

3 - RISK ASSESSMENT

3.1 Hazard Identification	5
3.1.1 <i>Review of Existing Mitigation Plans</i>	5
3.1.2 <i>Review Disaster Declaration History</i>	5
3.1.3 <i>Research Additional Sources</i>	6
3.1.4 <i>Hazards Identified</i>	9
3.1.5 <i>Multi-Jurisdictional Risk Assessment</i>	10
3.2 Assets at Risk	11
3.2.1 <i>Total Exposure of Population and Structures</i>	12
3.2.2 <i>Critical and Essential Facilities and Infrastructure</i>	15
3.2.3 <i>Other Assets</i>	17
3.3 Land Use and Development	21
3.4 Hazard Profiles, Vulnerability, and Problem Statements	22
Hazard Profiles	23
Vulnerability Assessments	23
Problem Statements	24
3.4.1 <i>Dam Failure</i>	24
Hazard Profile	24
Vulnerability	32
Problem Statement	33
3.4.2 <i>Drought</i>	33
Hazard Profile	33
Vulnerability	36
Problem Statement	37
3.4.3 <i>Earthquakes</i>	37

Hazard Profile.....	37
Vulnerability.....	41
Problem Statement.....	42
<i>3.4.4 Extreme Temperatures.....</i>	<i>43</i>
Hazard Description.....	43
Vulnerability.....	48
Problem Statement.....	50
<i>3.4.5 Flooding (Riverine and Flash).....</i>	<i>51</i>
Hazard Profile.....	51
Vulnerability.....	65
Problem Statement.....	66
<i>3.4.6 Levee Failure.....</i>	<i>67</i>
Hazard Profile.....	67
Vulnerability.....	72
Problem Statement.....	74
<i>3.4.7 Sinkholes.....</i>	<i>74</i>
Hazard Profile.....	74
Vulnerability.....	76
Problem Statement.....	77
<i>3.4.8 Severe Thunderstorms including High Winds, Hail and Lightning.....</i>	<i>77</i>
Hazard Profile.....	77
Vulnerability.....	84
Problem Statement.....	85
<i>3.4.9 Tornado.....</i>	<i>85</i>
Hazard Profile.....	85
Vulnerability.....	89
Problem Statement.....	91

3.4.10 Wild Fires	91
Hazard Profile.....	91
Vulnerability.....	94
Problem Statement.....	95
3.4.11 Winter Weather / Snow / Ice / Severe Cold	96
Hazard Profile.....	96
Vulnerability.....	101
Problem Statement.....	103
3.4.12 Hazardous Materials Release (Fixed Facility and Transportation Accidents)	103
Hazard Profile.....	103
Vulnerability.....	108
Problem Statement.....	109
3.4.13 Terrorism	110
Hazard Profile.....	110
Vulnerability.....	115
Problem Statement.....	116
3.4.14 Transportation Disruption.....	116
Hazard Profile.....	116
Vulnerability.....	119
Problem Statement.....	120
3.4.15 Utilities Disruption	120
Hazard Profile.....	120
Vulnerability.....	128
Problem Statement.....	128

The risk assessment process identifies and profiles relevant hazards and assesses the effects of exposure to these hazards on the lives, property, and infrastructure of Lincoln County residents. The process allows Lincoln County and its communities to better understand the potential risk from natural and manmade hazards and it provides a framework for developing and prioritizing mitigation actions to further reduce risk from future hazard events should they occur.

The risk assessment for Lincoln County and its jurisdictions followed the methodology described in the Local Mitigation Planning Handbook (March 2013).

This section is further divided into four parts; Hazard Identification, Assets at Risk, Land Use and Development, and Vulnerability Assessment.

Section 3.1 Hazard Identification identifies the hazards that threaten the planning area and provides a factual basis for elimination of hazards from further consideration;

Section 3.2 Assets at Risk provides the planning area's total exposure to natural hazards, considering critical facilities and other community assets at risk;

Section 3.3 Land Use and Development discusses development that has occurred since the last plan update and any increased or decreased risk that resulted. This section also discusses areas of planned future development and any implications on risk/vulnerability;

Section 3.4 Hazard Profiles and Vulnerability Analysis provides more detailed information about the hazards impacting the planning area. For each hazard, there are three sections: 1) Hazard Profile provides a general description and discusses the threat to the planning area, the geographic location at risk, potential Strength/Magnitude/Extent, previous occurrences of hazard events, probability of future occurrence, risk summary by jurisdiction, impact of future development on the risk; 2) Vulnerability Assessment further defines and quantifies populations, buildings, critical facilities, and other community/school or special district assets at risk to natural hazards; and 3) Problem Statement briefly summarizes the problem and develops possible solutions.

3.1 Hazard Identification

The Lincoln Emergency Management Director, along with members of the MPC and the Boonslick Regional Planning Commission, reviewed existing mitigation plans, researched historical disaster declaration records, and surveyed various other sources, including anecdotal information, to fairly identify hazards to be included in this plan.

