Contents: Sac Osage Electric

Section 1: Introduction

Sac Osage Electric Cooperative (SOEC) was established in 1940 to provide electric service to the rural areas of west-central Missouri. A Touchstone Energy Cooperative, SOEC is headquartered in El Dorado Springs Mo, and provides service to customers in St. Clair, Vernon, Cedar, and Dade, as well as parts of Barton, Polk, Hickory, Benton, and Henry Counties in Missouri. The cooperative is run by a board of nine directors which approve the company's mission and internally developed business policy:

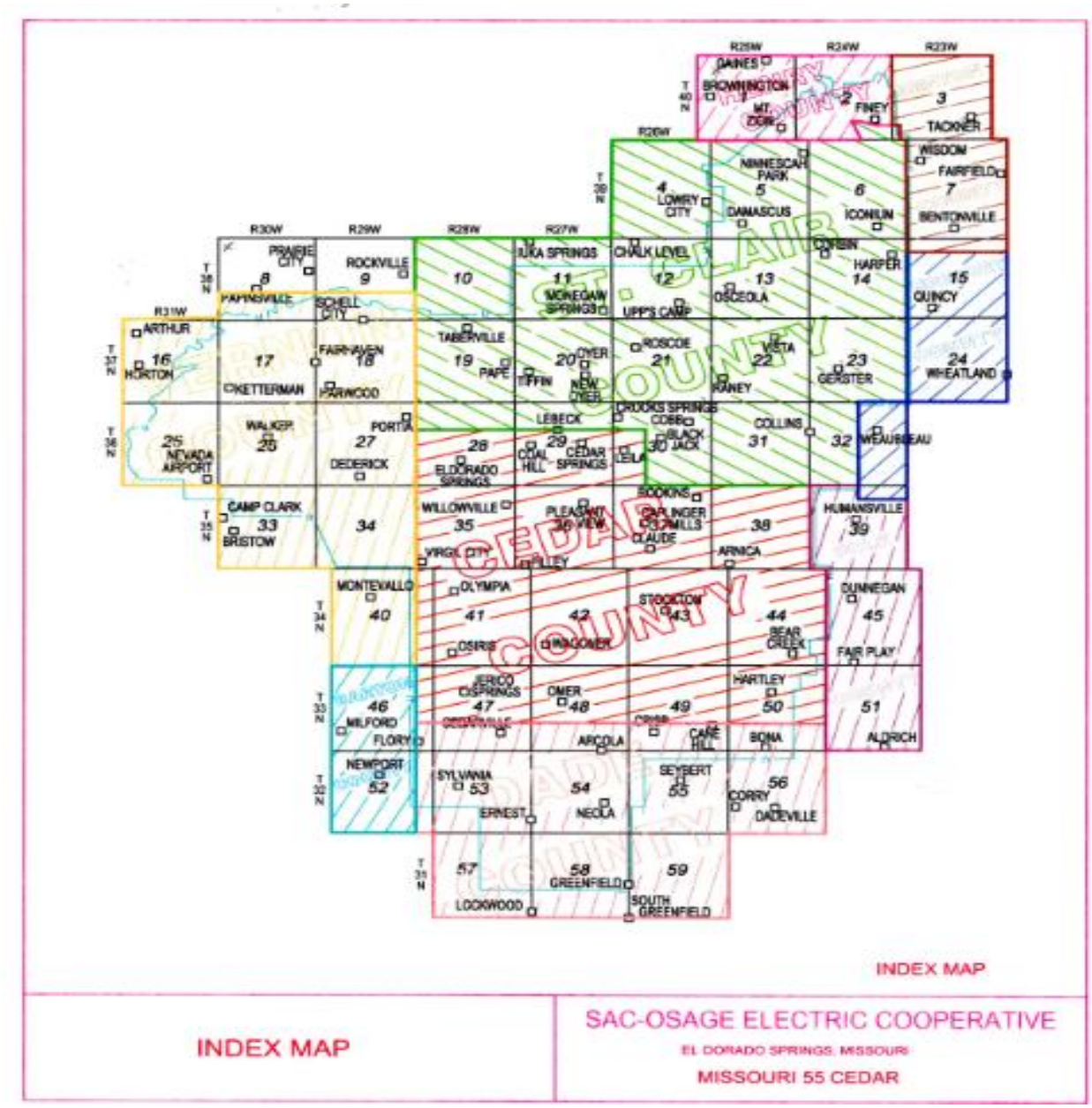
"Sac Osage Electric's (the Cooperative) primary mission is to make the Cooperative the provider of choice for all of its customers. This mission requires that the Cooperative function as a financially sound business enterprise committed to the following:

1. ***Voluntary and Open Membership —*** *Cooperatives are voluntary organizations, open to all persons able to use their services and willing to accept the responsibilities of membership, without gender, social, racial, political, or religious discrimination.*
2. ***Democratic Member Control —*** *Cooperatives are democratic organizations controlled by their members, who actively participate in setting policies and making decisions. The elected representatives are accountable to the membership. In primary cooperatives, members have equal voting rights (one member, one vote) and cooperatives at other levels are organized in a democratic manner.*
3. ***Members' Economic Participation —*** *Members contribute equitably to, and democratically control, the capital of their cooperative. At least part of that capital is usually the common property of the cooperative. Members usually receive limited compensation, if any, on capital subscribed as a condition of membership.*
4. ***Autonomy and Independence —*** *Cooperatives are autonomous, self-help organizations controlled by their members. If they enter into agreements with other organizations, including governments, or raise capital from external sources, they do so on terms that ensure democratic control by their members and maintain their cooperative autonomy.*
5. ***Education, Training, and Information —*** *Cooperatives provide education and training for their members, elected representatives, managers, and employees so they can contribute effectively to the development of their cooperatives. They inform the general public, particularly young people and opinion leaders, about the nature and benefits of cooperation.*
6. ***Cooperation among Cooperatives —*** *Cooperatives serve their members most effectively and strengthen the cooperative movement by working together through local, national, regional, and international structures.*
7. ***Concern for Community —*** *while focusing on member needs, cooperatives work for the sustainable development of their communities through policies accepted by their members."*

SOEC's service boundaries within the state of Missouri include all of Cedar County, three quarters of St. Clair County, and portions of Barton, Benton, Dade, Henry, Hickory, Polk and Vernon counties. The cooperative owns 2,433 miles of service line within these counties.

Figure 1, on the next page, depicts the geographic boundaries of the cooperative in relation to USGS local quadrangles within the state of Missouri. *(Map sources: www.usgs.gov, Association of Missouri Electric Cooperatives, Sac Osage Electric Cooperative.)*

Figure 1 *Sac-Osage Electric Boundaries*



The customer base of SOEC is approximately 11,472 members in nine counties in Missouri. Residential customers account for 94% of memberships (10,872 members); while nonresidential customers make up the remaining 6% (600 members).

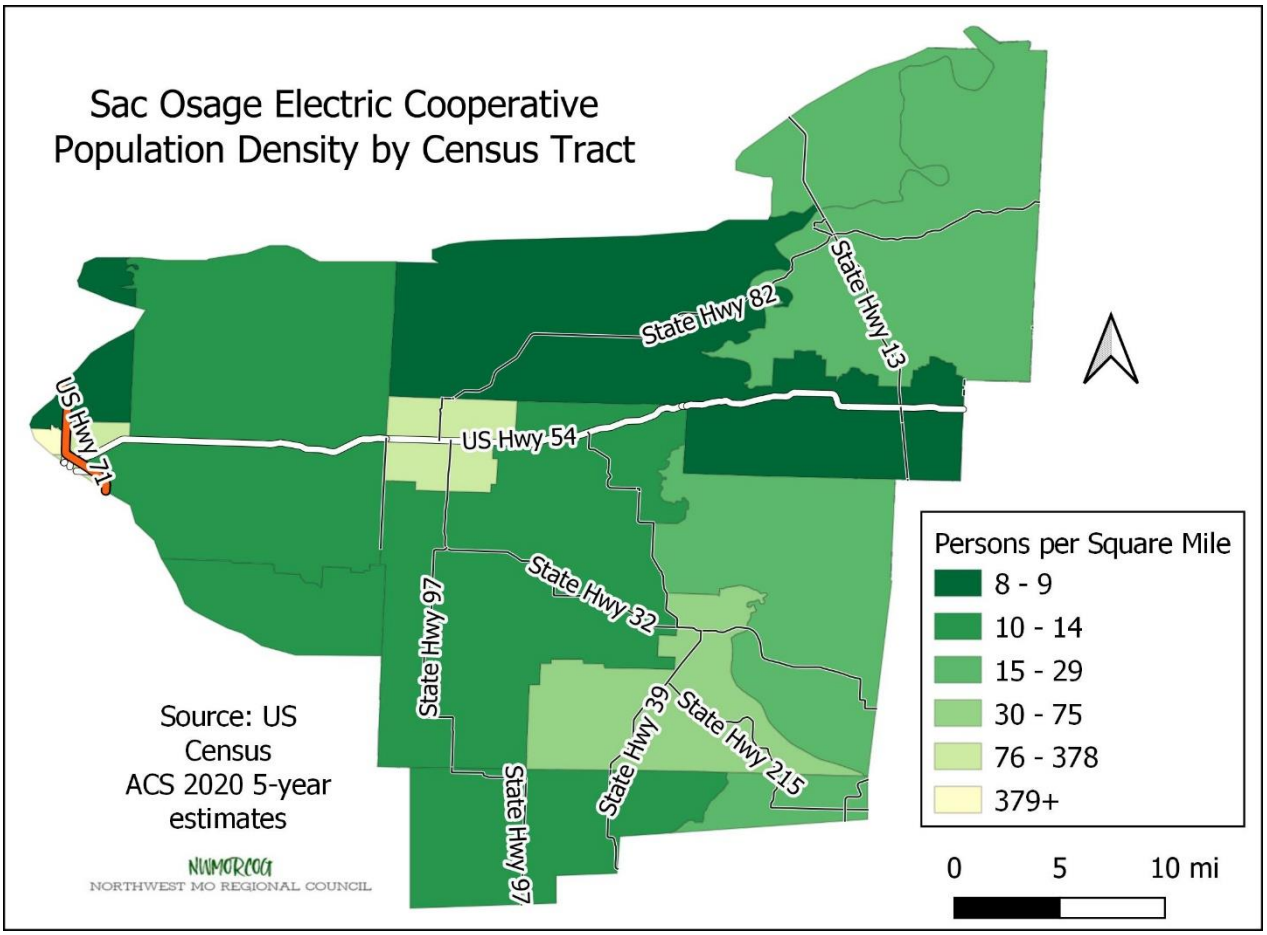
Table 1 provides the summary of metered customers by Missouri County.

