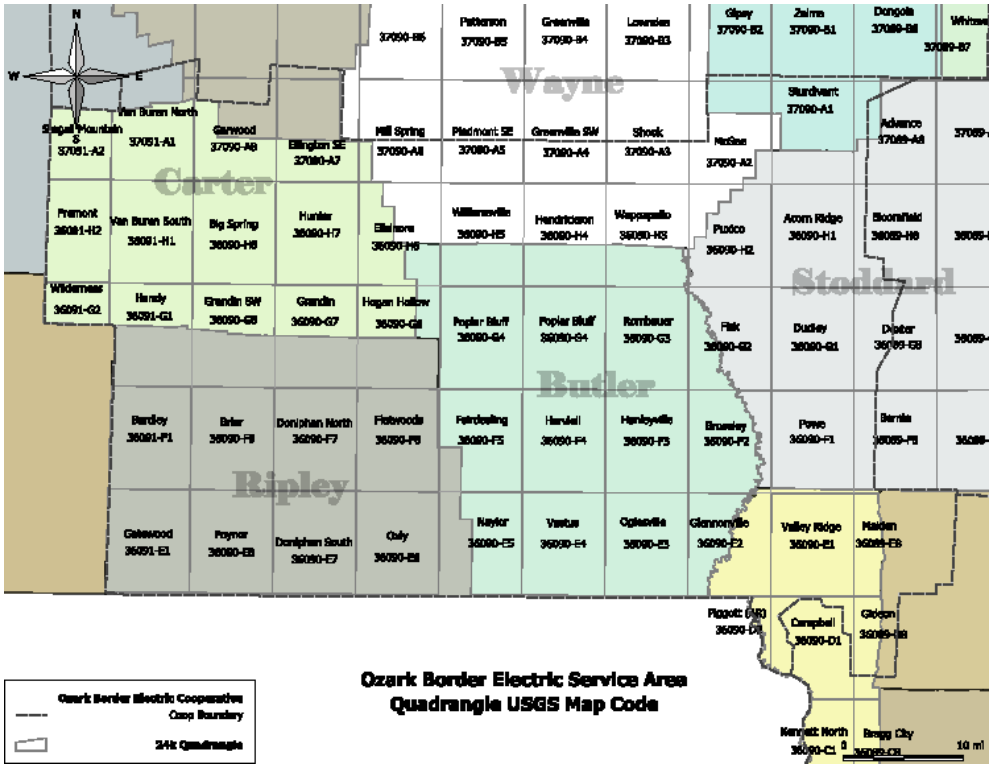
Contents: Ozark Border Electric

Section 1: Introduction

Ozark Border Electric Cooperative, Inc. (OBEC) was established in 1938 to provide electric service to rural areas of southeast Missouri. It is governed by a board of twelve directors. OBEC is headquartered in Poplar Bluff, Missouri, and provides service to members in all of Carter and Ripley counties, as well as parts of Bollinger, Butler, Dunklin, New Madrid, Oregon, Reynolds, Shannon, Stoddard and Wayne counties. Towns included in the service area include Ellsinore, Van Buren, Grandin, Qulin, Neelyville, Puxico, Naylor, Doniphan, Williamsville, Fisk, Dudley, and Campbell.

OBEC's service boundaries within the state of Missouri include Bollinger, Butler, Carter, Dunklin, New Madrid, Oregon, Reynolds, Ripley, Shannon, Stoddard, and Wayne Counties. The cooperative owns 5,960 miles of service line within these counties. Figure 1 depicts the geographic boundaries in relation to the USGS local quadrangles within the state of Missouri. *(Map sources: www.usgs.gov, Association of Missouri Electric Cooperatives, Ozark Border Electric Cooperative.)*

Figure 1 *OBEC Service Area Map*



The customer base of OBEC currently exceeds 40,500 members in the service area. The majority of OBEC's members are residential, 81.6% (33,067), an additional 10.1% (4,109) of accounts are irrigation, and the remaining 8.3% (3,328) of accounts are commercial and governmental.

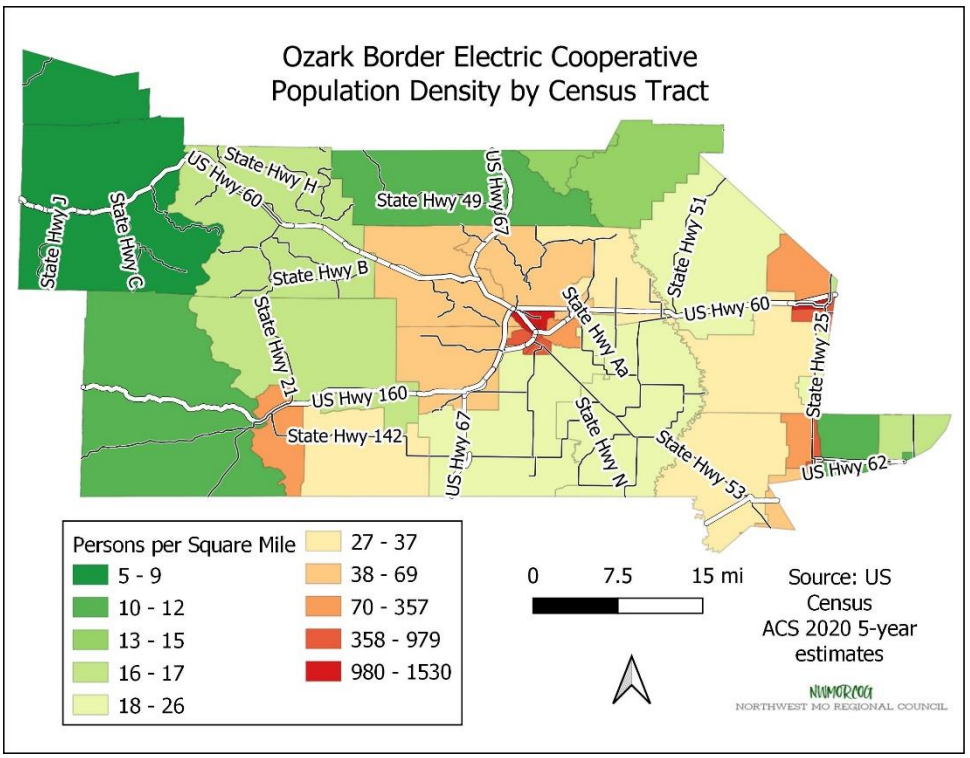
Table 1 provides the summary of metered members by Missouri County.

Table 1 *Meters by Missouri County*

County	Number of Meters
Bollinger	833
Butler	16,047
Carter	4,175
Dunklin	3,260
New Madrid	432
Oregon	19
Reynolds	309
Ripley	7,767
Shannon	14
Stoddard	4,462
Wayne	3,182
Total	40,500
Source: Internal Ozark Border Accounting and Insurance records, 2021	

The average daily customer usage for OBEC was 49 kilowatt-watt (kWh) in 2021. Annual total usage of OBEC members in 2021 was 719,455,057 kWh of service. Population density for the cooperative service area is depicted in Figure 2 (*Map source: U.S. Census 2020*).

Figure 2 *OBEC 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. OBEC provides service to many critical facilities such as senior housing complexes, fire stations, and highway patrol substations. This includes 6 nursing homes, 9 senior citizens housing complexes, 1 Missouri Department of youth Services Detention Center, 22 fire stations, 5 health care facilities, a Missouri Highway Patrol Troop Headquarters, the Missouri National Guard Armory, 4 county emergency management agencies, and one FEMA tornado shelter located at a local school. This list has not changed since the 2012 Hazard Mitigation Electric Cooperative Plan.

Future Development

OBEC provided no information about plans for future development in their service area. Table 2 below illustrates the population trend for the counties served by Ozark Border Electric.

Table 2 *County Population Trend, 1990-2030*

County	1990	2000	2010	2020	2030 Projected
Bollinger	10,619	12,029	12,363	21,111	12,805
Butler	38,765	40,867	42,794	42,178	41,491
Carter	5,515	5,941	6,265	5,991	5,837
Dunklin	33,112	33,155	31,953	28,878	28,765
New Madrid	20,928	19,760	18,956	16,693	12,554
Oregon	9,470	10,344	10,881	10,411	10,558
Reynolds	6,661	6,689	6,696	6,198	6,285
Ripley	12,303	13,509	14,100	13,300	14,008
Shannon	7,613	8,324	8,441	8,203	9,693
Stoddard	28,895	29,705	29,968	29,001	28,973
Wayne	11,543	13,259	13,521	12,769	11,200
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 for each Cooperative's 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

Ozark Border Electric Cooperative has a wide variety of assets by type. Real estate owned by the company includes office buildings, warehouses, garages, and other outbuildings throughout the service area. Fifty-nine vehicles provide access to members and infrastructure. OBEC does not own any electric generation or transmission infrastructure 6,026 miles of distribution lines are owned and maintained by OBEC. Table 3 provides information concerning total asset valuation.