3.1.1 Review of Existing Mitigation Plans

The MPC reviewed the hazards identified in the previously approved plan from 2016, as well as the hazards identified in the most recent State Plan. There were no significant differences between the lists of hazards included in the previously approved plan and this plan update. The Lincoln County plan differs from a typical Natural Hazard Mitigation plan in that it includes some manmade hazards.

Missouri requires only natural hazards to be included in county plans because federal regulations do not require manmade hazards to be included. However, as discussed above, the MPC determined some manmade hazards should be included; specifically, hazards relating to Terrorism, Transportation, Utility Disruption, and Hazardous Material Spills. These hazards were included as they are significant risks for Lincoln County due to its proximity to major railroads and highways.

3.1.2 Review Disaster Declaration History

Federal and state declarations may be granted when the severity and magnitude of an event surpasses the ability of the local government to respond and recover. Disaster assistance is supplemental and sequential. When the local government's capacity has been surpassed, a state disaster declaration may be issued, allowing for the provision of state assistance. If the disaster is so severe that both the local and state governments' capacities are exceeded; a federal emergency or disaster declaration may be issued allowing for the provision of federal assistance.

FEMA also issues emergency declarations, which are more limited in scope and do not include the long-term federal recovery programs of major disaster declarations. Determinations for declaration type are based on scale and type of damages and institutions or industrial sectors affected.

The following table lists FEMA disaster declarations made since 2000 that include Lincoln County.

Table 3.1. FEMA Declared Disasters for Lincoln County, Missouri, 2005-Present

Disaster Number	Description	Declaration Date / Incident Period	Individual Assistance (IA) / Public Assistance (PA)
FEMA-3232-EM	Hurricane Katrina Evacuation	10-Sep-05	PA
FEMA-1631-DR	Severe Storms and Flooding	16-Mar-06	IA
FEMA-1736-DR	Severe Winter Storms	27-Dec-07	PA
FEMA-3281-EM	Severe Winter Storms	12-Dec-07	PA

Disaster Number	Description	Declaration Date / Incident Period	Individual Assistance (IA) / Public Assistance (PA)
FEMA-1676-DR	Severe Winter Storms and Flooding	15-Jan-07	PA
FEMA-1749-DR	Severe Storms and Flooding	25-Jun-08	PA
FEMA-1773-DR	Severe Storms and Flooding	30-Jun-11	IA & PA
FEMA-1809-DR	Severe Storms, Flooding and A Tornado	13-Nov-08	IA & PA
FEMA-3303-EM	Severe Winter Storm	30-Jan-09	PA
FEMA-3317-EM	Severe Winter Storm	3-Feb-11	PA
FEMA-4130-DR	Severe Storms, Straight-line Winds, Tornadoes, and Flooding	18-Jul-13	PA
FEMA-4238-EM	Severe Storms, Straight-line Winds, Tornadoes, and Flooding	07-Aug-15	PA
FEMA-3374-DR	Severe Storms, Straight-line Winds, Tornadoes, and Flooding	02-Jan-16	PA
FEMA-4250-DR	Severe Storms, Straight-line Winds, Tornadoes, and Flooding	21-Jan-16	IA & PA
FEMA-4451-DR	Severe Storms, Tornadoes, and Flooding	09-Jul-19	IA & PA
FEMA-3482-EM	Covid-19	13-Mar-20	PA
FEMA-4490-EM	Covid-19 Pandemic	26-Mar-20	IA & PA

Source: Federal Emergency Management Agency,
<https://www.fema.gov/data-visualization-summary-disaster-declarations-and-grants>

3.1.3 Research Additional Sources

The following additional data sources were also consulted during the completion of this plan.

- Missouri Hazard Mitigation Plans (2013 and 2018)
- Previously approved planning area Hazard Mitigation Plan (2016)
- Federal Emergency Management Agency (FEMA)
- Missouri Department of Natural Resources
- National Drought Mitigation Center Drought Reporter
- US Department of Agriculture's (USDA) Risk Management Agency Crop Insurance Statistics
- National Agricultural Statistics Service (Agriculture production/losses)

- Data Collection Questionnaires completed by each jurisdiction
- State of Missouri GIS data
- Environmental Protection Agency
- Flood Insurance Administration
- Hazards US (Hazus)
- Missouri Department of Transportation
- Missouri Division of Fire Marshal Safety
- Missouri Public Service Commission
- National Fire Incident Reporting System (NFIRS)
- National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information (NCEI);
- County and local Comprehensive Plans to the extent available
- County Emergency Management
- County Flood Insurance Rate Map, FEMA
- Flood Insurance Study, FEMA
- SILVIS Lab, Department of Forest Ecology and Management, University of Wisconsin
- U.S. Army Corps of Engineers
- U.S. Department of Transportation
- United States Geological Survey (USGS)
- Various articles and publications available on the internet (appropriate citations are provided in the plan)

The only centralized source of data for many of the weather-related hazards is the National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information (NCEI). Although it is usually the best and most current source, there are limitations to the data which should be noted. The NCEI documents the occurrence of storms and other significant weather phenomena having sufficient intensity to cause loss of life, injuries, significant property damage, and/or disruption to commerce. In addition, it is a partial record of other significant meteorological events, such as record maximum or minimum temperatures or precipitation that occurs in connection with another event. Some information appearing in the NCEI may be provided by or gathered from sources outside the National Weather Service (NWS), such as the media, law enforcement and/or other government agencies, private companies, individuals, etc. An effort is made to use the best available information but because of time and resource constraints, information from these sources may be unverified by the NWS. Those using information from NCEI should be cautious as the NWS does not guarantee the accuracy or validity of the information.