Table 1 *Meters by Missouri County*

County	Number of Meters
Barton	6
Benton	125
Cedar	5178
Dade	780
Henry	461
Hickory	21
Polk	44
St. Clair	3,666
Vernon	1,191
Total	11,472

The average daily customer usage for SOEC is 38.3 kilowatt-hours (kWh). Annual total usage of SOEC customers in 2021 was 159,429,434 kWh of service. Population density for the cooperative service area is depicted in Figure 2 *(Map source: U.S. Census 2020).*

Figure 2 *Population Density Map*



Critical Facilities

It is important in mitigation planning for the Electric Cooperatives to identify the critical facilities in each area and to be able to prioritize reconnection and back-up power needs. SOEC provides service to the following critical facilities: Truman Nursing Home, St. Clair County, communication towers in El Dorado Springs, Lowry City, Osceola and Stockton, power for KMOS radio and at television station, KRDK in Stockton.

Future Development

In recent months Sac Osage Electric has been approached by individuals seeking service to bitcoin and data mining operations with power requirements ranging from 5 – 30 MW. If just the one operation requiring 30 Mw was to locate on our system it alone would represent well over 50% of our total power requirements. To date, however, interest has not progressed beyond the interest shown at the initial visit, and we do not expect anything further to develop.

Table 2 below illustrates the population trend for the counties served by SOEC.

Table 2 *County Population Trend, 1990-2030*

County	1990	2000	2010	2020	2030 Projected
Barton	11,312	12,541	12,402	11,592	13,730
Benton	13,859	17,180	19,056	19,627	20,228
Cedar	12,093	13,733	13,982	14,322	13,207
Dade	7,449	7,923	7,883	7,568	6,977
Henry	20,044	21,997	22,272	22,076	24,176
Hickory	7,335	8,940	9,627	9,586	9,292
Polk	21,826	26,992	31,137	32,490	40,139
St. Clair	8,457	9,652	9,805	9,689	9,184
Vernon	19,041	20,454	21,159	20,388	19,465
Source: U.S. Census Data					

Planning Process

Since the planning process is the same for each of the electric cooperative plans, the details of the planning process are presented in the Statewide Summary section of the plan.

Appendices

Three appendices are included at the end of each plan:

Appendix A contains the Adoption Resolution; a document signed by the Cooperative's governing official showing that the Board of Directors has adopted the mitigation plan.

Appendix B contains the Documentation of Participation; copies of press releases, website postings and other public outreach that was made to request public comment.

Appendix C contains the Surveys; the Data Survey that is the source of data for the 2023 plan update; the Goals and Actions Survey is the updated review of the mitigation strategies.

Section 2: Asset Inventory

Sac Osage Electric Cooperative has a wide variety of assets by type. Real estate owned by the company includes office buildings and other outbuildings throughout the service area. Twenty-five vehicles provide access to customers and infrastructure. SOEC does not own any electric generation or transmission infrastructure. More than 2,433 miles of distribution lines are owned and maintained by SOEC. Table 3 provides information concerning total asset valuation.

Table 3 *Sac Osage Asset Inventory Valuation Summary*

Asset	Total Replacement Cost	Cost Breakdown
Total SOEC Assets	$359,981,658	Buildings and vehicles $11,700,000 Overhead Assets $348,281,658
Distribution Lines	$225,165,551	* OH Single-Phase lines - $135,040,377 * OH Three-Phase lines - $90,125,174
Supporting Infrastructure	$123,116,107	Meters $4,623,216 Poles $82,375,779 Transformers $24,450,074 Regulators $4,155,301 Capacitors $361,472 Breakers $7,150,265
Office Buildings & Warehouses	$8,069,000	
Vehicles	$3,631,000	
Source: Internal Sac Osage records. *Breakdown is estimated		

Ensuring quality distribution to its customers, Sac Osage maintains not only distribution lines, but also the supporting infrastructure as well.

SAC OSAGE ELECTRIC COOPERATIVE

Tables 4 includes a list of asset types, emergency replacement cost per unit or mile, and the asset inventory by service and county and total infrastructure numbers.

Table 4 *Sac Osage Asset Inventory by Service County*

Assets	Replacement Cost per unit or mile	No. Units / Miles BARTON	No. Units / Miles BENTON	No. Units / Miles CEDAR	No. Units / Miles DADE
Meters	$403/unit	6	125	5,178	780
Poles	$1,553/unit	38	348	21,705	4,371
Single Phase Distribution Line	$66,942/mile	2	12	797	183
Three Phase Distribution Line	$216,790/mile	0	2	170	38
Transformers	$2,017/unit	7	131	5,251	800
Regulators	$34,800/unit	0	1	49	11
Capacitors	$2,824/unit	0	1	51	10
Breakers	$10,085/unit	0	4	307	66
Total Replacement Value by County		$242,068	$206,145	$141,765,853	$30,412,314

Sac Osage Asset Inventory by Service County (Continued)

No. Units / Miles HENRY	No. Units / Miles HICKORY	No. Units / Miles POLK	No. Units / Miles ST. CLAIR	No. Units / Miles VERNON	Number of units or miles: TOTAL
461	21	44	3,666	1,191	11,472
1,467	130	262	17,390	7,332	53,043
48	7	12	664	292	2,433
14	0	0	131	61	416
430	20	48	4,061	1,374	12,122
3	0	0	25	14	103
5	0	0	42	19	128
24	0	0	220	88	709
$10,000,397	$694,711	$1,331,115	$112,832,140	$48,908,561	$348,281,658
Source: Internal Sac Osage Accounting and Maintenance records Note: Cost for overhead and underground transmission line are the same, and no breakdown between the two was provided by SOEC.					

Section 3: Risk Assessment

Risk Assessment Methodology

The risk assessment methodology used in the following section was utilized for both the statewide aggregation as well as for each individual cooperative chapter. Section 4 of the Statewide Summary details this methodology. Some variation in the availability of data exists between the electric cooperatives as each utilizes a different system of recording the impact of natural disasters.

For the purpose of this risk assessment, the identified hazards for the SOEC service area have been divided into two categories: **historical and non-historical hazards**. Based on the data collected for the update, the hazards have been reclassified to reflect the actual data available and those hazards with no data available have been reclassified as non-historical. This does not mean that a non-historical hazard will never cause damage; it just means there have been no impacts prior to this report. The potential still exists, but the probability of the occurrence is numerically near zero. For the analysis in this plan non-historical hazard probability is stated as less than one.

Historical Hazards are those hazards with a measurable previous impact upon the service area. Damage costs per event and a chronology of occurrences are available. The associated vulnerability assessments utilize the number of events and cost of each event to establish an average cost per incident. For SOEC, hazards with historical data include tornadoes, severe thunderstorms/high wind/hail, flood /levee failure, and severe winter weather.

Non-historical Hazards are hazards with no previous record of impact upon local service area. As such, the associated vulnerability assessments for each of these hazards will have an occurrence probability of less than 1% in any given year, but the extent of damage will vary considerably. For SOEC, hazards without historical data include earthquakes, land subsidence, wildfire and dam failure.

