BUTLER PUBLIC POWER DISTRICT'S
Annex to the
NEBRASKA HAZARD MITIGATION PLAN (2020)

Prepared by

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August 2020

Butler Public Power District
Board Resolution 20-03

WHEREAS, the Federal Disaster Mitigation Act of 2000 was signed into law on October 30, 2000 placing new emphasis on state and local mitigation planning for natural hazards and requiring public power districts to adopt a hazard mitigation plan to be attached to the State of Nebraska Hazard Mitigation Plan and to be eligible for pre-disaster and post-disaster federal funding for mitigation purposes, and;

WHEREAS, the Board of Directors recognizes that no public power district is immune from natural hazards whether it be tornado/severe thunderstorm, flood, severe winter weather, drought, heat wave, or wildfire and recognizes the importance of enhancing its ability to withstand natural hazards as well as the importance of reducing human suffering, property damage, interruption of public services and economic losses caused by those hazards, and;

WHEREAS, a Hazard Mitigation Team was developed by Butler Public Power District in association with RVW Inc., to study Butler Public Power District's risks from and vulnerabilities to natural hazards, and to make recommendations on mitigating the effects of such hazards on the community, and;

WHEREAS, the efforts of the Hazard Mitigation Team assisted by staff from RVW Inc., have resulted in the development of a Hazard Mitigation Plan for Butler Public Power District, and;

WHEREAS, NEMA recommends documentation that the Plan has been formally adopted by the governing body of Butler Public Power District in the form of a resolution and further requesting approval of the Plan at the Federal Level and updated every five years corresponding with the State of Nebraska Hazard Mitigation Plan updates, and;

NOW, THEREFORE, BE IT RESOLVED, that the Board of Directors of Butler Public Power District does hereby adopt the "Butler Public Power District Hazard Mitigation Plan" in its entirety and resolves to execute the actions in the Plan.

BUTLER PUBLIC POWER DISTRICT

By: _____

Larry Dauel - President

Participants

Butler Public Power District Board of Directors and Manager

Larry Dauel ---------- Board President
Daryl Crook---------- Board Vice President
James Papik ---------- Board Attorney/Secretary
Mark Blazek ---------- Board Treasurer
Mike DeWispelare ---------- Board Member
Gary Kucera ---------- Board Member
Gary Yindrick ---------- Board Member
John Schmid ---------- Board Member
Mark Kirby---------- General Manager

Butler Public Power District Hazard Mitigation Planning Team

Mark Kirby---------- General Manager
Jerry Abel ---------- Operations Manager
Amanda Topil ---------- Marketing/Communications/Customer Coordinator

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Appendix

- ***Neighboring Jurisdiction Letter***
- ***DNR letter***
- ***Plan update worksheets***

1 Introduction

1.1 Hazard Mitigation Planning

This Hazard Mitigation Plan was developed to preserve the current electrical system grid maintained by Butler Public Power District (BPPD). By doing this, the plan will provide protection to area consumers by reducing the impacts of natural and technological hazards. The plan will provide policies that are considered proactive in reducing the District's vulnerability to the most frequent hazards.

The definition of Hazard Mitigation according to the Stafford Act: (44 CFR 206:401) – "Hazard Mitigation means any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards." Hazard mitigation can occur through direct or indirect means. Direct hazard mitigation occurs through actions taken to reduce the impact of the hazard or actions taken to reduce or eliminate exposure (e.g. vulnerability) to the hazard. Indirect hazard mitigation occurs through steps taken to reduce the long-term harmful effects of the hazard, including its aftermath. This plan follows these and other requirements established in 44 CFR Part 201.

Hazard mitigation techniques include both structural and non-structural measures. These can vary from strengthening potentially affected infrastructure to the creation of public awareness programs. A broad mitigation approach addresses hazard vulnerabilities that exist today and in the future. The Butler Public Power District Hazard Mitigation Plan is an effective means to incorporate hazard mitigation principles and practices into the day-to-day activities of the District. This plan recommends actions designed to protect residents and, to a certain extent, the environment from those hazards deemed to be the greatest risk to the District's infrastructure.

Implementing this Plan provides the following benefits:

- Saving lives and protecting property
- Reduce vulnerability to future hazard events
- Facilitate post-disaster funding for mitigation assistance
- Decrease recovery time after a disaster
- Improved coordination with other utilities or jurisdictions
- Assist in 404 and 406 type federal funding applications
- Reduce overall cost to utility

This plan was prepared using current FEMA planning guides in coordination with the Nebraska Emergency Management Agency (NEMA) in order to meet all applicable state and federal mitigation plan requirements. Butler Public Power District, as a Public Power District, will be able to submit their plan as an annex to the State of Nebraska's Hazard Mitigation Plan.

1.2 Disaster Mitigation Act of 2000

The plan is also established to fulfill federal and state mitigation planning requirements. The Disaster Mitigation Act of 2000 (DMA 2000), Section 322 (a-d) requires local governments to have an approved local mitigation plan in accordance with 44 CFR 201.6 as a condition of receiving future federal disaster mitigation funds. To be approved, the local mitigation plan must describe a process for identifying

hazards, vulnerabilities, and risks; identify and prioritize mitigation measures; encourage the development of local mitigation; and provide technical support to those efforts. This is in addition to being in compliance with applicable federal, state and local laws.

1.3 Plan Outline

The Butler Public Power District mitigation plan is organized as follows.

- Introduction
- Planning Process
  - Includes processes used to develop plan
- Profile
  - Butler Public Power District overview
- Risk Assessment
  - Process of assessing risk for the area
- Mitigation Strategy and Actions
  - Goals and objectives of the mitigation plan
- Plan Implementation and Maintenance
  - Process going forward

2 Planning Process

Hazard mitigation planning is the process of determining how to reduce or eliminate the loss of life and property damage resulting from natural and manmade hazards. It includes organizing local resources, identifying and assessing hazard risks, and determining how best to minimize or manage those risks. The resulting hazard mitigation plan identifies specific mitigation actions that address current and future needs. Annual reviews of the plan will be required to evaluate and change the plan if necessary.

Prior to any meeting with Butler Public Power District (BPPD), applicable worksheets were sent to BPPD by RVW (Engineering Service Provider) requesting mitigation data. In response Butler Public Power District put together a Hazard Mitigation team to assist with the development and implementation of the overall plan on behalf of the District. The team was responsible for gathering all applicable information. The team consisted of BPPD staff members and an RVW Inc. representative (see Table 1).

Table 1: Hazard Mitigation Planning Team

Name	Title	Jurisdiction
Mark Kirby	General Manager	BPPD
Jerry Abel	Operations Manager	BPPD
Amanda Topil	Marketing/Communications/Customer Coordinator	BPPD
Jim Herchenbach	System Analyst	RVW Inc.

The role of the team was to assist in the creation of this plan. This included, but was not limited to, the following areas:

- Reviewed and presented all historical data and how it pertained to each hazard event
- Identify hazards and associated risk

- Determined critical infrastructure
- Developed goals and strategies
- Researched and presented mitigation actions to meet goals
- Notified area entities of mitigation plan intentions asking for participation or comments
- Set up a post plan process to include plan maintenance and reviews

To be inclusive of the entities that BPPD serves, a letter was sent out to all city and county clerks within the Butler Public Power District's service boundary as well as neighboring electrical utilities detailing the intentions of BPPD to form a Hazard Mitigation Plan (see Table 2).

Table 2

Butler County Clerk	Saunders County Clerk	Village of Abie
Village of Bellwood	Village of Brainard	Village of Bruno
Village of Dwight	Village of Garrison	Village of Linwood
Village of Malmo	Village of Octavia	Village of Prague
Village of Rising City	Village of Surprise	Village of Touhy
Village of Ulysses	Village of Valparaiso	Village of Weston
Cornhusker Public Power District	Norris Public Power District	Omaha Public Power District
Polk Rural Public Power District	City of Wahoo Utilities	

As of the drafting of this document no comments were received by these entities. See Appendix A for a copy of this letter.

2.1 Contractor Support and Resources

Butler Public Power District hired RVW Inc. to assist in the creation of their Hazard Mitigation Plan. RVW Inc. is the electrical consultant for BPPD. RVW is a leader in telecommunications engineering, electric power engineering, architectural services, and telecommunications billing. Their corporate headquarters are in Columbus, Nebraska, and have been in business since 1937. The planning technician in charge of this project is Jim Herchenbach. He has been in the electrical planning field since 1994.

RVW provided support in the following areas of the plan project:

- Project management (the planning process)
- Hazard analysis and characterization
- Risk assessment
- Mitigation strategy and actions
- Facilitate plan up to adoption
- Plan documentation

Due to the current Covid-19 social distancing policies all communications between Butler PPD staff and the RVW engineer responsible for the creation of the plan were completed via conference calls and email. Communications began in July of 2020 and in general took place weekly.

The team, along with the RVW support staff member (Jim Herchenbach), went through the plan requirements, evaluated applicable hazards and outlining the type of structures affected by the individual hazards. Present and future mitigation projects were also discussed.

The hazard mitigation planning process has four general steps, which include organizing resources, assessing risks, developing a mitigation strategy, and implementing the plan and monitoring the progress. It is not unusual that ideas developed while assessing risks should need revision and additional information while developing the mitigation plan or that implementation of the plan may result in new goals or additional risk assessment. The hazard mitigation planning process consists of four basic phases:

1) Organize Resources – Focus on the resources needed for a successful mitigation planning process.
2) Assess Risks - Identify the characteristics and potential consequences of the hazard. Identify how much of the jurisdiction can be affected by specific hazards and the impacts they could have on local assets.
3) Develop Mitigation Plan - Determine what the priorities should be and look at possible solutions to avoid or minimize the undesired effects. The result is a hazard mitigation plan and strategy for implementation.
4) Implement Plan and Monitor Progress – Bring the plan to life by implementing specific mitigation projects and changing day-to-day operations. It is critical that the plan remains relevant to succeed. Thus, it is important to conduct periodic evaluations and make revisions as needed.

2.1.1 Organize Resources

In this phase, Butler Public Power District identified and obtained the human resources and support needed to initiate and sustain a successful hazard mitigation plan. RVW was acquired to oversee the plan from the application phase to adoption. At this time the Butler Public Power District staff began organizing their resource information.

In the early stages of the plan update process, the planning team members from Butler Public Power District along with the consultant were established to provide comments on the plan update, goals and objectives, hazard identification, risk assessment, as well as review and evaluate the current project list, projects that have been implemented, and new potential projects. Additional technical support was provided to the planning team through staff from NEMA and the Nebraska Department of Natural Resources (NDNR).

The Hazard Mitigation Team, which is made up of staff from Butler Public Power District, have experienced the area hazards first hand and will serve as experts throughout the planning process. The intent of the initial communications was to provide an overview of the work to be completed over the next several months and discuss what types of information would need to be provided to complete the plan. An opportunity for input on the identification of hazards, records of historical occurrences, goals and objectives, and mitigation alternatives, as well as to evaluate and prioritize mitigation action items and identify critical facilities was completed.

Several worksheets were used to gather data for the plan. These worksheets are included in appendix "A" of this report and will be referred to throughout this plan. Over several weeks data was reviewed, assessed and discussed between the planning team and the planning consultant.

Current GIS maps showing existing and projected facilities were also used throughout the planning process. These documents outline projects that fit within the mitigation goals discussed later in this document and assisted in prioritizing actions. Local village and county plans were discussed to consider opportunities for coordination of electrical infrastructure mitigation efforts.