The NCEI damage amounts are estimates received from a variety of sources, including those listed above in the Data Sources section. For damage amounts, the NWS makes a best guess using all available data at the time of the publication. Property and crop damage figures should be considered as a broad estimate. Damages reported are in dollar values as they existed at the time of the storm event. They do not represent current dollar values.

The database currently contains data from January 1950 to September 2020, as entered by the NWS. Due to changes in the data collection and processing procedures over time, there are unique

periods of record available depending on the event type. The following timelines show the different time spans for each period of unique data collection and processing procedures.

1. Tornado: From 1950 through 1954, only tornado events were recorded.
2. Tornado, Thunderstorm Wind and Hail: From 1955 through 1992, only tornado, thunderstorm wind and hail events were keyed from the paper publications into digital data. From 1993 to 1995, only tornado, thunderstorm wind and hail events have been extracted from the Unformatted Text Files.
3. All Event Types (48 from Directive 10-1605): From 1996 to present, 48 event types are recorded as defined in NWS Directive 10-1605.

Note that injuries and deaths caused by a storm event are reported on an area-wide basis. When reviewing a table resulting from an NCEI search by county, the death or injury listed in connection with that county search did not necessarily occur in that county.

3.1.4 Hazards Identified

The table below lists in alphabetical order the hazards that significantly impact Lincoln County that were chosen for further analysis. Not all hazards impact every jurisdiction. An “X” in the table column indicates the jurisdiction is impacted by the hazard, and an empty cell indicates the hazard is not applicable to that jurisdiction. Each of the hazards listed have an equal likelihood of occurrence throughout the county and its communities with the exception of Dam Failure, Wild Fires, and Flood/Levee failures which by nature are located in low-lying areas downstream from dams, levees, and rivers.

Table 3.2. Hazards Identified for Each Lincoln County Jurisdiction

	Dam Failure	Drought	Earthquake	Extreme Heat	Floods/Flash Floods	Levee Failure	Hail Storms	Severe Winter Weather	Thunderstorms /High Winds	Tornadoes	Wild Fires	Sink Holes	Hazardous Materials	Terrorism	Transportation Disruption	Utility Disruption/Power Failure
Lincoln County	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Chain of Rocks	X	X	X	X	X		X	X	X	X			X	X	X	X
Elsberry	X	X	X	X	X	X	X	X	X	X			X	X	X	X
Foley	X	X	X	X	X	X	X	X	X	X			X	X	X	X
Fountain 'N Lakes	X	X	X	X	X		X	X	X	X			X	X	X	X
Hawk Point	X	X	X	X	X		X	X	X	X			X	X	X	X
Moscow Mills	X	X	X	X	X		X	X	X	X			X	X	X	X
Old Monroe	X	X	X	X	X	X	X	X	X	X			X	X	X	X
Silex	X	X	X	X	X		X	X	X	X			X	X	X	X
Troy	X	X	X	X	X		X	X	X	X			X	X	X	X
Truxton	X	X	X	X	X		X	X	X	X			X	X	X	X
Whiteside	X	X	X	X	X		X	X	X	X			X	X	X	X
Winfield	X	X	X	X	X	X	X	X	X	X			X	X	X	X
Elsberry R-II	X	X	X	X	X		X	X	X	X			X	X	X	X
Silex R-I	X	X	X	X	X		X	X	X	X			X	X	X	X
Troy R-III	X	X	X	X	X		X	X	X	X			X	X	X	X
Winfield R-IV	X	X	X	X	X		X	X	X	X			X	X	X	X

Source: Boonslick Regional Planning Commission

3.1.5 Multi-Jurisdictional Risk Assessment

For this multi-jurisdictional plan, the risk assessment assesses each jurisdiction's risk where they deviate from the risks facing the entire county. Lincoln County is not geographically large at just 630 square miles, and is fairly uniform in terms of climate and topography as well as construction characteristics and development trends. Accordingly, overall hazards and vulnerability do not vary greatly across the planning area.

This is an update to the 2016 plan. Hazards added since the last update will be noted as such. For this update, all hazards were assessed on a county-wide basis except where so noted. Some hazards, like flooding, vary in risk across the planning area. Those variations were discussed by the MPC and included in the profile where appropriate. The hazards that vary across the planning area in terms of risk include dam failure, flash flood, grass or wild fire, levee failure, river flood, and flash flood.