Each hazard has a unique impact upon the service area, requiring each hazard to utilize a different valuation amount depending upon the level of impact. Non-historical hazards assume damage to all general assets. For Historical Hazards, assets were divided into two groups based upon historical impact which were utilized in the hazard damage analysis:

- Overhead infrastructure assets and buildings
    - Used for
        - Tornado damage assessments
            - Valued at $359,981,658*
- Overhead infrastructure assets only
    - Used for:
        - Severe Thunderstorm / High Wind / Hail
        - Flood
        - Severe Winter Weather
            - Valued at $348,281,658*

* Values estimated

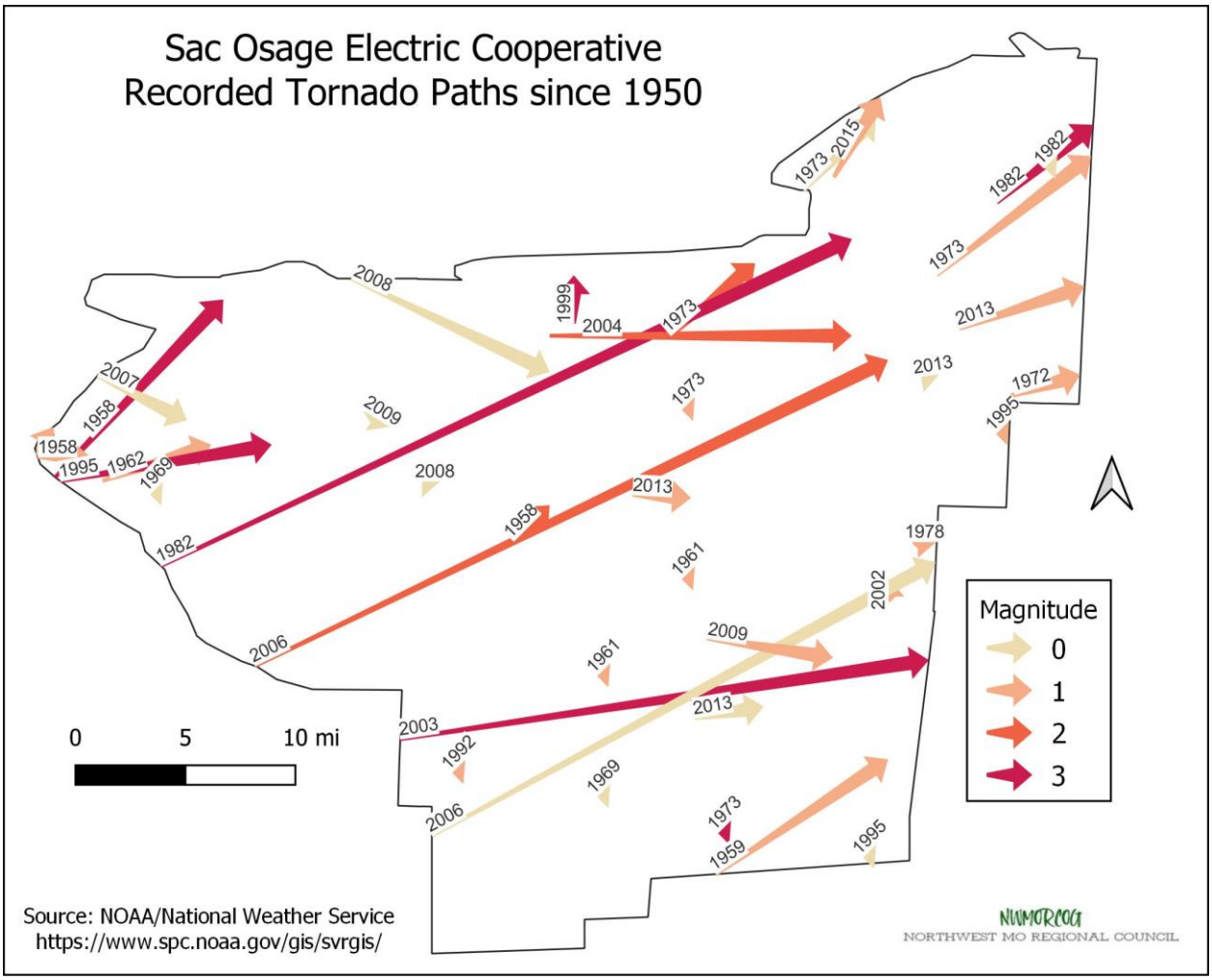
A. Historical Hazards

Tornadoes

Previous Occurrences

From 1950 through 2020 there have been 40 recorded tornadoes within the boundaries of the Sac Osage Electric Cooperative. Figure 3 provides a pictorial representation of all recorded tornado touchdown sites and recorded path. (*Map source: NOAA.*)

Figure 3 *Tornado Map*



A data insufficiency exists before 1982 in cooperative records concerning damage estimates. For the purpose of this assessment, the 35 years beginning in 1982 and going through 2016 from have been used.

Probability of Future Occurrence and Vulnerability

From 1982-2016, Sac Osage Electric Cooperative's service area within the state of Missouri has experienced a total of 31 tornadic events. The probability of a tornadic event in the Sac Osage Electric

Cooperative service area in any given year is 56%. Estimated cooperative material damages associated with each of these events were compiled by SOEC staff. 13 occurrences caused either damage to cooperative assets or outage of service or both during the years existing in cooperative records. In any given year, there is a 32.5% probability of a tornado occurring that will affect SOEC. Table 5 provides a summary of event dates, EF-scale ratings, damage cost estimates and outages reported.

Table 5 *SOEC Tornadic Event Summary*

Date of Event	EF Scale Rating	Damage Estimates	Customers Without Power
03/15/1982	F3	$50,000	1,800
05/04/2003	F3	$473,909	5,000
05/26/2004	F2	$7,020	161
03/12/2006	F2	$199,057	0
06/16/2009	F1	$71,247	4,408
11/24/2010	F1	Unknown	153
06/18/2011	F1	Unknown	314
02/28/2012	F1	Unknown	1,384
05/20/2013	F1	Unknown	1,448
01/29/2013	F1	Unknown	242
05/16/2015	F1	Unknown	1
05/24/2015	F1	Unknown	120
1/10/2020	F1	Unknown	119
	Totals	$801,233	15,150
Data provided based on internal SOEC records which reflect cost from the referenced year.			

In the period of 2010-2020, there have been eight F1 tornadoes reported in the nine-county area in which SOEC provides electric service. These eight tornadoes were not declared disasters and/or reported to FEMA/SEMA. Consequently, costs for power restoration were not designated separately from other outage restoration costs.

Based upon the last 40 years of historical event records, tornado events will cause an average annual damage of $20,031. This averaged amount accounts for less than 0.01% of SOEC's total overhead assets and building valuation of $359,981,658.

An average annual of 379 outages were recorded during tornadoes since the beginning of 1982. When compared with the total number of meters served by SOEC, it can be projected that 3.3% of all meters may experience outages during any given year due to a tornadic event.

Problem Statement

Tornadoes are potentially such violent events that it is cost prohibitive to build an infrastructure that can withstand such powerful winds. Strategies could be developed or improved, if already in place, to ensure that employees are warned of approaching storms when in the field. Procedures to restore power after outages should be reviewed regularly to ensure that power is restored to critical facilities as quickly as possible.

Severe Thunderstorms, High Wind, and Hail

Previous Occurrences

From 1997-2016, Sac Osage Electric Cooperative's service area within the Counties of Cedar, Dade, St. Clair and Vernon experienced 188 days of hail events which resulted in $825,000 in property damage. During the same period, NOAA recorded 189 days of thunderstorm / high wind events with over $9.7 million in property damage for the four-county area. For this update, it was possible to look at the bounds of the Sac-Osage Electric Cooperative using GPS, finding 310 hail events and 168 high wind/thunderstorm events from 1955-2020.

Probability of Future Occurrence and Vulnerability

The average annual number of days of hail storms is 4.7, while the average annual number of days with a high wind event is 4.2. Damages from hail events are not distinguished from high wind thunderstorm events. Table 6 provides information for thunderstorm / high wind events.

Table 6 *Severe Thunderstorm, High Wind Events*

Event Date	Damage Estimates	Meters Effected
06/13/1997	$22,000	2,519
06/13/1998	$13,400	1,378
07/05/2004	$57,532	2,376
07/19/2018	Unknown	4,109
Totals	$92,932	10,382
Data provided based on internal SOEC records which reflect cost from the referenced event year.		

In the period of 2012-2016, the thunderstorm events reported within the 9-county area that SOEC provides electric service either did not trigger a disaster declaration, which would involve FEMA/SEMA reporting, or did not involve a major cost to repair. Consequently, costs for power restoration were not designated separately from other storm restoration costs.

Based upon historical records, thunderstorm/high wind events will cause an average annual damage of $3,717. This averaged amount accounts for less than 0.01% of SOEC's overhead asset valuation of $348,281,658.

