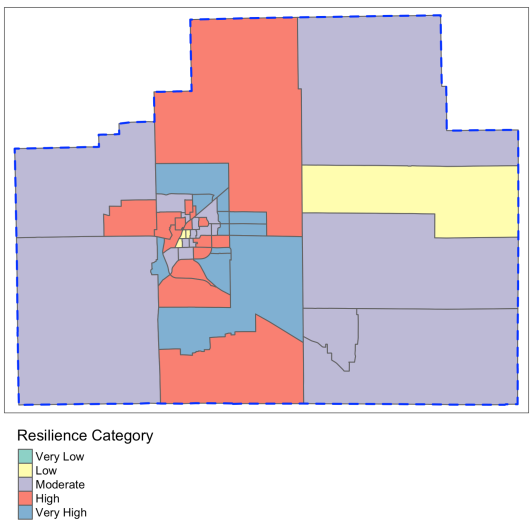


# County-Level Risk Assessment: McLean

## Census Tracts within McLean



## Basic Statistics

Table 1: Basic Statistics (County level)

Information	Value
Population	172164 persons
Area sq. miles	1185.5 sqm
Gross Density(persons/sq mil)	145 p/sqm
Avg HH Size	2.47 persons
Median HH Income	68037 USD

## Count of Tracts in each Category

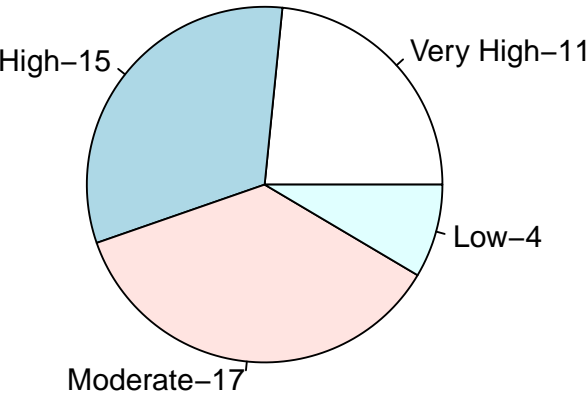


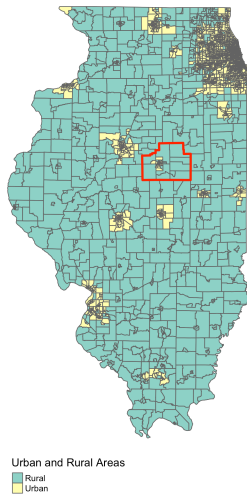
Table 2: Percentage of Census Tracts under each Resilience Category(County level)

Very High	High	Moderate	Low	Very Low
23	32	36	9	0

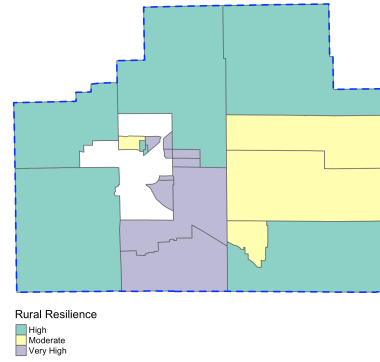
## Indicator Group Rankings

Indicator Group	High Risk Areas	Low Risk Areas
<b>Community</b> 	Young percent, NotMarried Percent, LargeFam Percent, Percent Food Insecure	Females Percent, Educated percent, Skilled Percent, FemaleLaborforce percent, PrimeWorkingAge percent, Percent BachelorsDegree, Food Environment Index, Percent Exercise Access, Percent Vaccinated
<b>Economy</b> 	UnstableEmployment Percent, Arts LQ, GINI Index, Gender Pay Gap, Percent income required for childcare expenses, CommuteTime, Recreation related business rate	MHHI, poverty, WorkNearby percent, MBS LQ, Sales LQ, Finance LQ, Management, Others, Walkability Score, Education related business rate, Healthcare related business rate
<b>Housing</b> 	OldHomes, Rented, Units SingleFamily, Rental CostBurden below20000, Percent HousingProblems	Homewownership, NewHomes, Renter MHHI, MedianHomeValue, Segregation Index
<b>Environment</b> 	NO21, O3, PM2.5, PM2Point5, pct disease acres ln, pct harvested acres ln, fungicide ln, herbicide ln, insecticide ln, W As ln, W Ba ln	CO8, Pb3, NO2AM, PM10, pct au ln, Kave ln
<b>Infrastructure</b> 	Percent PoorCondition Bridges, Percent commuters by transit, Other county workers, Workers to OtherCounties, Commuters withinCounty	Percent BroadbandAccess, Airports, Bridges, Freight railroad miles, Percent MediumFairCondition Bridges, Passenger railroad miles

## Census Tracts within McLean

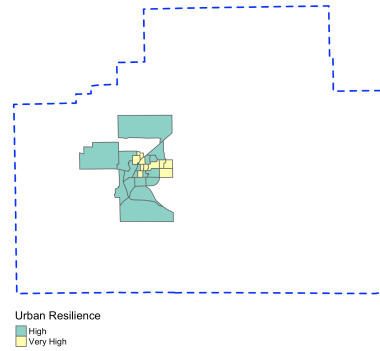


## Rural Resilience within McLean

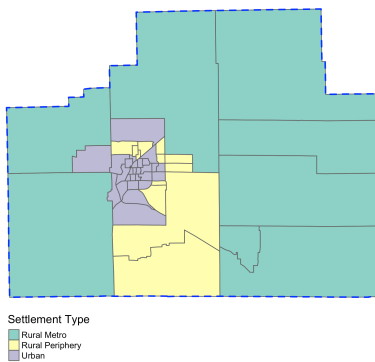


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## Urban Resilience within McLean








## Settlement Types



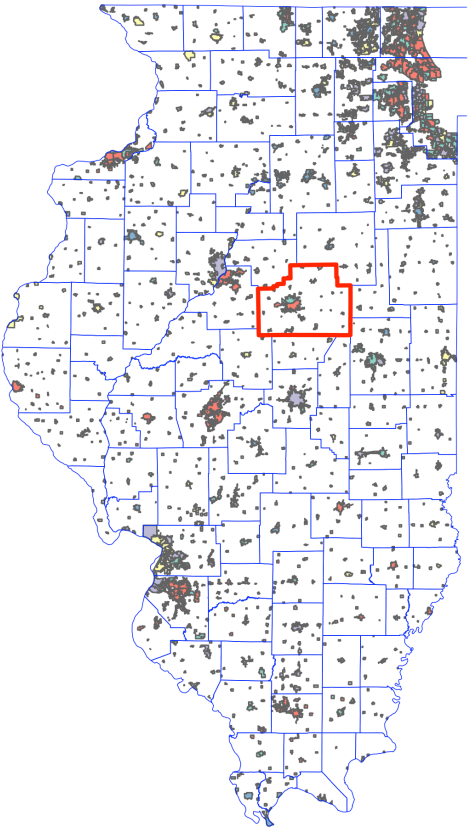
## Rural Indicator Rankings

Indicator Group	High Risk Areas	Low Risk Areas
<b>Community</b> 	Young percent, NotMarried Percent, Avg HHsize, Percent AssistanceNeed, Percent Food Insecure	Females Percent, Educated percent, PrimeWorkingAge percent, Food Environment Index, Percent Exercise Access, PrimaryCare Physicians Rate, MentalHealth Provider Rate, Percent Vaccinated, Social Association Rate
<b>Economy</b> 	UnstableEmployment Percent, GINI Index, Gender Pay Gap, Percent income required for childcare expenses, CommuteTime, Recreation related business rate	MHHI, WorkNearby percent, MBS LQ, Sales, Finance, Finance LQ, Edu LQ, Walkability Score, Civic related business rate, Education related business rate, Healthcare related business rate
<b>Housing</b> 	OldHomes, Units SingleFamily, Percent HousingProblems	Homewownership, NewHomes, Renter MHHI, MedianHomeValue, Segregation Index
<b>Environment</b> 	O3, PM2.5, PM2Point5, pct disease acres ln, pct harvested acres ln, fungicide ln, herbicide ln, insecticide ln, W As ln, W Ba ln	pct au ln, std stone prim pop ln, Kave ln
<b>Infrastructure</b> 	Percent PoorCondition Bridges, Percent commuters by transit, Other county workers, Workers to OtherCounties, Commuters withinCounty	Percent BroadbandAccess, Airports, Bridges, Freight railroad miles, Percent MediumFairCondition Bridges, Passenger railroad miles

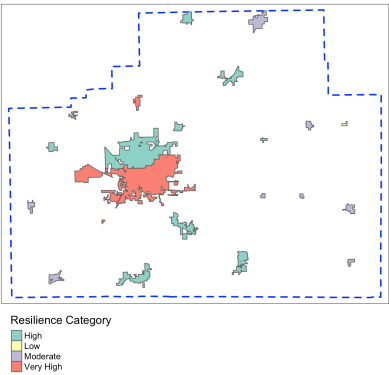
## Urban Indicator Rankings

Indicator Group	High Risk Areas	Low Risk Areas
<b>Community</b> 	SingleParent Percent, Percent LanguageBarrier, Physically Unhealthy Days, Inadequate Facilities, COVID-19 death rate, Percent Food Insecure	Females Percent, FemaleLaborforce percent, PrimeWorkingAge percent, Food Environment Index, Percent Exercise Access, PrimaryCare Physicians Rate, MentalHealth Provider Rate, Percent Vaccinated, Social Association Rate
<b>Economy</b> 	UnstableEmployment Percent, LowIncome Percent, Wholesale LQ, GINI Index, Percent Children in Poverty, Gender Pay Gap, CommuteTime, Vice related business rate, Recreation related business rate	MBS LQ, Service LQ, Finance, Finance LQ, Management LQ, Edu LQ, Others LQ, Civic related business rate, Education related business rate, Healthcare related business rate
<b>Housing</b> 	Total, Vacancy, Percent HousingProblems, Percent Section8	Homewownership, NewHomes, Rental CostBurden below, Renter MHHI
<b>Environment</b> 	pct manure acres ln, pct disease acres ln, pct au ln, fungicide ln, herbicide ln, std nonmetal prim pop ln, SO4Ave ln, W CN ln	pct harvested acres ln, std sandandgravel prim pop ln, D303 Percent ln, CaAve ln
<b>Infrastructure</b> 	Percent PoorCondition Bridges, Percent commuters by transit, Other county workers, Workers to OtherCounties, Commuters withinCounty	Percent BroadbandAccess, Airports, Freight railroad miles, Passenger railroad miles

State-Level Places Map



Places Map within McLean County, IL



Count of Places in each Category

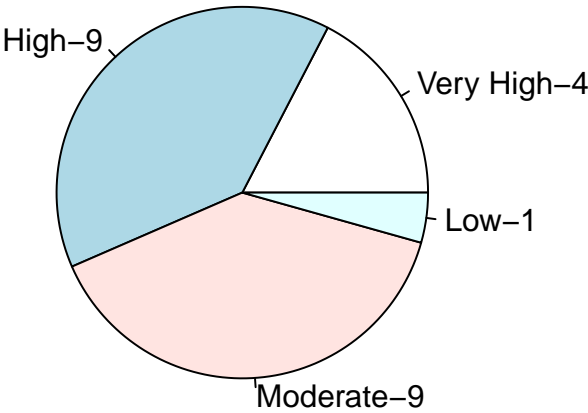







Table 6: Percentage of Census Tracts under each Resilience Category(County level)