Along with the worksheets and related data, the planning team also used several documents to help with the Hazard Mitigation Plan. These, as well as websites used, are listed below.

2.1.1.1 Documents & Websites used in creating this plan

- State of Nebraska's Hazard Mitigation Plan (2019)
- BPPD's Construction Work Plan
- Ice and Wind Storms of December 2006 – January 2007, Electrical System Impacts and Mitigation Strategies
- Joint Sub-transmission Plan – by Nebraska Public Power District & BPPD
- Disaster Mitigation Act of 2000
- www.ncdc.noaa.gov website – Weather related hazard information
- www.fema.gov website – Map data and hazard information
- www.dnr.ne.gov website – Nebraska Dept. of Natural Resources
- www.fema.gov website - Federal Emergency Management Agency (FEMA)
- www.spc.noaa.gov – Storm Prediction Center Statistics
- www.nrea.org – Nebraska Rural Electric Association (NREA)

2.1.2 **Risk Assessment**

Risk assessment, which is detailed in Section 4 – Risk Assessment, evaluates the level of risk that Butler Public Power District has relative to the identified hazards in the State of Nebraska Hazard Mitigation Plan. For this plan, thirteen hazards were initially considered.

Flooding	Wild fire	Hail
Winter Storm	Extreme Heat	Dam/Levee Failure
Ice	Severe Thunderstorms	Chemical Incident
Extreme cold	Tornado/High Winds	Terrorism/man-made
Drought		

The risk assessment also included defining the critical infrastructure and how vulnerable to each hazard these critical areas were. The team, along with the RVW representative, reviewed historical data to determine this information. Worksheets helped in allowing input from team members.

2.1.3 Mitigation Strategy & Actions

In this phase, detailed in Section 5 – Mitigation Strategy & Actions, realistic goals were set by the planning team. These goals were based on past success stories both inside the District and of the bordering regions. The RVW representative along with the planning team discussed these goals in regard to reducing damage cost and outage times for each relevant hazard.

2.1.4 Plan Implementation - Maintenance

The Hazard Mitigation plan will be used as a guide, in conjunction with other system planning studies, to analyze specific projects for mitigation actions. This will include a Benefit Cost Analysis and subsequent approval for FEMA funding if applicable and if funds are available. Plan maintenance is also a function of this process. Plan maintenance will include periodical review of the plan, specifically in regard to new hazards, lessons learned and additional mitigation actions. The maintenance will be done on an annual basis with a revised, updated plan every five years. Future updates will again attempt to include local jurisdiction input with regard to discussion of historic events, damages and risk.

2.1.5 Worksheets

Worksheets mentioned throughout this plan and can be referenced in the appendix. These worksheets were created to assist the District in obtaining crucial information. The below table illustrates the various worksheets used.

Worksheet	Summary	Description
District Capability & Risk Assessment	District profile Risk Assessment	Summarizes service area and critical infrastructure Prioritizes risk with regard to each Hazard
Project Tracker	Prioritized Mitigation Projects	List of ten projects that meet mitigation requirements and are in the planning process
Damage	Damage from Hazards	Cost of damage as they relate to hazards

3 Profile

Butler Public Power District

Butler Public Power District (BPPD) is headquartered in David City, Nebraska, and is a non-profit electrical utility that is a political subdivision of the State of Nebraska. BPPD provides electrical service to rural, town, irrigation, industrial, and resale customers within the chartered area located in east central Nebraska. Counties served by BPPD include Butler and Saunders. Within these counties several small towns are also served by the district either directly or indirectly. These include the following:

Bellwood	Rising City	Brainard
Prague	Valparaiso	Bruno
Octavia	Linwood	Malmo
Garrison	Dwight	Surprise
Ulysses		

The District was organized in 1937 and based on 2019 year ending data, serves approximately 6,326 meters. The District maintains 1,697 miles of electrically energized line consisting of 211 miles of transmission line (34.5 kV and above), 1,451 miles of overhead distribution line (12.47 kV and below) and 36 miles of underground distribution line (12.47 kV and below). The transmission lines and distribution lines are connected via 23 substations. Figures 1 & 2 illustrate BPPD's service boundary and facility map.

Figure 1

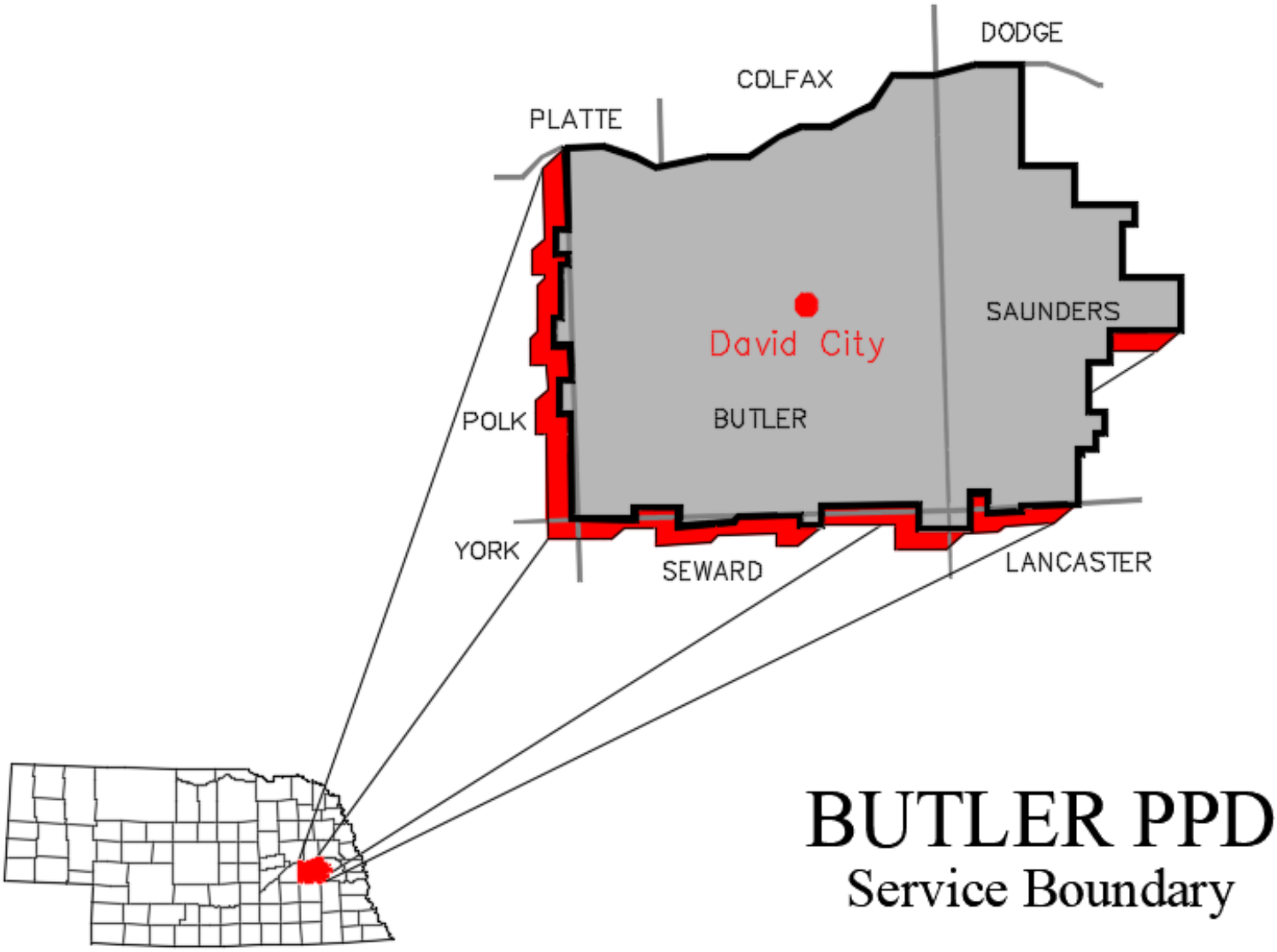
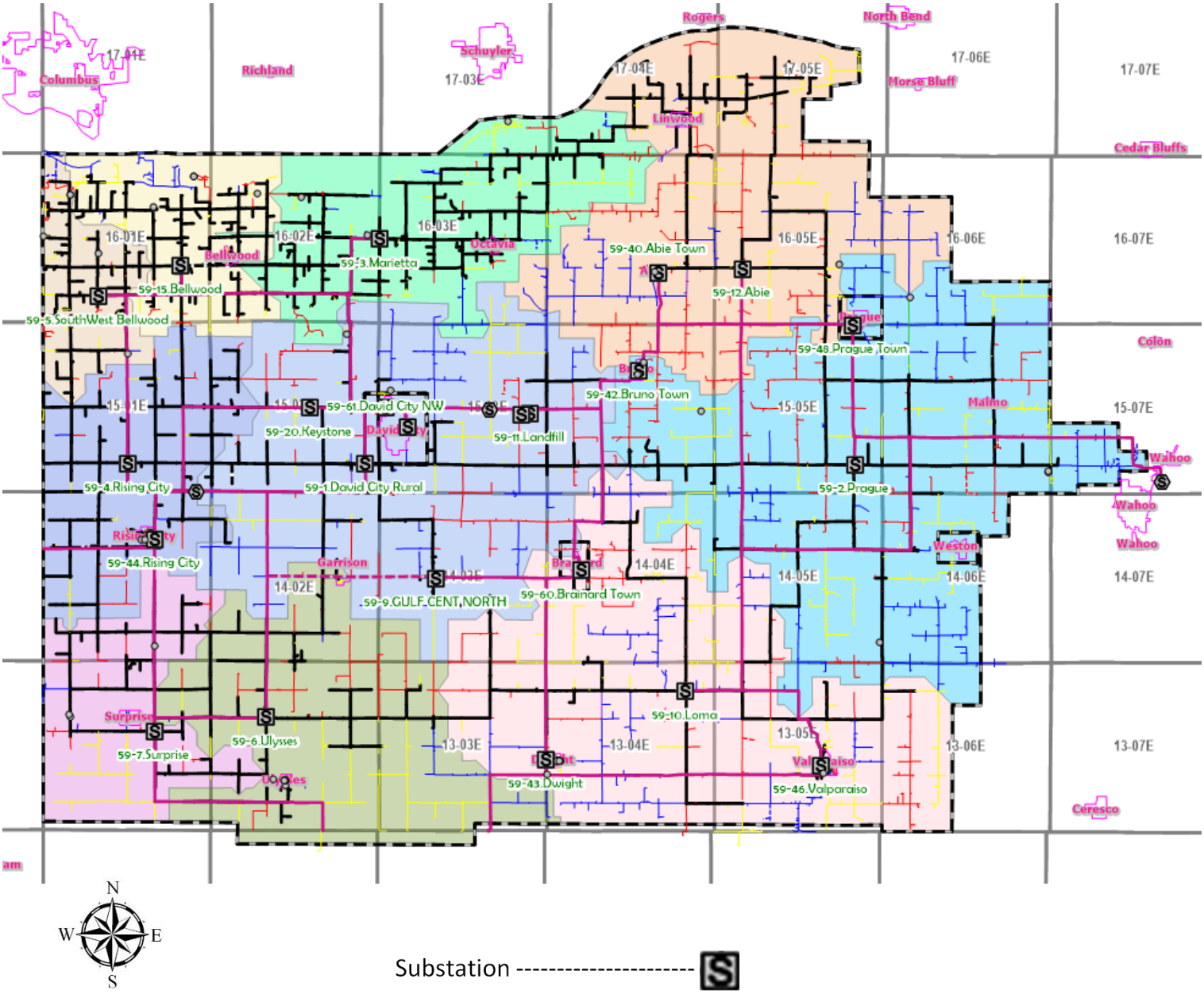