The county is essentially rural with more densely populated areas in and around Troy, Moscow Mills, Elsberry, and Winfield. All four of the aforementioned cities have school attendance centers located within their boundaries. Winfield lies in an alluvial plain and as such is subject to occasional flooding brought on by levee breaches and the high waters of the Mississippi River. Development tends to take root in these cities and along major US and State highways; US 61 and Missouri Highways 79 and 47. Row crops across the county are susceptible to drought, floods, hail, and high winds. Livestock is not as big a concern but ranching is adversely affected by flooding, drought, and extremes of heat and cold. Where appropriate, these differences will be explained in greater detail in the vulnerability sections of each hazard.

Each hazard identified in Section 3.1, Hazard Identification, is profiled individually in this section in alphabetical order for easier reference. The level of information presented in the profiles varies by hazard based on the information available. With each update of this plan, new information will be incorporated to provide for better evaluation and prioritization of the hazards that affect Lincoln County.

The sources used to collect information for these profiles include those mentioned in Section 3.1.3 as well as those cited individually in each hazard section. Detailed profiles for each of the identified hazards include information on the following characteristics of the hazard:

Hazard Description

This section consists of a general description of the hazard and the types of impacts it may have on a community. It also includes a ranking to indicate typical warning times and duration of hazard events.

Historical Statistics

This section describes the geographic extent or location of the hazard in the planning area and includes the information on historic incidents and their impacts based upon the sources described in Section 3.1.4 Hazard Identification and the information provided by the MPC. Where available,

maps are utilized to indicate the areas of the planning area that are vulnerable to the subject hazard.

Probability of Future Occurrence

The frequency of past events is used to gauge the likelihood of future occurrences. Where possible, the probability and severity of occurrence was calculated based on historical data.

Probability was determined by dividing the number of events observed by the number of years and multiplying by 100. This gives the percent chance of the event happening in any given year.

An example would be three droughts occurring over a 30-year period, which suggests a 10 percent chance of a drought occurring in any given year.

Magnitude/Severity

The magnitude of the impact of a hazard event (past and perceived) is related directly to the vulnerability of the people, property, and the environment it affects. This is a function of when the event occurs, the location affected the resilience of the community, and the effectiveness of the emergency response and disaster recovery efforts.

3.2 Assets at Risk

In this section of the plan, the Lincoln County population, structures, critical facilities and infrastructure, and other important assets that may be at risk to hazards are assessed. There were no changes to the planning area since the previously approved plan was adopted.

Missouri Mitigation Viewer

With the 2018 Hazard Mitigation Plan Update, SEMA now provides online access to risk assessment data and associated mapping for the 114 counties in the State, including the independent City of St. Louis. Through the web-based Missouri Hazard Mitigation Viewer, local planners or other interested parties can obtain all State Plan datasets.

The Missouri Hazard Mitigation Viewer includes a Map Viewer with a legend of clearly labeled features, a north arrow, a base map that is either aerial imagery or a street map, risk assessment data symbolized the same as in the 2018 State Plan for easy reference, search and query capabilities, ability to zoom to county level data and capability to download PDF format maps. The Missouri Hazard Mitigation Viewer can be found at this link:

- <http://bit.ly/MoHazardMitigationPlanViewer2018>
- <https://drive.google.com/file/d/1bPkc0jgF9ofwQLnTL9N0u-oPFWi9hkst/view> - User Guide

Assets at Risk available from the Mitigation Viewer include:

- State Owned Facilities
- State Leased Facilities
- Department of Higher Education Facilities
- State Owned Bridges

Flood Risk Datasets

Data sources include:

- FEMA Flood Insurance Rate Maps (FIRM)
<https://msc.fema.gov/portal/home>
- FEMA National Flood Hazard Layer
<https://hazards.fema.gov/femaportal/wps/portal/NFHLWMS>
- FEMA Hazus Program
<https://www.fema.gov/hazus>
- 2010 US Census Population and Housing Unit Counts
<https://www.census.gov/geo/maps-data/data/tiger-data.html>

3.2.1 Total Exposure of Population and Structures

For the 2018 State Plan, SEMA utilized a structure inventory dataset developed by the University of Missouri GIS Department (MSDIS) to determine the number of structures exposed to risks. MSDIS created a point and/or footprint dataset for every roof line in every county in the state of Missouri. This dataset is attributed with the type of structure such as Residential, Commercial, etc. This dataset was utilized throughout this section.

Unincorporated County and Incorporated Cities

In the following three tables, population data is based on 2017 population estimates. Building counts and building exposure values are based on parcel data provided by the State of Missouri Geographic Information Systems (GIS) database which can be obtained directly from the SEMA Mitigation Management Section. Contents exposure values were calculated by factoring a multiplier to the building exposure values based on usage type. The multipliers were derived from the Hazus and are defined below in Table 3.3. Land values have been purposely excluded from consideration because land remains following disasters, and subsequent market devaluations are frequently short term and difficult to quantify. Another reason for excluding land values is that state and federal disaster assistance programs generally do not address loss of land (other than crop insurance). It should be noted that the total valuation of buildings is based on county assessors' data which may not be current. In addition, government-owned properties are usually taxed differently or not at all, and so may not be an accurate representation of true value. Note that public school district assets and special districts assets are included in the total exposure tables assets by community and county.