An average annual of 415 outages were recorded during hail, thunderstorm, and high wind events since 1997. When compared with the total number of meters served by Sac Osage, it can be projected that 3.6% of all meters may experience outages during any given year due to a hail, thunderstorm, or high wind event.

Problem Statement

Damaging thunderstorms are a yearly event in the SOEC service area. Underground assets are protected from hail and high winds.

Flood and Levee Failure

Previous Occurrences

Flood and levee failure carry, perhaps, the greatest ongoing potential threat to existing infrastructure of the Sac Osage Electric Cooperative. In Benton County, approximately 15% of the cooperative service area is located directly within the 100 and 500 year flood plains, 90% of Cedar County, and 30% of Dade County cooperative service area located within the Sac Osage's service area also lie in the 100 and 500 year flood plain.

Figure 4 depicts the 100 year floodplain in relation to the cooperative's boundaries. Currently, inundation data for levee failure is lacking due to issues surrounding mapping, appropriate models, and its close association with flooding events, therefore there is no current levee mapping available.

Figure 4 *100 Year Floodplain Map*

From 1997 to 2016, Sac Osage Electric's service area experienced 133 days of flooding events. These included both flash and riverine events. Currently data concerning levee failure damage cannot be separated from flood damage data. NOAA recorded 2 fatalities and estimated over $5 million in property damage for the Counties of Cedar, Dade, St. Clair and Vernon for this twenty-year period. To update this

data, NCEI reported 12 events occurring during the past five years in the area. SOEC did not report any additional damages or outages since the last update.

Probability of Future Occurrence and Vulnerability

The average annual number of a flood events occurring within the cooperative service area in any given year is 2.4 of reported flooding. Due to the recording methods used, any damages sustained by SOEC due to flooding were not identified. With numerous flooding events each year, the possibility of a damaging flood cannot be ruled out. For this assessment, the probability of occurrence and annual loss of assets is set at less than 1%.

No customers were recorded as reporting outages during recorded flooding events since 1997. When compared with the total number of customers served by Sac Osage, it can be projected that less than 5% of all customers, or 573 may report outages during any given flooding event.

Problem Statement

With numerous flood-prone rivers crossing its area, SOEC needs to waterproof assets when possible.

Severe Winter Weather

Previous Occurrences

From 1997 to 2016, Sac Osage Electric Cooperative's service area experienced 36 days of severe winter weather events, including a blizzard, heavy snowfalls and ice storms that impacted the counties containing Sac Osage Electric Cooperatives service area. Over $5 million in property damage was reported by NOAA for this time period. To update this data, NCEI reported 9 winter weather events occurring during the past five years in the area. SOEC did not report any additional damages or outages since the last update.

Probability of Future Occurrence and Vulnerability

The probability of a severe winter weather event in the SOEC service area in any given year is 100% with an average annual of 1.8 events. Estimated material damages associated with each of these events were compiled by the Sac Osage staff. Table 7 provides a summary of event dates, types, associated damage estimates, and reported outages.

Table 7 *Severe Winter Weather Events*

Event Date	Damage Estimates	Customers Affected
01/01/1999	$50,000	2,239
01/12/2007	$65.000	1,202
12/09/2007	$546,136	9,901
01/20/2007	$27,000	382
01/01/2021	Unknown	3,449
Totals	$623,201	16,898
Data provided based on internal SOEC records which reflect cost from the referenced event year.		

Five occurrences caused damage to cooperative assets during the years existing in cooperative records. This resulted in a 20% probability that severe winter-weather will result in damage to SOEC in any given year.

Based upon these historical records, severe winter weather events will cause an average annual damage of $24,928. This averaged amount accounts for 0.01% of SOEC's total overhead asset valuation of $348,281,658.

An average annual of 676 outages were recorded during severe winter weather events since 1997. When compared with the total number of meters served by SOEC, it can be projected that 5.9% of all meters may experience outages during any given year due to a severe winter weather event.

Problem Statement

Underground placement of assets remains the best protection against damage from ice storms.

B. Non-Historical Hazards

Wildfire

Previous Occurrences

The incidence of wildfire in the SOEC service area presents a unique risk assessment since wildfire data is only available by county boundaries. Wildfire events have occurred in each of the nine counties; however, Barton, Benton, Henry, Hickory and Polk Counties are not included in this hazard's assessment since SOEC only serves small areas in those counties with a total of six percent of its total number of meters located there. Table 8 summarizes the incidences of wildfire within the remaining four counties. It should be noted that SOEC serves only Cedar County in its entirety, so areas not within the cooperative's boundaries are included in the other counties' numbers.

Table 8 *Wildfire Summary by County*

County	# of wildfires, 2004-16	Avg. annual # of wildfires	Acres burned	Avg. annual acres burned
Cedar	403	31	6,145	473
Dade	506	39	4,505	347
St. Clair	643	49	20,271	1,559
Vernon	278	21	7,873	606
Totals	1,830	140	38,794	2,985
Source: Missouri State Hazard Mitigation Plan, 2018				

Probability of Future Occurrence and Vulnerability

The probability of a wildfire event in the Sac Osage Electric service area in any given year is 100% with an average annual of 140 wildfires throughout the assessed four-county area. Although SOEC does not have records of any significant damage from wildfires, for the purposes of this assessment, wildfire and its associated impacts cannot be eliminated from the realm of possibility.

The potential extent of damage caused by wildfire is difficult to determine. Like earthquakes and dam failure, wildfires have had no measurable impact upon the SOEC service area. Cooperative assets are located throughout the service area rather than being located at a single central site. With a combined average annual of 2,985 acres burned in the area, and a total four-county area of 1,628,160 acres, it is unlikely that infrastructure damage would exceed one percent based upon asset location and the unlikeliness of an uncontrollable wildfire.

No customers have reported outages during recorded wildfires. When compared with the total number of customers served by SOEC, it can be projected that less than 1 percent of all customers may report outages during any given wildfire event.

Problem Statement

Further study will be required to create a model for damage assessments related to wildfire.

Earthquakes

Previous Occurrences

The closest source of earthquake risk in west-central Missouri is the Nemaha Fault, which runs through Oklahoma City, Oklahoma north to Lincoln, Nebraska. In 1993, the Nemaha fault produced a discernible earthquake that was felt in the region, measuring a 2.9 magnitude on the Richter Scale of Earthquake intensity. Additional quakes took place February 11, 1995 (3.1 magnitude); July 16, 2004 (3.5 magnitude); March 23, 2003 (3.1 magnitude). An earthquake of magnitude 3.6 was recorded on December 17, 2009. More recently a 4.8 magnitude event centered near Wichita, Kansas shook the SOEC service area on November 12, 2014. On September 3, 2016, a 5.6 magnitude earthquake was felt throughout the region. Although a relatively quiet fault system, the Nemaha fault has the potential to produce a damaging earthquake, profoundly impacting the Sac Osage Electric Cooperative service area.

The region is also subject to effects of the New Madrid Fault located in extreme southeast Missouri, which has the potential to produce the largest earthquakes in North America. Undoubtedly, this fault has the potential to affect the SOEC service area in its entirety. In addition, there have been several small, virtually undetectable earth movements in the region in recent history, which may or may not be attributed to the aforementioned fault lines or other, very small faults located nearby.

Probability of Future Occurrence and Vulnerability

While the Nemaha fault is geographically closer and geologically active, C.E.R.I. records demonstrate the limited impact of said earthquakes, with no quakes to date exceeding a 5.5 magnitude on the Richter scale. Its cascading effects have been largely restricted to more localized regions, but even then, the damage caused has been minimal. By contrast, the New Madrid fault has the potential to cause damage throughout the state of Missouri, including the SOEC service area. Scientist from the U.S. Geological Survey (USGS) and the Center for Earthquake Research and Information (CERI) at the University of Memphis has estimated the probability of a magnitude 6.0 or greater earthquake from the New Madrid Fault is 25-40 percent through the year 2053.

The projected earthquake intensity ratings for the cooperative region changes based upon the Modified Mercalli Scale. Given a new Madrid Earthquake with a 6.7 magnitude, the region would experience level V intensity characteristics. In the event of an earthquake with a 7.6 magnitude, the region would experience Level VI intensity characteristics while an earthquake with an 8.6 magnitude would most likely cause Level VII intensity characteristics.

In the event of an earthquake with a 7.6 magnitude, the SOEC service area would most likely experience minor building damage as well as damage to the electrical distribution system. This damage, however, would most likely be relatively minimal and localized when compared with the southeast corner of the state. Distribution lines overhead and underground could become disconnected or severed, and transformers could be damaged.

Based upon information from CERI, FEMA, and SEMA, it may be estimated that up to 1,100 of customers could be affected related to an earthquake event. When compared with the total number of customers served by SOEC, it can be projected that up to 10% of all customers may report outages during any given seismic event.