DODGE
COLFAX
PLATTE
SAUNDERS
David City
POLK
BUTLER
YORK
SEWARD
LANCASTER
BUTLER PPD
Service Boundary

Figure 2


Columbus
Richland
Schuyler
Rogers
North Bend
Morse Bluff
Linwood
Cedar Bluffs
Bellwood
Octavia
Colon
Malmo
Wahoo
Wahoo
Wahoo
Weston
Garrison
Surprise
Ceresco
17-01E
17-03E
17-04E
17-05E
17-06E
17-07E
16-01E
16-02E
16-03E
16-05E
16-06E
16-07E
15-01E
15-05E
15-07E
14-02E
14-04E
14-05E
14-06E
14-07E
13-03E
13-04E
13-05E
13-06E
13-07E
59-3.Marietta
59-15.Bellwood
59-5.SouthWest Bellwood
59-40.Abie Town
59-12.Abie
59-48.Prague Town
59-42.Bruno Town
59-61.David City NW
59-20.Keystone
59-11.Landfill
59-4.Rising City
59-1.David City Rural
59-2.Prague
59-44.Rising City
59-9.GULF CENT NORTH
59-60.Brainard Town
59-10.Loma
59-6.Ulysses
59-7.Surprise
59-43.Dwight
59-46.Valparaiso
N
W
E
S
Substation ----------
Sub-Transmission Line--------
3 PHS Distribution Line-------
1 PHS Distribution Line-------

3.1 Critical Infrastructure (summary)

The planning team reviewed and evaluated critical facilities as a part of the plan update. Critical facilities are defined as essential components for distribution of electricity to customers. The following facilities are considered critical.

- Main Office – David City, Nebraska
- 1,697 miles of electrically energized line
- 23 Substations – Substations convert the high voltage into a lower distribution voltage; all residential loads are fed via these Substations.
- Trucks and Equipment used by Electrical line maintenance crews

Below Facilities that rely on Electrical power

- Emergency and Health Facilities.
- Communication facilities
- Water treatment facilities

4 Risk Assessment

Risk is a combination of hazard, exposure, and vulnerability. Risk assessment evaluates the level of risk that Butler Public Power District has relative to the identified hazards. The first step in this process is to determine the critical infrastructure that could be at risk and then assess each risk as it relates to the critical infrastructure. Finally, based on probability, exposure and vulnerability, decide which hazards to target for mitigation.

The planning team identified natural and technological hazards that have or can affect the District's facilities. Resources used for this process included historical data derived from the District in regard to past hazards that caused damage to their system as well as weather maps and team input. For example, a hazard that may occur in the area may not affect the facilities of BPPD. All hazards in the Nebraska State Plan were evaluated and the list was reduced by the planning team.

Using the list of hazards identified by the State of Nebraska, the team then went on to profile each hazard. This consists of describing the causes and characteristics of each hazard, how it has affected the District's service area in the past and what infrastructure has historically been vulnerable to the specific hazard. The hazard profile is based on geographic extent of the hazard, the severity of the hazard, and the probability of its occurrence. Several websites were used in profiling the hazards, including FEMA and NOAA's National Weather Service.

4.1 Risk Assessment Process

The team utilized the "District Capability and Risk Assessment" worksheet using the following instructions. Following the instructions is the final assessment.

Hazards are listed down the left side of the sheet. The Risk Assessment factors we have identified are Probability, Vulnerability, Extent and Impact. Each of these is defined and characterized at the bottom of the sheet. Please use the parameters noted for each factor to rate each hazard for the district.

Butler Public Power District	*Probability*	*Vulnerability*	*Extent*	*Impact*
Hazards:				
Flooding	High	Medium	Limited	Low
Winter Storm	Medium	High	Critical	High
Ice	High	High	Catastrophic	High
Extreme cold	Medium	Medium	Limited	Low
Drought	High	Medium	Negligible	Medium
Wild fire	Medium	Medium	Negligible	Low
Extreme Heat	Medium	Medium	Negligible	Low
Severe Thunderstorms	High	Medium	Limited	High
Tornado/High Winds	High	High	Limited	High
Hail	Medium	Medium	Limited	Medium
Dam/Levee Failure	Low	Low	Negligible	Low
Chemical Incident	Low	Low	Negligible	Low
Terrorism/man-made	Low	Medium	Negligible	Low
Other: (list here)				
Earthquakes	Low	Low	Negligible	Low

Probability	*Is the likelihood that an event will occur in the future based on factual records. It is expressed as the number of chances per year that an event of specific intensity or greater will occur. For this annex's evaluation use the following parameters for your district's ranking of probability:*			
	HIGH = Between 80-100% chance this hazard will occur next year	MEDIUM = Between 21-79% chance this hazard will occur next year	LOW = 20% or less chance this hazard will occur next year	
Vulnerability	*is determined based on population, property, infrastructure, & environment directly exposed to the hazard. We will categorize vulnerability as High, Medium or Low based upon the potential for damage, injury, or loss from a hazard occuring using the following parameters:*			
	HIGH = Strong potential for major to catastrophic damage to exposed facilities, people, or infrastructure.	MEDIUM = some potential for moderate to major damage to exposed facilities, people, or infrastructure	LOW = there is little potential of lower levels of damage to facilities, people or infrastructure.	
Extent	*is the strength or magnitude relative to each hazard. For this analysis will include the negative impact to the district's customers as noted below:*			
	Catastrophic = over 50% of meters/customers without power, over half of the jursidiction affected, infrastructure destroyed beyond repair, essential facilities down >72 hours	*Critical* = 25-49% of meters/customers without power, 25-49% of the jurisdiction affected, major infrastructure damage and essential facilities down 24-72 hours	*Limited* = 10-24% of the meters/customers without power, 10-24% of the jurisdiction affected, minor infrastructure damage, facilities down between 4-24 hours	*Negligible* = less than 10% of the meters/customers with out power over less than 10% of the jursidiction with minor power interuption lasting 4 hours or less
Impact	*is the effect or consequence a hazard would have on the infrastructure, property, and people within the district or region of service. For noting impact to your jurisdiction please use the following parameters:*			
	HIGH = more than 25% of the district's systems are impacted	MEDIUM = 5-24% of the district's systems are impacted	LOW = less than 5% of the district systems are impacted	

4.2 Profile Hazards

Using the list of hazards, the team then went on to profile each hazard. This consists of describing the causes and characteristics of each hazard, how it has affected the District's service area in the past and what infrastructure has historically been vulnerable to the specific hazard. The hazard profile is based on geographic extent of the hazard, the severity of the hazard, and the probability of its occurrence. Using this information, a risk assessment was then completed.

Historical data supplied by the District in regard to damages, outages and related cost for any hazards reflects the time frame between their last Hazard Mitigation Plan and this one. Detailed outage information was not always available for each event so some event outages were estimated based on historical accounts by long term staff members.

4.3 Severe Winter Storm (snow, ice and wind)

Winter storms usually form along a stationary front. An area of lower pressure develops along the front as the atmosphere tries to even out the pressure difference. This creates wind, which blows from high pressure towards low pressure, in an attempt to move enough air to even out the pressure difference. As the air moves toward the low-pressure area, it has nowhere to go but up into the colder regions of the atmosphere. This causes water vapor in the air to condense. To the north of the storm, where temperatures are colder, this condensed water falls as snow. To the south, if the temperatures are warm enough, it can fall as heavy rain in thunderstorms. In between the rain and the snow, it can become an ice storm.

Over North America, strong winds blowing from west to east usually move a winter storm quickly across the continent. That is why a winter storm rarely lasts more than a day in one area. One exception to this rule occurs downwind of major bodies of water like the Great Lakes. If a strong, cold wind blows over a great length of unfrozen water, the air can acquire substantial amount of moisture. This moisture turns into heavy snow when it reaches land. These "lake-effect" snowstorms can last for many days and dump huge amounts of snow.

Severe winter storms can be an annual occurrence across Nebraska between the months of November and March, but can occur as early as October and as late as April. These early and late storms can be just as damaging due to their heavy snow characteristics. Storms characterized as blizzards can often cripple an entire power district by damaging facilities and delaying transportation of maintenance crews.

4.3.1 Previous Historical Occurrences

Winter Storm Events (2000-2019)				
County	**Blizzard**	**Heavy Snow**	**Ice Storm**	Because any single event may be reported for more than one county, (that is, the same blizzard in one county may be reported in adjacent county), this analysis is based on the maximum count for each event type. The entire area experienced a total of 17 winter storm events in 20 years, or 0.85 events in any given year.
Butler	8	4	2	
Saunders	8	6	3	
Maximum Event Count	**8**	**6**	**3**	
Note: Although Butler PPD does not serve all of the entire counties listed; event occurrences for all of the counties will be used as a basis for evaluating winter storm exposure for the PPD.				

Historically, severe winter storms have caused extreme damage and long outages to BPPD's consumers. The probability of this hazard happening is yearly. The following information summarizes the "Butler PPD Damage" worksheet provided by Butler PPD. This data represents severe winter storms that have adversely affected Butler PPD since 2001.

Year	Total Damages ($)	Miles of Line affected	# of customers affected	Outage Length (Hours)
2001	$ 14,355.55	12	3800	11
2002	$ 31,365.00	29	4000	20
2005	$ 3,526.00	12	1250	2
2006	$ 76,601.27	25	5000	48
2007	$ 26,350.00	41	4000	20
2009	$ 116,313.33	8	1158	7
2009	$ 10,334.00	4	104	11
2016	$ 28,950.13	35	845	9
2017	$ 17,543.17	47	1329	4
2017	$ 13,644.04	47	1372	2
2018	$ 31,221.11	34	1495	13
2018	$ 38,315.69	26	1675	11
2020	$ 100,326.49	52	2265	26
Total Damage	$ 508,845.78			

4.3.2 Vulnerability

This historical data gives a clear view of the probability and the frequency of this hazard. Severe winter storms have previously occurred across the entire area making the probability "medium to high" for this event to occur annually. These storms can be catastrophic to the District, causing 30% or more damage. The intensity of these storms and the location determine the effect on the District's facilities. Overhead electric sub-transmission (69 kV & 34.5 kV) and distribution lines (12.47kV) with wood structures are more likely to be damaged than any other critical infrastructure. The likelihood increases if the conductor is not of the twisted pair variety.

Damage to higher voltage lines (69 kV & 34.5 kV) are generally costlier, affect more consumers, and require longer outage times to repair then that of distribution voltages. All consumers are fed via the sub-transmission lines, whereas distribution lines feed local areas only.

Accumulated snow and especially ice on power lines, electrical facilities and trees in close proximity can cause power lines to be damaged, interrupting electricity to a large contingent of the power District's service area population. Transportation is also affected by these types of storms, limiting the travel of emergency responders and electrical maintenance crews.

The FEMA publication "BCA Reference Guide" assigns $148 total economic impact to a complete loss of electrical service per person per day. If only 10% of BPPD's 6,326 meters were affected that would equal $93,625 per day. This is a conservative number because we are dealing with meters and not actual population.

Based on the recent storms and historical data, a severe winter storm event could produce as much as $1,000,000 in damages.

4.4 Tornado

A tornado is a violently rotating column of air extending between and in contact with a cloud and the surface of the earth. Tornadoes are generally spawned by thunderstorms, though they have been known to occur without the presence of lightning. The stronger tornadoes attain an awe-inspiring intensity, with wind speeds that exceed 200 mph and, in extreme cases, may approach 300 mph.