Table 3.3 shows the total population, building count, estimated value of buildings, estimated value of contents and estimated total exposure to parcels for the unincorporated county and each incorporated city. For multi-county communities, the population and building data may include data on assets located outside the planning area. Table 3.4 provides the building value exposures for the county and each city in the planning area broken down by usage type. Finally, Table 3.5 provides the building count total for the county and each city in the planning area broken out by building usage types (residential, commercial, industrial, and agricultural). Cave is

combined with Lincoln County as it is not an incorporated area. Pike and Warren numbers are not considered as they are outside Lincoln County

Table 3.3. Maximum Population and Building Count for Lincoln County

Jurisdiction	2020 population	Building Count	Building Exposure (\$)	Contents Exposure (\$)	Total Exposure (\$)
Lincoln County	59,574	26,934	1,985,280	1,034,535	2,959,915
Chain of Rocks	97	27	4,103	2051	6154
Elsberry	1,937	859	148,185	88,138	236,323
Foley	89	54	8,787	5129	13,916
Fountain N Lakes	169	55	8,537	4179	12,536
Hawk Point	676	285	45,733	25,705	71,438
Moscow Mills	3,317	939	147,682	80,708	228,390
Old Monroe	249	113	20,959	14,821	35,780
Silex	24	84	16,117	9444	25,562
Troy	12,686	3313	575,337	325,637	900,974
Truxton	59	52	6,259	3115	9374
Whiteside	52	29	5,692	3641	9333
Winfield	1,404	480	90,937	48,053	138,990
Totals	52,566	33,224	3,003,530	1,645,158	4,648,687

Source: U.S. Bureau of the Census, Annual population estimates/ 5-Year American Community Survey 2015; Building Count and Building Exposure, Missouri GIS Database from SEMA Mitigation Management; Contents Exposure derived by applying multiplier to Building Exposure based on Hazus MH 2.1 standard contents multipliers per usage type as follows: Residential (50%), Commercial (100%), Industrial (150%), Agricultural (100%). For purposes of these calculations, government, school, and utility were calculated at the commercial contents rate

Table 3.4. Building Values/Exposure by Usage Type (in dollars)

Jurisdiction	Residential	Commercial	Industrial	Agricultural	Government	Education	Total
Lincoln County	1,750,205	70,738	56,838	41,188	3437	2974	
Chain of Rocks	4103	0	0	0	0	0	4,103
Elsberry	117,460	29,408	0	127	0	1190	148,185
Foley	7294	0	0	11	687	0	8,787
Fountain N Lakes	8357	0	0	0	0	0	45,733
Hawk Point	37,573	5654	0	73	1375	1190	1,925,380
Moscow Mills	132,504	10,333	0	127	4124	595	147,682
Old Monroe	12,156	8743	0	59	0	0	20,959
Silex	10,941	3974	0	13	0	1190	16,117

Jurisdiction	Residential	Commercial	Industrial	Agricultural	Government	Education	Total
Troy	474,096	85,840	0	162	2749	12,490	575,337
Truxton	6230	0	0	30	0	0	6259
Whiteside	4103	1590	0	0	0	0	5692
Winfield	67,293	12,717	0	0	1375	8922	90,937
Totals	2,632,449	229,701	56,838	41,745	13,747	28,549	

Source: Missouri GIS Database, SEMA Mitigation Management Section

Table 3.5. Building counts by usage type

Jurisdiction	Residential	Commercial	Industrial	Agricultural	Government	Education	Total
Lincoln County	11,518	89	26	15,291	5	5	26,934
Chain of Rocks	27	0	0	0	0	0	27
Elsberry	773	37	0	47	0	2	859
Foley	48	1	0	4	1	0	54
Fountain N Lakes	55	0	0	0	0	0	55
Hawk Point	247	7	0	27	2	2	285
Moscow Mills	872	13	0	47	6	1	939
Old Monroe	80	11	0	22	0	0	113
Silex	72	5	0	5	0	2	84
Troy	3120	108	0	60	4	21	3,313
Truxton	41	0	0	11	0	0	52
Whiteside	27	2	0	0	0	0	29
Winfield	447	16	0	0	2	15	480
Totals	17,327	289	26	15,514	20	48	33,224

Source: Missouri GIS Database, SEMA Mitigation Management Section

School district assets are included in the tables above. However, more discrete school district data is provided below and was taken from the School District Data Collection Questionnaire, data provided by Missouri's Department of Elementary and Secondary Education (DESE) and district-maintained websites. Additional information includes the number of buildings, building exposure and contents exposure. These numbers will represent the total enrollment and building count for the public school districts regardless of the county in which they are located.