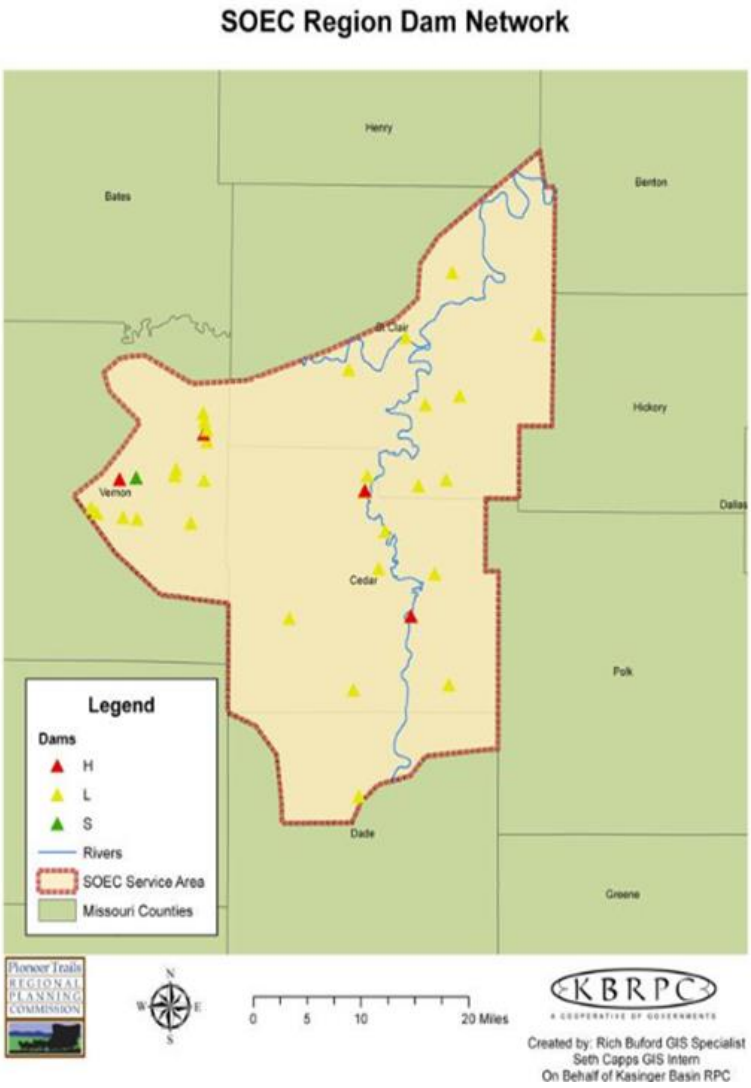
Problem Statement

SOEC should strive to meet seismic design standards for electrical substation equipment and other overhead assets susceptible to damage from earthquake events.

Dam Failure

Like earthquakes, dam failures have had no measurable impact upon the SOEC service area to date. According to Missouri DNR's Dam Safety Division, 220 dams currently exist within the cooperative boundaries: 41 in Barton County, 26 in Benton County, 11 in Cedar County, 11 in Dade County, 52 in Henry County, 7 in Hickory County, 13 in Polk County, 15 in St. Clair County, and 44 in Vernon County. Of these 220 dams, 7 are regulated by the state due to the fact that they are non-agricultural, non-federal dams which exceed 35 feet in height. Figure 5 shows the locations of all known dams located within Sac Osage's service area. (*Source:* *http://msdis.missouri.edu/*)

Figure 5 *Dam Map*



Previous Occurrences

The 2018 Missouri State Hazard Mitigation plan states “For the 42-year period from 1975 to 2016 for which dam failure statistics are available, 19 dam failures and 68 incidents are recorded. According to this data, annual probability calculates to a 45 percent annual probability of a dam failure somewhere in the state and a 100 percent annual probability of dam incidents. In should be noted that historical dam failures and incidents include events from all hazard classes and all dams (whether regulated or un-regulated). Failures and incidents for regulated dams that have higher inspection frequencies should be less probable. The probability of future events is 45%." However, no such event has occurred within or near the cooperative’s boundaries.

Probability of Future Occurrence and Vulnerability

For the purposes of this assessment, dam failure and its associated impacts cannot be eliminated from the realm of possibility. The probability of this event has been included as less than 1%.

Determining the potential extent of dam failure is currently impossible due to a lack of data concerning inundation zones. Based on discussions with Sac Osage staff on the location of infrastructure relative to dams, this initial assessment assumes a limited impact upon downstream electric distribution infrastructure of less than 10% for both infrastructure damage and service interruption.

Problem Statement

Further study concerning existing dams and the impact of their failure is required to make a more comprehensive assessment of potential damages and mitigation strategies to address this potential hazard.

Land Subsidence (Sinkholes)

Previous Occurrences

SOEC’s location in the southern half of Missouri places it squarely in a region where karst topography is common. This type of geological feature is characterized by springs, caves and sinkholes – the result of the collapse of a cave ceiling. Although there have not been any reported incidents of sinkholes collapsing and causing personal injury or damage to SOEC infrastructure, this type of land subsidence has occurred before in Missouri. There are hundreds of sinkholes in the counties that contain SOEC and more than 30 of those sinkholes are in the cooperative’s service area as shown in Table 9.

Table 9 *Sinkholes in the SOEC Area*

County	Number of Sinkholes in each County	Estimated Number of Sinkholes in the Service Area
Barton	0	0
Benton	1	0
Cedar	7	12
Dade	85	10
Henry	1	0
Hickory	19	1

Polk	75	1
St. Clair	5	9
Vernon	0	0
Totals	193	33
Source: 2018 MO State Hazard Mitigation Plan		

Probability of Future Occurrence and Vulnerability

Determining the potential impact of land subsidence on SOEC infrastructure is currently impossible due to a lack of historical data. This assessment assumes a limited impact upon infrastructure of less than one percent, and less than one percent for interruption of electrical service.

Problem Statement

The fact that Sac Osage does extensive engineering and environmental impact studies prior to construction of infrastructure reduces the potential threat of damage from land subsidence. If an incident of land subsidence occurred, it would be localized to a relatively small area which would further limit its impact on the cooperative.

C. Risk Assessment Summary

Most of the historical hazards have had an impact on the electric cooperatives. Table 10 below shows the annual damages associated with each hazard for SOEC. The table is ranked by the highest Average Annual Damages which is an indication of the vulnerability to each hazard.

Table 10 *SOEC Hazard Risk Summary*

Hazard	Average Annual Damages
Severe Winter Weather	$24,928
Tornadoes	$20,031
Severe Thunderstorms, Hail and High Winds	$3,717
Dam Failure	$0
Earthquakes	$0
Flood and Levee Failure	$0
Land Subsidence (Sinkholes)	$0
Wildfire	$0

Flood and Levee Failure, along with each of the non-historical hazards Wildfire, Earthquakes, Land Subsidence and Dam Failure has the potential for causing catastrophic damages in any given year. To date there have been zero reported damages to the assets of the Sac Osage Electric Cooperative from these events. Nonetheless, this set of hazards should be considered in mitigation strategies because of the damage potential.

Section 4: Mitigation Strategies

Previous Mitigation Efforts

For organizations like SOEC, mitigation is part of prudent business operations. In order to ensure the delivery of a quality product and minimize service interruptions, a number of mitigation strategies are continually utilized. Routine maintenance and upgrades to existing equipment are completed as part of daily tasks. Vegetation management is utilized to limit the cascading effects of natural hazards. Safety and reporting information are disseminated to the public through various types of media. Mutual aid agreements and partnerships create relationships which provide for future support in the event of a natural disaster.

Additionally, mitigation is considered prior to any expansion of service into special hazard areas. Before any service is built, it is first "staked out" in coordination with local builders and property owners. This process, completed by the Line Superintendent and contracted engineers, identifies, and addresses foreseeable hazards and safety issues before any new service line area is constructed. USDA-RUS specifications regarding operation and safety are utilized in every step of the process. Steps are taken to practically minimize the exposure of equipment to loss due to foreseeable hazards, particularly flooding. Customers who reside in the floodplain are not charged for repairs or losses associated with flooding unless they purposefully destroy or restrict the cooperative from protecting their distribution system assets.

Existing and Potential Resources

As stated above, mitigation is a key component of good business practices. Sac Osage Electric Cooperative includes mitigation strategies as part of regular work activities to ensure service with minimal interruptions. Funding for these activities is provided through the cooperative's normal budgetary process for maintenance.

In order to expand mitigation efforts beyond normal maintenance, it is likely that SOEC will need to seek outside funding sources. These may include private, state, or federal programs which provide grant and loan funding. Upon passage of this plan, SOEC will be eligible for funding through FEMA in the following categories:

- Hazard Mitigation Grant Program
- Flood Mitigation Assistance Program
- Pre-Disaster mitigation Program
- 406 Stafford Act
- USDA Economic Development Grants

Review of Goals, Objectives, and Actions

To focus on the mitigation actions for the 2023 update to this plan, it was decided to reach consensus on four goals that would address the needs of every cooperative member of AMEC and eliminate the objectives from previous updates. The AHEC mitigation staff reviewed these goals and the actions from the previous update which addressed hazard mitigation issues. They evaluated each action to decide if it

was completed, will be continued, or should be deleted. There also was the opportunity to add new actions.

