COLORADO RURAL ELECTRIC
NATURAL HAZARDS MITIGATION PLAN

October 2010

Prepared Pursuant to
Disaster Mitigation Act 2000 & Section 409, PL 93-288

Colorado Department of Local Affairs, Division of Emergency Management
in Cooperation with the
Colorado Rural Electric Association

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Prerequisite

Formal Adoption by the State

The Colorado Rural Electric Natural Hazards Mitigation Plan is incorporated as an annex to the 2010 State of Colorado Natural Hazards Mitigation Plan. The state plan was adopted by the Office of the Governor on _____.

[Placeholder for copy of state adoption]

Assurances of Continued Compliance with Federal Requirements

The Colorado Rural Electric Natural Hazards Mitigation Plan falls under assurances proclaimed within the state plan. The state assures that it will comply with all applicable Federal statutes and regulations in effect with respect to the periods for which it receives grant funding in compliance with 44 CFR part 13.11(c). The State will amend its plan whenever necessary to reflect changes in State or Federal laws and statutes as required in 13.11(d).

Introduction

Purpose

To develop a Colorado Rural Electric Natural Hazards Mitigation Plan (REC Mitigation Plan) for rural electric providers as part of the State of Colorado Natural Hazards Mitigation Plan (State Plan) that meets or exceeds Federal planning standards while strengthening disaster resilience and recovery capabilities of the State's rural electric providers.

Background

Due to the rural nature of Colorado and the extensive amount of infrastructure required to provide statewide electric service, natural hazards affect electric cooperatives in the state. These hazards include blizzards, ice storms, windstorms, tornadoes, fires, landslides and floods. In 2001 and 2006/07, severe winter storms resulted in presidential disaster declarations for the state. These declarations were due in part to extensive damage incurred by rural electric cooperatives (REC).

During a disaster event, rural electric providers act as first responders as power is restored to customers. Because power restoration is time-sensitive, post-event mitigation opportunities are often lost. Recognizing this problem, the Colorado Division of Emergency Management (CDEM) pursued and succeeded in receiving a planning grant from the Federal Emergency Management Agency (FEMA) to develop a rural electric mitigation plan as an annex to the State of Colorado Natural Hazards Mitigation Plan. This planning process will provide further opportunity for rural electric cooperatives to identify and implement disaster mitigation opportunities.

Sources

The sources used to collect information for the REC Mitigation Plan include, but are not limited to the following:

- Colorado Rural Electric Association Web Page (http://www.crea.coop), 2010
- National Rural Utilities Cooperative Finance Corporation Web Page (http://www.nrucfc.coop), 2010
- North American Electric Reliability Corporation, *CIP-002-3*, 2009
- Colorado Governor's Energy Office, *2010 Colorado Utilities Report*
- Colorado Department of Local Affairs Colorado, State Demography Office, *Demographic Fact Sheet*, 2008
- Iowa Homeland Security and Emergency Management Division, *State of Iowa Hazard Mitigation Plan, Rural Electric Cooperatives Annex*, 2007
- Federal Emergency Management Agency, *Ice Storm of 2002: Four rural electric cooperatives in Kansas*, 2003

- Federal Emergency Management Agency, *FY11 Hazard Mitigation Unified Guidance*
- Federal Emergency Management Agency, *Electrical Transmission and Distribution Mitigation: Loss Avoidance Study, Nebraska and Kansas*, April 2008
- United States Department of Agriculture, Rural Utility Service, *Bulletin 1730B-2*, 2005
- United States Department of Agriculture, Rural Development Electric Programs, Web Page (http://www.usda.gov/rus/electric), 2010
- United States Department of Energy, Energy Information Administration, *Colorado Electricity Profile*, 2008
- United States Department of Energy, Berkley National Laboratory, *Cost of Power Interruptions to Electricity Consumers in the United States*, LaCommare and Eto, 2006

Planning Process

The process established for this planning effort is based on the Disaster Mitigation Act of 2000 planning and update requirements and the Federal Emergency Management Agency's associated guidance for hazard mitigation plans. In some instances, steps completed in the planning process for the State Plan dovetailed and fulfilled portions of the planning process for the rural electric mitigation planning effort.

Project Participants

Development of the planning team focused on pre-existing associations within Colorado's rural electric provider community. One such organization is the Colorado Rural Electric Association (CREA) which represents 19 of the 22 RECs exclusively serving Colorado customers. The mission of the CREA is to enhance and advance the interests of its member electric cooperatives through a united effort.