Table 3 *Ozark Border Asset Inventory Valuation Summary*

Asset	Total Replacement Cost	Cost Breakdown
Total OBEC Assets	$221,687,739	Buildings and vehicles – $12,832,674 Overhead assets – $153,019,434 Underground assets – $55,835,631
Distribution Lines	$40,549,077 $31,978,907	OH Single-phase lines – $18,652,575 UG Single-phase lines – $28,781,013 OH Three-phase lines – $21,896,502 UG Three-phase lines – $3,197,894
Supporting Infrastructure	$110,171,094	Meters - $15,904,409 Poles - $43,674,641 OH Transformers – $32,689,079 UG Transformers – $17,979,965 Guys/Anchors – $10,898,399 Cross-arms – $7,403,370 Regulators - $1,715,263 SP Oil-Circuit Reclosures – $3,564,792 3phase Oil-Circuit Reclosures - $1,755,793 Capacitors - $741,370
Office Buildings	$4,914,108	
Warehouses	$563,500	
Vehicles	$7,355,066	
Source: Internal Ozark Border Accounting and Insurance records, 2021		

Ensuring quality distribution to its members, Ozark Border maintains not only distribution lines, but also the supporting infrastructure as well. Table 4 and continuing in Table 5 include a list of asset types, emergency replacement cost per unit or mile, the asset inventory by Service County, and total infrastructure numbers.

OZARK BORDER ELECTRIC COOPERATIVE

Table 4 *Ozark Border Asset Inventory by Service County*

Asset	Emergency Replacement Cost per unit or mile	Bollinger County	Butler County	Carter County	Dunklin County	New Madrid County
Meters	331	1,781	34,316	8,925	6,969	924
Poles	706	2,074	39,975	10,397	8,119	1,076
SP Distribution Lines, OH	9,227	72	1,382	360	281	37
SP Distribution Lines, UG	8,943	26	504	131	102	14
TP Distribution Lines, OH	19,732	18	366	96	75	10
TP Distribution Lines, UG	4,120	7	134	35	27	3
Transformers OH	1,677	624	12,027	3,128	2,443	324
Transformers UG	2,342	194	3,736	972	759	100
Guys/ Anchors	171	1,310	25,243	6,565	5,126	679
Cross-Arms	177	862	16,609	4,320	3,373	447
Regulators	5,428	6	125	33	25	3
Oil Circuit Reclosures SP	2,598	28	544	141	110	15
Oil Circuit Reclosure TP	3,834	9	182	47	36	5
Capacitors	1,298	12	226	59	46	6
County Totals		7,023	13,5369	35,209	27,491	3,643

Table 5 *Ozark Border Asset Inventory by Service County (Continued)*

Oregon County	Reynolds County	Ripley County	Shannon County	Stoddard County	Wayne County	Total number of units or miles
41	661	16,604	30	9,539	6,802	86,592
47	770	19,343	35	11,112	7,924	100,872
2	27	668	1	384	274	3,488
1	10	244	1	140	99	1,272
1	7	178	1	102	73	927
1	3	65	1	37	26	339
14	232	5,819	10	3,343	2,384	30,348
6	72	1,808	3	1,038	740	9,428
30	486	12,214	22	7,017	5,004	63,696
20	320	8036	15	4,616	3,292	41,910
1	2	61	1	35	24	316
1	10	263	1	151	108	1,372
1	3	88	1	50	36	458
1	4	110	1	62	44	571
167	2,607	65,501	123	37,626	2,6830	341,589

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 the risk assessment, the identified hazards for the Ozark Border Electric Cooperative 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 years of data and cost of each event to establish an average annual cost per year. For OBEC, hazards with historical data include tornadoes, severe thunderstorms/high wind/hail, flood and levee failure, and severe winter weather.
>
> **Non-historical Hazards** are hazards with no previous record of impact upon the 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 OBEC, hazards without historical data include earthquakes, land subsidence, dam failure and wildfire.

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 $165,852,108
- Overhead infrastructure assets only
    - Used for:
        - Severe Thunderstorm / High Wind / Hail
        - Flood
        - Severe Winter Weather
            - Valued at $153,019,434

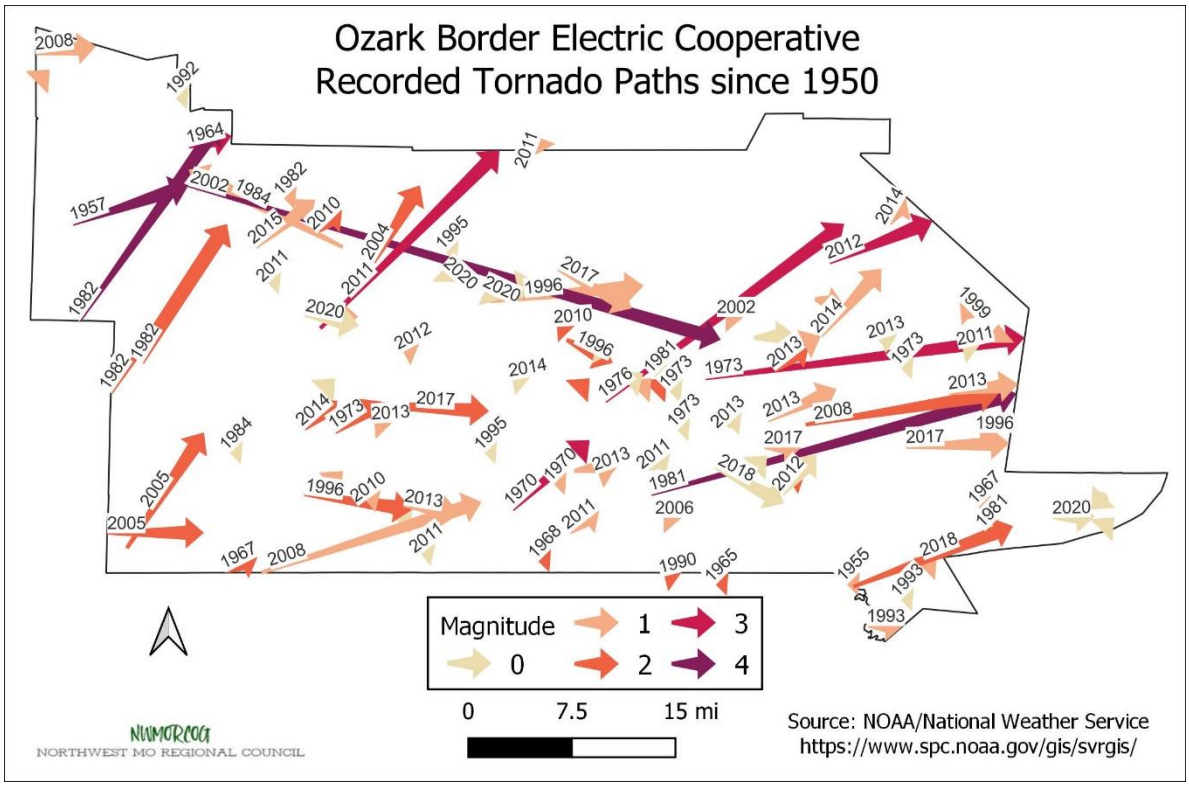
A. Historical Hazards:

Tornadoes

Previous Occurrences

From 1950-2020 104 tornadoes have been reported within the Ozark Border cooperative boundaries. Figure 3 provides a pictorial representation of all recorded tornado touchdown sites and recorded path. *(Data for map collected from National Oceanic and Atmospheric Administration, NOAA.)*

Figure 3 *Tornadoes in the OBEC Service Area, 1950-2021*



A data insufficiency exists, however, between 1968 and 1990 in both historical hazard records and cooperative records concerning damage estimates. For the purpose of this assessment, the years for which records exist for both data sets have been used. From 1990 through June 2017, Ozark Border's service area within the state of Missouri has experienced a total of 58 tornadic events.