Very High	High	Moderate	Low	Very Low
17 %	39 %	39 %	4 %	0 %

## Places Indicator Rankings

Indicator Group	High Risk Areas	Low Risk Areas
<b>Community</b> 	Young percent, NotMarried Percent, LargeFam Percent, Physically Unhealthy Days, Inadequate Facilities, COVID-19 death rate, Percent Food Insecure, Percent Limited Access to Healthy Foods	Females Percent, Educated percent, PrimeWorkingAge percent, Food Environment Index, Percent Exercise Access, PrimaryCare Physicians Rate, MentalHealth Provider Rate, Percent Vaccinated, Social Association Rate
<b>Economy</b> 	LowIncome Percent, PT LQ, Arts LQ, GINI Index, Percent Children in Poverty, Gender Pay Gap, Percent income required for childcare expenses, CommuteTime, Vice related business rate, Recreation related business rate	MHHI, poverty, Service LQ, Sales LQ, construction LQ, Finance LQ, Management, Others, Walkability Score, Civic related business rate, Education related business rate, Healthcare related business rate
<b>Housing</b> 	OldHomes, Units SingleFamily, Percent HousingProblems	Homewownership, NewHomes, Renter MHHI, MedianHomeValue, Segregation Index
<b>Environment</b> 	O3, PM2.5, PM2Point5, pct disease acres ln, pct harvested acres ln, fungicide ln, herbicide ln, insecticide ln, W As ln, W Ba ln	pct au ln, std stone prim pop ln, Kave ln
<b>Infrastructure</b> 	Percent PoorCondition Bridges, Percent commuters by transit, Other county workers, Workers to OtherCounties, Commuters withinCounty	Percent BroadbandAccess, Airports, Bridges, Freight railroad miles, Percent MediumFairCondition Bridges, Passenger railroad miles

## Relevant Resources

The following represent key areas of concern (in order of importance) at the county level:

- **Environment**

- **Housing**

The resources below have been extracted from the Disaster Planning Library to facilitate planning for high-risk areas observed through the assessment. Please go through the following tools as a starting point for your planning process and feel free to search the Disaster Planning Library for further information, if required. The resources here are included to facilitate the process of hazard mitigation planning, through the Planning for a Purpose Model of Illinois Extension (see Toolkit).

## Environment

### Environmental Resources

- **Branching Out: Agroforestry As A Climate Change Mitigation And Adaptation Tool For Agriculture**

Organization : Journal of Soil and Water Conservation

Year : 2012

Document\_type : General Resource/ Foundational Research, Planning Tool

Disasters : Flood, Drought, Extreme Weather, Man-Made Disasters, Soil Erosion/Landslides, Agricultural Disasters

Abstract : US and Canadian agricultural lands are being pressed to provide more environmental and economic services, while at the same time their capacity to provide these services under potential climate change (CC) is being questioned (Field et al. 2007; CAST 2011). Producers are already experiencing weather patterns outside of climate norms (e.g., the 2011 droughts in Texas, and flooding along the Missouri River in the United States and along the Red River in Canada) that have had significant impacts on production. Predictions of future climate conditions for the US Midwest include longer growing seasons that could potentially increase crop yields but also increase heat waves, floods, droughts, and insect and weed issues that may then adversely impact production (USGCRP 2009). Climate change drives many stressors and interacts with many non-climatic stressors. This makes it difficult to forecast outcomes in any general way other than many existing threats to agricultural production, such as erosion and pests, which will most likely be exacerbated under shifting climate (Field et al. 2007; USGCRP 2009). Creating profitable and healthy operations under this unpredictable interplay of factors driven by shifting climate (and, along with it, shifting markets) will be a daunting task.

It will be essential that farmers, ranchers, and even communities have a variety of land management options to minimize the risks and maximize services under such uncertain conditions.

Plan\_Components : Strategies

- **Green Infrastructure: Smart Conservation For The 21st Century**

Organization : Renewable Resources Journal

Year : 2002

Document\_type : General Resource/ Foundational Research, Planning Tool

Disasters : Flood, Man-Made Disasters

Abstract : “Green infrastructure” is a term becoming more commonly used among natural resource professionals. While it means different things to different people, depending on the context in which it is used, for the purposes of this article, green infrastructure is an interconnected network of green space that conserves natural ecosystem values and functions and provides associated benefits to human populations. Green infrastructure is the ecological framework needed for environmental, social and economic sustainability- our nation’s natural life support system. Planning utilizing green infrastructure differs from conventional open space planning because it looks at conservation values



in concert with land development, growth management and built infrastructure planning. This article introduces green infrastructure as a strategic approach to land conservation that addresses the ecological and social impacts of sprawl and the accelerated consumption and fragmentation of open land. It describes the concept and value of green infrastructure and presents seven principles for successful green infrastructure initiatives.

Plan\_Components : Planning Processes

- **Emergency Support Function #11**

Organization : Department of Agriculture

Year : 2016

Document\_type : General Resource/ Foundational Research

Disasters : Agricultural Disasters

Abstract : Emergency Support Function (ESF) #11 – Agriculture and Natural Resources organizes and coordinates Federal support for the protection of the Nation’s agricultural and natural and cultural resources during national emergencies. ESF #11 works during actual and potential incidents to provide nutrition assistance; respond to animal and agricultural health issues; provide technical expertise, coordination and support of animal and agricultural emergency management; ensure the safety and defense of the Nation’s supply of meat, poultry, and processed egg products; and ensure the protection of natural and cultural resources and historic properties

Plan\_Components : Strategies

- **Questions And Answers About Drainage Water Management For The Midwest**

Organization : Purdue Extension

Document\_type : General Resource/ Foundational Research

Disasters : Flood, Drought, Man-Made Disasters, Biological Disasters, Agricultural Disasters

Abstract : Subsurface tile drainage is an essential water management practice on many highly productive fields in the Midwest. However, nitrate carried in drainage water can lead to local water quality problems and contribute to hypoxia in the Gulf of Mexico, so strategies are needed to reduce the nitrate loads while maintaining adequate drainage for crop production. Practices that can reduce nitrate loads on tile-drained soils include growing winter forage or cover crops, fine-tuning fertilizer application rates and timing, bioreactors, treatment wetlands, and modifying drainage system design and operation. Drainage water management is one of these practices and is described in this fact sheet. Answers given here apply specifically to Midwest corn and soybean cropping systems, and not to perennial or winter annual crops.

Plan\_Components : Strategies, Funding Mechanisms

- **Cover Crop Decision Tool**

Organization : Midwest Cover Crop Council

Year : 2021

Document\_type : General Resource/ Foundational Research, Manual for an Local Organization

Disasters : Biological Disasters, Soil Erosion/Landslides, Agricultural Disasters

Abstract : Decision tool for deciding what cover crop to use.

Plan\_Components : Strategies

- **Buffers And Vegetative Filter Strips**

Organization : EPA

Document\_type : General Resource/ Foundational Research

Disasters : Flood, Drought, Biological Disasters, Soil Erosion/Landslides

Abstract : Buffers have been found to be most effective in trapping particulate pollutants. In addition, the export of soluble pollutants is expected to decrease when infiltration is maximized. Narrow buffers have also been shown to be effective in reducing the export of particulate pollutants when the integrity of the system is maintained. This highlights that one of the primary functions

of buffers is to slow surface water movement which reduces the export of pollutants, particularly 2 particulate pollutants, and narrow strips of dense grass can function in this capacity and provide water quality benefits (Dabney et al. 2006). Also, these narrow strips could be used in-field as vegetative barriers to slow pollutant movement in-field and control concentrated flow erosion.

To maximize infiltration of runoff, wider buffers or a greater buffer area to source area should be used. Research has found a significant range in buffer performance with reported sediment trapping efficiencies ranging from 41% to 100% and infiltration efficiencies ranging from 9% to 100%.

Plan\_Components : Surveys/Assessments

- **Aquifer Storage And Recovery**

Organization : FEMA

Document\_type : Manual for an Local Organization

Disasters : Flood, Drought

Abstract : FEMA is encouraging communities to incorporate methods to mitigate the impacts of climate change into

eligible Hazard Mitigation Assistance (HMA) funded risk reduction activities by providing guidance on

mitigating flood and drought conditions. FEMA has developed initial guidance on flood and drought mitigation

activities including green infrastructure methods, expanded ecosystem service benefits, and three flood reduction and drought mitigation activities: Aquifer Storage and Recovery (ASR), Floodplain and Stream

Restoration (FSR), and Flood Diversion and Storage (FDS).

Plan\_Components : Strategies

- **The Regional Conservation Partnership Program**

Organization : USDA

Year : 2022

Document\_type : Web-based Resource, Funding Opportunities

Disasters : Flood, Man-Made Disasters, Soil Erosion/Landslides, Agricultural Disasters

Abstract : The Regional Conservation Partnership Program (RCPP) promotes coordination of NRCS conservation activities with partners that offer value-added contributions to expand our collective ability to address on-farm, watershed, and regional natural resource concerns. Through RCPP, NRCS seeks to co-invest with partners to implement projects that demonstrate innovative solutions to conservation challenges and provide measurable improvements and outcomes tied to the resource concerns they seek to address.

Plan\_Components : Strategies, Funding Mechanisms, Green Infrastructure

- **Volunteer Fire Assistance Program**

Organization : IDNR

Year : 2022

Document\_type : Web-based Resource, Funding Opportunities

Disasters : Wildfires

Abstract : The Illinois Department of Natural Resources Division of Forestry administers the USDA Forest Service's VFA funds. The funds are for rural and small fire departments. The grant funds fire projects at 50% of the cost of a project up to \$10,000 per department. Forestry's portion is up to \$10,000, the Department may spend as much as they need to complete the project. No one item can be \$5,000 or more. The funds can only be used for fire projects, EMS, HazMat or crash rescue are not eligible. The funds are awarded based on competitive applications. Applications will be posted on Forestry's web site. The Office of the State Fire Marshall will send out a blast email and post it on their web site and the Illinois Fire Service Institute (IFSI) will also post it on their web site. Once the application is posted, Departments will have three months to submit their applications. The types of projects that have been funded in previous grants include radios, hose, SCBA, turn out gear, wildland PPE, hand tools, chainsaws, backpack blowers, modifying federal excess vehicles and

equipment and other equipment. For more information Contact Forestry's Wildland Fire Program Manager 217/782-8774.

Plan\_Components : Strategies, Funding Mechanisms, Tools

- **Wildland Fire Fighter Program**

Organization : IDNR

Year : 2022

Document\_type : Web-based Resource

Disasters : Wildfires

Abstract : Information about the Wildland Fire Fighter Program.

Plan\_Components : Information

- **Comprehensive Environmental Review Process Manual**

Organization : IDNR

Year : 2014

Document\_type : Manual for an Local Organization, Funding Opportunities

Disasters : Man-Made Disasters, Biological Disasters, Soil Erosion/Landslides, Agricultural Disasters, habitat destruction, invasive species,

Abstract : The Comprehensive Environmental Review Process (CERP) is an internal IDNR process to review:

actions that the Department performs or funds,

actions that the Department approves and a tax incentive is provided,

actions that occur on IDNR-owned or leased land.

An action is any activity that may change

existing physical, chemical or biological

conditions of air, land, or water.