This relationship between the RECs and its statewide association was leveraged for the collection and dissemination of plan information as well as overall guidance within the planning process. In particular, the Safety Training and Loss Control section of CREA served as the point of contact for CDEM staff.

RECs serving the state but not CREA members and cooperatives serving customers in multi-state regions were also included as team organizations. All organizations were provided the same opportunities to participate in the planning process. The list of participating electric cooperatives is shown in the following table.

Participating Organizations

Rural Electric Cooperatives & Trade Associations	
Colorado Rural Electric Association	Mountain View Electric Association*
Delta-Montrose Electric Association	Poudre Valley Rural Electric Association*
Empire Electric Association*	San Isabel Electric Association*
Grand Valley Rural Power Lines*	San Luis Valley Rural Electric Cooperative*
Gunnison County Electric Association*	San Miguel Power Association
Highline Electric Association*	Sangre De Cristo Electric Association*
High West Energy✧	Southeast Colorado Power Association*
Holy Cross Energy*	Tri-County Electric Cooperative✧
Intermountain Rural Electric Association	United Power*
K.C. Electric Association*	Wheatland Electric✧
Moon Lake Electric✧	White River Electric Association*
La Plata Electric Association*	Y-W Electric Association*
Morgan County Rural Electric Association*	Yampa Valley Electric Association*
Mountain Parks Electric*	**CREA Members, ✧Multi-state service territory*

Also included in the participating organizations are the Colorado Division of Emergency Management, which served as a principal contributor to the plan development process, and the Governor's Energy Office which was a valuable source of information.

Planning Process Activities

CDEM used existing state-based rural electric cooperative forums for planning process participation, plan development, and draft plan review. In particular, CREA served as a sounding board throughout the plan development process and as point of departure for association contacts. RECs not in membership with CREA or headquartered in surrounding states and serving Colorado customers were contacted directly by CDEM. The following table represents the major activities of the planning process.

REC Mitigation Planning Activities

Date	Activity	Description
April 7, 2010	Kick-off meeting with CREA	CDEM management and staff met with Mike Williams, CREA Director of Safety Training and Loss Control. Discussed project scope and planning process.
June 2010	Project Article on CREA Webpage	CDEM provided CREA with a project brief for a newsletter or for posting on the CREA webpage.
June/July 2010	Colorado REC Natural Hazards Mitigation Survey and Project Brief Distributed	CDEM developed and distributed project brief and survey to RECs to collect input on hazard identification, vulnerability assessment, mitigation strategies, local coordination, and communication preferences.
July 13, 2010	Loss Prevention Seminar	CDEM provided formal project presentation to REC management and staff. Presentation included overview, review and comment on risk assessment from the surveys, and a mitigation strategy and action workshop.
Aug / Sept 2010	Draft plan development	Initial draft plan developed in coordination with State Plan development with REC survey results incorporated.
October 2010	Draft plan conference with CREA	Conference with Mike Williams, CREA, to review plan initial draft prior to distribution to RECs for review.
October 2010	Draft plan distributed to RECs for review	Review and comment period for initial draft REC mitigation plan. Comments considered with revised plan.
October 2010	Final REC plan in state mitigation plan	Incorporation of final draft Colorado Rural Electric Natural Hazards Mitigation Plan into State Plan.
October 2010	State plan submitted to FEMA for review	Plan sent to FEMA for 45 day review period. Updates will be made and the plan resubmitted if necessary.
December 2010	Plan signed off on by Governor	Plan reviewed by CDEM management and staff, Colorado Department of Local Affairs, and Governor's Office.
January 2011	Plan distribution to RECs	Final approved plan with Governor's signature distributed to RECs.

Plan Review and Analysis

Throughout the planning process, RECs provided input for development of the plan. The first opportunity for plan input was participation in a survey regarding mitigation of natural hazards as they relate to rural electric utilities. REC participants at the CREA Loss Control Seminar reviewed survey results presented by CDEM staff related to hazard identification, vulnerability assessment, mitigation strategies, local preparedness and response coordination, and communication preferences. In addition, seminar attendees participated in a mitigation strategy and action workshop as part of CDEM's presentation.