Tornado wind speeds are estimated after the fact based on the damage they produce. Tornadoes are categorized on a scale of 0 (weakest) to 5 (strongest) according to the Enhanced Fujita Scale. Tornadoes can come one at a time or in clusters, and they can vary greatly in length, width, direction of travel, and speed. They can leave a path 50 yards wide or over a mile wide. They may touch down for only a matter of seconds or remain in contact with the ground for over an hour.

The United States has the highest incidence of tornadoes worldwide, with more than 1,000 occurring every year. This is due to the unique geography that brings together polar air from Canada, tropical air from the Gulf of Mexico, and dry air from the South to clash in the middle of the country, producing thunderstorms and the tornadoes they spawn.

4.4.1 Previous Historical Occurrences

Tornado Events 2000-2019		
County	**Tornadoes**	Because tornadoes are considered more discrete events impacting a limited area, the event probability could reasonably total all tornado events. This analysis indicates that 16 events in 20 years results in a probability of 0.8 tornadoes in any given year.
Butler	6	
Saunders	10	
Maximum Event Count	**16**	
Note: Although Butler PPD does not serve all of the entire counties listed; event occurrences for all of the counties will be used as a basis for evaluating Tornado exposure for the PPD.		

Historically, tornados have caused extreme damage and long outages to BPPD's consumers. The probability of this hazard happening is yearly. The following information summarizes the "Butler PPD Damage" worksheet provided by Butler PPD. This data represents tornados that have adversely affected Butler PPD since 2006.

Year	Total Damages ($)	Miles of Line affected	# of customers affected	Outage Length (Hours)
2006	$212,393.00	2	4000	48
2008	$665,248.00	6	1257	6261
2014	$133,909.07	2	1719	23
Total Damage	$ 1,011,550.07			

4.4.2 Vulnerability

The District's entire above-ground infrastructure is subject to tornadoes, though in reality, the cost will be associated with the actual area of damage. The average path length of a tornado is approximately 2 miles long and 50 yards wide, as determined by the Department of Public Safety. Based on the average path of a tornado and typical facility cost within such a path as well as historical data, an associated cost with this type of an event could be as much as $1,500,000.

4.5 High Winds

Wind is the flow of air. More generally, it is the flow of the gases which compose an atmosphere since wind is not unique to Earth. Simply it occurs as air is heated by the sun and, thus, rises. Cool air then rushes in to occupy the area the now hot air has moved from. It could be loosely classed as convection current.

Winds are commonly classified by their spatial scale, their speed, the types of forces that cause them, the geographic regions in which they occur, or their effect.

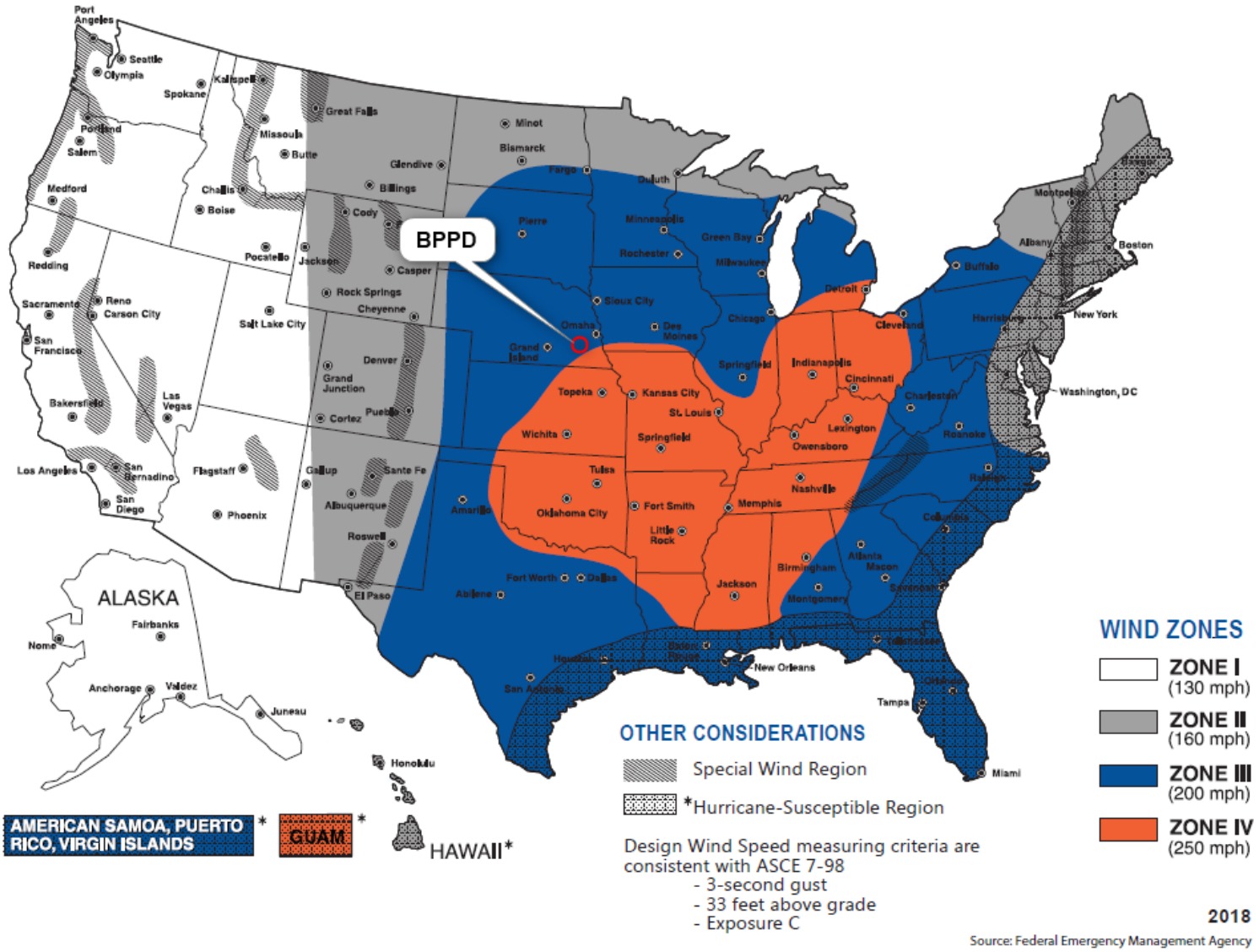
There are global winds, such as the wind belts which exist between the atmospheric circulation cells. There are upper-level winds which typically include narrow belts of concentrated flow called jet streams. There are synoptic-scale winds that result from pressure differences in surface air masses in the middle latitudes, and there are winds that come about as a consequence of geographic features, such as the sea breezes on coastlines or canyon breezes near mountains. Mesoscale winds are those which act on a local

scale, such as gust fronts. At the smallest scale are the microscale winds, which blow on a scale of only tens to hundreds of meters and are essentially unpredictable, such as dust devils and microbursts.

Forces which drive wind or affect it are the pressure gradient force, the Coriolis force, buoyancy forces, and friction forces. When a difference in pressure exists between two adjacent air masses, the air tends to flow from the region of high pressure to the region of low pressure. On a rotating planet, flows will be acted upon by the Coriolis force in regions sufficiently far from the equator and sufficiently high above the surface.

The major driving factors of large scale global winds are the differential heating between the equator and the poles (difference in absorption of solar energy between these climate zones) and the rotation of the planet. Winds can shape landforms via a variety of Aeolian processes. Figure 5 shows the wind zones in the United States. BPPD lies within Zones III.

Figure 5



4.5.1 Previous Historical Occurrences and Probability

Wind Events (2000-2019)			
County	**High Wind**	**Strong Wind**	Because any single event may be reported for more than one county, (that is, the same wind event in one county may be reported in adjacent county), this analysis is based on the maximum count for each event type. The entire area experienced a total of 15 high wind events in 20 years, or 0.75 events in any given year.
Butler	12	0	
Saunders	13	2	
Maximum Event Count	**13**	**2**	
Note: Although Butler PPD does not serve all of the entire counties listed; event occurrences for all of the counties will be used as a basis for evaluating high wind exposure for the PPD.			

High winds can occur at any time during the year in Nebraska but are generally associated with storm fronts. The following information summarizes the "Butler PPD Damage" worksheet provided by Butler PPD. This data represents high wind events that have adversely affected Butler PPD since 2002.

Year	Total Damages ($)	Miles of Line affected	# of customers affected	Outage Length (Hours)
2002	$ 4,203.18	48	1500	3
2002	$ 2,036.36	22	870	2
2003	$ 5,126.30	26	1200	4
2003	$ 26,756.25	14	600	18
2004	$ 8,030.00	21	1650	6
2005	$ 3,126.40	11	1385	2
2007	$ 6,784.70	4	1785	1
2016	$ 28,950.13	8	434	17
2017	$ 12,015.06	62	1595	66
Total Damage	$ 97,028.38			

4.5.2 Vulnerability

Electrical sub-transmission (34.5 kV to 69 kV) and distribution (12.47 kV) overhead designed lines are affected by high wind hazards, specifically overhead lines that are not using twisted pair conductor. Single pole structures are more vulnerable due to the clearances between conductors. Galloping[1] conductors caused by high winds will operate electrical protective devices causing outages. The conductor movement can also damage connection devices and any equipment installed on poles.

Based on the past historical cost associated with a wind event as listed above and a reasonable inflation factor, the committee associated a possible cost of $150,000 for this event.

4.6 Thunderstorms

Lightning is the key ingredient that defines a thunderstorm. Thunderstorms can come in all shapes and sizes with some cells only a few miles in diameter and some clusters of storms, known as mesoscale convective complexes, can span hundreds of miles.

A typical thunderstorm produces a brief period of heavy rain and lasts anywhere from 30 minutes to an hour. However, not all thunderstorms produce rain that reaches the ground. These dry thunderstorms are most common across the western USA and often spawn wildfires. They often form high above the ground with a large layer of very dry air between the base of the cloud and the ground. As rain falls from the cloud into the dry air, the rain drops evaporate before they reach the ground.

Warm, humid conditions are very favorable for thunderstorm development. This helps create the strong updrafts that feed warm, moist air into thunderstorms. If the air is very unstable, severe thunderstorms with damaging winds, large hail, and sometimes tornadoes erupt. Cold fronts, dry-lines, or afternoon heating, which causes warm air to rise, can trigger thunderstorms.

4.6.1 Previous Occurrences and Probability

Storm Events (2000-2019)			
County	**Thunderstorm**	**Lightning**	Because any single event may be reported for more than one county, (that is, the same wind event in one county may be reported in adjacent county), this analysis is based on the maximum count for each event type. The entire 8 county area experienced a total of 63 high wind events in 20 years, or 3.2 events in any given year.
Butler	43	1	
Saunders	62	1	
Maximum Event Count	**62**	**1**	
Note: Although Butler PPD does not serve all of the entire counties listed; event occurrences for all of the counties will be used as a basis for evaluating high wind exposure for the PPD.			

[1] A rotational or up and down movement as a result of wind, or sudden dropping of ice or snow from the power line.

Multiple thunderstorms are experienced annually across the planning area; however, storms are more prevalent between the months of April and September.

Historically, Thunderstorms have caused extreme damage and long outages to BPPD's consumers. The probability of this hazard happening is yearly. The following information summarizes the "Butler PPD Damage" worksheet provided by Butler PPD. This data represents Thunderstorms that have adversely affected Butler PPD since 1997.