Plan\_Components : Surveys/Assessments, Strategies, Green Infrastructure, Information

- **Community Flood Resilience In Vinton: Engaging Residents Affected By The Floods Of 2008 And 2016**

Organization : Iowa Watershed Approach, U.S. Department of Housing and Urban Development (HUD)

Year : 2020

Document\_type : Planning Tool, Manual for an Local Organization

Disasters : Flood

Abstract : Vinton was selected to be included in the Iowa Watershed Approach's

Flood Resilience Program, which recognizes that social resources are often absent or minimally evident when it comes to flood resiliency.

The program strives to improve the use of social resources in watersheds by connecting local partners and stakeholders, enhancing the presence of social resources in watershed planning efforts, and increasing the awareness and communication about established and novel flood resilience initiatives.

Plan\_Components : Surveys/Assessments, Strategies, Planning Processes, Case Studies

- **All Hazards**

Organization : Iowa State University

Year : 2018

Document\_type : General Resource/ Foundational Research, Web-based Resource, Planning Tool

Disasters : Tornado, Flood, Drought, Extreme Weather, Wildfires, Man-Made Disasters, Biological Disasters, Soil Erosion/Landslides, Agricultural Disasters

Abstract : The educational materials found on this site are the compilation of many resources currently available on-line. The information has been gathered from federal agencies such as the Centers for Disease Control and Prevention (CDC), Environmental Protection Agency, the Federal

Emergency Management System (FEMA), the U.S. Department of Agriculture (USDA), the Food and Drug Administration, and the National Oceanic and Atmospheric Administration (NOAA). Many non-governmental groups, such as the American Red Cross and the National Safety Council, as well as various Cooperative Extension agencies also have resources and information for preparedness that are provided through this website.

Plan\_Components : Surveys/Assessments, Planning Processes, Tools, Information

- **Upper South Branch Kishwaukee River Watershed Improvement Plan**

Organization : Applied Ecological Services Inc.

Year : 2021

Document\_type : Specific Plan

Disasters : Flood, Man-Made Disasters, Soil Erosion/Landslides, Agricultural Disasters

Abstract : A RESOLUTION ADOPTING THE UPPER SOUTH BRANCH KISHWAUKEE RIVER IMPROVEMENT WATERSHED PLAN AS AN AMENDMENT TO THE STORMWATER MANAGEMENT PLAN FOR DEKALB COUNTY, IL

Plan\_Components : Surveys/Assessments, Strategies, Planning Processes, Green Infrastructure

- **Kane County 2040 Green Infrastructure Plan**

Organization : Kane County Board, Quality of Kane, Greening Infrastructure, IDNR

Year : 2012

Document\_type : Specific Plan

Disasters : Flood, Soil Erosion/Landslides

Abstract : The ultimate goal of the Kane County 2040 Green Infrastructure Plan is to lay the groundwork for green infrastructure planning and projects at the regional, community, neighborhood and site levels addressing current issues of water resource management, biodiversity, conservation, water supply, public health, climate change and economic development.

Plan\_Components : Surveys/Assessments, Planning Processes, Funding Mechanisms, Green Infrastructure, Information

- **State Of Illinois Illinois Department Of Natural Resources Model Stormwater Management Ordinance**

Organization : Illinois Department of Natural Resources

Year : 2015

Document\_type : Planning Tool, Manual for an Local Organization, Policy

Disasters : Flood, Drought, Extreme Weather, Soil Erosion/Landslides

Abstract : In June 2015, the Illinois Department of Natural Resources, Office of Water Resources (IDNR/OWR) issued a report for the Urban Flooding Awareness Act. The report recognizes that combating the damages of urban flooding requires a coordinated approach from state and local governments. A critical component in that effort is for local governmental entities to adopt sound, comprehensive stormwater management ordinances that incorporate best practices. To that end, IDNR/OWR and the Illinois State Water Survey (ISWS) developed this Model Stormwater Management Ordinance as a

resource for counties and municipalities to use when drafting or revising their own stormwater ordinances. While local development, review, and approval processes are unique, IDNR/OWR provides this document as a template containing the minimum requirements for an effective ordinance and suggestions for more advanced stormwater protection

Plan\_Components : Tools, Green Infrastructure, Information

## Housing

### Buildings and Codes

- **Partial Implementation Of The Federal Flood Risk Management Standard For Hazard Mitigation Assistance Programs (Interim)**

Organization : FEMA

Year : 2021

Document\_type : Planning Tool, Policy

Disasters : Flood

Abstract : In its Hazard Mitigation Assistance (HMA) programs, the Federal Emergency Management Agency (FEMA) utilizes the American Society of Civil Engineers (ASCE) 24-14,3 or latest edition, to establish minimum design and construction requirements for structure elevation, dry floodproofing, and mitigation reconstruction.4 Under this interim policy, the FFRMS FVA will be utilized to determine the minimum flood protection elevation for certain project types. This interim policy applies to all HMA programs: the Hazard Mitigation Grant Program (HMGP), HMGP Post Fire, Building Resilient Infrastructure and Communities (BRIC), and Flood Mitigation Assistance (FMA).

Plan\_Components : Strategies, Planning Processes

- **Building Codes Toolkit**

Organization : FEMA

Year : 2021

Document\_type : Manual for an Local Organization

Disasters : Tornado, Flood, Extreme Weather, Earthquakes, Wildfires, Soil Erosion/Landslides

Abstract : The new FEMA Building Science Branch Building Codes Toolkit offers basic guidance and tools to help building owners and occupants learn about building codes and the process of making a building stronger against natural hazards.

Plan\_Components : Strategies, Planning Processes, Funding Mechanisms

- **Building Code And Floodplain Management Administration And Enforcement**

Organization : FEMA

Year : 2018

Document\_type : Policy

Disasters : Tornado, Flood, Extreme Weather, Earthquakes, Wildfires, Man-Made Disasters, Soil Erosion/Landslides

Abstract : The Disaster Recovery Reform Act of 2018 (DRRA), amended Sections 402 and 406 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), and authorized FEMA to “provide assistance to state and local governments for building code and floodplain administration and enforcement, including inspections for substantial damage compliance”1 and “base and overtime wages for extra hires to facilitate the implementation and enforcement of adopted building codes for a period of not more than 180 days after the major disaster is declared.”

Plan\_Components : Strategies, Funding Mechanisms

- **Building Codes Save: A Nationwide Study**

Organization : FEMA

Year : 2020

Document\_type : General Resource/ Foundational Research

Disasters : Tornado, Flood, Drought, Extreme Weather, Earthquakes, Wildfires, Soil Erosion/Landslides

Abstract : The findings of the MAT investigations, the magnitude of recent hazard events, and the escalating cost of natural disasters together revealed a compelling need to quantify the value of building codes in reducing damage from natural disasters nationwide.

Plan\_Components : Surveys/Assessments

- **Protecting Communities And Saving Money**

Organization : FEMA

Year : 2020

Document\_type : General Resource/ Foundational Research

Disasters : Tornado, Flood, Drought, Extreme Weather, Earthquakes, Wildfires, Soil Erosion/Landslides

Abstract : One of the most cost-effective ways to safeguard our communities against natural disasters is to adopt and follow hazard-resistant building codes. Not only are casualties reduced, but the cost of building damage is also reduced during a natural disaster. Building codes also help communities get back on their feet faster by minimizing indirect costs such as business interruptions and lost income. A new FEMA study has made the impact of building codes on sustainability clear. The cost of not adopting building codes is too high.

Plan\_Components : Surveys/Assessments, Strategies, Planning Processes, Funding Mechanisms, Case Studies

- **Resilience Toolkit**

Organization : ICC (International Code Council)

Year : 2022

Document\_type : Web-based Resource

Disasters : Tornado, Flood, Drought, Extreme Weather, Earthquakes, Wildfires, Soil Erosion/Landslides

Abstract : Over the past twenty years communities worldwide have experienced disaster events that have significantly impacted their society, economy, and culture. As populations grow, urban areas expand, and interconnectedness increases, the potential for a disaster event to have deeper and further-reaching consequences also increases. As a result, there is a need to implement measures that increase resilience across the social, organizational, and infrastructural aspects of communities - community resilience.

Plan\_Components : Strategies, Planning Processes

- **Resilience Strategies For Wildfire**

Organization : Center for Climate and Energy Solutions

Year : 2018

Document\_type : Planning Tool, Example Ordinances and Codes

Disasters : Wildfires

Abstract : The risk of wildfire is expected to grow across the United States due to reduced precipitation in some regions, and higher temperatures caused by climate change. Wildfire has far-reaching impacts that can ripple through communities, regions, watersheds, and ecosystems. This paper overviews a number of adaptation strategies for areas with a projected increase in wildfire conditions. For each strategy, it will discuss design and operation costs, and primary and co-benefits. The paper includes a community case

study of Austin, Texas, which has used a number of these strategies, and a list of publications and interactive tools to help communities become more resilient to wildfire

Plan\_Components : Strategies, Planning Processes, Case Studies, Tools, Information

- **Tornado Risks And Hazards In The Midwest United States**

Organization : FEMA

Year : 2007

Document\_type : General Resource/ Foundational Research, Planning Tool

Disasters : Tornado

Abstract : The purpose of this Tornado Recovery Advisory (RA) is to summarize facts about the Midwest tornado hazard, specifically the area served by FEMA Region VII. Region VII includes Iowa, Kansas, Missouri, and Nebraska. The general population, specifically homeowners and renters, policy makers, local officials, builders, and building officials know and understand

that tornado occurrence in the Midwest is not a rare event. In fact, more than half of the 20 states with the highest frequency of tornado occurrence on record, and 4 of the top 5 (Texas, Oklahoma, Kansas, and Nebraska) are located in the Midwest

Plan\_Components : Surveys/Assessments, Strategies, Tools, Information

- **Tornado Protection Selecting Refuge Areas In Buildings**

Organization : FEMA

Year : 2009

Document\_type : Manual for an Local Organization

Disasters : Tornado

Abstract : The guidance presented in this booklet is intended primarily to help building administrators, architects, and engineers select the best available refuge areas in existing schools. Building administrators, architects, and engineers are encouraged to apply this guidance so that the number of injuries and deaths will be minimized if a tornado strikes an occupied school

Plan\_Components : Strategies, Planning Processes, Case Studies, Tools, Information

- **Sustainable Land Development Code City Of Greensburg, Kansas**

Organization : GREENSBURG PLANNING COMMISSION

Year : 2011

Document\_type : Example Ordinances and Codes

Disasters : Tornado, Flood, Soil Erosion/Landslides, Agricultural Disasters

Abstract : City code for Greensburg, Kansas. The small rural town is a unique example in which the entire town was destroyed by a tornado. This gave leeway for a complete reimagination of the town and code, building a sustainable and resilient community from the ground up.

Plan\_Components : Strategies, Tools, Green Infrastructure, Information

- **Code Of Ordinances Village Of Thomasboro, Illinois**

Organization : Order of the Board of Trustees, Village of Thomasboro

Document\_type : Example Ordinances and Codes

Disasters : Tornado, Flood, Drought, Extreme Weather, Earthquakes, Man-Made Disasters

Abstract : Code of Ordinances for a small rural town in Illinois.