Upon completion of the initial draft, the plan was distributed to RECs for review and comment. Comments were considered with appropriate changes made to the initial draft and the second draft subsequently posted on the CDEM and/or CREA web site. Additional opportunity for RECs, state agencies, and the general public to review the REC Mitigation Plan came after its incorporation into the State Natural Hazard Mitigation Plan during the public review and comment period.

Public Involvement

Development of the Colorado Rural Electric Natural Hazards Mitigation Plan was coordinated within the State Plan public involvement process. However, the second draft REC plan was posted on the CDEM and/or CREA web page and distributed directly to RECs for both public and subject matter expert review and comment.

Program Integration

The Colorado Governor's Energy Office (GEO) utilities program was awarded a United States Department of Energy grant to develop a statewide energy emergency planning program. Moving forward, the GEO intends to build a new intra-state framework for handling energy-related emergencies such as cyber attacks, major system outages and threats to critical energy infrastructure. The objectives include developing response actions that include new energy portfolios and Smart Grid applications. The project will focus on building regional energy assurance capability to allow the State of Colorado to coordinate and communicate statewide and have critical energy infrastructure partners in the areas of energy security, grid reliability, emergency response and large-scale disruption. This effort is scheduled for completion by 2012.

As part of the GEO grant and related update to the Colorado Energy Assurance Emergency Plan, there is a project component to develop a Geographic Information System (GIS) database of statewide critical electric infrastructure. This GIS database will allow relevant state agencies to view critical infrastructure such as power plants, high voltage transmission lines, and critical high voltage substations in relation to emergency or disaster events. The successful completion of this effort will allow for enhanced hazard analysis of the RECs statewide critical infrastructure in future planning processes.

Community Profile

Rural electric cooperatives are private, independent electric utilities, owned by the members they serve in rural America. Electric cooperatives operate much like a food cooperative or a credit union, where each organization is an independent utility owned by its customers.

As democratically governed businesses, electric cooperatives are organized under the Cooperative or Rochdale Principles, affixing them in the communities they serve and ensuring close regulation by their customers. Utility rates are determined independently through a board elected by members of the cooperative. If annual revenues exceed costs, members may receive a credit.

Nationally, investor-owned utilities maintain about half of all electric distribution lines, publicly owned utilities maintain about 7 percent, and cooperatives maintain the remaining 43 percent. The number of customers per mile of line has a significant effect on operation and maintenance costs. While the number of customers per mile averages 35 for investor-owned utilities and 46 for publicly owned utilities, cooperatives typically serve 7.8 customers per mile. As a result, investor-owned and public utilities receive significantly higher revenue per mile of line as cooperatives.

Electric cooperatives are currently the only utilities in the country that rely on government and other loans to finance capital construction. Unlike municipal or investor-owned utilities, they do not receive tax-exempt financing or revenue bonds. Cooperatives repay loans monthly with interest.

History of Electric Cooperatives

As late as the mid-1930s, nine out of ten rural homes were without electric service. The unavailability of electricity in rural areas kept their economies largely based on agriculture. Factories and businesses preferred to locate in cities where electric power was easily acquired.