Year	Total Damages ($)	Miles of Line affected	# of customers affected	Outage Length (Hours)
1997	$ 7,230.35	49	2100	6
1997	$ 6,930.00	14	1800	5
1998	$ 11,352.15	15	1200	10
1999	$ 6,130.35	6	1000	4
2000	$ 8,127.15	12	1050	5
2001	$ 5,628.12	6	1600	4
2002	$ 1,333.52	7	400	3
2002	$ 2,178.71	7	850	2
2003	$ 3,917.30	13	1350	3
2007	$ 8,125.00	4	200	6
2012	$ 8,912.44	4	245	5
2013	$ 2,038.50	5	175	2
2014	$ 4,385.16	3	196	12
2015	$ 4,223.00	7	599	7
2017	$ 3,961.25	7	521	5
2018	$ 38,843.54	15	1486	6
2018	$ 19,251.01	13	985	6
2018	$ 5,696.57	5	17	4
2020	$ 20,324.00	9	1124	8
Total Damage	$ 168,588.12			

4.6.2 Vulnerability

Electric sub-transmission and distribution lines, as well as substation facilities, can be vulnerable to thunderstorm hazard events depending on the type of grounding and protection equipment installed. Where vulnerabilities exist BPPD is making a concerted effort to protect. This may be as simple as adding lightning arrestors or maintaining affective tree trimming.

The magnitude and cost associated with a thunderstorm is approximately $50,000. This number is based on estimated damage cost with inflation, as well as recent construction contracts.

4.7 Flooding

Low level flooding is a common hazard along rivers and streams in the District's area. Flooding is a natural process that may occur in a variety of forms, long duration flooding along rivers, flash floods, and coastal flooding. Flooding is only considered a problem when human development is located in flood-prone areas. Riverine type flooding is what can be experienced in the District's area.

Riverine flooding is due to the accumulation of runoff from rainfall or snowmelt such that the volume of the flow exceeds the capacity of the waterway and, therefore, water spreads out over the adjacent land. Riverine flooding flows downstream under the force of gravity. Inundation, duration and velocity are functions of many factors, including watershed size and slope, degree of upstream development, soil types, nature and extent of vegetation, steepness of the topography, and characteristics of the storm.

The only major river within the District's service boundary is the Republican River.

4.7.1 Previous Occurrences and Probability

Flood Events (2000-2019)			
County	**Flash Flooding**	**Flood**	Because any single event may be reported for more than one county, (that is, the same flood event in one county may be reported in adjacent county), this analysis is based on the maximum count for each event type. The entire area experienced a total of 47 flood events in 20 years, or 2.4 events in any given year.
Butler	8	15	
Saunders	12	35	
Maximum Event Count	**12**	**35**	
Note: Although Butler PPD does not serve all of the entire counties listed; event occurrences for all of the counties will be used as a basis for evaluating flood exposure for the PPD.			

Counties served by BPPD have had between 4 and 9 Flood Disaster Declarations since 1953. Although periodical floods are not rare, damage to Butler Public Power District critical infrastructure caused by floods are. Past erosion around poles has been repaired on a case by case basis with little record keeping done in regard to a flood being the actual cause of an outage.

The probability of this hazard happening is yearly. The following information summarizes the "Butler PPD Damage" worksheet provided by Butler PPD. This data represents floods that have adversely affected Butler PPD since the last Hazard Mitigation Plan Update (2014).

Year	Total Damages ($)	Miles of Line affected	# of customers affected	Outage Length (Hours)
2019	$151,627.82	27	637	13807

4.7.2 Vulnerability

In general Butler Public Power District does not have critical infrastructure located in the 100-Year flood plains. Butler Public Power District will continue to monitor any assets that are vulnerable to this hazard and update the plan as needed. Based on the flood plain maps provided by the Department of Natural Resources (DNR), it appears that some electrical facilities cross through a designated flood plain area. These facilities, which are limited to pole structures and related equipment, make up an estimated 2% of the total utility plant. Pole structures are not as susceptible to damage from a flood unless it involves rapidly moving water. It can be assumed then that a severe flood could cause some damage to the District's facilities. Magnitude of this event is estimated at $1,000,000.

4.8 Drought

Drought is a normal, recurrent feature of climate, although many erroneously consider it a rare and random event. It occurs in virtually all climatic zones, but its characteristics vary significantly from one region to another. Drought is a temporary aberration; it differs from aridity, which is restricted to low rainfall regions and is a permanent feature of climate.

Drought is an insidious hazard of nature. Although it has scores of definitions, it originates from a deficiency of precipitation over an extended period of time, usually a season or more. This deficiency results in a water shortage for some activity, group, or environmental sector. Drought should be considered relative to some long-term average condition of balance between precipitation and evapotranspiration (i.e., evaporation + transpiration) in a particular area, a condition often perceived as "normal". It is also related to the timing (i.e., principal season of occurrence, delays in the start of the rainy season, occurrence of rains in relation to principal crop growth stages) and the effectiveness (i.e., rainfall intensity, number of rainfall events) of the rains. Other climatic factors such as high temperature, high wind, and low relative humidity are often associated with it in many regions of the world and can significantly aggravate its severity.

4.8.1 Previous Occurrences and Probability

Although droughts can occur in the District's area, there is little historical data to support the fact that it is a high priority hazard to the facilities of Butler Public Power District.

4.8.2 Vulnerability

Drought can cause economic impact to BPPD, but does not directly impact actual electrical facilities.

4.9 Wildfires

A wildfire is an undesirable fire occurring in the natural environment and is a serious and growing hazard over much of the United States. Wildfires pose a great threat to life and property, particularly when they move from forest or rangeland into developed areas. Each year more than 100,000 wildfires occur in the United States, almost 90 percent of which are started by humans; the rest are caused by lightning. Weather is one of the most significant factors in determining the severity of wildfires. The intensity of fires and the rate with which they spread is directly related to wind speed, temperature, and relative humidity. Climatic conditions such as long-term drought also play a major role in the number and the intensity of wildfires.

Fire danger in Nebraska is determined daily by the National Weather Service (NWS). This rating is based upon the forecasted high temperature, low relative humidity, wind speed, cloud cover and fuel moisture. Fuel moisture is a very important component and can be measured by satellite.

4.9.1 Previous Occurrences and Probability

Although wildfires can occur in the District's area, there is no historical data to support the fact that it is a high priority hazard to the facilities of BPPD.

4.10 Dam Failure

As stated in the Nebraska Mitigation Plan, dam failure is the uncontrolled release of impounded water resulting in downstream flooding, which can affect life and property. Flooding, earthquakes, blockages, landslides, lack of maintenance, improper operation, and poor construction, vandalism, or terrorism cause dam failures. Dams are constructed for a variety of uses, including flood control, erosion control, water supply impoundment, hydroelectric power generation, and recreation.

4.10.1 Previous Occurrences and Probability

The Spencer Dam, which is located in the Neighboring utilities service boundary did have an adverse effect on Butler PPD in 2019. Damages from this were reported in the Flood section of this report. The District has no other historical information regarding damages caused by this hazard.

4.10.2 Vulnerability

Using the Nebraska Department of Natural Resource web site, it has been determined that three "High Hazard" type dams impact Butler Public Power District's service area. All dam locations are depicted in below table. Dam breach inundation maps are not available due to security and public safety concerns. Please see Appendix for the DNR letter outlining their policy concerning dam inundation maps. In the unlikely event of a dam failure, the event could expose approximately one mile of transmission or distribution line as well as a substation facility. A cost associated with this then would be $1,200,000. The following table lists the high hazard dam(s) in and outside the District's service boundary that may impact the PPD's assets.

Name	*Location*
Cottonwood Creek 7-A	NE35-T16N-R5E
Cottonwood Creek 21-A	S10-T15N-R6E
Lake Wanahoo Dam	S27-T15N-R7E

4.11 Levee Failure

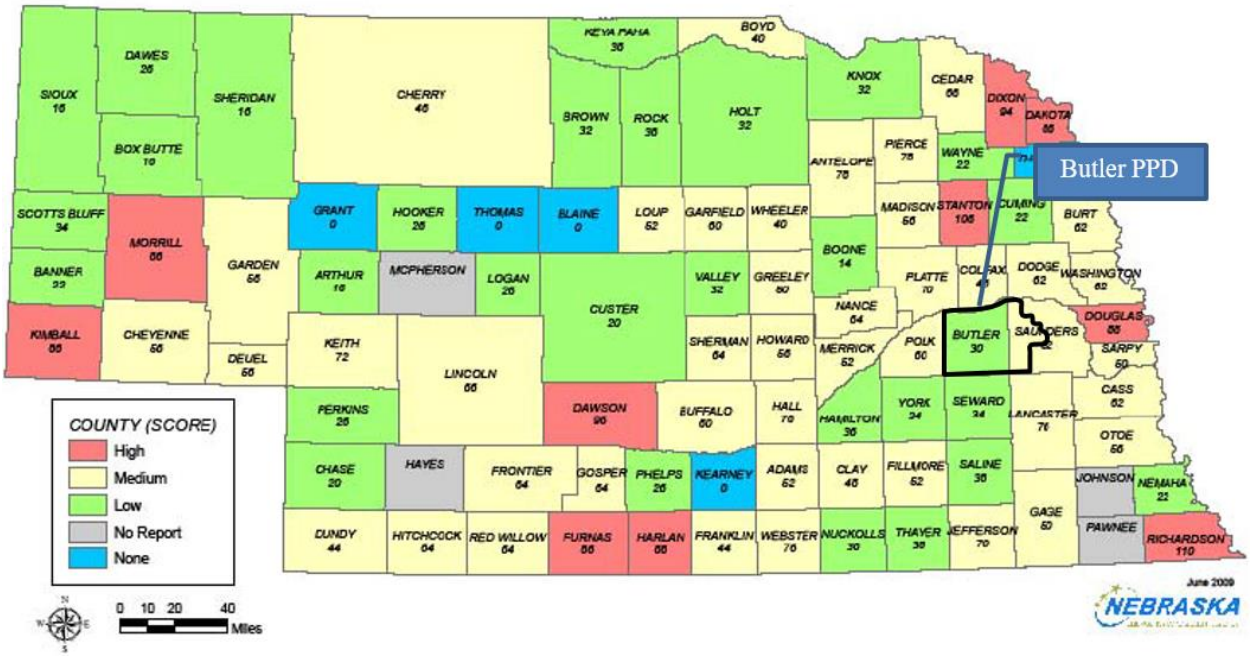
Levees in Nebraska are overseen by the Army Corp of Engineers. The State Hazard Mitigation Plan (Section II) details all the levee locations. Using the available data, it has been determined that no levees exist in the BPPD service boundary. No historical data exist that would indicate this hazard will affect the critical infrastructure of BPPD. This data will be reexamined as necessary.

4.11.1 Vulnerability

The District's vulnerability to this hazard will be similar to a dam failure with regard to probability, but less with regard to possible cost. Limited information with regard to this event makes it impossible to assign an estimated cost. The Hazard Identification and Risk Assessment (HIRA) map shown in Figure 7 illustrates the risk per county for the State of Nebraska. The BPPD counties are in the high to low risk range. The following table list levee's that may impact BPPD's assets.