Plan\_Components : Strategies, Funding Mechanisms, Information

- **State Of Illinois Illinois Department Of Natural Resources Model Stormwater Management Ordinance**

Organization : Illinois Department of Natural Resources

Year : 2015

Document\_type : Planning Tool, Manual for an Local Organization, Policy

Disasters : Flood, Drought, Extreme Weather, Soil Erosion/Landslides

Abstract : In June 2015, the Illinois Department of Natural Resources, Office of Water Resources (IDNR/OWR) issued a report for the Urban Flooding Awareness Act. The report recognizes that combating the damages of urban flooding requires a coordinated approach from state and local governments. A critical component in that effort is for local governmental entities to adopt sound, comprehensive stormwater management ordinances that incorporate best practices. To that end, IDNR/OWR and the Illinois State Water Survey (ISWS) developed this Model Stormwater Management Ordinance as a

resource for counties and municipalities to use when drafting or revising their own stormwater ordinances. While local development, review, and approval processes are unique, IDNR/OWR provides this document as a template containing the minimum requirements for an effective ordinance and suggestions for more advanced stormwater protection

Plan\_Components : Tools, Green Infrastructure, Information

## Floods and Disaster Mitigation

- **Partial Implementation Of The Federal Flood Risk Management Standard For Hazard Mitigation Assistance Programs (Interim)**

Organization : FEMA

Year : 2021

Document\_type : Planning Tool, Policy

Disasters : Flood

Abstract : In its Hazard Mitigation Assistance (HMA) programs, the Federal Emergency Management Agency (FEMA) utilizes the American Society of Civil Engineers (ASCE) 24-14,3 or latest edition, to establish minimum design and construction requirements for structure elevation, dry floodproofing, and mitigation reconstruction.<sup>4</sup> Under this interim policy, the FFRMS FVA will be utilized to determine the minimum flood protection elevation for certain project types. This interim policy applies to all HMA programs: the Hazard Mitigation Grant Program (HMGP), HMGP Post Fire, Building Resilient Infrastructure and Communities (BRIC), and Flood Mitigation Assistance (FMA).

Plan\_Components : Strategies, Planning Processes

- **Building Codes Toolkit**

Organization : FEMA

Year : 2021

Document\_type : Manual for an Local Organization

Disasters : Tornado, Flood, Extreme Weather, Earthquakes, Wildfires, Soil Erosion/Landslides

Abstract : The new FEMA Building Science Branch Building Codes Toolkit offers basic guidance and tools to help building owners and occupants learn about building codes and the process of making a building stronger against natural hazards.

Plan\_Components : Strategies, Planning Processes, Funding Mechanisms

- **Building Code And Floodplain Management Administration And Enforcement**

Organization : FEMA

Year : 2018

Document\_type : Policy

Disasters : Tornado, Flood, Extreme Weather, Earthquakes, Wildfires, Man-Made Disasters, Soil Erosion/Landslides

Abstract : The Disaster Recovery Reform Act of 2018 (DRRA), amended Sections 402 and 406 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), and authorized FEMA to “provide assistance to state and local governments for building code and floodplain administration and enforcement, including inspections for substantial damage compliance”<sup>1</sup> and “base and overtime wages for extra hires to facilitate the implementation and enforcement of adopted building codes for a period of not more than 180 days after the major disaster is declared.”

Plan\_Components : Strategies, Funding Mechanisms

- **Building Codes Save: A Nationwide Study**

Organization : FEMA

Year : 2020

Document\_type : General Resource/ Foundational Research

Disasters : Tornado, Flood, Drought, Extreme Weather, Earthquakes, Wildfires, Soil Erosion/Landslides

Abstract : The findings of the MAT investigations, the magnitude of recent hazard events, and the escalating cost of natural disasters together revealed a compelling need to quantify the value of building codes in reducing damage from natural disasters nationwide.

Plan\_Components : Surveys/Assessments

- **Protecting Communities And Saving Money**



Organization : FEMA

Year : 2020

Document\_type : General Resource/ Foundational Research

Disasters : Tornado, Flood, Drought, Extreme Weather, Earthquakes, Wildfires, Soil Erosion/Landslides

Abstract : One of the most cost-effective ways to safeguard our communities against natural disasters is to adopt and follow hazard-resistant building codes. Not only are casualties reduced, but the cost of building damage is also reduced during a natural disaster. Building codes also help communities get back on their feet faster by minimizing indirect costs such as business interruptions and lost income. A new FEMA study has made the impact of building codes on sustainability clear. The cost of not adopting building codes is too high.

Plan\_Components : Surveys/Assessments, Strategies, Planning Processes, Funding Mechanisms, Case Studies

- **Resilience Toolkit**

Organization : ICC (International Code Council)

Year : 2022

Document\_type : Web-based Resource

Disasters : Tornado, Flood, Drought, Extreme Weather, Earthquakes, Wildfires, Soil Erosion/Landslides

Abstract : Over the past twenty years communities worldwide have experienced disaster events that have significantly impacted their society, economy, and culture. As populations grow, urban areas expand, and interconnectedness increases, the potential for a disaster event to have deeper and further-reaching consequences also increases. As a result, there is a need to implement measures that increase resilience across the social, organizational, and infrastructural aspects of communities - community resilience.

Plan\_Components : Strategies, Planning Processes

- **Resilience Strategies For Wildfire**

Organization : Center for Climate and Energy Solutions

Year : 2018

Document\_type : Planning Tool, Example Ordinances and Codes

Disasters : Wildfires

Abstract : The risk of wildfire is expected to grow across the United States due to reduced precipitation in some regions, and higher temperatures caused by climate change. Wildfire has far-reaching impacts that can ripple through communities, regions, watersheds, and ecosystems. This paper overviews a number of adaptation strategies for areas with a projected increase in wildfire conditions. For each strategy, it will discuss design and operation costs, and primary and co-benefits. The paper includes a community case

study of Austin, Texas, which has used a number of these strategies, and a list of publications and interactive tools to help communities become more resilient to wildfire

Plan\_Components : Strategies, Planning Processes, Case Studies, Tools, Information

- **Tornado Risks And Hazards In The Midwest United States**

Organization : FEMA

Year : 2007

Document\_type : General Resource/ Foundational Research, Planning Tool

Disasters : Tornado

Abstract : The purpose of this Tornado Recovery Advisory (RA) is to summarize facts about the Midwest tornado hazard, specifically the area served by FEMA Region VII. Region VII includes Iowa, Kansas, Missouri, and Nebraska. The general population, specifically homeowners and renters, policy makers, local officials, builders, and building officials know and understand

that tornado occurrence in the Midwest is not a rare event. In fact, more than half of the 20 states with the highest frequency of tornado occurrence on record, and 4 of the top 5 (Texas, Oklahoma,

Kansas, and Nebraska) are located in the Midwest  
Plan\_Components : Surveys/Assessments, Strategies, Tools, Information

- **Tornado Protection Selecting Refuge Areas In Buildings**

Organization : FEMA

Year : 2009

Document\_type : Manual for an Local Organization

Disasters : Tornado

Abstract : The guidance presented in this booklet is intended primarily to help building administrators, architects, and engineers select the best available refuge areas in existing schools. Building administrators, architects, and engineers are encouraged to apply this guidance so that the number of injuries and deaths will be minimized if a tornado strikes an occupied school

Plan\_Components : Strategies, Planning Processes, Case Studies, Tools, Information

- **Sustainable Land Development Code City Of Greensburg, Kansas**

Organization : GREENSBURG PLANNING COMMISSION

Year : 2011

Document\_type : Example Ordinances and Codes

Disasters : Tornado, Flood, Soil Erosion/Landslides, Agricultural Disasters

Abstract : City code for Greensburg, Kansas. The small rural town is a unique example in which the entire town was destroyed by a tornado. This gave leeway for a complete reimagination of the town and code, building a sustainable and resilient community from the ground up.

Plan\_Components : Strategies, Tools, Green Infrastructure, Information

- **Code Of Ordinances Village Of Thomasboro, Illinois**

Organization : Order of the Board of Trustees, Village of Thomasboro

Document\_type : Example Ordinances and Codes

Disasters : Tornado, Flood, Drought, Extreme Weather, Earthquakes, Man-Made Disasters

Abstract : Code of Ordinances for a small rural town in Illinois.

Plan\_Components : Strategies, Funding Mechanisms, Information

- **State Of Illinois Illinois Department Of Natural Resources Model Stormwater Management Ordinance**

Organization : Illinois Department of Natural Resources

Year : 2015

Document\_type : Planning Tool, Manual for an Local Organization, Policy

Disasters : Flood, Drought, Extreme Weather, Soil Erosion/Landslides

Abstract : In June 2015, the Illinois Department of Natural Resources, Office of Water Resources (IDNR/OWR) issued a report for the Urban Flooding Awareness Act. The report recognizes that combating the damages of urban flooding requires a coordinated approach from state and local governments. A critical component in that effort is for local governmental entities to adopt sound, comprehensive stormwater management ordinances that incorporate best practices. To that end, IDNR/OWR and the Illinois State Water Survey (ISWS) developed this Model Stormwater Management Ordinance as a

resource for counties and municipalities to use when drafting or revising their own stormwater ordinances. While local development, review, and approval processes are unique, IDNR/OWR provides this document as a template containing the minimum requirements for an effective ordinance and suggestions for more advanced stormwater protection

Plan\_Components : Tools, Green Infrastructure, Information

## Appendix A

### Interpretation of High Risk and Low Risk Areas at County Level

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
Agri	Percentage Employed in Agricultural Occupations	A lower percentage of workers in the agricultural sector indicates a greater economic diversity, lower dependence on weather conditions, higher resilience and lower risk	Agricultural sector is most directly affected by natural disasters and extreme weather events such that their productivity goes down drastically. Therefore a predominantly agrarian economy represents lower economic resilience and greater disaster risk	Very High
Agri LQ	Location Quotient of Agricultural Occupations	A lower LQ for the Agricultural Sector indicates a low risk	A higher LQ for Agricultural Businesses indicates a higher risk	Very Low
Agro Percent	Percentage Employment in Agriculture and related Sectors	A lower percentage of workers in the agricultural sector indicates a greater economic diversity, lower dependence on weather conditions, higher resilience and lower risk	Agricultural sector is most directly affected by natural disasters and extreme weather events such that their productivity goes down drastically. Therefore a predominantly agrarian economy represents lower economic resilience and greater disaster risk	Very Low
Airports	Non-Commercial-Civil Public Use Airports and Seaplane base	A higher value is associated is low risk	It indicates access to communication and transportation infrastructure which is essential in times of disasters. A lower value is associated with high risk	Very Low

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
ALLNPDESperKM ln	All NPDES permits per 1000 km of stream, as permits per 1000km stream length, log transformed	A Lower value is associated with low risk	It indicates pollution of water resources. A higher value is associated with high risk	High
Arts	Percentage Employed in Arts Occupations	A lower employment in the arts sector could indicate higher resilience to economic shocks and higher incomes and is therefore associated with lower risk	Although a higher proportion of artists could signal a greater economic diversity, arts occupations are highly susceptible to natural disasters. Therefore a greater employment in arts industries could signal a higher disaster risk.	Very High
Arts LQ	Location Quotient of Arts Occupations	A low LQ in the arts sector is associated with low risk	A high LQ in the arts sector is associated with higher risk	Very High
Avg HHsize	Average Household Size	A smaller average household size indicates a greater proportion of household resources available to every individual in the household and is therefore a lower risk	Household sizes relate with the distribution of resources among individuals with the household. A greater average household size indicates a lesser proportion of resources available to individuals and is therefore interpreted as a high risk	High
Avg temp	Average Temperature	A lower average temperature is associated with lower risk	A higher average temperature is associated with a higher risk	Low