The staff considered which type of actions will maximize benefits and minimizes costs, how mitigation strategies will be implemented, and how the plan will be maintained and updated. Table 12 lists the goals as reviewed in the 2023 plan update.

Table 11 *SOEC Goals and Objectives*

Identified Goals	Reassessment of the Goal 2023
Goal 1: Protect the health and safety of the community.	Accept, as is
Goal 2: Reduce future losses due to natural hazard events.	Accept, as is
Goal 3: Improve emergency management capabilities and enhance local partnerships.	Accept, as is
Goal 4: Continue to promote public awareness and education.	Accept, as is

Traditionally, the STAPLEE (Social, Technical, Administrative, Political, Legal, Environmental, and Economic) method is used to prioritize mitigation actions. These categories, however, do not necessarily align with the private sector in the same way they are applicable to governmental agencies. Several action items could be included with multiple goals, for example. As a result, the cooperatives chose to use a different method to prioritize their mitigation strategy.

The chosen method of reviewing the proposed and existing mitigation strategies was to perform a cost-benefit analysis of all mitigation actions. The analysis was based on past experiences of performing certain actions and the potential number of beneficiaries. The following matrix, Table 12, was used to rate each mitigation action. Cooperative staff was asked in the Goals and Actions Survey to review the cost-benefit rating and change if necessary.

Table 12 *Cost Benefit Matrix*

COST	BENEFIT		
	High	Medium	Low
High	7	4	1
Medium	8	5	2
Low	9	6	3

The following tables represent the completed review of current and potential mitigation strategies. Each strategy has assigned a cost benefit score assigned by the cooperative staff based on prior experience and professional opinions. Table 13 shows review the actions and the results of the cost-benefit analysis. The table has been updated through the Goals and Actions Survey that was sent to facilitate the staff update review. The Survey can be found in Appendix C. Staff members reviewed each item on the original tables and determined the status of the item.

Table 13 *Prioritized Mitigation Actions for Sac Osage Electric Cooperative 2023*

Goal-Action#	Action Item	Status Update	Progress on Continued Actions	Hazards Addressed by This Action	Completion Date	Cost/ Benefit Score
1-1	Increase maintenance on "right of way" (limit safety danger to public from downed lines)	Continue (In-progress)	In 2014, a more aggressive ROW clearing program was established. To date, 34 out of 34 circuits have been side trimmed. It is our desire to obtain a less than 7-year rotation on clearing. We plan on continuing this rate. We are spraying the ground to keep the underbrush down.	Thunderstorms Winter Weather	annually	7
1-2	Increase the number of high voltage generators for use in critical facility outages.	Continue (Not started)	Most of our critical facilities have multiple feed sources.	Thunderstorms Tornado Winter Weather	2027 or later	1
2-1	Add storm anchors to poles to cut down on pole costs replacement especially when trees are involved.	Continue (In-progress)	Anchors are added as necessary.	Thunderstorms Winter Weather	annually	9
2-2	Replace existing copper weld conductors with aluminum for economic benefit. Aluminum is stronger	Continue (In-progress)	Copperweld continues to be replaced on a systematic basis.	Thunderstorms Winter Weather	annually	7
2-3	Convert certain overhead lines to underground lines. Limestone is hard to drill when burying underground lines	Continue (In-progress)	We encourage new members to utilize underground construction where appropriate.	Flooding Thunderstorms Tornado Winter Weather	annually	7
2-4	Increase number of electronic recloser circuits.	Continue (In-progress)	Substation electronic reclosers are being replaced as necessary.	Thunderstorms Tornado Winter Weather	annually	7
3-1	Move computer servers off site	Continue (Not started)	Two servers remain that can be moved off-site to a virtualized environment. The remaining two servers are being considered for virtualized redundancy.	Earthquakes Tornado	2027 or later	9
3-2	Maintain and increase mutual aid agreements	Continue (In-progress)	We maintain our relationship with the Missouri statewide organization, AMEC.	Flooding Thunderstorms Tornado	annually	9

Goal-Action#	Action Item	Status Update	Progress on Continued Actions	Hazards Addressed by This Action	Completion Date	Cost/ Benefit Score
				Winter Weather		
3-3	Increase County Emergency Management partners	Continue (In-progress)	We want to continue our relationship with County Emergency Management teams.	Dam Failure Earthquakes Flooding Thunderstorms Tornado Wildfire Winter Weather	annually	9
4-1	Monitor developments in data availability concerning the impact of dam failure and wildfire upon the Sac Osage service area through local, state, and federal agencies.	Continue (Not started)	Dam failures and wildfires pose very little system risk.	Dam Failure Wildfire	annually	9

After review, there were no Actions completed and removed from the Action Items list for the 2023 plan update. There were no Actions deleted. All other actions are continued in the 2023 plan update. There are no additional actions added to the 2023 plan.

Section 5: Plan Implementation and Maintenance

Plan Incorporation

The goals and actions of the previous section identify both ongoing efforts at mitigation and potential methods for expanding efforts. The updated plan has been reviewed and adopted by the Board of Directors as part of the company's operations policy. This mitigation plan necessitates involvement from every SOEC employment level as the organization strives to ensure quality service to their customers.

Local Planning Capabilities

Some internal planning capabilities do exist at SOEC. The Hazard Mitigation Plan can be considered and/or incorporated into regular budgetary planning, the four-year work plan for capital improvements, and the maintenance planning policy and the Disaster Recovery Plan. Planning capabilities per se for the electric cooperatives are limited. What is important is that the Action Items developed through the mitigation planning process are incorporated into the daily activities of the cooperative.

The four-year work plans embrace the mitigation efforts that are in the mitigation plan. The electric cooperatives across Missouri are always working to strengthen their systems. This would include installing stronger/larger poles when smaller ones need to be changed out, installing stronger/larger conductors that can carry more weight and decreasing span lengths between poles, installing larger anchors, relocating structures out of flood plains, and installing structures to stop cascading during ice storms.

Other capabilities are unique to the electric cooperative's business of providing reliable electricity to their members. Many of the Action Items listed in the plan include tree trimming plans, use of GPS to locate outages, service upgrades to lines and poles, warning systems and use of weather radios, collection of GIS data and utility specific software for locating and rerouting outages to restore power, all contribute to local capabilities. Integration of SOEC's planning with local law enforcement, mutual aid agreements, and partnerships with local emergency management resources ensures power to critical facilities during a hazard event. This coordination and cooperation broaden the capabilities of the local cooperative.

Beyond the Sac Osage Electric Hazard Mitigation Plan, regional planning capabilities exist at the local level. The Missouri counties of Barton, Benton, Cedar, Henry, Hickory, Polk, St. Clair and Vernon each have a FEMA approved Natural Hazard Mitigation Plan in place. County emergency management directors have Local Emergency Operations Plans which seek to mitigate the same hazards for residents. These same counties are also included in the Regional Transportation Plan (RTP) as well as a Comprehensive Economic Development Strategy (CEDS). SOEC's plan can be easily incorporated into these local plans and allow for coordination across agencies in the event of an emergency.

Sac Osage Electric is located within the rural portions of third-class counties which are prohibited from enforcing building codes and zoning by the state of Missouri. They do not provide service to any municipality within these counties. Comprehensive plans and Capital Improvement plans do not exist inside of the SOEC service areas.

Plan Maintenance

Sac Osage Electric Cooperative will follow the requirements coordinated by the Association of Missouri Electric Cooperatives (AMEC) for monitoring, evaluating, and updating the plan.

Continued Public Involvement Opportunities

Public notice was given in the form a notice in the *Rural Missouri*, a publication of the Association of Missouri Electric Cooperatives, distributed to all cooperative members. The updated 2023 plans were posted on the website of the Northwest Missouri Regional Council of Governments for public review and comment. Comments were considered and addressed. Once all co-op plans were completed, they were assembled into one plan and submitted to the State Emergency Management Agency and the Federal Emergency Management Agency for review and approval. The documentation for public involvement and comments can be found in Appendix B of each cooperative's section of the plan

SOEC will follow the requirements coordinated by the Association of Missouri Electric Cooperatives (AMEC) for continued public involvement. Opportunities for public comment will continue to be offered through various media outlets and the physical office of Sac Osage Electric Cooperative.

Appendix: A - Adoption Resolution

RESOLUTION

HAZARD MITIGATION PLAN

A NEW RESOLUTION WILL GO HERE

Appendix: B - Documentation of Participation

This ad was published in the *Rural Missouri*, a monthly publication of the Missouri Association of Missouri Electric Cooperatives, giving public notice to all subscribing members of AMEC.

THE NEW AD WILL GO HERE

Appendix: C - Surveys

Data Survey

The following is the returned survey from GEC which was used by NWMORCOG staff to update the Plan:

Please correct/update the following information from the previous plan.