Table 3.6. Population and Building Exposure by Jurisdiction-Public School Districts

Public School District	Enrollment	Building Count	Contents value (\$)	Replacement value (Insured \$)
Elsberry R-II	800	5	5,000,000	30,000,000
Silex R-I	430	4	4,000,000	20,000,000
Troy R-III	6,370	12	12,000,000	50,000,000
Winfield R-IV	1,532	4	4,000,000	20,000,000

3.2.2 Critical and Essential Facilities and Infrastructure

This section includes information from the Data Collection Questionnaire and other sources concerning the vulnerability of participating jurisdictions' critical, essential, high potential loss, and transportation/lifeline facilities to identified hazards. Definitions of each of these types of facilities are provided below.

- **Critical Facility:** Those facilities essential in providing utility or direction either during the response to an emergency or during the recovery operation.
- **Essential Facility:** Those facilities that if damaged, would have devastating impacts on disaster response and / or recovery.
- **High Potential Loss Facilities:** Those facilities that would have a high loss or impact on the community.
- **Transportation and life line facilities:** Those facilities and infrastructure critical to transportation, communications, and necessary utilities.

Table 3.7 includes a summary of the inventory of critical and essential facilities and infrastructure in the planning area. The list was compiled from the Data Collection Questionnaire as well as the following sources:

- Interviews with County Emergency Planning Director
- Interview with County Flood Plain Manager
- Interviews with City Government Employees
- Tribal Knowledge of Regional Planning Commission employees
- Tribal Knowledge of State Office of Homeland Security Region C Planner
- Chemical Facilities (Tier II Facilities) information
- Hazus

Table 3.7. Inventory of Critical / Essential Facilities and Infrastructure by Jurisdiction

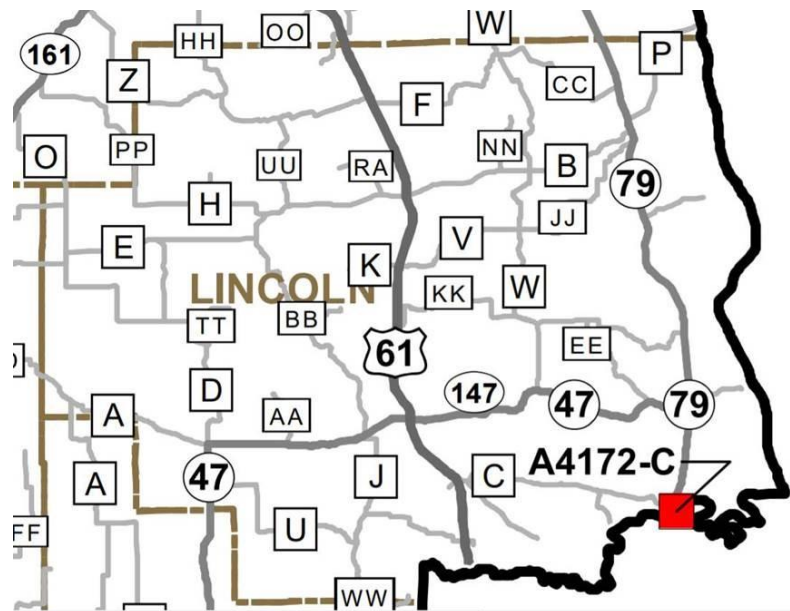
Jurisdiction	Airport Facility	Bus Facility	Childcare Facility	Communications Tower	Electric Power Facility	Emergency Operations	Fire Service	Government	Shelters	Highway Bridge	Hospital/Health Care	Natural Gas Facility	Nursing Homes	Police Station	Potable Water Facility	Rail	Sanitary Pump Stations	School Facilities	Stormwater Pump Stations	Tier II Chemical Facility	Wastewater Facility	Total
Unincorporated Lincoln County	4	0	0	16	8	1	9	7	0	1	0	0	0	1	1	1	3	0	0	4	2	58
Chain of Rocks	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Elsberry	0	0	1	0	0	1	0	1	0	0	0	0	2	1	1	0	0	0	0	31	0	38
Foley	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	2	0	4
Fountain 'N Lakes	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Hawk Point	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	19	0	21
Moscow Mills	0	0	0	0	0	0	0	1	0	0	0	0	2	1	0	0	2	0	0	24	0	30
Old Monroe	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	1	0	0	5	0	8
Silex	0	0	0	0	0	0	0	1	0	0	0	0	2	1	0	0	1	0	0	18	1	24
Troy	0	1	6	4	0	0	0	2	1	0	1	0	7	1	1	0	2	0	1	137	2	166
Truxton	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	3
Whiteside	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Winfield	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	8
Elsberry R-II	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	3
Silex R-I	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	3
Troy R-III	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	1	0	10
Winfield R-IV	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	1	0	4
Totals	4	5	8	20	8	2	9	18	1	1	1	0	13	9	3	1	9	12	1	253	5	383

Source: Lincoln County EMD, Data Collection Questionnaires; MoDOT, DNR, DHSS

Scour Critical Bridges

The term “scour critical” refers to one of the database elements in the National Bridge Inventory which is quantified using a “scour index”; a number indicating the vulnerability of a bridge to scour during a flood. Bridges with a scour index between 1 and 3 are considered “scour critical”, or a bridge with a foundation determined to be unstable for the observed or evaluated scour condition. It is located on MO 79 over the Cuivre River and Dyer County Road, as shown on the map below. This bridge is maintained by our St. Louis District.