Probability of Future Occurrence and Vulnerability

Using the previously described methodology, the probability of tornadic events occurring in the service area is 100% with an average of 1.5 tornadoes each year (104 tornadoes divided by 71 years). Estimated cooperative material damages associated with each of these events were compiled by OBEC staff. Seven occurrences caused damage to cooperative assets during the years existing in cooperative records. This results in a 12% probability that any given tornadic occurrence will produce damage. Table 6 provides a summary of event dates, EF-scale ratings, damage cost estimates and outages reported.

Table 6 *OBEC Tornadic Event Summary*

Date of Event	EF Scale Rating	Damage Estimates	Outages Reported
May 1990	F2	$175,000	7,000
January 1996	F1	$100,000	500
April 2002	F2	$400,000	1,100
February 2008	F2	$65,000	1,110
May 2011	EF3	$200,000	1,000
December 2015	EF1	$100,000	4,035
March 2017	EF2	$85,000	3,396
Totals		$1,125,000	18,141
Data provided based on internal OBEC records which reflect cost from the referenced event year.			

Based upon the last 33 years of historical event records, the average tornado to affect the cooperative will have an EF1-EF2 rating, causing an average annual damage cost of $35,156. This averaged amount accounts for less than 1% of OBEC's total overhead assets and building valuation ($35,156/$165,852,108).

The average annual number of outages is 566 outages. When compared with the total number of members served by OBEC, it can be projected that less than 2% of all members may report outages during a tornadic event in any given year.

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 1990 through June 2017, Ozark Border's service area within the state of Missouri has experienced a total 227 hail events and 201 thunderstorm/high wind events.

For this update, it was possible to look at the bounds of the Ozark Border Electric Cooperative using GPS, finding 400 hail events and 487 high wind/thunderstorm events from 1955-2020.

Probability of Future Occurrence and Vulnerability

The probability of hail events occurring in the Ozark Border service area in any given year is 100% with an average of over 6.1 hail storms each year. The probability of thunderstorm/high wind events in any given year is also 100% with an average of 7 events each year. Estimated material damages associated with each of these events were compiled by OBEC staff. No damages or outages were reported as a result

of the hail events resulting in a less than 1% probability that any given hail event will produce damage. Table 7 provides a summary of only those thunderstorm/high wind events which caused damage to cooperative infrastructure by date, cost estimate of damage, and reported outages.

Table 7 *OBEC Thunderstorm/High Wind Event Summary*

Event Date	Damage Estimates	Outages Reported
June-93	$325,000	15,000
January-99	$90,000	5,000
May-00	$275,000	12,000
May-04	$260,000	8,000
June-04	$210,000	8,500
March-06	$115,000	4,639
April-06	$80,000	1,768
January-08	$100,000	10,427
April-11	$545,000	15,724
August-11	$200,000	7,444
June-12	$60,000	3,285
April-13	$40,000	1,470
October-14	$60,000	2,142
May-16	$80,000	5,818
July-16	$60,000	6,146
March-17	$85,000	8,661
May-20	$1,300,000	17,250
Totals	$3,885,000	122,274
Data provided based on internal OBEC records which reflect cost from the referenced event year.		

Sixteen thunderstorm/high wind occurrences caused damage to cooperative assets during the years existing in cooperative records. This resulted in an 50% probability that a thunderstorm/high wind event occurrence will produce damage. (16 / 32) . Based upon historical records, thunderstorm/high wind events will cause an average annual damage cost of $121,406 ($3,885,000 / 32 years). This averaged amount accounts for less than 1% of OBEC's total overhead asset valuation ($153,019,434).

A total of 122,274 members reported outages during recorded thunderstorm and high wind events since 1990, while no members reported outages during hail events. For the 32 years of records, thunderstorm wind events caused an annual average of 3,821 outages. When compared with the total number of members served by OBEC, it can be projected that approximately 9% of all members may report outages during a thunderstorm or high wind event while less than 1% may report outages during a hail event.

Problem Statement

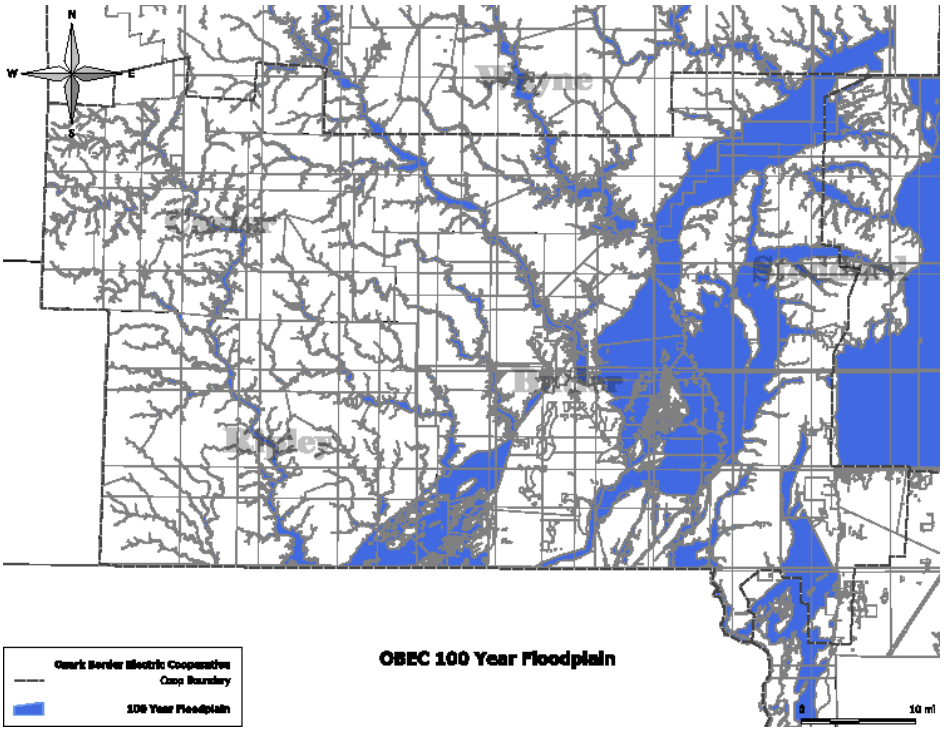
While the amount of damage to the assets has been relatively low when damage has occurred from thunderstorm events, replacement of wood poles with those made of more wind-force resistant material

where feasible is recommended. Programs that encourage the elimination of trees near powerlines would help reduce the outages due to limbs taking down lines.

Flood and Levee Failure

Flood and levee failure carry, perhaps, the greatest ongoing potential threat to the existing infrastructure of the Ozark Border Electric Cooperative. Large portions of the 11-county service area of OBEC are located directly within the 100 year floodplain. There are four rivers in the service area that magnify this risk, the St. Francis River, Black River, Little Black River, and the Current River. Figure 4 below depicts the 100 year floodplain in relation to the cooperative's boundaries. *(Map sources: FEMA HAZUS-MH; DFIRMS; Missouri Office of Administration, and Association of Missouri Electric Cooperatives.)*

Figure 4 *100 Year Floodplains in the OBEC Service Area*



Geographically, the western portion of OBEC's territory is hilly and rocky, while the eastern portion tends to be flatter and sandier. Four rivers cut through the cooperative's service area: the Current River, Black River, Little Black River, and St. Francis River. All four are susceptible to flooding and have caused significant problems and damage for Ozark Border during those times. The cooperative service area also contains Wappapello Lake, which has created its own set of problems – particularly when extreme flooding caused the emergency spillway to overflow in 1945 and again in 2011. The flooding in the spring of 2017 was especially destructive to the area.

Currently, inundation data for levee failure is lacking due to issues surrounding mapping, appropriate models, and its close association with flooding events. Accurate data is unavailable to provide maps of the area's levees. Levees have been constructed across the state and the region by a variety of public and private entities with varying levels of protection, oversight and maintenance. There is no single comprehensive inventory of all of the levees located in the area, or in the State of Missouri.

Previous Occurrences

From 1990 through June 2017, OBEC's service area has experienced 326 flooding events. To update this data, NCEI reported events 67 flood events occurring during the past five years in the area. OBEC did not report any additional damages or outages since the last update. Currently, no data concerning levee failure damage can be separated from flood damage data.