County(ies)	Segment(s)	Sponsor(s)	Length (Miles)
Butler County, Clay County	2	Western Clay Drainage District No. 2 And 5	22.49
Butler County	2	North Inter-River Drainage District, Ring Levee Drainage District	27.05
Butler County	1	Reorganized Butler County Drainage District No. 7	27.99
Butler County	1	City Of El Dorado, Ks	0.29
Butler County, Clay County	1	Central Clay Drainage District	12.3
Butler County	1	Butler County Government	4.37
Butler County	1	City Of Augusta, Ks	3.84
Saunders County	1	Clear Creek Drianage District	10.16

Figure 7 HIRA - DAM/LEVEE FAILURE



4.12 Earthquake

The following information has been taken from the Nebraska State Plan – Part II Risk Assessment.

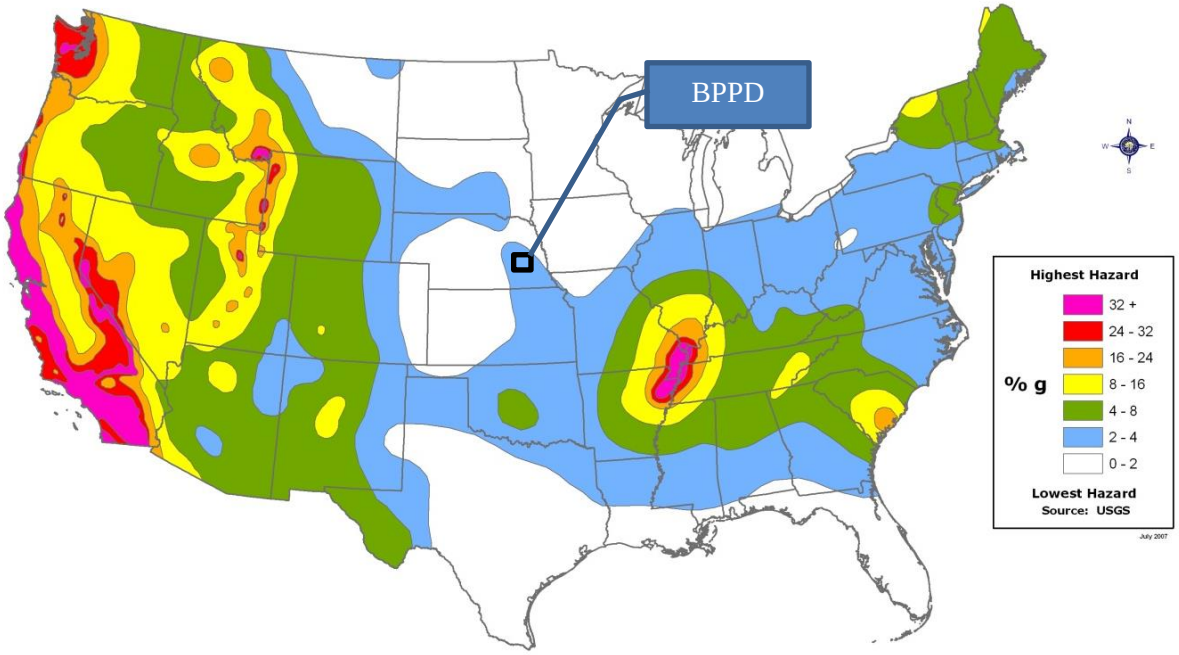
4.12.1 Location and Previous Occurrences

Between 1866 and 1990, 51 earthquakes occurred in Nebraska with intensity of I through VII using the modified Mercalli scale. The strongest of the earthquakes occurred in the southeast half of the state. A majority of the quakes in recent history have ranged from 2.5 to 3.

The largest earthquake in Nebraskan history occurred in November 15, 1877. The worst damages took place in Columbus (located in Platte County) where the thirty-second shock split the courthouse walls in nine places and damaged the schoolhouse walls. Other shocks were felt in North Platte and in neighboring states.

Another major earthquake happened on March 28, 1964. Damages involved cracked roadways in the city of Merriman, steep slope slumping into the Niobrara River, and cracked stucco under residential windows. Figure 8 from the USGS indicates percent likelihood of an earthquake event.

Figure 8



4.12.2 Probability

No historical data supplied by Butler Public Power District supports hazard mitigation for earthquakes in their District. Cost associated with the likelihood of this event, therefore, cannot be determined.

4.13 Chemical Spills

Under the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986, the federal government has designated several hundred as "extremely hazardous substances" based on their acute lethal toxicity. Under the law, releases of these extremely hazardous substances trigger reporting requirements to state and local authorities. Specifically, EPA requires that the owner or operator of a facility that releases an extremely hazardous substance in an amount greater than its established RQ notify the state emergency response commission and the local emergency planning committee established for the location where the incident occurs.

There are over 100 chemicals that are designated as both a Superfund hazardous substance and an EPCRA extremely hazardous substance. In the event of a release of any of these substances, the person responsible for the release is required to contact all of the appropriate federal, state, and local authorities.

4.13.1 Previous Occurrences and Probability

This hazard can affect substations if a transformer were to leak oil. Currently no historical records indicate damage to any electrical facilities due to chemical spills in the BPPD service boundary area. The staff has determined that policies in effect would minimize this hazard if it were to happen. The District does have a current Spill Prevention Control and Countermeasure Plan in place to guard against this hazard.

4.13.2 Vulnerability

No electrical facilities are believed to be vulnerable to this hazard.

4.14 Extreme Heat

Extreme heat is often associated with drought and can be described as prolonged periods of high temperature usually combined with high humidity. Heat kills by pushing the human body beyond its limits. In extreme heat and high humidity, evaporation is slowed and the body must work extra hard to maintain a normal temperature. A heat wave is an extended period of extreme heat and is often accompanied by high humidity. These conditions can be dangerous and even life-threatening for humans who don't take the proper precautions.

Most heat disorders occur because the victim has been overexposed to heat or has over-exercised for his or her age and physical condition. Older adults, young children and those who are sick or overweight are more likely to succumb to extreme heat.

Conditions that can induce heat-related illnesses include stagnant atmospheric conditions and poor air quality. Consequently, people living in urban areas may be at greater risk from the effects of a prolonged heat wave than those living in rural areas. Also, asphalt and concrete store heat longer and gradually release heat at night, which can produce higher nighttime temperatures known as the "urban heat island effect."

4.14.1 Previous Occurrences and Probability

Based on recorded events; there has been 1 extreme (excessive) heat events in the planning area since 1994; this would represent a 5% chance of an extreme heat event in any given year. Planning team members recognize that there are commonly periods of higher temperatures and humidity that contribute to uncomfortable conditions during the months of July and August.

4.14.2 Vulnerability

Extreme heat can be a factor in causing damages associated with other factors. Monitoring of this event will be discussed and reviewed as this plan moves forward.

5 Mitigation Strategy and Actions

The purpose of the Hazard Mitigation Plan is to protect the health, safety and economic interests of consumers in the Butler Public Power District's service area as it relates to the electrical facilities of BPPD. This is done by reducing the impacts of hazards through hazard mitigation planning and implementation of hazard mitigation actions. Hazard mitigation is any action taken to reduce or eliminate the risk to human life and property from natural and technological hazards.

Hazard mitigation can occur through direct or indirect means. Direct hazard mitigation occurs either through actions taken to reduce the impact of the hazard or actions taken to reduce or eliminate exposure to the hazard. Indirect hazard mitigation occurs through steps taken to reduce the long-term harmful effects of the hazard, including its aftermath. Hazard mitigation is an essential element of emergency management along with preparedness, response and recovery.

There are very few practical measures available to BPPD to reduce or limit the occurrence of any of the potential natural hazards and many of the technological hazards. This plan, therefore, has focused its development of mitigation actions on reducing or eliminating the exposure or vulnerability of critical infrastructure to the storm related hazards such as thunderstorm, high winds, tornado, and severe winter storm.

After each hazard was identified, goals and objectives were established for Butler Public Power District. The intent of each goal and set of objectives was to develop strategies to account for the risks associated with the hazards and identify ways to reduce or eliminate those risks. Each goal and set of objectives is preceded by 'mitigation alternatives' or actions items.

The original list of goals and objectives from the Butler Public Power District's 2008 Hazard Mitigation Plan was provided to the planning team at the meeting. The planning team was asked to review all of the goals and objectives and comment on how to improve or change them to meet the needs of the District. Information from this review was used to finalize the goals and objectives for the District's mitigation plan update.

5.1 Development of Goals

In order to have a successful mitigation plan, goals are needed to provide direction. Goals were created with actions in mind that would help to reduce the impact of high-risk hazards described earlier. Below is the final list of the goals and objectives as determined by the planning team. These goals and objectives provide specific direction to Butler Public Power District for reducing future hazard-related losses. The goals and objectives were numbered to assist in the development and organization of mitigation alternatives or 'action items' as discussed in this section. These goals have changed slightly in regard to scope due to lessons learned since mitigation plan was initially created.

Goal 1: Protect the Health and Safety of Customers (overall intent of the plan)

Objective 1.1: Provide a safe source of electricity to customers in the BPPD and keep the general public safe.

Goal 2: Strengthen the District's Transmission/Distribution System

Objective 2.1: Improve all components of the electrical transmission/distribution system District-wide.

Objective 2.2: Provide a reliable and safe source of electricity to customers in the BPPD service area.

Goal 3: Reduce Future Losses from Hazard Events

Objective 3.1: Provide service to customers, critical facilities, and other vital services through existing structures, along with the addition of future structures.

Objective 3.2: Minimize and control the impact of hazard events on the existing electrical system.

Objective 3.3: Perform regular upgrades of lines and equipment.

Objective 3.4: Ensure an adequate communication system is available during a hazard event. Introducing Outage Management Communications Tool.

Objective 3.5: Ongoing effort to upgrade the system with planned maintenance and replacement; development of a four-year work plan and "Joint Sub-Transmission Plan" for guidance.

Objective 3.6: Use of FEMA guidelines and the National Electric Safety Code.

Goal 4: Increase Public Awareness and Educate Customers on the Vulnerability to Hazards

Objective 4.1: Develop and provide information on an ongoing basis to customers about the types of hazards, potential effects they can be exposed to after the occurrence of a hazard, and how they can be better prepared.

5.2 Mitigation Action Items

All planning committee proposed projects discussed were included in the plan. At the planning team meeting, a list of mitigation alternatives from the Butler Public Power District's staff, organized by hazard type, was to be used as a starting point in reviewing and evaluating the current project list, projects that have been implemented, and developing new potential projects.

5.3 Action items

This plan has identified potential mitigation actions from various sources that could be used to address the stated hazard mitigation goals and objectives. Along with the general goals listed, the planning team used criteria listed below as a measuring stick to the effectiveness of the action:

- Substantially reduce the risk of future damage, hardship, or loss from a hazard
- Address problem areas using a priority based plan
- Be a long term solution
- Cost effective
- Utilize Industry Best Practices
- Reflect the most practical, effective and environmentally sound solution from all alternatives considered.

5.4 Prioritizing Actions

Actions will be prioritized based on need and Benefit Cost Analysis (BCA). Planning documents, such as the "BPPD Construction Work Plan" and the "Joint Sub-transmission Plan", will also aid in establishing a priority for these action items.

5.5 Goal No. 1 – Protect the Health and Safety of Electrical Consumers

Objective 1.1: Provide a safe source of electricity to customers in the BPPD and keep the general public safe.