Figure 3.1. Lincoln County Scour Critical Bridges



Source: Missouri Department of Transportation (MoDOT)

3.2.3 Other Assets

Assessing the vulnerability of the planning area to disaster also requires data on the natural, historic, cultural, and economic assets of the area. This information is important for many reasons.

- These types of resources warrant a greater degree of protection due to their unique and irreplaceable nature and contribution to the overall economy.
- Knowing about these resources in advance allows for consideration immediately following a hazard event, which is when the potential for damages is higher.
- The rules for reconstruction, restoration, rehabilitation, and/or replacement are often different for these types of designated resources.
- The presence of natural resources can reduce the impacts of future natural hazards, such as wetlands and riparian habitats which help absorb floodwaters.
- Losses to economic assets like these (e.g., major employers or primary economic sectors) could have severe impacts on a community and its ability to recover from disaster.

Lincoln County is home to several threatened and endangered species including the bats, fish, and plants listed in the table below.

Table 3.8. Threatened and Endangered Species in Lincoln County

Common Name	Scientific Name	Status
Decurrent False Aster	Boltonia decurrens	Threatened
Indiana Bat	Myotis sodalist	Endangered
Least Tern	Sterna antillarum	Endangered
Northern Long-eared Bat	Myotis septentrionalis	Threatened
Pallid Sturgeon	Scaphirhynchus albus	Endangered
Piping Plover	Charadrius melodus	Threatened
Rufa Red Knot	Calidris canutus rufa	Threatened
Running Buffalo Clover	Trifolium Stoloniferum	Endangered

Source: U.S. Fish and Wildlife Service, <http://www.fws.gov/midwest/Endangered/lists/missouri-cty.html>

Natural Resources

The Missouri Department of Conservation (MDC) provides a database of lands it owns, leases, or manages for public use. These assets are listed in the table below for the Lincoln County planning area.

Table 3.9. Parks in Lincoln County

MDC Area Name	Address	City
Crouch (R H) Access	Shafer Road	Troy
Cuivre Island Conservation Area	Dalbaw Road	Old Monroe
Kessler Mem Wilderness Area	Route KK	Troy
Leach (B K) Mem Conservation Area	Route M	Elsberry
Logan (William R) Conservation Area	Route RA	Troy
Millsap Bridge Access	Beck Road	Truxton
Prairie Slough Conservation Area	Route P	Elsberry
Sandy Island Conservation Area	Route N	Lock & Dam #25
Vonaventure Mem Forest and Wilderness Area	Route UU	Silex
White (William G and Erma Parke) Mem Wilderness Area	Route Z	Whiteside

Source: Missouri Department of Conservation;

<http://mdc4.mdc.mo.gov/applications/moatlas/AreaList.aspx?txtUserID=quest&txtAreaNm=s>

State / City Park Name	Address	City
Avery Park	805 Cap Au Gris	Troy
Cuivre River State Park	678 State Route 147	Troy
Elsberry City Park	401-499 Griffin Street	Elsberry
Page Branch Park	N 5 th Street	Elsberry
Fairgrounds Park	971 Monroe Street	Troy
Hawk Point Community Park	Maple Street	Hawk Point
Mill Park		Moscow Mills

State / City Park Name	Address	City
Old Monroe Community Ball Park	197 East Elm Street	Winfield
Weinand Park	1305 Boone Street	Troy
Woods Fort Park	Main and Boone Streets	Troy

Source: <http://cityoftroymissouri.com>, <http://elsberrycity.com>, <http://moscowmills.com>, cityofhawkpoint.iqsy.com

Historic Resources

The National Register of Historic Places is the official list of registered cultural resources worthy of preservation. It was authorized under the National Historic Preservation Act of 1966 as part of a national program. The purpose of the program is to coordinate and support public and private efforts to identify, evaluate, and protect our historic and archeological resources. The National Register is administered by the National Park Service under the Secretary of the Interior. Properties listed in the National Register include districts, sites, buildings, structures and objects that are significant in American history, architecture, archeology, engineering, and culture.

The table below lists the Lincoln County properties that are included in the National Register of Historic Places.

Table 3.10. Lincoln County Properties on the National Register of Historic Places

Property	Address	City	Date Listed
Camp Sherwood Forrest Historic District, Cuiivre River State Park	678 State Route 147	Troy	3/4/1985
Cuiivre River State Park Administrative Area Historic District	678 State Route 147	Troy	3/4/1985
Downton Troy Historic District	Bounded by Annie Avenue, 2nd Street, Marble Street, and Court Street	Troy	10/30/2013
Lock and Dam No. 25 Historic District	10 Sandy Slough Road	Winfield	3/10/2004
Old Rock House	2nd and Mill Streets	Moscow Mills	10/18/1972

Source: Missouri Department of Natural Resources – Missouri National Register Listings by County, <http://dnr.mo.gov/shpo/mnrlist.htm>

Economic Resources

The table below shows major non-government employers with 50 or more employees operating within Lincoln County.