Probability of Future Occurrence and Vulnerability

The probability of a flood/levee failure event occurring in the OBEC service area in any given year is 100% with an average annual of almost 13.4 events (67 events/5 years). Estimated material damages associated with each of these events were compiled by OBEC staff. Table 8 summarizes flood event dates by month, damage cost estimates, and number of reported outages.

Table 8 *OBEC Flood Event Summary*

Event Date	Damage Estimates	Reported Outages
November 2003	$40,000	200
May 2004	$65,000	400
March 2008	$700,000	500
May 2011	$1,000,000	300
April 2017	$1,500,000	4,500
Totals	$3,305,000	5,900
Data provided based on internal OBEC 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 15.6% probability of a damaging storm in any given year is. The most significant flood event in the area occurred in April of 2017. Damages were approximately $1.5 million with 4,500 members reporting outages during the event.

Flood and levee failure events vary widely based upon numerous factors including, but not limited to, excessive precipitation and extent of levee damage. Based upon historical records, the average flood/levee failure event to affect the cooperative will cause an average damage cost of $661,000 ($3,305,000 / 5 events = $661,000). The average annual damage due to flooding is $103,281. This averaged amount accounts for less than 1% of OBEC's overhead asset valuation ($153,019,434).

A total of 5,900 members reported outages during the five flooding events since 1990 that resulted in damages to OBEC assets. This averages out to about 1,180 members losing power during any damaging flooding event and an average annual of 184 average annual outages. When compared with the total number of members served by OBEC, it can be projected that 3% of all members (40,500) may report outages during a damaging flooding event.

Problem Statement

The trend of the impact of flooding events on OBEC has been for increased asset damages and a corresponding increase in the number of outages. To guide OBEC in developing a strategy to lessen the effects of flooding events, a detailed study of which assets are damaged in a flood event and whether the location of damaged assets is repetitive, could be conducted.

Severe Winter Weather

Previous Occurrences

From 1990-2017, OBEC's service area has experienced a total of 176 severe-winter weather events, including significant snowfall and ice storms. According to the NOAA's Storm Events Database, there were only 41 days during this time span with winter weather events, but the events were located throughout the 11-county area. Many snowfall and ice events are not of a magnitude to affect the infrastructure. The severe ice storm of January 2009 was the most catastrophic weather event in the history of Ozark Border Electric Cooperative. The number of damages sustained, and the number of outages reported are exponentially greater than any other recorded event.

Probability of Future Occurrence and Vulnerability

The probability of a severe winter weather event in the OBEC service area in any given year is 100% with an average of 6.4 events per year. Of these 176 recorded severe winter weather events, nine resulted in damages and customer outages. To update this data, NCEI reported 8 winter weather events occurring during the past five years in the area. OBEC did not report any additional damages or outages since the last update. There is a 23% probability that a damaging storm will occur in any given year. Table 9 provides a summary of event dates, types, associated damage estimates, and customer outages.

Table 9 *OBEC Severe Winter Weather Event Summary*

Event Date	Event Type	Damage Estimates	Outages Reported
November 1993	Ice	$150,000	8,000
October 1993	Snow	$132,000	7,500
January 1994	Ice	$180,000	7,500
January 1999	Ice	$200,000	10,000
March 1999	Snow	$165,000	12,000
December 2003	Ice	$150,000	6,000
February 2008	Ice	$900,000	9,971
January 2009	Ice	$19,000,000	27,884
February 2013	Ice	$150,000	11,300
	Totals	$21,027,000	100,155
Data provided based on internal OBEC records which reflect cost from the referenced event year.			

Based upon the nine historical events, severe winter weather events will cause an average annual damage cost of $657,094 ($21,027,000/32 years). This averaged amount accounts for less than 1% of OBEC's total overhead asset valuation ($153,019,434). A total of 101,155 outages were reported during the 9 damaging severe winter weather events since 1990. That is an average of about 317 outages per year.

When compared with the total number of members served by OBEC, it can be projected that .7% of all members may report outages during any given severe winter weather event.

Problem Statement

The data shows that the most destructive winter weather event for OBEC is the ice storm. Over 98% of the damage sustained from winter weather has been from ice storms. Aside from using the strongest lines and poles, there are few improvements to be made to minimize the impact of an ice storm for overhead transmission. Increasing the amount of transmission line placed underground and improving repair procedures to minimize outage times could also help lessen the effects of severe winter weather.

B. Non-historical Hazards

Wildfire

Previous Occurrences

The incidence of wildfire in the OBEC service area presents a unique risk assessment. Wildfire events have occurred in each of the 11 counties. Between 2004 and 2016, 4,619 fires have burned a total of 69,026 acres, for an average of 14.9 acres affected per event. Although OBEC has not recorded any damages as a result of wildfires, for the purposes of this assessment, wildfire and its associated impacts cannot be eliminated from the realm of possible damages. Table 10 summarizes the incidences of wildfire within the 11 counties.

Table 10 *Wildfire Summary by County*

County	Wildfires 2004-2016	Average Annual # of Wildfires	Acres Burned	Average Annual Acres Burned
Bollinger	399	31	2,814	216
Butler	1,158	89	4,151	319
Carter	113	9	6,250	481
Dunklin	14	1	24	2
New Madrid	98	8	167	13
Oregon	622	48	6,919	532
Reynolds	559	43	21,737	1,672
Ripley	418	32	4,900	377
Shannon	510	39	13,437	1,034
Stoddard	484	37	2,706	208
Wayne	244	19	5,921	455
Totals	4,619	356	69,026	5,309
Source: Missouri State Hazard Mitigation Plan, 2018				

Probability of Future Occurrence and Vulnerability

The potential extent of damage caused by wildfire is difficult to determine. Like earthquakes, wildfires have had no measurable impact upon the OBEC assets in its service area. The probability of a wildfire event in the Ozark Border service area in any given year is 100% with the average number of fires per county ranging from one in Dunklin County to 100 in Butler County. OBEC sustained no damage related to wildfires in its service area during this time period. Cooperative assets are located throughout the service area rather than being located at a single central site. OBEC has a minimal number of assets in Shannon and Reynolds Counties, the two counties with the largest average number of acres burned. With a combined average of 356 acres burned per fire in the service area, it is unlikely that infrastructure

damage would exceed 1% based upon asset location and unlikeliness of an uncontrollable wildfire. No members have reported outages during recorded wildfires.

Problem Statement

Further study will be required to create a model for damage assessments related to wildfire. It is important to consider that the assets in Bollinger, New Madrid, Oregon, Reynolds, and Shannon Counties total only 4% of the total assets of OBEC.

Land Subsidence (Sinkholes)

Previous Occurrences

The incidence of sinkholes varies widely when comparing the historical occurrences. On August 6, 2012, a sinkhole caused a road to collapse near Springfield-Branson National Airport. A water main snapped when the concrete collapsed. The hole likely formed after heavy rains. The southeastern section of the service area is immune to sinkholes, while Shannon County has 782 sinkholes reported from the most recent data available from the 2018 Missouri State Hazard Mitigation Plan. The total number of reported sinkholes reported in the data for the eleven county service area of Ozark Border is 1,429. Table 11 below details the number of sinkholes by county and service area.

Table 11 *Sinkholes in OBEC Service Area*

County	Number of Sinkholes in Each County	Number of Sinkholes Estimated in the OBEC Service Area
Bollinger	3	0
Butler	3	3
Carter	72	72
Dunklin	0	0
New Madrid	0	0
Oregon	463	50
Reynolds	56	8
Ripley	33	33
Shannon	782	3
Stoddard	0	0
Wayne	17	3
Total	1,429	172
Source: 2014 data, Missouri Spatial Data Information Service		

Probability of Future Occurrence and Vulnerability

Although there are a significant number of sinkholes in several of the counties, damages are rarely associated with these events. Ozark Border Electric Coop has no reported damages as a result of sinkholes. Although OBEC has not recorded any damages as a result of sinkholes, for the purposes of this assessment, sinkholes and their associated impacts cannot be eliminated from the realm of possible

damages. Due to the number of sinkholes reported in the area, there is a high probability that they will occur in the future. When considering the historical data available, the probability of damage to OBEC facilities is low. No members have reported outages as a result of sinkholes.

Problem Statement

Without any previous damage from land subsidence, OBEC has demonstrated good planning in avoiding placing assets in sinkhole prone areas. Careful monitoring of those areas in the future should minimize the risk of losses.