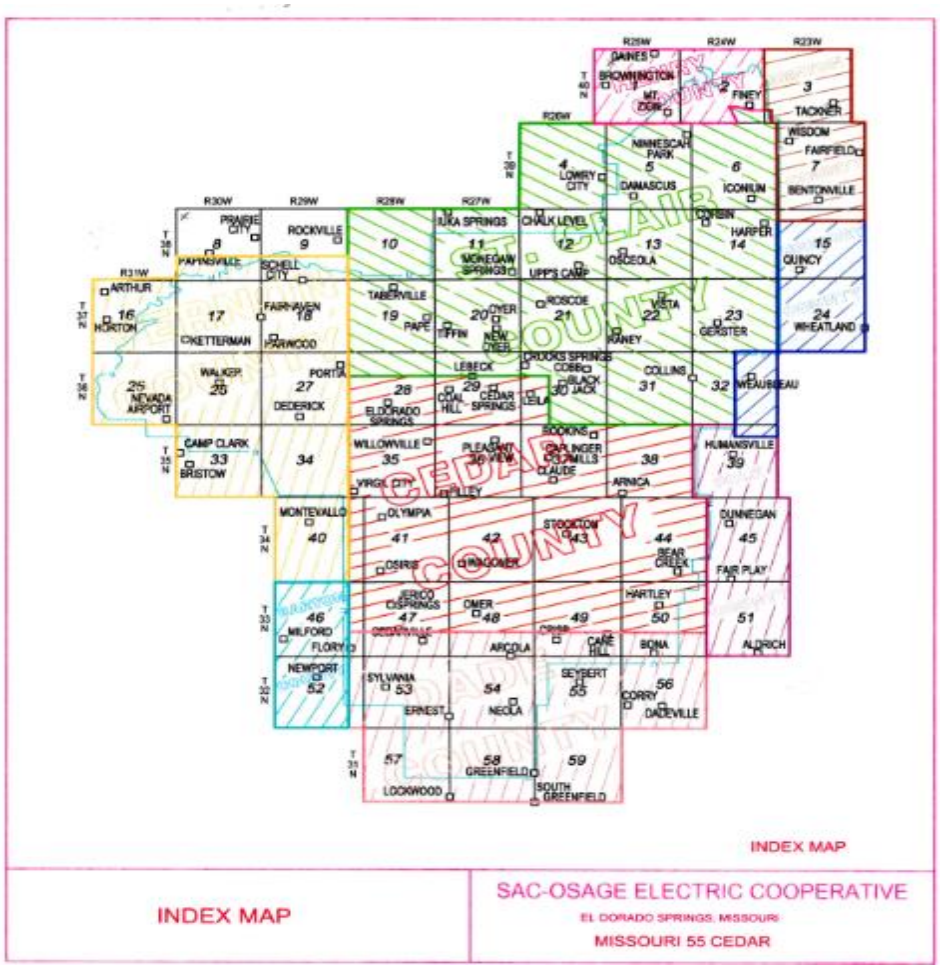
Sac Osage Electric Cooperative (SOEC) was established in 1940 to provide electric service to the rural areas of west-central Missouri. A Touchstone Energy Cooperative, SOEC is headquartered in El Dorado Springs Mo, and provides service to customers in St. Clair, Vernon, Cedar, and Dade, as well as parts of Barton, Polk, Hickory, Benton, and Henry Counties in Missouri. The cooperative is run by a board of nine directors which approve the company's mission and internally developed business policy:

"Sac Osage Electric's (the Cooperative) primary mission is to make the Cooperative the provider of choice for all of its customers. This mission requires that the Cooperative function as a financially sound business enterprise committed to the following:

8. ***Voluntary and Open Membership —*** *Cooperatives are voluntary organizations, open to all persons able to use their services and willing to accept the responsibilities of membership, without gender, social, racial, political, or religious discrimination.*
9. ***Democratic Member Control —*** *Cooperatives are democratic organizations controlled by their members, who actively participate in setting policies and making decisions. The elected representatives are accountable to the membership. In primary cooperatives, members have equal voting rights (one member, one vote) and cooperatives at other levels are organized in a democratic manner.*
10. ***Members' Economic Participation —*** *Members contribute equitably to, and democratically control, the capital of their cooperative. At least part of that capital is usually the common property of the cooperative. Members usually receive limited compensation, if any, on capital subscribed as a condition of membership.*
11. ***Autonomy and Independence —*** *Cooperatives are autonomous, self-help organizations controlled by their members. If they enter into agreements with other organizations, including governments, or raise capital from external sources, they do so on terms that ensure democratic control by their members and maintain their cooperative autonomy.*
12. ***Education, Training, and Information —*** *Cooperatives provide education and training for their members, elected representatives, managers, and employees so they can contribute effectively to the development of their cooperatives. They inform the general public, particularly young people and opinion leaders, about the nature and benefits of cooperation.*
13. ***Cooperation among Cooperatives —*** *Cooperatives serve their members most effectively and strengthen the cooperative movement by working together through local, national, regional, and international structures.*
14. ***Concern for Community —*** *while focusing on member needs, cooperatives work for the sustainable development of their communities through policies accepted by their members."*

SOEC's service boundaries within the state of Missouri include all of Cedar County, three quarters of St. Clair County, and portions of Barton, Benton, Dade, Henry, Hickory, Polk and Vernon counties. The cooperative owns 2,433 miles of service line within these counties.

if needed, please replace or attach a different map if available or provide info on changes so a new map can be made.



Population Density Map will be updated by staff at NWMORCOG

The customer base of SOEC is approximately 11,472 meters in nine counties in Missouri. Residential customers account for 94% of memberships (10,872 meters); while nonresidential customers make up the remaining 6% (600 meters).

Table ? provides the summary of metered customers by Missouri County.

Meters by Missouri County

County	Number of Meters
Barton	6
Benton	125
Cedar	5178
Dade	780
Henry	461
Hickory	21
Polk	44
St. Clair	3,666
Vernon	1,191
Total	11,472

The average daily customer usage for SOEC is 38.3 kilowatt-hours (kWh). Annual total usage of SOEC customers in 2021 was 159,429,434 kWh of service.

Critical Facilities

SOEC provides service to the following critical facilities: Truman Nursing Home, St. Clair County, communication towers in El Dorado Springs, Lowry City, Osceola and Stockton, power for KMOS radio and at television station, KRDK in Stockton.

Future Development The info wanted here is if any of your members you serve have future development plans that would potentially affect your operation.

In recent months Sac Osage Electric has been approached by individuals seeking service to bitcoin and data mining operations with power requirements ranging from 5 – 30 MW. If just the one operation requiring 30 Mw was to locate on our system it alone would represent well over 50% of our total power requirements. To date, however, interest has not progressed beyond the interest shown at the initial visit, and we do not expect anything further to develop.

The FEMA reviewers that approved the previous update suggested including current operating budget information, any capital improvements, or strategic initiatives in this update. Please add or attach if possible.

Sac Osage Electric Cooperative has partnered with CONEXON to design a fiber network to realize the capabilities for a number of smart grid applications, in addition providing Fiber-To-The-Home broadband connectivity for our members (and non-members located within our service territory) to be completed over the next 3-4 years. Initial connection speed offerings are symmetrical 100 Mb, 1Gb, and 2 Gb, with VOIP phone being available as well. The cost of this project is estimated to be $50 million.

A separate file (spreadsheet) has been provided summarizing 2022 operating budget information.

Asset Inventory Please update the figures below to the most current information

Sac Osage Electric Cooperative has a wide variety of assets by type. Real estate owned by the company includes office buildings and other outbuildings throughout the service area. Twenty-five vehicles provide access to customers and infrastructure. SOEC does not own any electric generation or transmission infrastructure. More than 2,433 miles of distribution lines are owned and maintained by SOEC. Table ? provides information concerning total asset valuation.

Sac Osage Asset Inventory Valuation Summary

Asset	Total Replacement Cost	Cost Breakdown
Total SOEC Assets	$359,981,658	Buildings and vehicles $11,700,000 Overhead Assets $348,281,658
Distribution Lines	$225,165,551	* OH Single-Phase lines - $135,040,377 * OH Three-Phase lines - $90,125,174
Supporting Infrastructure	$123,116,107	Meters $4,623,216 Poles $8,2375,779 Transformers $24,450,074 Regulators $4,155,301 Capacitors $361,472 Breakers $7,150,265
Office Buildings & Warehouses	$8,069,000	
Vehicles	$3,631,000	
Source: Internal Sac Osage records. *Breakdown is estimated		

Ensuring quality distribution to its customers, Sac Osage maintains not only distribution lines, but also the supporting infrastructure as well.

Tables ? includes a list of asset types, emergency replacement cost per unit or mile, and the asset inventory by service and county and total infrastructure numbers.