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
Bridges	Number of Bridges	A higher value is associated is low risk	It indicates access to transportation infrastructure which is essential in times of disasters. A lower value is associated with high riskA lower value is associated with high risk	Very Low
Business establishments	Number of business establishments	A higher value is associated is low risk	It represents access to resources , and economic vilatility. A lower value is associated with high risk	Very Low
CaAve ln	Calcium (Ca) precipitation weighted mean in mg/L, log transformed	A Lower value is associated with low risk	It is a pollutant. A higher value is associated with high risk	Moderate
Civic related business rate	Rate of civic-related business per county	A higher value is associated is low risk	Civic-related businesses indicate a strong, built-environment and development industry. A lower value is associated with high risk	Very High
CO8	Concentration of Pollutant	A lower concentration indicates less pollution and is associated with lower risk	A higher concentration indicates more pollution and is associated with higher risk	Very Low
Commuters withinCounty	Number of resident workers who commute within county	A higher value is associated is low risk	A lower commute time is associated with a health local economy. A lower value is associated with high risk	Very High

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
CommuteTime	Time it takes from home to go to work in minutes	A Lower value is associated with low risk	Time spent in commute is associated with lack of productivity and extra expenses. A lower commute time is associated with a health local economy. A higher value is associated with high risk	Very Low
construction	Percentage Employed in Construction Occupations	Construction and allied industries represent possibilities for robust economic growth and government investment. A greater employment in the construction industry also signals potential for development of local infrastrcuture. A higher employment in this sector is therefore a low risk	Lower employment in the construction sector indicates lower investment in built environment and infrastructure and high disaster risks	Very Low
construction LQ	Location Quotient of Construction Occupations	A higher LQ for the construction industry indicates a low disaster risk	A lower LQ for the construction industry indictes a high disaster risk	Very High
Cost IncomeRatio	Ratio of Housing Cost to Household Income	A lower cost to income ratio indicates that households are successfully able to meet their financial demands and are more resilient to disasters. It is therefore a low risk.	A higher cost to income ratio indicates that households are unable to meet their financial needs and are more likely to suffer adversely during disasters. It is therefore associated with high risk.	Very High

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
COVID-19 death rate	All deaths occurring between January 1, 2020 and December 31, 2020 due to COVID-19, per 100,000 population (age-adjusted).	A Lower value is associated with low risk	A greater number of deaths owing to Covid-19 indicates pre-existing health conditions and comorbidities within the community. A higher value is associated with high risk	Low
D303 Percent In	% of stream length impaired in county, log-transformed	A Lower value is associated with low risk	It indicates pollution of water resources. A higher value is associated with high risk	Low
Disabled Percent	Percentage of Disabled Persons	A lower percentage of disabled individuals in the community indicates a lower risk owing to reduced requirements for preparation, disaster and accessibility planning	A higher percentage of disabled individuals is associated with a high risk. They are disproportionately affected owing to inaccessible evacuation, response and recovery efforts and could often be left behind.	Very Low
Docks	Total Docks	A higher value is associated is low risk	It indicates access to transportation infrastructure which is essential in times of disasters. A lower value is associated with high risk	High
Edu	Percentage Employed in Education-related Occupations	A higher employment in the education sector signals a more skilled economy, which is typically more resilient to natural disasters. It is therefore a low risk	A lower employment in the education sector signals a less resilient, less skilled economy, and is therefore associated with high risk	Very Low

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
Edu LQ	Location Quotient of Education-related Occupations	A high LQ in the education sector signals a higher economic resilience and low risk	A lower LQ in education sector signals a lower economic resilience and high risk	Low
Educated percent	Percentage of Educated Persons	A greater person of educated individuals is interpreted as low disaster risk	Lack of education is associated with social marginalization, lack of preparation and disaster planning. Therefore a lower percentage of educated individuals is interpreted as high risk.	Very Low
Education related business rate	Rate of education-related business per county	A higher value is associated is low risk	Education-related businesses enable a community to obtain access to education and child development resources. A lower value is associated with high risk	High
Elderly growth percent	Growth Percent of Elderly Population	A lower percentage of older adults represents a lower disaster risk.	Older adults are more vulnerable to disaster risks owing to functional problems, health and medication concerns. A greater percentage of older adults represents a higher risk.	Very Low



(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
FemaleHeaded HHs Percent	Percentage of Households with Female Householder	A lower percentage of female headed households indicates a lower disaster risk, a more stable family and household structure, greater social integration and family support, and higher socio-economic status at the community level	A higher percentage of female headed households could indicate a higher disaster risk owing to greater chances of poverty, and particular risk from housing shocks and stresses, hunger and food insecurity owing to gender discrimination	High
FemaleLaborforce percent	Percentage of Labor Force constituted by Women	A higher participation of females in the workforce indicates increased incomes, and lowers or leads to sharing of unpaid care-work with other members of the family, leading to a more economically resilient community. Thus a higher female workforce participation indicates a low disaster risk	A lower participation of women in the labour force is associated with lower household incomes and poverty. Therefore a lower female workforce participation means a higher disaster risk owing to lower economic support.	Very Low
Females Percent	Percentage of Females	A good percentage of women represent a stable sex ratio for the area and is therefore a positive indicator	A low percentage of women could indicate an unstable sex ratio, thereby showing that there are fewer opportunities for women in the area. This could have negative consequences during a disaster	Very Low

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
Finance	Percentage Employed in Finance Occupations	Finance, realestate, etc. jobs are positively correlated with high incomes, job security and high economic resilience during disasters. Therefore a greater employment ins uch industries poses a low risk and indicates a diverse economic base. A higher employment in such industries is associated with a low risk	A lower employment in finance, real estate etc. signals lower incomes and less resilient jobs. Therefore, a lower employment in this sector is associated with high risk	Very Low
Finance LQ	Location Quotient of Finance Occupations	A high LQ in finance, real estate, etc. signals a low risk	A low LQ in finance, real estate, etc. signals a high risk	Very Low
Food Environment Index	Index of factors that contribute to a healthy food environment, from 0 (worst) to 10 (best).	A higher value is associated is low risk	A poor food environment reduces the physical and mental vitality of a community. A lower value is associated with high risk.	Moderate
Freight railroad miles	Route miles of freight railroad	A higher value is associated is low risk	It indicates access to transportation infrastructure which is essential in times of disasters. A lower value is associated with high risk	Very Low

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
fungicide ln	Fungicides applied in pounds, log-transformed	A Lower value is associated with low risk	It indicates soil quality and environmental pollution. During disasters, pollutants from the soil can contaminate the environment. A higher value is associated with high risk	Very High
Gender Pay Gap	A ratio of women's median earnings to men's median earnings for all full-time, year-round workers, presented as "cents on the dollar."	A Lower value is associated with low risk	Gender inequality determines a society's ability to develop economically and equitably. A higher value is associated with high risk	High
GINI Index	GINI Index for Inequality Determination	A lower GINI Index depicts lesser inequality in the industry and is associated with low risk	A higher inequality represents differential distribution of resources, greater poverty and lack of accessibility. A higher GINI Index is associated with high risk.	Very High
GroupQuarters	Percentage of GroupQuarters as part of Total Housing Stock	A lower concentration of group quarter residents is a low risk owing to greater access to recovery resources and social support	Group quarters consist of unrelated persons sharing a living space, either in institutionalized or non-institutionalized settings. Thus they lack the social support of a family and a high percentage of group quarter population is associated with high risk	High

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
Healthcare related business rate	Rate of healthcare-related businesses per county	A higher value is associated is low risk	Availability of health care businesses indicate access to medical resources during disasters. A lower value is associated with high risk	Low
HelperPool	Percentage of Helpers in a time of crisis	A higher proportion of helpers indicates a lower risk, since a greater number of persons will be available for disaster recovery and mitigation efforts.	A good number of participants in the helper pool could indicate greater support and emergency management in the community. A lower percentage of helpers represents a high risk.	Low
herbicide ln	Herbicides applied in pounds, log-transformed	A Lower value is associated with low risk	It indicates soil quality and environmental pollution. During disasters, pollutants from the soil can contaminate the environment. A higher value is associated with high risk	Very High
Homewownership	Percentage Homewowners	A higher percentage of homeownership is associated with greater income and family stability and greater access to relief during a disaster. It is therefore a low risk	A lower percentage of homeownership signals lower incomes and support during disasters. It is therefore a higher risk.	Very High
Inadequate Facilities	Percentage of households with inadequate infrastructure within their housing unit	A Lower value is associated with low risk	Inadequate infrastructure within the household lowers quality of life and residents' health. A higher value is associated with high risk	Low

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
Info	Percentage Employed in Information-based Occupations	Information industries are positively associated with mitigation planning and have the ability to shift to remote working during a disaster. Therefore, such a higher employment in such industries poses a low risk	A lower employment in information industries signals a less diverse economic base and a higher susceptibility to natural disasters. It is therefore associated with higher disaster risks	Very Low
Info LQ	Location Quotient of Information-based Occupations	A lower LQ in the information sector signals a low risk	A lower LQ in information sector signals a high risk	High
insecticide ln	Insecticide applied in pounds, log-transformed	A Lower value is associated with low risk	It indicates soil quality and environmental pollution. During disasters, pollutants from the soil can contaminate the environment. A higher value is associated with high risk	Very High
Kave ln	Potassium (K) precipitation weighted mean in mg/L, log transformed	A Lower value is associated with low risk	It is a pollutant. A higher value is associated with high risk	Very Low

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
LargeFam Percent	Percentage of Large Families as part of all Families	In case of smaller family sizes, a greater investment of the family's resources is possible leading to greater achievements. Therefore a smaller proportion of big families is a reduced social vulnerability during disasters	In case of large families, the same limited resources are shared by a large group of individuals owing to less investment per person. This can result in differential academic achievements and occupational performance. Thus prevalence of a bigger family size would indicate a higher disaster risk.	Very High
LowIncome Percent	Percentage Low Income Population	A lower proportion of low income families indicates a greater access to resources for preparation and recovery from disasters and is hence a low disaster risk	A higher proportion of low income households lack of adequate access to resources to prepare for and recover from disasters, contingency funds, personal vehicles and abilities to arrange for alternate housing arrangements during disasters. It is therefore a high risk.	Very Low
Management	Percentage Employed in Management Occupations	Management, Business and Science jobs are invariably correlated with greater incomes, social mobility and lower dependence on place-based work. Therefore they are more resilient during disasters and higher employment in these sector represent lower risks	A lower proportion of employees in Management, Business and Science professions indicates lower incomes and a low skill economy and is therefore indicative of higher disaster risks	Very Low

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
Management LQ	Location Quotient of Management Occupations	A higher LQ in management, business, or science indicates a low risk	A lower LQ in Management, business or science indicates a high risk	Very High
Manufacturing	Percentage Employed in Manufacturing Occupations	A lower concentration of manufacturing industries/employment indicates lower chances of disruption during disasters. It is therefore an area of low risk	Manufacturing industries are directly affected by natural disasters. Extreme events cause great damage to the manufacturing units and their associated supply chains. A higher concentration of Manufacturing Industries is associated with high risk	High
Manufacturing LQ	Location Quotient of Manufacturing Occupations	A lower LQ for manufacturing industries indicates a low risk	A higher LQ for manufacturing industries indicates a high risk	Very Low
Marinas	Total Marinas	A higher value is associated is low risk	It indicates access to transportation infrastructure which is essential in times of disasters. A lower value is associated with high risk	NA
Max temp	Maximum Temperature	A lower maximum temperature is associated with lower risk	A higher maximum temperature is associated with a higher risk	Low