Earthquakes

Previous Occurrences

The closest source of earthquake risk in southeast Missouri is the New Madrid Seismic Zone, which is the most active zone impacting Missouri and also the most active seismic area in the United States east of the Rocky Mountains. The New Madrid Seismic Zone runs from northern Arkansas through southeast Missouri and western Tennessee and Kentucky to the Illinois side of the Ohio River Valley. It is estimated that about 200 earthquakes are detected every year in the New Madrid Seismic Zone. Although the majority can only be detected by sensitive instruments, the area experiences an earthquake once or twice every 18 months that is strong enough to crack plaster in buildings. The most severe earthquakes occurred in the area during a period between December 1811 and March 1812. Two of the earthquakes during this period rank number seven and nine among the largest earthquakes in the United States. Although the New Madrid Seismic Zone is a rather active zone, no damages have ever been reported to have occurred to OBEC's facilities. However, the seismic zone has the potential to produce a damaging earthquake, profoundly impacting the Ozark Border Electric Cooperative.

Probability of Future Occurrence and Vulnerability

Scientists from the U.S. Geological Survey (USGS) and the Center for Earthquake Research and Information (CERI) at the University of Memphis have estimated the probability of a magnitude 6.0 or greater earthquake from the New Madrid Seismic Zone 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 7.6 magnitude, the region would experience Level X in Mississippi, New Madrid and Pemiscot Counties, Level IX in Dunklin, Scott, and Stoddard Counties, Level VIII in Butler, Bollinger, and Cape Girardeau Counties, and Level VII and VI in the remaining counties of the service area. The destruction of the area would range from completely catastrophic in the eastern section of the service area that would experience Level X and IX which would amount to almost all buildings sustaining significant damage or collapse. Overhead distribution lines would collapse or sustain considerable damage rendering them out-of-service. Though the probability of occurrence is very small, the potential extent of damage could significantly impact both the cooperative and its members. Based upon information from CERI, FEMA, and SEMA, it can be projected that more than 50% of all members may report outages during any given seismic event.

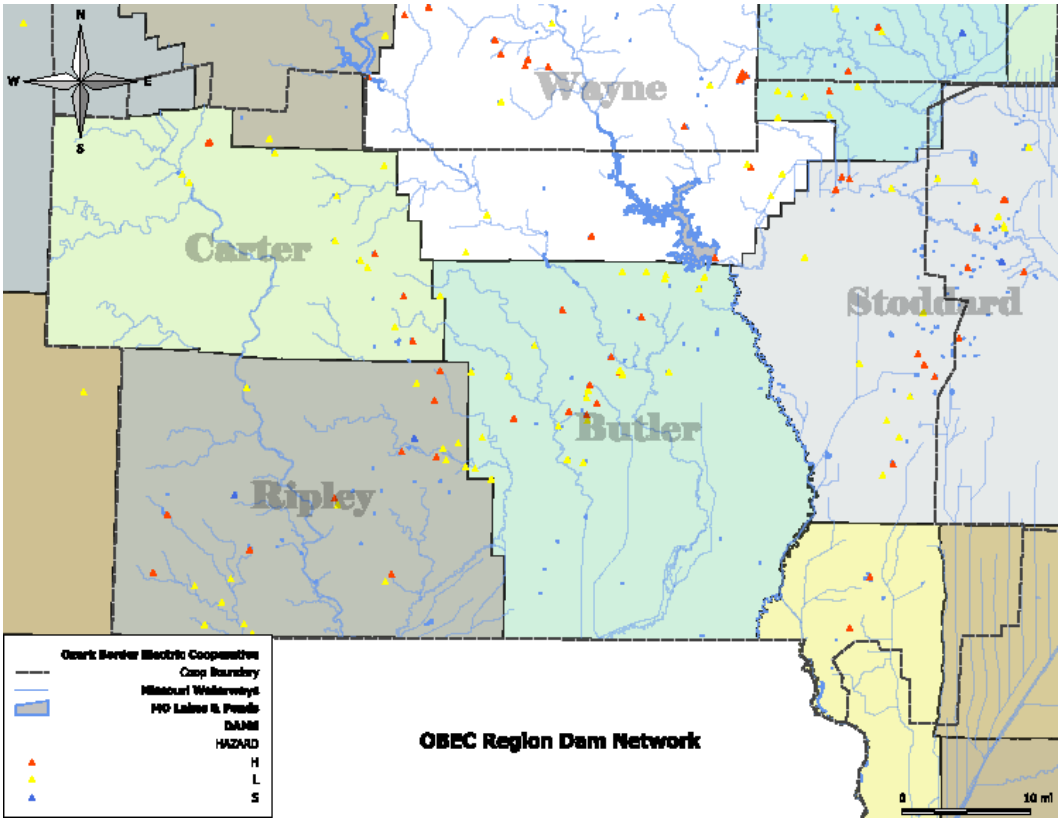
Problem Statement

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

Dam Failure

According to Missouri DNR's Dam Safety Division, 203 dams currently exist within the cooperative boundaries, of these dams, 33 are regulated by the State of Missouri and two dams located in Wayne County are regulated by the US Army Corps of Engineers. Figure 5 shows the locations of all known dams located within OBEC's service area. *(Map sources: www.msdis.missouri.edu; www.dnr.mo.gov/env/wrc.)*

Figure 5 *OBEC Dam Location Map*



Previous Occurrences

On December 14, 2005, the Taum Sauk reservoir dam owned by AmerenUE of St. Louis failed creating a 600-foot breach in the northwest side of the reservoir and releasing 1.5 billion gallons of water into the Johnson Shut-Ins State Park. The reservoir is a federally regulated dam that is located in Reynolds County on the Black River north of the OBEC service area. The failure destroyed the state park and the superintendent's home. OBEC reported no damages to their facilities and no power outages were reported in connection with this failure.

Probability of Future Occurrence and Vulnerability

Although no damages or outages have been reported as a result of a dam failure in the OBEC service area, for the purposes of this assessment, dam failure and its associated impacts cannot be eliminated from the realm of possibility. In order to allow for a risk assessment, the probability of this event has been included as less than 1 percent.

Problem Statement

Determining the potential extent of dam failure is currently impossible due to a lack of data concerning inundation zones. Further study concerning existing dams and their impact is required to make a more comprehensive assessment of potential damages.

C. Risk Assessment Summary

Most of the historical hazards have had an impact on the electric cooperatives. Table 12 below shows the annual damages associated with each hazard for OBEC. The table is ranked by the highest Average Annual Damages which is an indication of the vulnerability to each hazard.

Table 12 *OBEC Hazard Risk Summary*

Hazard	Average Annual Damages
Severe Winter Weather	$657,094
Flood and Levee Failure	$103,281
Severe Thunderstorms, and High Winds	$121,406
Tornadoes	$35,156
Dam Failure	$0
Earthquakes	$0
Hail	$0
Land Subsidence (Sinkholes)	$0
Wildfire	$0

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 damages to the assets of the Ozark Border Electric Cooperative from the non-historical 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 OBEC, mitigation is considered to be 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 lines area 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. Ozark Border 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 OBEC 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, OBEC 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 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 OBEC 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 13 lists the goals as reviewed in the 2023 plan update.