Sac Osage Asset Inventory by Service County

Assets	Replacement Cost per unit or mile	No. Units / Miles BARTON	No. Units / Miles BENTON	No. Units / Miles CEDAR	No. Units / Miles DADE
Meters	$403/unit	6	125	5,178	780
Poles	$1,553/unit	38	348	21,705	4,371
Single Phase Distribution Line	$66,942/mile	2	12	797	183
Three Phase Distribution Line	$216,790/mile	0	2	170	38
Transformers	$2,017/unit	7	131	5,251	800
Regulators	$34,800/unit	0	1	49	11
Capacitors	$2,824/unit	0	1	51	10
Breakers	$10,085/unit	0	4	307	66
Total Replacement Value by County		$206,145	$2,130,423	$141,765,853	$30,412,314

Sac Osage Asset Inventory by Service County (Continued)

No. Units / Miles HENRY	No. Units / Miles HICKORY	No. Units / Miles POLK	No. Units / Miles ST. CLAIR	No. Units / Miles VERNON	Number of units or miles: TOTAL
461	21	44	3,666	1,191	11,472
1,467	130	262	17,390	7,332	53,043
48	7	12	664	292	2,433
14	0	0	131	61	416
430	20	48	4,061	1,374	12,122
3	0	0	25	14	103
5	0	0	42	19	128
24	0	0	220	88	709
$10,000,397	$694,711	$1,331,115	$112,832,140	$48,908,561	$348,281,658
Source: Internal Sac Osage Accounting and Maintenance records Note: Cost for overhead and underground transmission line are the same, and no breakdown between the two was provided by SOEC.					

Risk Assessment

Please add any known information related to each of the natural hazards that follow: Flooding (Major and Flash), Levee Failure, Dam Failure, Earthquake, Land Subsidence/Sinkholes, Drought, Extreme Temperature, Severe Thunderstorms, Severe Winter Weather, Tornadoes, Wildfire

NWMORCOG will add information to the narrative from the National Weather Service that has occurred since 2016

Tornadic Event Summary

Date of Event	EF Scale Rating	Damage Estimates	Customers Without Power
03/15/1982	F3	$50,000	1,800
05/04/2003	F3	$473,909	5,000
05/26/2004	F2	$7,020	161

03/12/2006	F2	$199,057	0
06/16/2009	F1	$71,247	4,408
11/24/2010	F1	Unknown	153
06/18/2011	F1	Unknown	314
02/28/2012	F1	Unknown	1,384
05/20/2013	F1	Unknown	1,448
01/29/2013	F1	Unknown	242
05/16/2015	F1	Unknown	1
05/24/2015	F1	Unknown	120
1/10/2020	F1	Unknown	119
	Totals		
Data provided based on internal SOEC records which reflect cost from the referenced year.			

Thunderstorm/High Wind, Hail Event Summary

Event Date	Damage Estimates	Meters Effected
06/13/1997	$22,000	2,519
06/13/1998	$13,400	1,378
07/05/2004	$57,532	2,376
07/19/2018	Unknown	4,109
Totals		
Data provided based on internal SOEC records which reflect cost from the referenced event year.		

The hazards of flood and levee failure have been separated in the Missouri State Hazard Mitigation Plan. If possible, separate any damage/outages data into the appropriate hazard's table.

Flood Event Summary

Event date	Damage estimates	Outages reported

Levee failure,

Event date	Damage estimates	Outages reported

Severe Winter Weather Event Summary

Event Date	Damage Estimates	Customers Affected
01/01/1999	$50,000	2,239
01/12/2007	$65.000	1,202
12/09/2007	$546,136	9,901
01/20/2007	$27,000	382
01/01/2021	Unknown	3,449
Totals		
Data provided based on internal SOEC records which reflect cost from the referenced event year.		

Please add any dates, known damage, and outages since the last plan due to

dam failure,

Event date	Damage estimates	Outages reported

drought,

Event date	Damage estimates	Outages reported

earthquake,

Event date	Damage estimates	Outages reported

extreme temperatures (hot & cold)

Event Date	Event Type	Damage Estimates	Outages reported

land subsidence,

Event date	Damage estimates	Outages reported

or wildfire.

Event date	Damage estimates	Outages reported

Goals and Actions Survey

The original survey is an interactive Excel file that could not be inserted without stabilizing the formatting. All of the data submitted is included in the tables below.

Complete each row left to right. Click on each box to receive instructions for that box.	Goals	Reassess the goal	Instructions	Justifications
→	**Goal 1**: Protect the health and safety of the community	accept, as is ☑ yes	If you chose to remove or modify the goal, please give your reasons in the box to the right.	
→	**Goal 2**: Reduce future losses due to natural hazard events.	accept, as is ☑ yes	If you chose to remove or modify the goal, please give your reasons in the box to the right.	
→	**Goal 3**: Improve emergency management capabilities and enhance partnerships.	accept, as is ☑ yes	If you chose to remove or modify the goal, please give your reasons in the box to the right.	
→	**Goal 4**: Continue to promote public awareness and education.	accept, as is ☑ yes	If you chose to remove or modify the goal, please give your reasons in the box to the right.	
↘	**After completing this sheet, please click the "actions" tab at the bottom**			

risk summary table Information to consider when updating

Table 1 *SOEC Hazard Risk Summary*

Hazard	Average Annual Damages
Severe Winter Weather	$24,928
Tornadoes	$20,031
Severe Thunderstorms, Hail and High Winds	$3,717
Dam Failure	$0
Earthquakes	$0
Flood and Levee Failure	$0
Land Subsidence (Sinkholes)	$0
Wildfire	$0

goals | actions

	Goal-Action#	Action Items Specify locations when able	Status Update	Explanation for completed/deleted	Report progress on continued actions	Select Hazard(s) addressed by this	Completion Date	COST/BENEFIT
Read each row left to right. Click on each box to receive instructions for that box.	1-1	Increase maintenance on "right of way" (limit safety danger to public from downed lines)	Continue (In-progress)		In 2014, a more aggressive ROW clearing program was established. To date, 34 out of 34 circuits have been side trimmed. It is our desire to obtain a less than 7 year rotation on clearing. We plan on continuing this rate. We are spraying the ground to keep the underbrush down.	Dam Failure Earthquakes Flooding Land Subsidence Levee Failure Thunderstorms Tornado Wildfire Winter Weather	annually	7
	2-1	Add storm anchors to poles to cut down on pole costs replacement especially when trees are involved.	Continue (In-progress)		Anchors are added as necessary.	Dam Failure Earthquakes Flooding Land Subsidence Levee Failure Thunderstorms Tornado Wildfire Winter Weather	annually	9
	2-2	Replace existing copper weld conductors with aluminum for economic benefit.. Aluminum is stronger	Continue (In-progress)		Copperweld continues to be replaced on a systematic basis.	Dam Failure Earthquakes Flooding Land Subsidence Levee Failure Thunderstorms Tornado Wildfire Winter Weather	annually	7
	3-1	Move computer servers off site	Continue (Not started)		Two servers remain that can be moved off-site to a virtualized environment. The remaining two servers are being considered for virtualized redundancy.	Dam Failure Earthquakes Flooding Land Subsidence Levee Failure Thunderstorms Tornado Wildfire Winter Weather	2027 or later	9
	2-3	Convert certain overhead lines to underground lines. Limestone is hard to drill when burying underground lines	Continue (In-progress)		We encourage new members to utilize underground construction where appropriate.	Dam Failure Earthquakes Flooding Land Subsidence Levee Failure Thunderstorms Tornado Wildfire Winter Weather	annually	7
	1-2	Increase the number of high voltage generators for use in critical facility outages.	Continue (Not started)		Most of our critical facilities have multiple feed sources.	Dam Failure Earthquakes Flooding Land Subsidence Levee Failure Thunderstorms Tornado Wildfire Winter Weather	2027 or later	1
	3-2	Maintain and increase mutual aid agreements	Continue (In-progress)		We maintain our relationship with the Missouri statewide organization, AMEC.	Dam Failure Earthquakes Flooding Land Subsidence Levee Failure Thunderstorms Tornado Wildfire Winter Weather	annually	9
	3-3	Increase County Emergency Management partners	Continue (In-progress)		We want to continue our relationship with County Emergency Management teams.	Dam Failure Earthquakes Flooding Land Subsidence Levee Failure Thunderstorms Tornado Wildfire Winter Weather	annually	9
	2-4	Increase number of electronic recloser circuits.	Continue (In-progress)		Substation electronic reclosers are being replaced as necessary.	Dam Failure Earthquakes Flooding Land Subsidence Levee Failure Thunderstorms Tornado Wildfire Winter Weather	annually	7
	2-5	Monitor developments in data availability concerning the impact of dam failure and wildfire upon the Sac Osage service area through local, state, and federal agencies.	Continue (Not started)		Dam failures and wildfires pose very little system risk.	Dam Failure Earthquakes Flooding Land Subsidence Levee Failure Thunderstorms Tornado Wildfire Winter Weather	annually	9
NEW Action (optional)			NEW Not Started	NEW	NEW	Dam Failure Earthquakes Flooding Land Subsidence Levee Failure Thunderstorms Tornado Wildfire Winter Weather		