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
MBS	Percentage Employed in Management, Business and Science Occupations	Management, Business and Science jobs are invariably correlated with greater incomes, social mobility and lower dependence on place-based work. Therefore they are more resilient during disasters and higher employment in these sector represent lower risks	A lower proportion of employees in Management, Business and Science professions indicates lower incomes and a low skill economy and is therefore indicative of higher disaster risks	Very Low
MBS LQ	Location Quotient of Management, Business and Science Occupations	A high Location Quotient for Management, Business and Science professions indicates a more specialized, high income economy. It is indicative of low disaster risk	A low LQ for Management, Business and Science professions indicates a less specialized economy and is therefore indicative of lower economic diversity, lower incomes and high risk	Very Low
MedianHomeValue	Median Home Value	A higher home value indicates higher incomes, higher accessibility to funds during disaster and is therefore associated with low risk	A lower home value indicates lower incomes and is therefore associated with high risk	Very Low
MentalHealth Provider Rate	Ratio of population to mental health providers.	A higher value is associated is low risk	A lower proportion of physicians indicates that community members may not have access to mental health resources during disasters. A lower value is associated with high risk	Low



(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
MHHI	Median Household Income	A higher income indicates greater availability of resources to cope with disasters as well as to prevent them. Therefore it is a low risk	Low income HHs tend to locate or concentrate in areas prone to natural disasters such as floodplains, because the land is cheaper. Moreover they face resource deficiencies when a disaster strikes. A lower Median Household Income is associated with a higher disaster risk.	Very Low
Min temp	Minimum Temperature	A higher minimum temperature is associated with lower risk	A lower minimum temperature is associated with a higher risk	Low
MobileHomes	Percentage of Mobile Homes as part of Total Housing Stock	A lower proportion of mobile homes indicates greater structural resilience of the housing sector and more stable economy	A greater proportion of mobile homes is associated with greater risk owing to structural problems and lower incomes.	Low
NewHomes	Percentage of New Homes as part of Total Housing Stock	A higher proportion of new homes indicates a greater structural resilience to natural disasters and is associated with a low risk	A lower proportion of new homes indicates the possibility of greater structural damage during disasters. It is therefore associated with a high risk	Very Low
NO21	Concentration of Pollutant	A lower concentration indicates less pollution and is associated with lower risk	A higher concentration indicates more pollution and is associated with higher risk	Very High
NO2AM	Concentration of Pollutant	A lower concentration indicates less pollution and is associated with lower risk	A higher concentration indicates more pollution and is associated with higher risk	Very Low

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
NO3Ave.x	Nitrate (NO3) precipitation weighted mean in mg/L, log transformed	A Lower value is associated with low risk	It is a pollutant. A higher value is associated with high risk	High
NonWhite Percent	Percentage of Non-White Population**Minority Populations, add Hispanic Population	A lower population of ethnic minorities might indicate a less diverse population. However, in case of disaster vulnerability, a lower population of racial minorities has been represented as a lower vulnerability, owing to its correlations with poverty and health care outcomes.	Race and ethnicity are highly correlated with poverty and thus often with health outcomes. Owing to historical, systemic and structural barriers, racial minorities are often more susceptible to disasters and often lack the support mechanisms required to cope. As a result, a higher population of racial or ethnic minorities might (in conjunction with income, poverty, employment, education and other indicators) represent a greater vulnerability.	Very High
NotMarried Percent	Percentage of Unmarried Persons	A lower percentage of unmarried individuals could indicate a lower vulnerability to disasters owing to the availability of social support that comes with having a family	A higher percentage of unmarried individuals could indicate lack of family and social support.	Very High
O3	Concentration of Pollutant	A lower concentration indicates less pollution and is associated with lower risk	A higher concentration indicates more pollution and is associated with higher risk	Very High

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
Old percent	Percentage of Elders**	A lower percentage population of elders indicates a lower vulnerability.	A higher percentage of elder population indicates a greater vulnerability, owing to physical infirmities, functional limitations and care needs.	Very Low
OldHomes	Percentage of Old Homes as part of Total Housing Stock	A lower proportion of old homes signals new construction that is more structurally resilient to natural disasters. It is therefore associated with low disaster risk	A higher proportion of houses that are built more than 30 years ago signals an old housing stock in need of repair and reconstruction. It is therefore associated with high disaster risk.	Very Low
Other county workers	Number of workers from other counties who commute to work in the county	A Lower value is associated with low risk	Asmaller commute time is associated with a health local economy. A higher value is associated with high risk	High
Others	Percentage Employed in Other Occupations	Employment across other sectors represents diversification of the economic base and is therefore positively correlated with economic resilience. It is therefore a low risk	A lower employment in other sectors represents a less diverse and creative economy. It is therefore associated with high risks	Very Low
Others LQ	Location Quotient of Other Occupations	A higher LQ in other industries is associated with low risk	A lower LQ in other industries is associated with high risk	Very High

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
Overcrowding	Percentage of Overcrowded Homes as part of Total Housing Stock	A lower proportion of overcrowded units signals higher incomes and well-maintained, structurally sound housing units which are resilient to disasters. It is therefore associated with low risk	In an overcrowded housing unit, available resources are distributed among a higher than average number of individuals which could lead to familial, socio-economic and structural inadequacies over a period of time. It is therefore associated with high risk.	Low
Passenger railroad miles	Route miles of passenger railroad and rail transit	A higher value is associated is low risk	It indicates access to transportation infrastructure which is essential in times of disasters. A lower value is associated with high risk	Very Low
Pb3	Concentration of Pollutant	A lower concentration indicates less pollution and is associated with lower risk	A higher concentration indicates more pollution and is associated with higher risk	Very Low
pct au ln	Animal Units, animal units per county acres , log-transformed	A Lower value is associated with low risk	It indicates soil quality and environmental pollution. During disasters, pollutants from the soil can contaminate the environment. A higher value is associated with high risk	Very Low

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
pct disease acres ln	Chemicals used to control Diseases in crops and orchards, acres applied per county acres , log-transformed	A Lower value is associated with low risk	It indicates soil quality and environmental pollution. During disasters, pollutants from the soil can contaminate the environment. A higher value is associated with high risk	Very High
pct harvested acres ln	Harvested acres, acres harvested per county acres , log-transformed	A Lower value is associated with low risk	It indicates soil quality and environmental pollution. During disasters, pollutants from the soil can contaminate the environment. A higher value is associated with high risk	Very High
PCT IRRIGATED ACRES ln	Irrigated acres, acres irrigated per county acres, log-transformed	A higher value is associated is low risk	A lower value is associated with high risk, since poor irrigation can lead to agricultural failure	Low
pct manure acres ln	Manure, acres applied per county acres , log-transformed	A Lower value is associated with low risk	It indicates soil quality and environmental pollution. During disasters, pollutants from the soil can contaminate the environment. A higher value is associated with high risk	High
Per PSWithSW.x	Percent of Public Supply Population which is on Surface Water	A Lower value is associated with high risk	It indicates access to water resources. A higher value is associated with low risk	Low

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
Per TotPopSS.x	Percent of Population on Self Supply	A Lower value is associated with high risk	It indicates access to water resources. A higher value is associated with low risk	Low
Percent Medium-FairCondition Bridges	% of Medium to Fair Condition Bridges	A higher value is associated is low risk	It indicates access to transportation infrastructure which is essential in times of disasters. A lower value is associated with high risk	Very Low
Percent AssistanceNeed	Percentage of Population with Assistance Need	A lower percentage of people with food assistance indicates higher incomes and economic resilience, and is therefore a low risk area	A high proportion of persons with assistance needs indicates poverty and lack of socio-economic resilience. Therefore it is interpreted as a high risk.	Low
Percent BachelorsDegree	Percentage of Population with Bachelors' Degree	A greater proportion of persons with bachelors' degree indicates a greater likelihood of being employed by a variety of employers, along with a higher concentration of high skilled high income positions. Therefore it is interpreted as a low risk	A lower proportion of persons with a bachelor's degree indicates a lower number of persons with skills for career advancement. It indicates lack of skilled labour in the workforce and therefore lower incomes and social mobility. Therefore it is interpreted as a high risk factor	Very Low
Percent Children in Poverty	Percentage of people under age 18 in poverty.	A Lower value is associated with low risk	Children living in poverty indicate inadequate resources available for growth, education and development. A higher value is associated with high risk	Very Low

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
Percent Commuters	Percentage of Population who Commute to work regularly	A lower percentage of commuters indicates that most workers live near where they work and can continue their jobs irrespective of transportation network disruptions. Therefore it is an area of low risk	Natural disasters invariably affect transportation routes and make it difficult for persons requiring commutes to their workplace to continue their employment. Therefore a greater proportion of commuters indicates a disaster risk	Very High
Percent commuters by transit	Percent of resident workers who commute by transit	A Lower value is associated with low risk	A lower commute time is associated with a health local economy. A higher value is associated with high risk	Very High
Percent Disconnected Youth	Percentage of teens and young adults ages 16-19 who are neither working nor in school.	A Lower value is associated with low risk	Teens and young adults need to either be in school, or part of the workforce, to be able to cultivate a healthy, self-sufficient lifestyle, involved hopeful and forward looking endeavours. Disconnected youth have been positively associated with poverty, unemployment and crime. A higher value is associated with high risk	High
Percent Exercise Access	Percentage of population with adequate access to locations for physical activity.	A higher value is associated is low risk	Lower physical exercise increases health risks with age. A lower value is associated with high risk	Very Low

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
Percent Food Insecure	Percentage of population who lack adequate access to food.	A Lower value is associated with low risk	Access to food indicates community health. A higher value is associated with high risk	Low
Percent Housing Problems	Percentage of households with at least 1 of 4 housing problems: overcrowding, high housing costs, lack of kitchen facilities, or lack of plumbing facilities.	A Lower value is associated with low risk	Unavailability of housing infrastructure adversely affects residents' health. A higher value is associated with high risk	High
Percent income required for childcare expenses	Childcare costs for a household with two children as a percent of median household income	A Lower value is associated with low risk	A high burden of childcare costs indicates that a family may not be able to provide for its other necessary expenditures. A higher value is associated with high risk	Moderate
Percent Language Barrier	Percentage of Population facing Language Barrier	A lower proportion of persons with language problems indicates greater accessibility to disaster relief efforts and is therefore an area of low risk	A higher proportion of persons with language barriers could indicate a higher percentage of people suffering due to communication problems, interpretation of instructions and emergency rescue operations. Therefore it is interpreted as a high risk	Very High



(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
Percent Limited Access to Healthy Foods	Percentage of population who are low-income and do not live close to a grocery store.	A Lower value is associated with low risk	Persons who are low income lack access to healthy food, especially if they live away from grocery stores and lack transportation. A higher value is associated with high risk	High
Percent NoHealthIns	Percentage of Population without Health Insurance	Greater health insurance coverage is correlated with better health conditions and higher economic productivity. Therefore a higher number of persons with health insurance is a low risk	Lack of health insurance coverage has negative impacts on health as patients are less likely to receive preventive health care, or affordable medical care during a disaster. A greater proportion of persons without health insurance indicates a higher disaster risk.	Low
Percent PoorCondition Bridges	% of Poor Condition Bridges	A Lower value is associated with low risk	It indicates access to quality transportation infrastructure which is essential in times of disasters. A higher value is associated with high risk	Very Low
Percent rural	Percentage of population living in rural areas	A Lower value is associated with low risk	Rural areas often lack access to resources and are geographically isolated. A higher value is associated with high risk	Low
Percent Section8	Rate of low-rent + section-eight units in county	A Lower value is associated with low risk	Greater proportion of low income housing indicates poverty and declining housing quality. A higher value is associated with high risk	Low