Table 13 *2023 OBEC Goals*

Identified Goals-2018	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 14, 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 14 *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 15 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 15 *Prioritized Mitigation Actions for Ozark Border Electric Cooperative*

Goal-Action#	Action Item:	Status Update	Progress Report	Hazards Mitigated	Timeframe for Completion	Cost-Benefit Score
1-1	Use vegetation management to limit the public safety danger of downed lines	Continue (In-progress)	Ongoing	Dam Failure Earthquakes Flooding Land Subsidence Levee failure **Thunderstorms** **Tornado** Wildfire **Winter Weather**	annually	7
1-2	Partner with county emergency management agencies to ensure power for local shelters, fuel stations, and public safety.	Continue (In-progress)	Ongoing	**Dam Failure** **Earthquakes** **Flooding** Land Subsidence **Levee failure** **Thunderstorms** **Tornado** Wildfire **Winter Weather**	annually	6
2-1	Replace critical wood structures with concrete or steel structures.	Continue (In-progress)	ongoing	Dam Failure **Earthquakes** **Flooding** Land Subsidence Levee failure **Thunderstorms** **Tornado** **Wildfire** **Winter Weather**	2027 or later	4
2-2	Upgrade/install protection devices (reclosers, breakers, fuses, smart electronic controls, etc.) which will automatically disconnect damaged line sections and protect critical facilities from unnecessary outages.	Continue (In-progress)	Ongoing	Dam Failure **Earthquakes** **Flooding** Land Subsidence Levee failure **Thunderstorms** **Tornado** Wildfire **Winter Weather**	2027 or later	5
2-4	Upgrade line crossings over roadways to be more reliable. This includes shortening span length at the road crossing, installing stronger structures and guying either side of the roadway, and in some cases replacing an overhead crossing with underground construction.	Continue (In-progress)	ongoing	Dam Failure **Earthquakes** Flooding Land Subsidence Levee failure **Thunderstorms** **Tornado** Wildfire **Winter Weather**	2027 or later	8

OZARK BORDER ELECTRIC COOPERATIVE

Goal-Action#	Action Item:	Status Update	Progress Report	Hazards Mitigated	Timeframe for Completion	Cost-Benefit Score
2-5	Install dead-end structures and/or guying for the purpose of minimizing cascading of structures (storm guying)	Continue (In-progress)	ongoing	Dam Failure Earthquakes Flooding Land Subsidence Levee failure **Thunderstorms** **Tornado** Wildfire **Winter Weather**	2027 or later	5
2-6	Install tie downs and bolted attachments to secure equipment to concrete pads and structure platforms to minimize damage resulting from movement during an earthquake.	Continue (In-progress)	Ongoing	Dam Failure **Earthquakes** Flooding Land Subsidence Levee failure Thunderstorms Tornado Wildfire Winter Weather	2027 or later	6
2-7	Raise or relocate electrical equipment (transformers, junctions, meters, et.) located in flood prone areas to prevent interruption of service and/or electrical hazards during flooding.	Continue (In-progress)	Ongoing	Dam Failure Earthquakes **Flooding** Land Subsidence Levee failure Thunderstorms Tornado Wildfire Winter Weather	annually	5
2-8	Install alternate sources. This includes construction of power lines to permit backfeeding and in some cases, installation of transfer facilities to automatically transfer the load to the alternate source.	Continue (In-progress)	ongoing	Dam Failure **Earthquakes** **Flooding** Land Subsidence Levee failure **Thunderstorms** **Tornado** Wildfire **Winter Weather**	annually	7
2-9	Rebuild Existing lines which are unreliable or vulnerable to damages. This includes replacing damaged and old conductors, replacing structures and guying, and possibly revising the line route to provide better reliability. In some cases, it may also include replacing part or all of the existing line with underground construction	Continue (In-progress)	ongoing	Dam Failure **Earthquakes** **Flooding** Land Subsidence Levee failure **Thunderstorms** **Tornado** Wildfire **Winter Weather**	annually	7

OZARK BORDER ELECTRIC COOPERATIVE

Goal-Action#	Action Item:	Status Update	Progress Report	Hazards Mitigated	Timeframe for Completion	Cost-Benefit Score
2-10	Research key lines to determine areas where concrete or steel poles will improve reliability.	Continue (In-progress)	ongoing	Dam Failure **Earthquakes** **Flooding** Land Subsidence Levee failure **Thunderstorms** **Tornado** Wildfire **Winter Weather**	2027 or later	6
2-11	Research key lines to determine areas where in-line switches will improve sectionalizing.	Continue (In-progress)	ongoing	Dam Failure **Earthquakes** **Flooding** Land Subsidence Levee failure **Thunderstorms** **Tornado** Wildfire **Winter Weather**	2025	9
2-12	Monitor developments in data availability concerning the impact of dam failure and wildfire upon the OBEC service area through local, state, and federal agencies.	Continue (In-progress)	ongoing	**Dam Failure** Earthquakes Flooding Land Subsidence Levee failure Thunderstorms Tornado **Wildfire** Winter Weather	annually	5
3-1	Cooperate with local law enforcement and government officials to reduce the impact of power outages.	Continue (In-progress)	ongoing	**Dam Failure** Earthquakes Flooding Land Subsidence Levee failure Thunderstorms Tornado **Wildfire** Winter Weather	annually	9
3-2	Maintain and improve Cooperative's emergency response procedure.	Continue (In-progress)	ongoing	**Dam Failure** **Earthquakes** **Flooding** Land Subsidence **Levee failure** **Thunderstorms** **Tornado** Wildfire **Winter Weather**	annually	9

Goal-Action#	Action Item:	Status Update	Progress Report	Hazards Mitigated	Timeframe for Completion	Cost-Benefit Score
4-1	Provide safety and reporting information to the general public through varying methods: • Company website • Local newspapers • Presentations • Publications	Continue (In-progress)	ongoing	Dam Failure Earthquakes Flooding Land Subsidence Levee failure Thunderstorms Tornado Wildfire Winter Weather	annually	9

After review, there were five Actions completed and removed from the Action Items list for the 2023 plan update. The completed Actions are listed in Table 16 below. There were zero Actions deleted. All other actions are continued in the 2023 plan update. There are no additional actions added to the 2023 plan.

Table 16 *OBEC Summary of Completed Actions*

Actions Item	Status Update	Explanation for Deleted Action
Increase number of generators owned for use in critical asset outages	Action Completed	All coop facilities now have back-up generators
Research flood maps to determine electric lines and equipment susceptible to flooding.	Action Completed	List of lines vulnerable to flooding have been identified
Research locations for back-up control center and call center.	Action Completed	Project completed
Utilize GIS technology to reduce site identification and response time.	Action Completed	Project completed
Development of outage information section for Cooperative's web page.	Action Completed	Project completed

Section 5: Plan Implementation and Maintenance

Plan Incorporation

The goals, objectives, 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 OBEC employment level as the organization strives to ensure quality service to their customers.

Local Planning Capabilities

OBEC has both long and short-term plans that include annual budgeting, system improvements, and hardening. Additional planning efforts revolve around growth and expansion as well as maintenance on existing infrastructure. The Hazard Mitigation Plan can be considered and/or incorporated into these capabilities. 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 OBEC 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 Ozark Border Electric Hazard Mitigation Plan, regional planning capabilities exist at the local level. The eleven Missouri counties of Ozark Border's service area 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 counties are also included in their respective Regional Transportation Plan (RTP) as well as a Comprehensive Economic Development Strategy (CEDS). OBEC's plan can be easily incorporated into these local plans and allow for coordination across agencies in the event of an emergency.

OBEC is located within the rural portions of third-class counties which are prohibited from enforcing building codes and zoning by the state of Missouri. The cities and towns served by OBEC are small, rural communities. The majority of these small, incorporated areas have some level of building codes and

zoning laws. This plan complies with all of these building codes and zoning requirements. Comprehensive plans and Capital Improvement plans do not exist inside of the OBEC service areas.

Plan Maintenance

Ozark Border 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 2017 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.

Ozark Border 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 OBEC.

Appendix: A - Adoption Resolution

A copy of the signed adoption resolution will go on this page

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.

An updated copy of the Rural Missouri Ad will go here

Appendix: C – Surveys

Data Survey

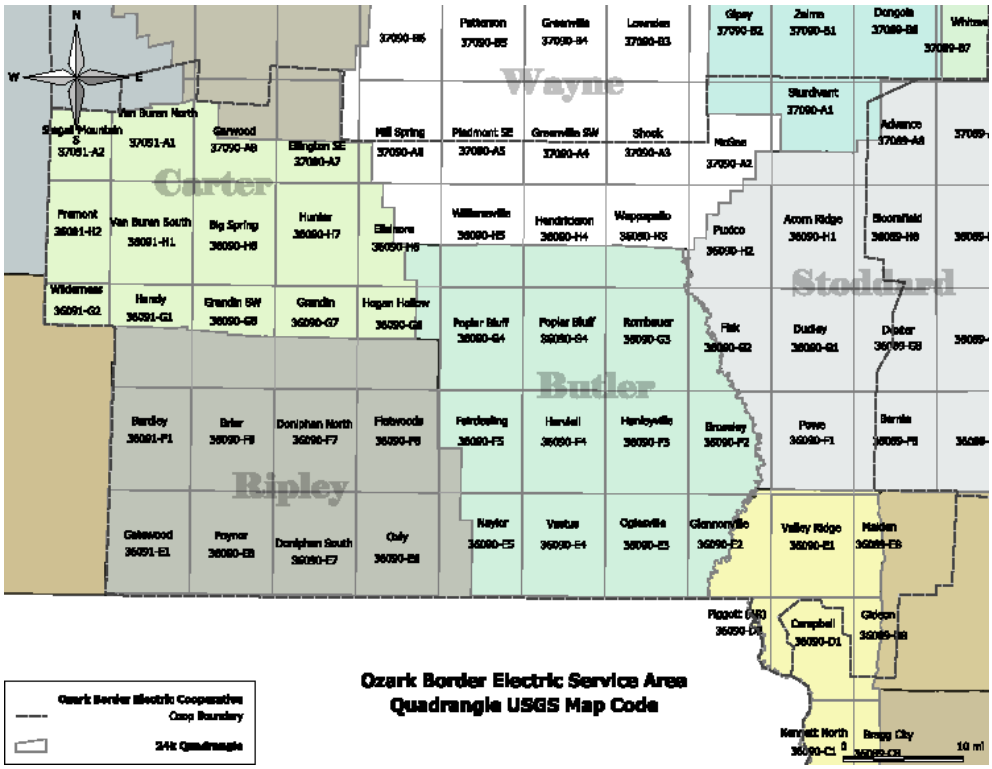
The following is the returned survey from OBEC which was used by NWMORCOG staff to update the Plan:

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

Ozark Border Electric Cooperative, Inc. (OBEC) was established in 1938 to provide electric service to rural areas of southeast Missouri. It is governed by a board of twelve directors. OBEC is headquartered in Poplar Bluff, Missouri, and provides service to members in all of Carter and Ripley counties, as well as parts of Bollinger, Butler, Dunklin, New Madrid, Oregon, Reynolds, Shannon, Stoddard and Wayne counties. Towns included in the service area include Ellsinore, Van Buren, Grandin, Qulin, Neelyville, Puxico, Naylor, Doniphan, Williamsville, Fisk, Dudley, and Campbell.

OBEC's service boundaries within the state of Missouri include Bollinger, Butler, Carter, Dunklin, New Madrid, Oregon, Reynolds, Ripley, Shannon, Stoddard, and Wayne Counties. The cooperative owns 6,026 miles of service line within these counties. Figure ? depicts the geographic boundaries in relation to the USGS local quadrangles within the state of Missouri. *(Map sources: www.usgs.gov, Association of Missouri Electric Cooperatives, Ozark Border Electric Cooperative.)* *Service Area Map* if needed, please replace or attach a different map if available or provide info on changes so a new map can be made.

OBEC Service Area Map



The customer base of OBEC currently exceeds 40,500 members in the service area. The majority of OBEC's members are residential, 81.6% (33,067), an additional 10.1% (4.109) of accounts are irrigation, and the remaining 8.3% (3,328) of accounts are commercial and governmental.

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

Meters by Missouri County

County	Number of Meters
Bollinger	833
Butler	16,047
Carter	4,175
Dunklin	3,260
New Madrid	432
Oregon	19
Reynolds	309
Ripley	7,767
Shannon	14
Stoddard	4,462
Wayne	3,182
Total	40,500
Source: Internal Ozark Border Accounting and Insurance records, 2021	

The average daily customer usage for OBEC was 49 kilowatt-watt (kWh) in 2021. Annual total usage of OBEC members in 2021 was 719,455,057 kWh of service.

Population Density Map will be updated by staff at NWMORCOG

Critical Facilities

OBEC provides service to many critical facilities such as senior housing complexes, fire stations, and highway patrol substations. This includes 6 nursing homes, 9 senior citizens housing complexes, 1 Missouri Department of youth Services Detention Center, 22 fire stations, 5 health care facilities, a Missouri Highway Patrol Troop Headquarters, the Missouri National Guard Armory, 4 county emergency management agencies, and one FEMA tornado shelter located at a local school. This list has not changed since the 2012 Hazard Mitigation Electric Cooperative Plan.

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

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.

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

Ozark Border Electric Cooperative has a wide variety of assets by type. Real estate owned by the company includes office buildings, warehouses, garages, and other outbuildings throughout the service area. Fifty-nine vehicles provide access to members and infrastructure. OBEC does not own any electric generation or transmission infrastructure 6,026 miles of distribution lines are owned and maintained by OBEC. Table ? provides information concerning total asset valuation.

Ozark Border Asset Inventory Valuation Summary

Asset	Total Replacement Cost	Cost Breakdown
Total OBEC Assets	$221,687,739	Buildings and vehicles – $12,832,674 Overhead assets – $153,019,434 Underground assets – $55,835,631
Distribution Lines	$40,549,077 $31,978,907	OH Single-phase lines – $18,652,575 UG Single-phase lines – $28,781,013 OH Three-phase lines – $21,896,502 UG Three-phase lines – $3,197,894
Supporting Infrastructure	$110,171,094	Meters - $15,904,409 Poles - $43,674,641 OH Transformers – $32,689,079 UG Transformers – $17,979,965 Guys/Anchors – $10,898,399 Cross-arms – $7,403,370 Regulators - $1,715,263 SP Oil-Circuit Reclosures – $3,564,792 3phase Oil-Circuit Reclosures - $1,755,793 Capacitors - $741,370
Office Buildings	$4,914,108	
Warehouses	$563,500	
Vehicles	$7,355,066	
Source: Internal Ozark Border Accounting and Insurance records, 2021		

Ensuring quality distribution to its members, Ozark Border maintains not only distribution lines, but also the supporting infrastructure as well. Table ? includes a list of asset types, emergency replacement cost per unit or mile, the asset inventory by Service County, and total infrastructure numbers.

Ozark Border Asset Inventory by Service County

Asset	Emergency Replacement Cost per unit or mile	Bollinger County	Butler County	Carter County	Dunklin County	New Madrid County	Oregon County	Reynolds County	Ripley County	Shannon County	Stoddard County	Wayne County	Total number of units or miles
Meters	331	1781	34316	8925	6969	924	41	661	16604	30	9539	6802	86592
Poles	706	2074	39975	10397	8119	1076	47	770	19343	35	11112	7924	100872
SP Distribution Lines, OH	9227	72	1382	360	281	37	2	27	668	1	384	274	3488
SP Distribution Lines, UG	8943	26	504	131	102	14	1	10	244	1	140	99	1272
TP Distribution Lines, OH	19732	18	366	96	75	10	1	7	178	1	102	73	927
TP Distribution Lines, UG	4120	7	134	35	27	3	1	3	65	1	37	26	339
Transformer OH	1677	624	12027	3128	2443	324	14	232	5819	10	3343	2384	30348
Transformer UG	2342	194	3736	972	759	100	6	72	1808	3	1038	740	9428
Guys/ Anchors	171	1310	25243	6565	5126	679	30	486	12214	22	7017	5004	63696
Cross-Arms	177	862	16609	4320	3373	447	20	320	8036	15	4616	3292	41910
Regulators	5428	6	125	33	25	3	1	2	61	1	35	24	316
Oil Circuit Reclosures SP	2598	28	544	141	110	15	1	10	263	1	151	108	1372
Oil Circuit Reclosure TP	3834	9	182	47	36	5	1	3	88	1	50	36	458
Capacitors	1298	12	226	59	46	6	1	4	110	1	62	44	571
County Totals		7023	135369	35209	27491	3643	167	2607	65501	123	37626	26830	341589

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	Outages Reported
May 1990	F2	$175,000	7,000
January 1996	F1	$100,000	500
April 2002	F2	$400,000	1,100
February 2008	F2	$65,000	1,110
May 2011	EF3	$200,000	1,000
December 2015	EF1	$100,000	4,035
March 2017	EF2	$85,000	3,396
Totals			
Data provided based on internal OBEC records which reflect cost from the referenced event year.			

Thunderstorm/High Wind, Hail Event Summary

Event Date	Damage Estimates	Outages Reported
June-93	$325,000	15,000
January-99	$90,000	5,000
May-00	$275,000	12,000
May-04	$260,000	8,000
June-04	$210,000	8,500
March-06	$115,000	4,639
April-06	$80,000	1,768
January-08	$100,000	10,427
April-11	$545,000	15,724
August-11	$200,000	7,444
June-12	$60,000	3,285
April-13	$40,000	1,470
October-14	$60,000	2,142
May-16	$80,000	5,818
July-16	$60,000	6,146
March-17	$85,000	8,661
May-20	$1,300,000	17,250
Totals		

Data provided based on internal OBEC 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	Reported Outages
November 2003	$40,000	200
May 2004	$65,000	400
March 2008	$700,000	500
May 2011	$1,000,000	300
April 2017	$1,500,000	4,500
Totals		
Data provided based on internal OBEC records which reflect cost from the referenced event year.		