Table 3.11. Major Non-Government Employers in Lincoln County

Name	City	Employees
CARING CENTER-LINCOLN COUNTY	TROY	100
COMMUNITY OPPORTUNIES-PEOPLE	TROY	100

Name	City	Employees
GEEDING CONSTRUCTION	TROY	100
HOUGHTON MIFFLIN HARCOURT	TROY	100
KROGER	TROY	100
MC DONALD'S	TROY	100
TROY BUCHANAN SENIOR HIGH SCHL	TROY	100
TROY MIDDLE SCHOOL	TROY	100
TROY NURSING & REHAB	TROY	100
LINCOLN COUNTY SHELTER WRKSHP	TROY	120
CUIVRE RIVER ELECTRIC CO-OP	TROY	126
DADDY RAY'S INC	MOSCOW MILLS	135
LINCOLN COUNTY R II SCHOOL	ELSBERRY	140
WITTE BROTHERS EXCHANGE	TROY	140
WILLIAM R CAPPEL ELEMENTARY	MOSCOW MILLS	60
LINCOLN COUNTY ENVIRONMENTAL	TROY	200
LCMC HOME CARE	TROY	236
LINCOLN COUNTY MEDICAL	TROY	325
WALMART SUPERCENTER	TROY	400
JONES OIL SUPPLY LLC	MOSCOW MILLS	50
QUICK LANE TIRE & AUTO	MOSCOW MILLS	50
MUELLER BROTHERS TIMBER INC	OLD MONROE	50
DENNY'S	TROY	60
BOONE ELEMENTARY SCHOOL	TROY	50
BURGER KING	TROY	50
CANNON REALTY INC	TROY	50
MARQUITZ PONTIAC CAD BCK GM	TROY	50
NORMANDY MACHINE CO	TROY	50
LINCOLN COUNTY BANCORP INC	TROY	60
VICTOR PIPE & STEEL INC	WINFIELD	50
WINFIELD HIGH SCHOOL	WINFIELD	50
MAIN STREET ELEMENTARY SCHOOL	TROY	60
SILEX R1 SCHOOL DISTRICT	SILEX	51
CHAMPION PRECAST INC	TROY	51
SILEX COMMUNITY CARE CTR	SILEX	52
WINFIELD ELEMENTARY SCHOOL	WINFIELD	53
HICKMAN'S IGA	WINFIELD	55
WINFIELD R-4 SCHOOL DISTRICT	WINFIELD	55
TROY CITY HALL	TROY	62
FORREST KEELING NURSERY	ELSBERRY	65
LINCOLN ELEMENTARY	TROY	65
CLAUDE BROWN INTERMEDIATE SCHL	TROY	70
MOST INC	TROY	70

Name	City	Employees
CLARENCE CANNON ELEMENTARY	ELSBERRY	75
BODINE ALUMINUM INC	TROY	750
AGRI-FOODS	HAWK POINT	80
HOUGHTON MIFFLIN HARCOURT	TROY	80
TROY SCHOOL DISTRICT R-3	TROY	85

Source: MERIC; Local Economic Development Commissions

Agriculture: According to the USDA's 2017 Census of Agriculture, there are 1,092 farms in Lincoln County for a total of 227,433 acres. The average size of the farm is 208 acres while the state average is at 285 acres. The number of farms in Lincoln County in 2017 is down 6% from 2012. The total value of farm products sold in Lincoln County in 2012 is \$86,329,000. Crop sales account for 70% of the total sales and livestock account for the remaining 30% of sales.

3.3 Land Use and Development

The table below summarizes Lincoln County's population growth between the years of 2010 and 2020. The population growth has been stable.

Table 3.12. Lincoln County Population Growth, 2010 - 2020

Jurisdiction	2010 Population	2020 Population	Change	% Change
Lincoln County	52,566	59,574	7,008	13
Chain of Rocks	93	97	4	4
Elsberry	1934	1937	3	0
Foley	131	89	-72	-45
Fountain N Lakes	165	169	4	2
Hawk Point	669	676	7	1
Moscow Mills	2509	3317	808	32
Old Monroe	265	249	-16	-6
Silex	187	24	-163	-87
Troy	10,540	12,686	2146	20
Truxton	91	59	-32	-35
Whiteside	75	52	-23	-31
Winfield	1404	1518	114	8

Source: U.S. Bureau of the Census

Table 3.13. Change in Housing Units, 2010 - 2020

Jurisdiction	Housing Units 2010	Housing Units 2020	Change in Housing Units	Percent of Change
Lincoln County Total	21,011	23,366	2,355	11%
Chain of Rocks	39	37	-2	-5.13%
Elsberry	939	870	-69	-7.35%