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
Percent Vaccinated	Percentage of Households vaccinated against Covid-19 and other diseases	A higher value is associated is low risk	A high proportion of vaccination indicates that the community is safe against the Covid-19 pandemic. A lower value is associated with high risk	Very Low
Percent work at home	Resident workers who work at home	A higher value is associated is low risk	A lower commute time is associated with a health local economy. A lower value is associated with high risk	Very Low
Physically Unhealthy Days	Average number of physically unhealthy days per year for the population	A Lower value is associated with low risk	A higher value is associated with high risk because people are more prone to being affected by disaster risks	Very Low
PM10	Concentration of Pollutant	A lower concentration indicates less pollution and is associated with lower risk	A higher concentration indicates more pollution and is associated with higher risk	Very Low
PM2.5	Concentration of Pollutant	A lower concentration indicates less pollution and is associated with lower risk	A higher concentration indicates more pollution and is associated with higher risk	Very High
PM2Point5	Concentration of Pollutant	A lower concentration indicates less pollution and is associated with lower risk	A higher concentration indicates more pollution and is associated with higher risk	Very High
Population	Total Population	A small number of people will be affected by a disaster	A large number of persons will be affected by the disaster	Very High

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
poverty	Percentage Below Poverty Line	A lower poverty indicates less exposure to disaster risks and greater accessibility to exigency funds. It is therefore a low risk	Poverty can be both a cause and consequence of disaster risk. A greater poverty is associated with a higher risk	Moderate
Precipitation	Precipitation	A lower precipitation is associated with a lower risk	A higher precipitation is associated with higher risk	Low
PrimaryCare Physicians Rate	Ratio of population to primary care physicians.	A higher value is associated is low risk	A lower proportion of physicians indicates that community members may not have access to medical help during disasters and have to rely on external support. A lower value is associated with high risk	Low
PrimeWorkingAge percent	Percentage of population in Prime Working Age	A greater number of persons of working age indicates a greater labour pool available for the local economy. Therefore a higher ratio indicates a lower risk.	A lower number of persons of working age represents a greater number of dependents on the existing workfore and is hence a high risk.	Moderate
PT	Percentage Employed in Production and Transportation Occupations	A lower concentration of production and transportation industries indicates a lower dependence of the economic base on land, location and natural resources. It is therefore more economically resilient and a low risk	Both production and transportation industries are dependent on availability of local natural resources and are therefore more susceptible to natural disasters. A higher employment in such industries signals greater disaster risk.	Very High

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
PT LQ	Location Quotient of Production and Transportation Occupations	A lower concentration of the production and transportation industry indicates a low risk	A higher LQ for the Production and Transportation Industry indicates a high risk	Very Low
Radon.x	Radon zone, ordinal value	A Lower value is associated with low risk	It indicates environmental quality and stability. A higher value is associated with high risk	Low
Recent Immigrants Percent	Percentage of Recent Immigrant Individuals	A lower percentage of immigrants represents a lower disaster risk owing to more equitable access to local and regional resources within the community and lack of communication barriers	A higher percentage of immigrants represents a greater disaster risk owing to their immigration status, lack of English proficiency and lack of direct access to resources in comparison with native citizens	Low
Recreation related business rate	Rate of recreation-related businesses per county	A lower value is associated with low risk	Greater proportion of recreation-related business indicate heightened economic instability during disasters. A higher value is associated with high risk	Low
Rental CostBurden below20000	Housing Cost Burden on renters whose incomes are below 20,000 USD	A lower proportion of cost-burdened low income households indicates greater economic resilience among low-income renters. This is an asset during natural disasters and is a low risk area	A higher proportion of low income rental households who are housing cost burdened signals a higher concentration of highly vulnerable households in the community. This is an area of high risk, structurally, financially and socially	Very High

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
Rental Overcrowding	Percentage of Rental Units that are Overcrowded	A lower proportion of overcrowded rental units indicates a more affordable rental housing stock, and a more resilient rental population. It is a low risk	A higher proportion of rental units which are overcrowded signals lower incomes, structural and maintenance issues associated with the rental housing stock. It indicates that the rental stock is inadequate and unaffordable and is therefore associated with high risk	High
Rented	Percentage Renters	A lower proportion of renters signals greater homeownership, higher incomes and access to resources. This is therefore an area of low risk	Renters are associated with higher vulnerability during disasters owing to lower incomes, and lesser accessibility to disaster relief. A high proportion of renters is therefore associated with a higher risk	Very High
Renter MHHI	Monthly Household Income of Renters	A higher income indicates greater capacity to cope with disasters. It is therefore associated with low risk.	A lower income indicates a lower capacity to cope with disasters and is associated with high risk	Moderate
Renters Cost IncomeRatio	Ratio of Renter Housing Cost to Household Income	A lower cost to income ratio for renters indicates that rental households are successfully able to meet their financial demands and are more resilient to disasters. It is therefore a low risk.	A higher cost to income ratio for renters indicates that rental households are unable to meet their financial needs and are more likely to suffer adversely during disasters. It is therefore associated with high risk.	Very Low

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
Resident Workers	Number of resident workers	A higher value is associated is low risk	Greater number of workers represent greater economic participation. A lower value is associated with high risk	Very Low
Retail	Percentage Employed in Retail Occupations	Although prone to natural disasters, retail industries generally show a higher resilience to natural disasters than wholesale industries. This is because they are less likely to be low mitigators and often associated with having a plan unlike wholesale industries. Thus a higher employment in retail industries is associated with low risk.	A lower employment in retail industries signals lower economic resilience and is associated with higher risk	Very Low
Retail LQ	Location Quotient of Retail Occupations	A higher LQ in retail industries is associated with low risk	A lower LQ in retail industries is associated with high risk	High
Sales	Percentage Employed in Sales Occupations	Employment in sales is associated with higher pay greater skills and organizational support. It signals greater economic resilience and low risk	A lower employment in sales industries could indicate a less entrepreneurial economy, lower resilience and therefore higher disaster risk	Very Low
Sales LQ	Location Quotient of Service Occupations	A higher LQ for the service sector indicates a low risk	A lower LQ for sales industries is associated with high risk	Very Low

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
Segregation Index	Index of dissimilarity where higher values indicate greater residential segregation between non-white and white county residents.	A Lower value is associated with low risk	Dissimilarity or segregation indicates social inequality and differential access to resources. A higher value is associated with high risk	Moderate
Service	Percentage Employed in Service	Service sector is a huge contributor to the economic productivity and bolsters the primary and secondary economic sectors as well and provides a huge source of employment. A higher employment in the service sector signals greater economic resilience and lower risk.	A lower proportion of workers in the service sector indicates a less developed and resilient economy with greater dependence on place-based work. It is therefore an area of high risk.	Very Low
Service LQ	Location Quotient of Service Occupations	A higher LQ for the service sector indicates a high risk	A lower LQ for the service sector indicates a lower resilience and higher risk	High
SingleParent Percent	Percentage of Single Parent Households	A lower proportion of single parent households indicates a lower disaster vulnerability, owing to lesser probability of financial, academic and behavioural problems which have been correlated with single parent households.	Children living in single-parent households have greater risks to their physical and social health and wellbeing compared with other family structures such as two parent or grandparent headed households. Thus, a greater proportion of single parent households represents a higher disaster risk	Low

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
Skilled Percent	Percentage of Skilled Persons	A higher number of skilled individuals represents a lower disaster risk	Lack of occupational skill is associated with lower incomes and employment benefits and therefore less resources for disaster recovery. Therefore, a lower percentage of skilled workers indicates a greater disaster risk.	Very Low
SO4Ave ln	Sulfate (SO4) precipitation weighted mean in mg/L, log transformed	A Lower value is associated with low risk	It is a pollutant. A higher value is associated with high risk	High
Social Association Rate	Number of membership associations per 10,000 population.	A higher value is associated is low risk	A high rate of social associations indicates healthy relationships and community life. A lower value is associated with high risk	High
std coal prim pop ln	Primarily coal mines, mines per county population, as proportion	A Lower value is associated with low risk	It indicates mining activities and environmental stability. A higher value is associated with high risk	Low
std metal prim pop ln	Primarily metal mines, mines per county population, as proportion	A Lower value is associated with low risk	It indicates mining activities and environmental stability. A higher value is associated with high risk	High
std nonmetal prim pop ln	Primarily nonmetal mines, mines per county population, as proportion	A Lower value is associated with low risk	It indicates mining activities and environmental stability. A higher value is associated with high risk	Moderate



(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
std sandandgravel prim pop ln	Primarily sand and gravel mines, mines per county population, as proportion	A Lower value is associated with low risk	It indicates mining activities and environmental stability. A higher value is associated with high risk	High
std stone prim pop ln	Primarily stone mines, mines per county population, as proportion	A Lower value is associated with low risk	It indicates mining activities and environmental stability. A higher value is associated with high risk	Low
Total	Total Housing Stock	A lower number of housing units indicates less damage during a disaster and is associated with low risk	A higher number of housing units indicates the possibility of greater risk during disasters	Very High
Transport	Percentage Employed in Transportation Occupations	Like retail, transportation businesses are often associated with having business plans, more structurally sound and meets standards. Thus a higher employment in transportation indicates a low risk	A lower employment in transportation business could mean that the businesses are not widely spread out and less economically resilient. It is interpreted as a high risk.	Very Low
Transport LQ	Location Quotient of Transportation Occupations	A higher LQ in transportation industries is associated with low risk	A lower LQ in transportation industries associated with high risk	Very High
Unemployment percent	Percentage of Unemployed Persons	A lower rate of unemployment indicates a more stable and resilient economic environment and is therefore associated with lower disaster risks	A high rate of unemployment could indicate a range of socio-economic vulnerabilities and political struggles. It indicates lower economic resilience during disasters and is therefore associated with high risk	Very High

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
Units SingleFamily	Percentage of Single Family Units	A lower porportion of single family units signals greater housing mix, affordability and greater housing resilience. It is therefore associated with low risk	A greater proportion of single family homes signals lesser housing diversity and therefore higher risks for low income populations. It is associated with higher risk	Very Low
UnstableEmployment Percent	Percentage Population with Unstable Employment	A lower proportion of workers with unstable employment indicates greater economic stability and resilience, higher incomes and greater access to disaster recovery resources. It is therefore a low risk	Unstable employment is correlated with lower incomes, health problems, negative familial effects and other challenges lowering economic resilience post disaster. A greater proportion of workers with unstable employment indicates a higher risk	Very Low
Vacancy	Percentage Vacant Units	A lower proportion of vacant units signals greater utilization of available built environment resources, greater maintenance and lower probability of structural damage. It is therefore associated with low risk	A high proportion of vacant units signals a weak economic base and possibilities of blight and structural damage. It is therefore associated with a high risk	Low
Vice related business rate	Rate of vice-related businesses per county as proportion of total businesses	A Lower value is associated with low risk	Greater proportion of vice-related business indicate heightened economic instability during disasters. A higher value is associated with high risk	Low