Levee failure,

Event date	Damage estimates	Outages reported

Severe Winter Weather Event Summary

Event Date	Event Type	Damage Estimates	Outages Reported
November 1993	Ice	$150,000	8,000
October 1993	Snow	$132,000	7,500
January 1994	Ice	$180,000	7,500
January 1999	Ice	$200,000	10,000
March 1999	Snow	$165,000	12,000
December 2003	Ice	$150,000	6,000
February 2008	Ice	$900,000	9,971
January 2009	Ice	$19,000,000	27,884
February 2013	Ice	$150,000	11,300
	Totals		
Data provided based on internal OBEC 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 for modifying or removing a goal**	**Rewritten goal, if modified**	**Instructions**
→	**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.			Go to the next row & start at the left
→	**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.			Go to the next row & start at the left
→	**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.			Go to the next row & start at the left
→	**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.			Go to the next row & start at the left
↘	**After completing this sheet, please click the "actions" tab at the bottom**					
risk summary table Information to consider when updating						

Table 1 *OBEC Hazard Risk Summary*

Hazard	Average Annual Damages
Severe Winter Weather	$637,182
Flood and Levee Failure	$100,152
Severe Thunderstorms, and High Winds	$117,727
Tornadoes	$34,091
Dam Failure	$0
Earthquakes	$0
Hail	$0
Land Subsidence (Sinkholes)	$0
Wildfire	$0

Read each row left to right. Click on each box to receive instructions for that box.	Goal-Action#	Action Items Specify locations when able	Status Update	Explanation for completed/deleted action	Report progress on continued actions	Select Hazard(s) addressed by this action	Completion Date	COST BENEFIT SCORE
→	1-1	Use vegetation management to limit the public safety danger of downed lines	Continue (In-progress)		Ongoing	Dam Failure Earthquakes Flooding Land Subsidence Levee failure **Thunderstorms** **Tornado** Wildfire **Winter Weather**	annually	7
→	1-2	Increase number of generators owned for use in critical asset outages	Action Completed	All coop facilities now have back-up generators		Dam Failure **Earthquakes** **Flooding** Land Subsidence Levee failure **Thunderstorms** **Tornado** Wildfire **Winter Weather**		
→	1-2	Partner with county emergency management agencies to ensure power for local shelters, fuel stations, and public safety.	Continue (In-progress)		Ongoing	**Dam Failure** **Earthquakes** **Flooding** Land Subsidence **Levee failure** **Thunderstorms** **Tornado** Wildfire **Winter Weather**	annually	6
→	2-1	Replace critical wood structures with concrete or steel structures.	Continue (In-progress)		ongoing	Dam Failure **Earthquakes** **Flooding** Land Subsidence **Levee failure** **Thunderstorms** **Tornado** **Wildfire** **Winter Weather**	2027 or later	4
→	2-2	Upgrade/install protection devices (reclosers, breakers, fuses, smart electronic controls, etc.) which will automatically disconnect damaged line sections and protect critical facilities from unnecessary outages.	Continue (In-progress)		Ongoing	Dam Failure **Earthquakes** **Flooding** Land Subsidence Levee failure **Thunderstorms** **Tornado** Wildfire **Winter Weather**	2027 or later	5
→	2-3	Research flood maps to determine electric lines and equipment susceptible to flooding.	Action Completed	List of lines vulnerable to flooding have been identified		Dam Failure Earthquakes **Flooding** Land Subsidence **Levee failure** Thunderstorms Tornado Wildfire Winter Weather	annually	
→	2-4	Upgrade line crossings over roadways to be more reliable. This includes shortening span length at the road crossing, installing stronger structures and guying either side of the roadway, and in some cases replacing an overhead crossing with underground construction.	Continue (In-progress)		ongoing	Dam Failure **Earthquakes** Flooding Land Subsidence Levee failure **Thunderstorms** **Tornado** Wildfire **Winter Weather**		8
→	2-5	Install dead-end structures and/or guying for the purpose of minimizing cascading of structures (storm guying)	Continue (In-progress)		ongoing	Dam Failure Earthquakes Flooding Land Subsidence Levee failure **Thunderstorms** **Tornado** Wildfire **Winter Weather**		5
→	2-6	Install tie downs and bolted attachments to secure equipment to concrete pads and structure platforms to minimize damage resulting from movement during an earthquake.	Continue (In-progress)		Ongoing	Dam Failure **Earthquakes** Flooding Land Subsidence Levee failure Thunderstorms Tornado Wildfire Winter Weather		6
→	2-7	Raise or relocate electrical equipment (transformers, junctions, meters, et.) located in flood prone areas to prevent interruption of service and/or electrical hazards during flooding.	Continue (In-progress)		Ongoing	Dam Failure Earthquakes **Flooding** Land Subsidence Levee failure Thunderstorms Tornado Wildfire Winter Weather	annually	5
→	2-8	Install alternate sources. This includes construction of power lines to permit backfeeding and in some cases, installation of transfer facilities to automatically transfer the load to the alternate source.	Continue (In-progress)		ongoing	Dam Failure **Earthquakes** **Flooding** Land Subsidence Levee failure **Thunderstorms** **Tornado** Wildfire **Winter Weather**	annually	7
→	2-9	Rebuild Existing lines which are unreliable or vulnerable to damages. This includes replacing damaged and old conductors, replacing structures and guying, and possibly revising the line route to provide better reliability. In some cases, it may also include replacing part or all of the existing line with underground construction	Continue (In-progress)		ongoing	Dam Failure **Earthquakes** **Flooding** Land Subsidence Levee failure **Thunderstorms** **Tornado** Wildfire **Winter Weather**	annually	7

	2-10	Research key lines to determine areas where concrete or steel poles will improve reliability.	Continue (In-progress)		ongoing	Dam Failure Earthquakes Flooding Land Subsidence Levee failure Thunderstorms Tornado Wildfire Winter Weather	2027 or later	6
	2-11	Research key lines to determine areas where in-line switches will improve sectionalizing.	Continue (In-progress)		ongoing	Dam Failure Earthquakes Flooding Land Subsidence Levee failure Thunderstorms Tornado Wildfire Winter Weather	2025	9
	2-12	Monitor developments in data availability concerning the impact of dam failure and wildfire upon the OBEC service area through local, state, and federal agencies.	Continue (In-progress)		ongoing	Dam Failure Earthquakes Flooding Land Subsidence Levee failure Thunderstorms Tornado Wildfire Winter Weather	annually	5
	3-1	Cooperate with local law enforcement and government officials to reduce the impact of power outages.	Continue (In-progress)		ongoing	Dam Failure Earthquakes Flooding Land Subsidence Levee failure Thunderstorms Tornado Wildfire Winter Weather	annually	9
	3-2	Maintain and improve Cooperative's emergency response procedure.	Continue (In-progress)		ongoing	Dam Failure Earthquakes Flooding Land Subsidence Levee failure Thunderstorms Tornado Wildfire Winter Weather	annually	9
	3-3	Research locations for back-up control center and call center.	Action Completed	Project completed		Dam Failure Earthquakes Flooding Land Subsidence Levee failure Thunderstorms Tornado Wildfire Winter Weather		
	3-3	Utilize GIS technology to reduce site identification and response time.	Action Completed	Project completed		Dam Failure Earthquakes Flooding Land Subsidence Levee failure Thunderstorms Tornado Wildfire Winter Weather		
	4-1	Provide safety and reporting information to the general public through varying methods: • Company website • Local newspapers • Presentations • Publications	Continue (In-progress)		ongoing	Dam Failure Earthquakes Flooding Land Subsidence Levee failure Thunderstorms Tornado Wildfire Winter Weather	annually	9
	4-2	Development of outage information section for Cooperative's web page.	Action Completed	Project completed		Dam Failure Earthquakes Flooding Land Subsidence Levee failure Thunderstorms Tornado Wildfire Winter Weather		
NEW Action (optional)			NEW Not Started	NEW	NEW	Dam Failure Earthquakes Flooding Land Subsidence Levee failure Thunderstorms Tornado Wildfire Winter Weather		

Ozark Border provided a copy of the current operating budget as part of their data survey response.

Ozark Border EC Budget 2022_Workir