Mobile Generators

Description: Have portable generators on hand in order to provide towns and villages a continued source of electricity if sources or feeds were knocked out.
Hazard(s) Addressed: Severe Thunderstorms, Tornadoes/High Winds, Severe Winter Storms
Estimated Cost: $250,000 (1,000 KW)
Potential Funding: Pre-Disaster Mitigation Grant Program, Hazard Mitigation Grant Program, Butler Public Power District General Funds
Timeline: 5 to 10 years
Priority: Low
Lead Agency: Butler Public Power District

Portable/Mobile Substation

Description: Have portable Substation on hand in order to provide rural residents alternative source of electricity if sources or feeds were knocked out.
Hazard(s) Addressed: Severe Thunderstorms, Tornadoes/High Winds, Severe Winter Storms
Estimated Cost: $850,000 (5,000 KW)
Potential Funding: Pre-Disaster Mitigation Grant Program, Hazard Mitigation Grant Program, Butler Public Power District General Funds
Timeline: 5 to 10 years
Priority: Low
Lead Agency: Butler Public Power District

Update Emergency Response Plan (ERP)

Description: Review and update BPPD Emergency Response Plan.
Hazard(s) Addressed: Severe Thunderstorms, Tornadoes/High Winds, Severe Winter Storms
Estimated Cost: $4,500
Potential Funding: Pre-Disaster Mitigation Grant Program, Hazard Mitigation Grant Program, Butler Public Power District General Funds
Timeline: 1 to 2 years
Priority: Medium
Lead Agency: Butler Public Power District

Convert towns from 4160/2400V to 12.47/7.2kV

Description: Convert towns and villages to 12.47 kV for redundancy and safety.
Hazard(s) Addressed. Severe Thunderstorms, Tornadoes/High Winds, Severe Winter Storms
Estimated Cost: Varies
Potential Funding: Pre-Disaster Mitigation Grant Program, Hazard Mitigation Grant Program, Butler Public Power District General Funds
Timeline: Ongoing
Priority: Medium
Lead Agency: Butler Public Power District

Pole Inspection & Inventory of Facilities

Description: Inspect and identify inadequate poles and related equipment; confirm inventory.
Hazard(s) Addressed: Severe Thunderstorms, Tornadoes/High Winds, Severe Winter Storms
Estimated Cost: Varies
Potential Funding: Butler Public Power District General Funds
Timeline: Ongoing
Priority: High
Lead Agency: Butler Public Power District

5.6 Goal 2: Structurally Improve the BPPD Transmission/Distribution System

Objective 2.1: Improve all components of the electrical transmission/distribution system District-wide.

Utilize Twisted Pair Conductor on Main or Critical Distribution Circuits

Description: Reduce galloping of lines due to cross-winds by using gallop reducing twisted pair conductor on main feeder lines.
Hazard(s) Addressed: Severe Thunderstorms, Tornadoes/High Winds, Severe Winter Storms.
Estimated Cost: $90,000/mile
Potential Funding: Pre-Disaster Mitigation Grant Program, Hazard Mitigation Grant Program, Butler Public Power District General Funds
Timeline: Ongoing
Priority: High
Lead Agency: Butler Public Power District

Install Additional Primary and Secondary Arresters

Description: Better prepare the distribution systems resistance to lightning, especially secondary arrestors at the customer's meter.
Hazard(s) Addressed: Severe Thunderstorms
Estimated Cost: $110 for primary line arrestors; $85 for secondary service arrestors
Potential Funding: Pre-Disaster Mitigation Grant Program, Hazard Mitigation Grant Program, Butler Public Power District General Funds
Timeline: Ongoing
Priority: Low
Lead Agency: Butler Public Power District

Pad-Mounted Transformers to be Elevated Above the Base Flood Stage

Description: Raising transformers or relocating transformers near river area.
Hazard(s) Addressed. Flooding
Estimated Cost: $5,000
Potential Funding: Pre-Disaster Mitigation Grant Program, Hazard Mitigation Grant Program, Butler Public Power District General Funds
Timeline: Ongoing
Priority: Low
Lead Agency: Butler Public Power District

Objective 2.2: Provide a fully reliable and safe source of electricity to customers in the BPPD service area.

Create Electrical Redundancy to Critical Facilities (Distribution)

Description: Construct tie lines and strengthen existing ties.
Hazard(s) Addressed. Severe Thunderstorms, Tornadoes/ High Winds, Severe Winter Storms
Estimated Cost: $90,000 to $100,000/mile
Potential Funding: Pre-Disaster Mitigation Grant Program, Hazard Mitigation Grant Program, Butler Public Power District General Funds
Timeline: Ongoing
Priority: High
Lead Agency: Butler Public Power District

5.7 Goal 3: Reduce Future Losses from Hazard Events

Objective 3.1: Provide service to customers through existing structures, critical facilities, and other vital services in addition to future developments.

Eliminate Radial Feeds on the Sub-Transmission Grid

Description: Reduce radial feeds to all substations
Hazard(s) Addressed. Severe Thunderstorms, Tornadoes/High Winds, Severe Winter Storms
Estimated Cost: $160,000 to 200,000/mile
Potential Funding: Pre-Disaster Mitigation Grant Program, Hazard Mitigation Grant Program, Butler Public Power District General Funds
Timeline: Ongoing
Priority: High
Lead Agency: Butler Public Power District

Objective 3.2: Minimize and control the impact of hazard events on the existing electrical system.

Shorten Length of Spans Between Poles

Description: Re-span sections of line by increasing the number of poles per mile to reduce span lengths to an average of 250' or less.
Hazard(s) Addressed. Severe Thunderstorms, Tornadoes/High Winds, Severe Winter Storms
Estimated Cost: $20,000 to $30,000/mile
Potential Funding: Pre-Disaster Mitigation Grant Program, Hazard Mitigation Grant Program, Butler Public Power District General Funds
Timeline: Ongoing
Priority: Medium
Lead Agency: Butler Public Power District

Install Storm Structures – Reduce Cascading During Extreme Storms

Description: Install storm structures near switch pole facilities and install dead-end type structures every 1.25 miles and/or at switch poles.
Hazard(s) Addressed. Severe Thunderstorms, Tornadoes/High Winds, Severe Winter Storms
Estimated Cost: $12,500
Potential Funding: Pre-Disaster Mitigation Grant Program, Hazard Mitigation Grant Program, Butler Public Power District General Funds
Timeline: Ongoing
Priority: Medium
Lead Agency: Butler Public Power District

Upgrade to Electronic Reclosers at Substation Feeders

Description: Install electronic type reclosers to reduce damages caused by intermittent or temporary outages and minimize the effect of "single phasing" on three phase loads.
Hazard(s) Addressed. Severe Thunderstorms, Tornadoes/High Winds, Severe Winter Storms
Estimated Cost: $26,000/circuit
Potential Funding: Pre-Disaster Mitigation Grant Program, Hazard Mitigation Grant Program, Butler Public Power District General Funds
Timeline: Ongoing
Priority: High
Lead Agency: Butler Public Power District

Objective 3.3: Perform regular upgrades of lines and equipment

Replace Damaged Poles with Higher Class Poles and Storm Resistant Characteristics

Description: Replace poles built with lower standards compared to the District's current policies.
Hazard(s) Addressed. Severe Thunderstorms, Tornadoes/High Winds, Severe Winter Storms
Estimated Cost: $2,000/pole
Potential Funding: Pre-Disaster Mitigation Grant Program, Hazard Mitigation Grant Program, Butler Public Power District General Funds
Timeline: Ongoing
Priority: Medium
Lead Agency: Butler Public Power District

Replace Critical Transmission and Distribution Lines with Twisted Pair Conductor

Description: Upgrade existing overhead line with storm resistant Twisted Pair type conductor.
Hazard(s) Addressed. Severe Thunderstorms, Tornadoes/ High Winds, Severe Winter Storms
Estimated Cost: $90,000 to $220,000/mile
Potential Funding: Pre-Disaster Mitigation Grant Program, Hazard Mitigation Grant Program, Butler Public Power District General Funds.
Timeline: Ongoing
Priority: High
Lead Agency: Butler Public Power District

Replace aging sub-transmission and distribution lines using mitigation policies

Description: Upgrade lines to new standards and specifications
Hazard(s) Addressed. Severe Thunderstorms, Tornadoes/High Winds, Severe Winter Storms
Estimated Cost: $90,000 to $220,000/mile
Potential Funding: Pre-Disaster Mitigation Grant Program, Hazard Mitigation Grant Program, Butler Public Power District General Funds.
Timeline: Ongoing
Priority: Medium
Lead Agency: Butler Public Power District

Upgrade 12.47 kV Tie Lines Between Substations with Higher Capacity Twisted Conductor Types to Allow for Backup Capacities

Description: Upgrade 12.47 kV with larger twisted pair conductor and single phase to multiphase.
Hazard(s) Addressed. Severe Thunderstorms, Tornadoes/High Winds, Severe Winter Storms
Estimated Cost: $60,000 to $90,000/mile
Potential Funding: Pre-Disaster Mitigation Grant Program, Hazard Mitigation Grant Program, Butler Public Power District General Funds.
Timeline: Ongoing
Priority: High
Lead Agency: Butler Public Power District

Reduce outage time due to inaccessibility

Description: Relocate existing Sub-transmission and distribution facilities from inaccessible private Right Of Way (R.O.W.) to accessible private or non-private R.O.W.
Hazard(s) Addressed. Severe Thunderstorms, Tornadoes/High Winds, Severe Winter Storms
Estimated Cost: $55,000 to $100,000/mile
Potential Funding: Pre-Disaster Mitigation Grant Program, Hazard Mitigation Grant Program, Butler Public Power District General Funds.
Timeline: Ongoing
Priority: Medium
Lead Agency: Butler Public Power District

Objective 3.4: Ensure an adequate communication system is available during a hazard event

Improve Communications Infrastructure

Description: Improve substation, two-way radio and data communications with new, improved & existing technologies. Tower Inspections.
Hazard(s) Addressed: Severe Thunderstorms, Tornadoes/High Winds, Severe Winter Storms
Estimated Cost: Varies
Potential Funding: Pre-Disaster Mitigation Grant Program, Hazard Mitigation Grant Program, Butler Public Power District General Funds
Timeline: 5-10 years
Priority: Low
Lead Agency: Butler Public Power District

5.8 Goal 4: Increase Public Awareness and Educate Consumers and Staff on the Vulnerability to Hazards

Objective 4.1: Develop and provide information on an ongoing basis to customers about the types of hazards, potential effects they can be exposed to after the occurrence of a hazard, and how they can be better prepared

Increase Public Awareness of Dangers from Downed Power Lines

Description: Establish an educational campaign, such as a booth at fair, public service messages, etc. to provide information to customers about how to respond when coming across downed power lines. Provide safety materials (cling).
Hazard(s) Addressed: Severe Thunderstorms, Tornadoes/High Winds, Severe Winter Storms
Estimated Cost: Varies
Potential Funding: Pre-Disaster Mitigation Grant Program, Hazard Mitigation Grant Program, Butler Public Power District General Funds
Timeline: Ongoing
Priority: Medium
Lead Agency: Butler Public Power District

5.9 Previous and Future Mitigation Efforts

Butler PPD has a long history of implementing mitigation goals and objectives into their day to day maintenance as well as their long term system improvements. All projects are systematically reviewed to comply with mitigation policies outlined in this plan.

In 2008 Butler PPD was approved for a HMGP project titled “Harlan County Transmission line”. This project provided storm resistant line to serve 80% of all electrical meters in the region. This mitigation project helped to avoid a loss of function to 1000’s of electrical users, applicable facilities and other critical infrastructure.

Future projects will continue to be reviewed for mitigation characteristics and follow plan guidelines where applicable. Planned projects are listed in the appendix of this document under Butler PPD Project Tracker. These projects represent a prioritized list of mitigation projects and was put together by the Hazard Mitigation Team. Projects listed here as well as other potential projects will be considered for FEMA funding when applicable.