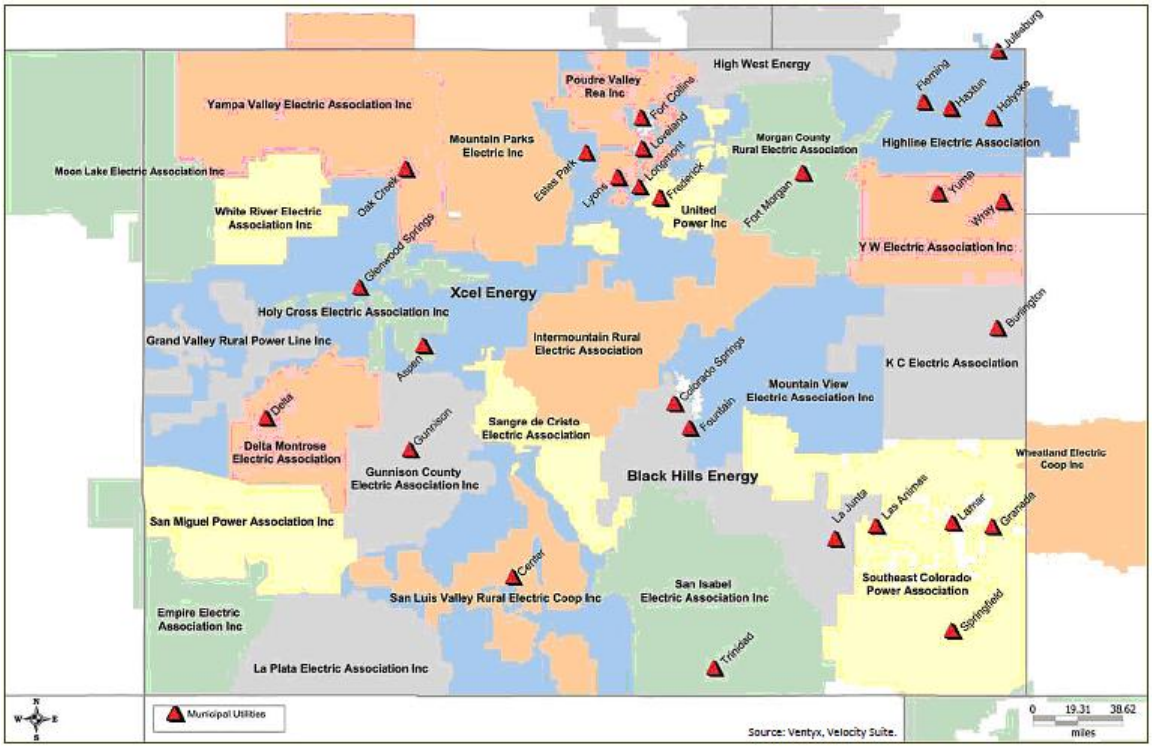
On May 11, 1935, President Roosevelt signed Executive Order No. 7037 establishing the Rural Electric Administration and a year later the Rural Electrification Act was passed. By 1953, more than 90 percent of farms in the United States had electricity. Today about 99 percent of the nation's farms have electric service. This availability of low-cost power to electric cooperatives has promoted rural economic development and has helped offset the cost of serving sparsely populated areas.

Colorado's Rural Electric Cooperatives

In Colorado, twenty-six RECs serve statewide residential, commercial, and industrial consumers. There are four RECs that serve multi-state regions, leaving twenty-two that

serve Colorado consumers exclusively. REC service territories are shown on the statewide electric service provided map below.

Colorado Rural Electric Cooperative Service Territory Map



In 2008, sales by rural electric cooperatives accounted for 21.8 percent of statewide electricity sales. Colorado's electric cooperatives serve communities from ski resorts to irrigated farmland. While some jurisdictions served by RECs have abundant financial resources some are the poorest in the state.

The following table shows Colorado's top five retailers of electricity in Colorado. According to the U.S. Emergency Information Association, electric cooperatives represent two out of the top five retailers of electricity in Colorado.

Top Five Retailers of Electricity in Colorado, 2008

Entity	Type of Provider	Total Megawatthours
1. Xcel	Investor-Owned	28,271,320
2. Colorado Springs Utilities	Public	4,575,984
3. Intermountain Rural Electric Association	Cooperative	2,121,573
4. City of Fort Collins	Public	1,429,798
5. United Power	Cooperative	1,208,720

Source: U.S. Energy Information Administration, Form EIA-861, "Annual Electric Power Industry Report"

Xcel is the state's largest electric provider. As for RECs, Intermountain Rural Electric Association (IREA) ranks number three in the state while United Power is ranked fifth.

Intermountain REA, serving customers in the central part of the state, is Colorado's largest rural electric provider with over 138,000 meters served, as shown in the table below. In contrast, White River Electric Association in northwest Colorado serves 3,238 meters. IREA also serves the most consumers per mile of line with 14.7. The Southeast Colorado Power Association serves 1.8 consumers per mile of line. Statewide, RECs average 7.3 customers per line, slightly lower than the national average of 7.8.