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
Violent Crime Rate	Number of reported violent crime offenses per 100,000 population.	A Lower value is associated with low risk	A high of crimes indicates safety issues within the community. A higher value is associated with high risk	High
W As ln	Arsenic in mg/L, log transformed	A Lower value is associated with low risk	It is a pollutant. A higher value is associated with high risk	Very High
W Ba ln	Barium in mg/L, log transformed	A Lower value is associated with low risk	It is a pollutant. A higher value is associated with high risk	Very High
W Cd ln	Cadmium in mg/L, log transformed	A Lower value is associated with low risk	It is a pollutant. A higher value is associated with high risk	High
W CN ln	Cyanide in mg/L, log transformed	A Lower value is associated with low risk	It is a pollutant. A higher value is associated with high risk	High
W Cr ln	Chromium (total) in mg/L, log transformed	A Lower value is associated with low risk	It is a pollutant. A higher value is associated with high risk	High
W FL ln	Fluoride in mg/L, log transformed	A Lower value is associated with low risk	It is a pollutant. A higher value is associated with high risk	High
W HG ln	Mercury (inorganic) in mg/L, log transformed	A Lower value is associated with low risk	It is a pollutant. A higher value is associated with high risk	High
W NO2 ln	Nitrite (as N) in mg/L, log transformed	A Lower value is associated with low risk	It is a pollutant. A higher value is associated with high risk	Moderate
W NO3 ln	Nitrate (as N) in mg/L, log transformed	A Lower value is associated with low risk	It is a pollutant. A higher value is associated with high risk	Moderate

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
Walkability Score	Walkability score (ordinal)	A higher value is associated is low risk	High walkability scores indicate greater community vitality and economic accessibility. A lower value is associated with high risk	Very Low
Wholesale	Percentage Employed in Wholesale Trade	A lower employment in wholesale businesses signals a greater economic resilience and low risk	Wholesale and retail businesses are more vulnerable to natural disasters and are more likely to close after disasters. They are also more likely to be low mitigators. A higher proportion of employment in the wholesale industry signals a high disaster risk	Very High
Wholesale LQ	Location Quotient of Wholesale Trade Occupations	A lower LQ in wholesale industries is associated with low risk	A higher LQ is wholesale industries is associated with high risk	Very Low
Workers to Other Counties	Number of resident workers who commute to work in other counties	A Lower value is associated with low risk	A lower commute time is associated with a health local economy. A higher value is associated with high risk	Very High
Working Nonworking ratio	Ratio of Working to Non-working Population	A high ratio indicates lower risk	This ratio indocates the amount of labor resources available in the market, and signals unemployment, income and other economic factors. A low ratio indicates a lower economic resilience to market shocks and is therefore high risk.	High

(continued)

Indicator	Definition	Low Risk Interpretation	High Risk Interpretation	Risk Level
WorkNearby percent	Percentage Workers who live near their place of work	A greater proportion of persons who live near their place of work indicates a lower dependence on commute and transportation networks and a more robust resilient economy. Therefore it is a low risk	A lower proportion of persons who live near their place of work indicates a high dependence on transportation networks for economic activities and a greater risk of disruption during disasters. It is therefore a high risk	Moderate
Young percent	Percentage of Young Persons	A small percentage of children would mean less vulnerability to disasters	A large percentage of children would indicate a greater vulnerability to disasters	Moderate

## Appendix B

### High Risk and Low Risk Areas at Rural, Urban and Census Place Levels

Indicator	Risk Level (Rural)	Risk Level (Urban)	Risk Level (Places)
Agri	Low	Low	Moderate
Agri LQ	Low	Very Low	Moderate
Agro Percent	Low	Moderate	Moderate
Airports	Very Low	Very Low	Very Low
ALLNPDESperKM ln	High	Low	High
Arts	High	Moderate	High
Arts LQ	Moderate	Moderate	Moderate
Avg HHsize	Very High	High	Very High
Avg Temp	High	Moderate	High
Bridges	Very Low	Very High	Very Low
Business establishments	Very Low	Moderate	Very Low
CaAve ln	Moderate	Very Low	Moderate
Civic related business rate	Very High	Low	Very High
CO8	Low	Moderate	Low
Commuters withinCounty	Very High	High	Very High
CommuteTime	Very Low	High	Very Low
construction	High	Moderate	Very Low
construction LQ	Very High	Very High	High
Cost IncomeRatio	Low	Low	Moderate
COVID-19 death rate	Low	High	Low
D303 Percent ln	Low	Very Low	Low
Disabled Percent	High	Very Low	High
Docks	Moderate	Low	Moderate
Edu	Very Low	Moderate	Low
Edu LQ	Moderate	Moderate	Low
Educated percent	Very Low	Moderate	Very Low
Education related business rate	High	Moderate	High
Elderly growth percent	Low	Moderate	Low
FemaleHeaded HHs Percent	High	High	Moderate
FemaleLaborforce percent	Low	Low	Low

(continued)

Indicator	Risk Level (Rural)	Risk Level (Urban)	Risk Level (Places)
Females Percent	High	Low	Moderate
Finance	Very Low	Very Low	Very Low
Finance LQ	Very Low	Moderate	Very Low
Food Environment Index	Moderate	Moderate	Moderate
Freight railroad miles	Very Low	Very Low	Very Low
fungicide ln	Very High	Very High	Very High
Gender Pay Gap	High	Moderate	High
GINI Index	Low	Moderate	High
GroupQuarters	Low	Low	Low
Healthcare related business rate	Low	High	Low
HelperPool	Moderate	Moderate	Moderate
herbicide ln	Very High	Very High	Very High
Homewownership	Very Low	High	Very Low
Inadequate Facilities	Low	Moderate	Low
Info	Moderate	High	Low
Info LQ	Moderate	Very Low	Moderate
insecticide ln	Very High	Low	Very High
Kave ln	Very Low	Moderate	Very Low
LargeFam Percent	Very High	Low	Moderate
LowIncome Percent	Very Low	High	Very Low
Management	Very Low	Very Low	Very Low
Management LQ	Low	High	Very Low
Manufacturing	Very Low	Moderate	Moderate
Manufacturing LQ	Very Low	Low	Low
Max Temp	High	Moderate	High
MBS	Very Low	Low	Low
MBS LQ	Very Low	High	Low
MedianHomeValue	Very Low	Low	Low
MentalHealth Provider Rate	Low	Very Low	Low
MHHI	Very Low	High	Very Low
Min Temp	High	Moderate	High

(continued)

Indicator	Risk Level (Rural)	Risk Level (Urban)	Risk Level (Places)
MobileHomes	Low	Low	Low
NewHomes	Very Low	Very Low	Moderate
NO21	Low	Low	Low
NO2AM	Low	Moderate	Low
NO3Ave.x	High	High	High
NonWhite Percent	Very High	Moderate	High
NotMarried Percent	Low	High	Low
NoVehicle Pop	Moderate	Moderate	Low
O3	Very High	Moderate	Very High
Old percent	Very Low	Low	Very Low
OldHomes	Very Low	High	Moderate
Other county workers	High	Moderate	High
Others	Moderate	Low	Low
Others LQ	High	Very Low	Very Low
Overcrowding	Very Low	Low	Low
Passenger railroad miles	Very Low	Moderate	Very Low
Pb3	Low	Moderate	Low
pct au ln	Very Low	Very High	Very Low
pct disease acres ln	Very High	Very High	Very High
pct harvested acres ln	Very High	Very Low	Very High
PCT IRRIGATED ACRES ln	Low	Moderate	Low
pct manure acres ln	High	Very High	High
Per PSWithSW.x	Low	High	Low
Per TotPopSS.x	Low	Moderate	Low
Percent MediumFairCondition Bridges	Very Low	Very Low	Very Low
Percent AssistanceNeed	High	Moderate	Low
Percent BachelorsDegree	Very Low	Moderate	Very Low
Percent BroadbandAccess	Very Low	Low	Very Low
Percent Children in Poverty	Very Low	High	Very Low
Percent Commuters	Low	Moderate	Low
Percent commuters by transit	Very High	High	Very High
Percent Disconnected Youth	High	High	High



(continued)

Indicator	Risk Level (Rural)	Risk Level (Urban)	Risk Level (Places)
Percent Exercise Access	Very Low	Moderate	Very Low
Percent Food Insecure	Low	Very High	Low
Percent HousingProblems	High	Moderate	High
Percent income required for childcare expenses	Moderate	Very Low	Moderate
Percent LanguageBarrier	Very High	Very Low	Low
Percent Limited Access to Healthy Foods	High	Moderate	High
Percent NoHealthIns	Very Low	Low	Low
Percent PoorCondition Bridges	Very Low	Moderate	Very Low
Percent rural	Low	Moderate	Low
Percent Section8	Low	High	Low
Percent Vaccinated	Very Low	Moderate	Very Low
Percent work at home	Very Low	High	Very Low
Physically Unhealthy Days	Very Low	Moderate	Very Low
PM10	Low	High	Low
PM2.5	Very High	High	Very High
PM2Point5	Very High	Low	Very High
Population	Very High	NA	NA
poverty	Very High	Very High	High
Precipitation	Low	Moderate	Low
PrimaryCare Physicians Rate	Low	Low	Low
PrimeWorkingAge percent	Moderate	Very High	Low
PT	Very Low	Moderate	Moderate
PT LQ	Very Low	Low	Very Low
Radon.x	Low	Low	Low
Recent Immigrants Percent	Low	Very Low	Low
Recreation related business rate	Low	Very Low	Low
Rental CostBurden below	Moderate	High	NA
Rental CostBurden below20000	NA	NA	Moderate
Rental Overcrowding	Low	Very High	Low
Rented	Low	Moderate	Very Low

(continued)

Indicator	Risk Level (Rural)	Risk Level (Urban)	Risk Level (Places)
Renter MHHI	Very Low	Moderate	Low
Renters Cost IncomeRatio	Moderate	Very High	High
Resident Workers	Very Low	High	Very Low
Retail	Moderate	Moderate	Moderate
Retail LQ	Very High	Very High	High
Sales	Very Low	Moderate	Low
Sales LQ	Moderate	Very High	Low
Segregation Index	Moderate	High	Moderate
Service	Moderate	Moderate	Low
Service LQ	Very High	High	High
SingleParent Percent	Low	Very High	Low
Skilled Percent	Very Low	Moderate	Very Low
SO21	Moderate	Moderate	Moderate
SO4Ave ln	High	Very High	High
Social Association Rate	High	Moderate	High
std coal prim pop ln	Low	Moderate	Low
std metal prim pop ln	Low	Low	Low
std nonmetal prim pop ln	Low	Very High	Low
std sandandgravel prim pop ln	High	Very Low	High
std stone prim pop ln	Very Low	Low	Very Low
Total	Moderate	Very Low	High
Transport	Moderate	Very High	Very Low
Transport LQ	Very High	High	Very Low
Unemployment percent	Very High	Moderate	Moderate
Units SingleFamily	Very High	Low	Very High
UnstableEmployment Percent	Low	Low	Low
Vacancy	Very Low	Very Low	Very Low
Vice related business rate	Low	Moderate	Low
Violent Crime Rate	High	Low	High
W As ln	Very High	High	Very High
W Ba ln	Very High	Moderate	Very High
W Cd ln	High	High	High

(continued)

Indicator	Risk Level (Rural)	Risk Level (Urban)	Risk Level (Places)
W CN ln	High	Very High	High
W Cr ln	High	High	High
W FL ln	High	Moderate	High
W HG ln	Low	Moderate	Low
W NO2 ln	Low	Low	Low
W NO3 ln	Moderate	Low	Moderate
Walkability Score	Very Low	High	Very Low
Wholesale	High	Low	High
Wholesale LQ	Very Low	Moderate	High
Workers to OtherCounties	Very High	High	Very High
Working Nonworking ratio	Moderate	Moderate	Moderate
WorkNearby percent	Moderate	High	Low
Young percent	Very High	Very Low	Very High