock River Drainage Imp	Drainage Improvement	2027-28	$1,785,000	2025 FEMA/ IEMA HMGP 4819 grant funding application submitted 6/2025.
Rote Rd	Rockford Township	Rote Rd	Drainage Improvement	2030+	$800,000	No funding identified yet. Engineering & Construction. Located E of Lyford Rd.
Roxbury Rd	Rockford Township	Roxbury Rd	Drainage Improvement	2030+	$600,000	No funding identified yet. Engineering & Construction. Located at La Cumbre Ln.

Appendix C:

PROTECT Formula Program

Although currently inactive, the Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT) Program remains a highly relevant and well-structured initiative for advancing transportation resilience. Its past framework provides valuable guidance for developing forward-looking strategies within the Rockford Metropolitan Planning Area (MPA).

According to the Federal Highway Administration (FHWA), the PROTECT Program funds were to be used for the following eligible activities:

- **Planning Activities:** These include developing a Resilience Improvement Plan (RIP), resilience planning, predesign, design, and the creation of data tools to simulate transportation disruptions, including vulnerability assessments. Additional activities may include technical capacity building to assess the vulnerabilities of surface transportation assets and develop community response strategies under current and future conditions, or planning for evacuation and emergency preparedness.
- **Resilience Improvements:** Projects aimed at strengthening the ability of existing surface transportation assets to withstand weather events or natural disasters, as well as enhancing infrastructure resilience to changing conditions such as sea level rise, flooding, wildfires, extreme weather events, and other hazards.
- **Community Resilience and Education Route Activities:** These focus on strengthening and protecting evacuation routes essential for emergency evacuations, including resilience improvements to ensure the routes are operational during emergencies and are protected from future damage.
- **At-Risk Coastal Infrastructure Activities:** These include strengthening, stabilizing, hardening, elevating, relocating, or enhancing the resilience of coastal highway infrastructure, such as bridges, roads, pedestrian walkways, and bicycle lanes. This also covers associated infrastructure like culverts and tide gates, specifically designed to protect highways from coastal flooding, coastal erosion, storm surges, or sea level rise, improving transportation and public safety while reducing long-term maintenance costs.[i]

While not currently funded, agencies and municipalities in the region should remain prepared to leverage the PROTECT Program should it be reactivated through future federal appropriations or infrastructure investments. The Rockford Region's ongoing strategic planning efforts position it to respond quickly and effectively if the program resumes. In the meantime, the PROTECT Program should be viewed not only as a potential funding source, but also as a guiding framework for integrating climate resilience into all phases of transportation planning and implementation.

In preparation for potential reinstatement, regional planners and local agencies are encouraged to:

- **Align Local Planning Frameworks:** Review Capital Improvements Plans (CIPs), transportation development plans, and hazard mitigation strategies to ensure compatibility with the PROTECT Program criteria. Establishing this alignment now can streamline eligibility should the program resume.
- **Maintain Inventory of Resilience-Oriented Projects:** Continuously develop and refine a portfolio of potential resilience projects – particularly those with components tied to climate adaptation, emergency preparedness, or infrastructure hardening.
- **Build Collaboration Efforts:** The effectiveness of PROTECT Program projects often depends on coordination across local jurisdictions, Metropolitan Planning Organizations (MPOs), emergency services, and environmental agencies. Establishing interagency resilience working groups or steering committees now can help define shared priorities and facilitate rapid action when funding becomes available.[ii]
- **Track Federal Legislative Developments:** The PROTECT Program was originally authorized through the 2021 Infrastructure Investment and Jobs Act (IIJA).[iii] Stakeholders should monitor federal legislation or updates from the U.S. Department of Transportation (USDOT) and the Federal Highway Administration (FHWA) for any signals regarding reauthorization or modification of resilience-specific funding opportunities.

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