Colorado REC Meters Served and Miles of Lines, 2010

Rural Electric Cooperative	Meters Served	Miles of Lines	Consumers/Mile
Delta-Montrose Electric Association	32,319	3,212	10.1
Empire Electric Association	15,749	1,924	8.2
Grand Valley Rural Power Lines	17,716	1,547	11.5
Gunnison County Electric Association	10,246	1,052	10.3
Highline Electric Association	10,392	5,114	2.0
High West Energy*	9,054	3,486	2.8
Holy Cross Energy	54,592	2,910	18.8
Intermountain Rural Electric Association	138,350	9,404	14.7
K.C. Electric Association	6,201	2,882	2.2
La Plata Electric Association	43,091	3,487	12.4
Moon Lake Electric*	18,347	3,610	5.0
Morgan County Rural Electric Association	8,054	2,862	2.8
Mountain Parks	19,450	1,830	10.6
Mountain View Electric Association	45,800	5,986	7.7
Poudre Valley Rural Electric Association	35,737	3,877	9.2
San Isabel Electric Association	23,669	4,373	5.4
San Luis Valley Rural Electric Cooperative	12,168	2,756	4.4
San Miguel Power Association	13,765	1,897	7.0
Sangre De Cristo Electric Association	11,927	1,746	6.8
Southeast Colorado Power Association	10,112	5,651	1.8
Tri-County Electric Cooperative*	22,864	4,916	2.6
United Power	65,385	5,566	11.8
Wheatland Electric*	33,022	4,218	8.0
White River Electric Association	3,238	918	3.5
Y-W Electric Association	8,861	4,027	2.3
Yampa Valley Electric Association	26,221	2,837	9.2

Source: 2010 Colorado Rural Electric Association Directory

*Totals reflect entire service area, only a portion of which is in Colorado

Of the 26 rural electric cooperatives serving Colorado, 19 purchase wholesale power from Tri-State (a wholesale electric power supplier owned by the 44 electric cooperatives that it serves), five purchase wholesale power from Xcel Energy, and two purchase power from wholesale providers in other states.

Risk Assessment

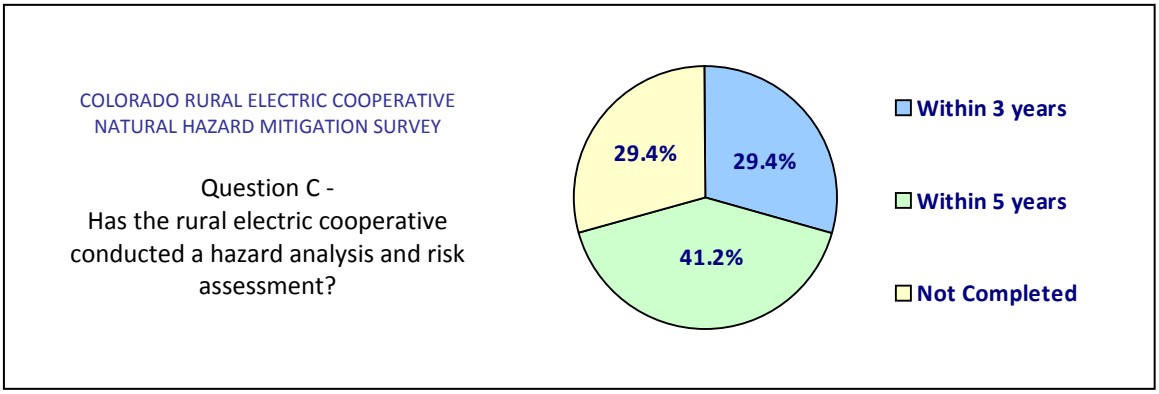
A vulnerability and risk assessment is a decision support tool for determining the need for and prioritization of mitigation measures to protect assets and processes. While it is financially unfeasible to reduce risk from every natural hazard event with the potential of affecting an electric system, vulnerability and risk assessments can help ensure that the available resources and actions taken are justified and implemented based on the threat, vulnerability, and the importance of the service or asset.

Guidance from the United States Department of Agriculture (USDA), Rural Utility Service (RUS) suggests that risk assessments performed by rural electricity providers consider the following:

- Facilities and functions that are considered critical facilities.
- Facilities and functions with possible exposure to harm.
- Methodologies to mitigate identified exposures to harm.
- Priority of mitigation measures for identified facilities and functions, if any, to ensure highest and best use of resources.

Colorado's groundwork for hazard mitigation is based on a hazard analysis and risk assessment that is comprehensive and multi-hazard. The purpose of this risk assessment is to identify, evaluate the impact of, and prioritize the mitigation of the natural hazards that pose risk to Colorado's rural electric associations. In particular, the assessment aims to reveal which hazards that may negatively impact a RECs critical infrastructure or provision of service to its electric consumers.

According to the REC survey results, 70 percent of RECs have completed a risk assessment within the last 5 years. Of these REC risk assessments, 30 percent have been completed within the last 3 years.