6 Plan Implementation

BPPD will implement the plan based on recommendations of the planning team. The team will prioritize the listed actions based on need and current studies such as the most recent Construction Work Plan and Benefit Cost Analysis of site specific projects. These site specific projects will then be submitted to FEMA for possible funding.

Projects will be overseen by Mark Kirby, the General Manager of BPPD, and funding will be budgeted accordingly. Engineering of the sub-transmission projects will be coordinated between the District's operations staff and consultants. Distribution line project engineering will be done in house by existing staff unless it is determined that more detailed engineering is needed. Projects done by sub-contractors will be overseen by BPPD and/or certified inspectors.

6.1 Plan Maintenance and Review

The planning team will meet at least annually and may meet more frequently at their discretion. These meetings will provide an opportunity to discuss the progress of the action items and the effectiveness and sustainability of the hazard mitigation plan. Possible new mitigation actions will be discussed.

Future meetings of the planning team will be used to review progress of the plan in mitigating against the priority hazards (e.g., severe winter storms and tornadoes), evaluate the need for formal updates and revisions to the plan, and evaluate and develop risk analyses of other hazards as appropriate. The planning team will also meet following a hazard event to review "lessons learned," evaluate the effectiveness of applied mitigation measures, and identify any additional mitigation measures needed.

The plan will then be formally revised as needed and adopted by Butler Public Power District at least once every five years as required. At the determination of the planning team, updates of the plan may be developed with greater frequency and, upon adoption by the District, submitted to the State Hazard Mitigation Officer and FEMA for review and approval.

Review and updating of this plan will occur at least every five years in coordination with the Nebraska State Hazard Mitigation Plan. BPPD will provide an opportunity for applicable local authorities and other entities to participate in the mitigation plan update process. This will be done through early notification by letter or email.

The planning team will also take the following steps to maintain and incorporate the plan:

- ✓ Establish a schedule for monitoring, evaluating and up-dating the plan.
- ✓ Institute a monitoring system of mitigation measures.
- ✓ Provide a system of reviewing progress on achieving goals identified in plan.
- ✓ Consider and recommend additional actions at annual meetings.
- ✓ Include mitigation actions into all Capital Improvement Plans, Construction Work Plans, Sub-transmission Contingency Plans and any other plans where it applicable.

Appendix A: Plan Materials

- ***Neighboring Jurisdiction Letter***
- ***DNR letter***
- ***Plan worksheets***
    - ***Butler PPD Damages***
    - ***Butler PPD Project Tracker***

BUTLER
PUBLIC POWER DISTRICT

September 22nd, 2020

Butler County Clerk
c/o Stephanie Laska
451 N 5th St
David City, NE 68632

To whom it may concern,

Butler Public Power District (BPPD), headquartered in David City, Nebraska, is in the process of updating their Hazard Mitigation Plan, which will be approved by FEMA in the fall of 2020. This endeavor is in coordination with an effort by the Nebraska Emergency Management Agency (NEMA) to update the Nebraska State Hazard Mitigation Plan.

Hazard mitigation planning is proactive and allows the Power District to take actions before disasters occur to reduce or eliminate future threats. The hazard mitigation plan is a publicly-guided document that assesses the vulnerability of the District's infrastructure to natural disasters such as flood, drought, earthquake, wildfire, winter storm, tornado and high winds, etc. and the potential losses associated with each hazard. In addition, the plan prioritizes goals, mitigation alternatives, and projects which can alleviate potential damages and provide protection to life and property when future disasters occur.

Butler Public Power's plan is currently being completed and will be submitted to FEMA. Once approved, the plan will be included as an annex to the Nebraska Statewide Hazard Mitigation Plan because of their independent status as Statutory Public Jurisdictions. Butler Power District has hired RVW, Inc. to assist with the development of the plan, which is anticipated to be FEMA approved by later this year.

Due to a FEMA requirement this letter is being sent to inform your jurisdiction about Butler Power District's planning effort. If you have any input or would like more information about the plan, contact me at 402-954-0383 or Jim Herchenbach of RVW at 402-564-2876.

Sincerely,

Mark J Kirby

Mark Kirby
General Manager

1331 N 4th Street • David City, NE 68632-1107
Phone: 402/367-3081 • 800/230-0569 • Fax: 402/367-6114

DNR MEMO

Date: January 27, 2008

TO: - FILE -

FROM: Steve McMaster
Pat Diederich

SUBJECT: Use of NDNR dam breach inundation maps for mitigation planning

Background

NDNR has been receiving several requests for high hazard dam breach route inundation maps from consultants for use in natural hazard mitigation plans. One of the requirements of a mitigation plan is that it must identify all relevant hazards and perform a vulnerability assessment for each one, and failing to do so means that FEMA will not approve the plan. This means that the local government or public entity will not be eligible for FEMA's mitigation funding assistance. A breach inundation map is attached to the Emergency Action Plan for each high hazard dam and is kept in NDNR's files. While there is some benefit for education and identification of vulnerable populations, NDNR is hesitant to make this information available in an age of terrorism.

FEMA mitigation plan policy and guidelines

FEMA is able to approve mitigation plans with specific information missing as long as the reasons for why the information is missing are stated explicitly in the plan. Furthermore, NDNR believes that in the event of a dam failure, this becomes a response issue and is not a mitigation issue. The only mitigation action which pertains to dams in the State of Nebraska is already being performed: namely, the annual inspections of high hazard dams by NDNR. Any deficiencies in a dam found at the time of inspection are immediately requested to be remedied by the dam owner.

NDNR Policy

For security and public safety concerns, NDNR shall not disseminate dam breach route inundation maps for use in local hazard mitigation plans. NDNR will consider special requests for this information on a case-by-case basis. If the information is released, it shall be available for viewing at the NDNR offices.

Year	Total Damages ($)	Storm Type	Federally declared - Y/N	Miles of Line affected	# of customers affected	Outage Length (Hours)	Use of Mutual Aide or MOU/MOA's
1997	$7,230.35	Severe Thunderstorm	No	49	2100	6	No
1997	$6,930.00	Severe Thunderstorm	No	14	1800	5	No
1998	$11,352.15	Severe Thunderstorm	No	15	1200	10	No
1999	$6,130.35	Severe Thunderstorm	No	6	1000	4	No
2000	$8,127.15	Severe Thunderstorm	No	12	1050	5	No
2001	$5,628.12	Severe Thunderstorm	No	6	1600	4	No
2002	$1,333.52	Severe Thunderstorm	No	7	400	3	No
2002	$2,178.71	Severe Thunderstorm	No	7	850	2	No
2003	$3,917.30	Severe Thunderstorm	No	13	1350	3	No
2007	$8,125.00	Severe Thunderstorm	No	4	200	6	No
2012	$8,912.44	Severe Thunderstorm	No	4	245	5	No
2013	$2,038.50	Severe Thunderstorm	No	5	175	2	No
2014	$4,385.16	Severe Thunderstorm	No	3	196	12	No
2015	$4,223.00	Severe Thunderstorm	No	7	599	7	No
2017	$3,961.25	Severe Thunderstorm	No	7	521	5	No
2018	$38,843.54	Severe Thunderstorm	No	15	1486	6	No
2018	$19,251.01	Severe Thunderstorm	No	13	985	6	No
2018	$5,696.57	Severe Thunderstorm	No	5	17	4	No
2020	$20,324.00	Severe Thunderstorm	No	9	1124	8	No
2006	$212,393.00	Tornado	No	2	4000	48	No
2008	$665,248.00	Tornado	Yes	6	1257	6261	No
2014	$133,909.07	Tornado	Yes	2	1719	23	No
2019	$151,627.82	Flood	Yes	27	637	13807	No
2002	$4,203.18	High Winds	No	48	1500	3	No
2002	$2,036.36	High Winds	No	22	870	2	No

2003	$5,126.30	High Winds	No	26	1200	4	No
2003	$26,756.25	High Winds	No	14	600	18	No
2004	$8,030.00	High Winds	No	21	1650	6	No
2005	$3,126.40	High Winds	No	11	1385	2	No
2007	$6,784.70	High Winds	No	4	1785	1	No
2016	$28,950.13	High Winds	No	8	434	17	No
2017	$12,015.06	High Winds	No	62	1595	66	No
2001	$14,355.55	Winter Storm	No	12	3800	11	No
2002	$31,365.00	Winter Storm	No	29	4000	20	No
2005	$3,526.00	Winter Storm	No	12	1250	2	No
2006	$76,601.27	Winter Storm	No	25	5000	48	No
2007	$26,350.00	Winter Storm	No	41	4000	20	No
2009	$116,313.33	Winter Storm	No	8	1158	7	No
2009	$10,334.00	Winter Storm	No	4	104	11	No
2016	$28,950.13	Winter Storm	No	35	845	9	No
2017	$17,543.17	Winter Storm	No	47	1329	4	No
2017	$13,644.04	Winter Storm	No	47	1372	2	No
2018	$31,221.11	Winter Storm	No	34	1495	13	No
2018	$38,315.69	Winter Storm	No	26	1675	11	No
2020	$100,326.49	Winter Storm	No	52	2265	26	No

Strategic Action Tracker

Butler Public Power District

SETUP

Top Ten Projects **$6,486,960.00** Project Total

Project Name	Type Action	Hazard Addressed	Estimated Start	Estimated Finish	Estimated Duration (in days)	Total Cost	Potential Funding Source	Work Plan Priority Year
59-07 Substation tie line to Norris 34.5 line	Rebuild/Relocation	Winter Storm/Ice	4/1/2021	7/31/2021	90	$ 800,000.00	Budget	2021
59-43 Substastion tie line to Norris-Bee	Rebuild/Relocation	Winter Storm/Ice	4/1/2022	7/31/2022	90	$ 800,000.00	Budget	2022
59-06 Substation, circuit 1, 3 miles	Line and/or Insulator Upgrade/Replacement	High Loads	2/1/2022	4/31/2022	60	$ 270,000.00	Budget	2022
59-15 Substation, Circuit 2, 1 mile rebuild	Line and/or Insulator Upgrade/Replacement	High Loads	4/1/2022	5/1/2022	30	$ 90,000.00	Budget	2022
59-04 Substation, Circuit 2, 1.5 miles	Line and/or Insulator Upgrade/Replacement	High Loads	6/1/2022	9/30/2022	90	$ 135,000.00	Budget	2022
New tie line 34.5 Substation 59-42 to 59-	Rebuild/Relocation	Winter Storm/Ice	4/1/2023	9/30/2023	150	$ 900,000.00	Budget	2023
59-03 Substation, Circuit 2, 2 miles	Rebuild/Relocation	High Loads	2/1/2023	4/30/2023	60	$ 216,360.00	Budget	2023
59-02 Substation, Circuit 2, 2 miles,	Rebuild/Relocation	High Loads	5/1/2023	7/31/2023	90	$ 200,000.00	Budget	2023
59-15 Substation, Circuit 4, 3 miles,	Rebuild/Relocation	High Loads	8/1/2023	12/15/2023	105	$ 300,000.00	Budget	2023
59-06 Substation tie to Switch	Rebuild/Relocation	Winter Storm/Ice	2/1/2024	6/30/2024	180	$ 1,245,200.00	Budget	2024
59-12 Substation, Ciorcuit 2, 3 miles	Rebuild/Relocation	High Loads	8/1/2024	12/1/2024	120	$ 300,000.00	Budget	2024
59-6 Substation 34.5 kV 8 mile rebuild	Rebuild/Relocation	Severe Thunderstorms	2/1/2023	8/1/2023	180	$ 1,230,400.00	Budget	2023