Many RECs perform routine risk assessments while others do not. Completion of risk assessments is connected to RECs receiving loan funds from RUS, where completion of an assessment and related Emergency Restoration Plan is a requirement.

Hazard Identification

Natural hazards identified in the State Plan were used as the base hazards for the REC Mitigation Plan with the exclusion of grasshopper infestation. Through the REC Natural Hazards Mitigation Survey, participants from RECs were asked to evaluate these baseline hazards and provide suggestions for additional ones, if applicable.

The natural hazards used for this risk assessment are listed below:

- Avalanche
- Drought
- Earthquake
- Erosion and Deposition
- Expansive Soils
- Extreme Heat
- Fire
- Floods
- Hailstorms
- Landslides, Mud/Debris Flows, Rockfalls
- Lightning
- Precipitation
- Subsidence
- Thunderstorms
- Tornados
- Windstorms
- Winter Weather

Although some RECs reported taking mitigation measures against insects and wildlife, in particular the mountain pine bark beetle and nesting raptors, no formal additions to the hazard list were presented.

Hazard Profiles

The planning process for the REC Mitigation Plan relied on existing hazard profiles from the State Plan. Although mitigation actions by RECs related to pine bark beetle and raptors were reported, these were not added to the REC or statewide hazard profiles for mitigation measures, but may be incorporated into future planning efforts. Beetle infestation will be considered for inclusion in future State Plan updates.

Definition and Characteristics

Definitions and associated characteristics of the natural hazards considered in this risk assessment are found in *Section 2 – Hazard Identification and Risk Assessment* in the State Plan.

Geographic Location

Natural hazards occurring in Colorado range from statewide to regional with some specifically associated to the geologic attributes of a localized area. Generally, atmospheric hazards such as severe thunderstorms and the ensuing hail, tornadoes, windstorms, and lightning tend to occur with greater frequency along the Front Range and into the eastern plains of Colorado. Likewise, hazards tied more to specific geology

such as avalanches, landslides, and rockfalls tend to occur in or along the mountains or areas with significant elevation variation. Natural hazards such as floods, drought, expansive soils, extreme heat, and winter weather tend to occur statewide.

REC service territories cover all extents of the state; therefore, this mitigation plan focuses on a statewide perspective and defers to territory-specific analysis at the REC service territory level.

Previous Occurrences

According to reported survey results from the REC survey, every electric cooperative in the state has experienced the adverse affects of natural hazards on critical electric infrastructure and/or service provision. Subsidence was the only natural hazard which no REC reported as adversely affecting or damaging critical electric infrastructure.

Severe weather is one of the most frequent causes of infrastructure damage and associated service interruptions for rural electric providers. As shown in the chart below, fire, lightning, thunderstorms, winter weather, and windstorms are identified by RECs as impacting the most critical infrastructure. Although the impact from tornadoes fell in the middle range for impacts, the high reported impact to critical infrastructure as reported for windstorms may correlate with tornado damage.

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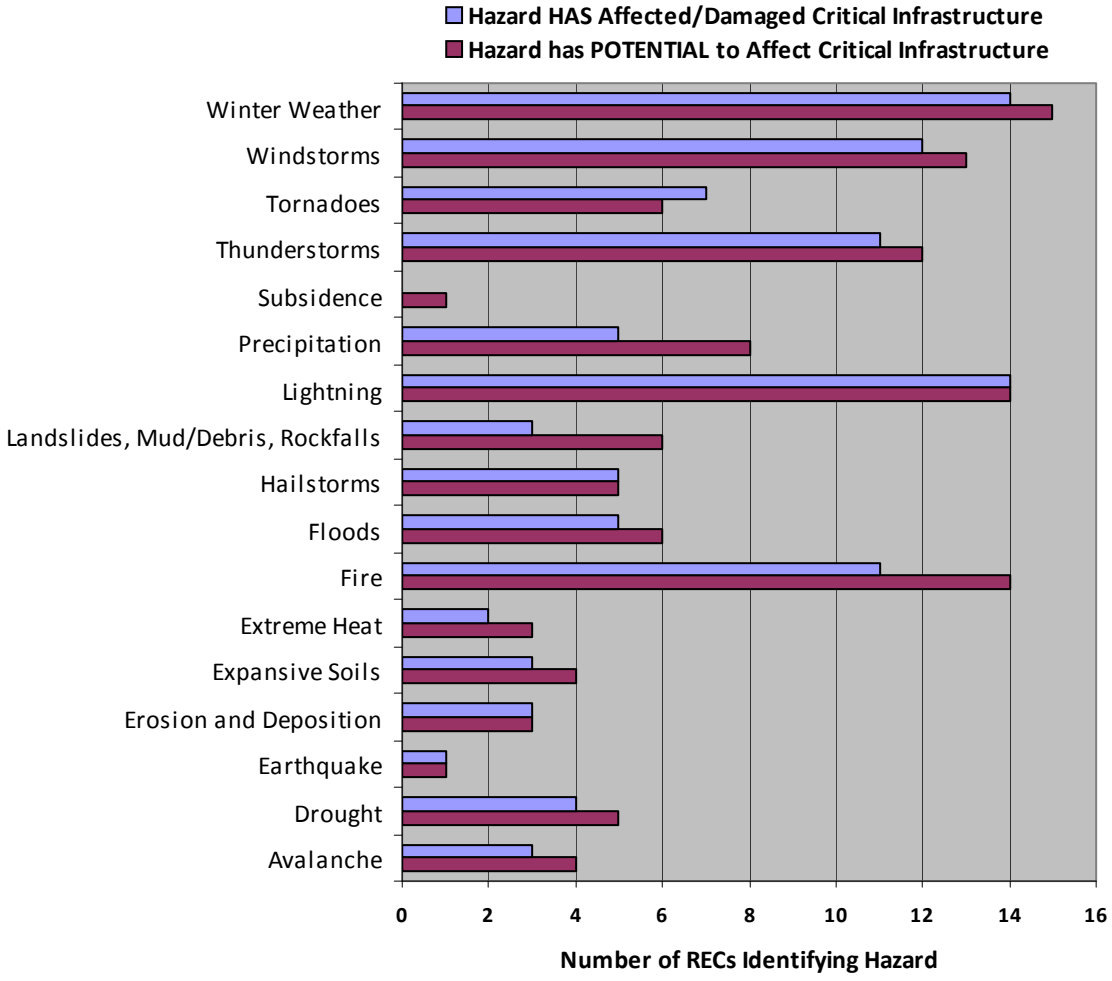
Question D - Which of the following natural hazards adversely affected/damaged critical electric infrastructure in the cooperative service territory? (Choose all that apply)

Question E - What is the potential impact of natural hazards to critical electric infrastructure in the cooperative service territory? Please rate the degree of impact by hazards as follows: Low, Medium, or High. (Choose all that apply)*



*High and medium responses were consolidated to achieve total for the potential impact of hazards.

Winter weather, including heavy snow and ice, is one of the most frequent and costly natural hazards to affect or damage critical utility infrastructure across the state. On two weekends in April 2001 (April 11-15 and April 20-22), the state sustained severe winter storms as ice fell across eastern Colorado. High winds and ice snapped power poles and downed lines, leaving many residents and businesses without power. The storms caused approximately $5 million in damage, primarily to rural electric utility cooperatives;

damages were estimated at 4,000 power poles and miles of transmission lines. Thousands of customers went without power for days while the lines were repaired.

Colorado's Governor requested and received a presidential disaster declaration (DR-1374). Counties with rural electric associations meeting the damage criteria (making the RECs eligible for Public Assistance) as of May 17, 2001 were Baca, Bent, Cheyenne, Crowley, Kiowa, Lincoln, Logan, Morgan, Phillips, Weld, Prowers, Sedgwick, Washington, and Yuma.

Future Probability

All of the natural hazards evaluated in this plan are expected to occur in the future. Future probability by natural hazard is addressed in the State Plan. RECs were asked to evaluate the potential impact of natural hazards to critical electric infrastructure by high, medium, and low. Raw results are shown in the table below. Definitions of high, medium, and low were purposely absent from the survey question which allowed RECs to rank potential impacts as they felt best reflected their service territory.

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Question E - What is the potential impact of natural hazards to critical electric infrastructure in the cooperative service territory? Please rate the degree of impact by hazards as follows: Low, Medium, or High. (Choose all that apply)

Natural Hazard	High	Medium	Low	High + Medium
Avalanche	3	1	9	4
Drought	2	3	6	5
Earthquake	0	1	9	1
Erosion and Deposition	0	3	9	3
Expansive Soils	0	4	8	4
Extreme Heat	1	2	9	3
Fire	7	7	1	14
Floods	1	5	7	6
Hailstorms	1	4	9	5
Landslides, Mud/Debris, Rockfalls	1	5	6	6
Lightning	7	7	1	14
Precipitation	1	7	5	8
Subsidence	0	1	9	1
Thunderstorms	4	8	3	12
Tornadoes	2	4	9	6
Windstorms	5	8	2	13
Winter Weather	8	7	1	15

Reflecting past occurrences, the natural hazards with the most potential for adversely impacting critical electric infrastructure are fire, lightning, thunderstorms, winter weather, and windstorms, as shown in the chart above along with the historic impact.

Magnitude and Severity

The analysis of magnitude and severity occurs in the State Plan. Individual natural hazards or a combination of events in different locations across the state may cause varying impacts to critical electric infrastructure and their customers.

Vulnerability

The risk assessment included in the State Plan describes Colorado's overall vulnerability to natural hazards. The REC Mitigation Plan focuses on the impact of these hazards on Colorado's rural electric associations including the critical infrastructure and consumers. Analyses include impact to customers, local capabilities to contend with natural hazards, critical electric infrastructure, and future development.

Customers

About 25 percent of electric customers (number of meters) in Colorado are served by rural electric cooperatives. Impacts of natural hazards that cause service interruption from electric providers may be far reaching. Depending on the duration of the hazard event, extent of damage to critical infrastructure, and subsequent possible interruption of service, affects to the following day-to-day residential and commercial service expectations will influence the magnitude and severity of the event:

- Traffic flow
- Running water
- Heating/cooling of homes
- Communication
- Sewage removal and processing
- Refrigeration
- Restaurants and food preparations
- Banking and ATMs

The loss of electrical service to residential, educational, and commercial establishments, and critical facilities such as police and fire stations, hospitals, nursing homes, water pumping stations, railroad crossings, and industrial facilities that handle hazardous materials may significantly affect public health and safety.

At some facilities, the loss of electrical service can cause disruption of the continuity of government, business, and private citizen activities. These facilities include road intersections resulting traffic congestion, elevator-served buildings and structures for

mass congregation creating difficulties for a large number of people exiting the facility, and facilities equipped with security alarms triggered by loss of power that may require investigations by local first responders.

Particular awareness should be given, but not limited to, facilities serving: military bases, chemical and pharmaceutical plants, hospitals and rural health clinics, fire, police, and emergency response centers. Many other critical infrastructures are dependant upon electric providers such as: emergency medical response stations, all forms of communications facilities (telecommunications, commercial radio, television, air transportation control, etc.,) food processing and associated transportation related facilities, banks and banking facilities, and major fuel storage and pipeline facilities.

Residential REC customers comprise 73 percent of usage in Colorado. The state's population relying on electricity for heating and cooling may run the risk of hypothermia during extreme cold weather and heat related illness during extreme heat. This is a particular concern for more vulnerable populations such as the elderly who are more susceptible to extreme temperatures. In addition, persons who are dependent on electric medical equipment such as breathing machines (respirators, ventilators), power wheelchairs and scooters, and oxygen, suction or home dialysis equipment.

Fortunately, in 2008 the average Colorado home used a low amount of electricity per month compared to the rest of the nation. According to the Colorado households and businesses had the 12th lowest consumption rate among U.S. states in 2008. This is attributable in part to the fact that Colorado's climate requires less air conditioning than other parts of the country and may help minimize the overall vulnerability of consumers if they were to experience a power outage during an extreme heat event.

Capabilities

The table below shows the results of a survey question related to local capability. The definition of local capability was left open for RECs to interpret but typically will include consideration of local first responders, non governmental organizations, emergency management, individual preparedness, and/or their own organizational resources.

RECs report that local capabilities are strong for winter weather, windstorms, thunderstorms, lighting, and fire, correlating with the same natural hazards with the highest potential to affect or damage to critical electric infrastructure. The table below provides a more detailed breakout of the high, medium, and low ratings for local capability from REC survey responses.

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Question F - What level of local capability exists to contend with the hazard in your cooperative service territory? Please rate the capability for each hazard as follows: Low, Medium, or High. (Choose all that apply)

Natural Hazard	High	Medium	Low	High + Medium
Avalanche	1	3	8	4
Drought	0	4	7	4
Earthquake	0	3	7	3
Erosion and Deposition	2	5	5	7
Expansive Soils	1	5	5	6
Extreme Heat	1	2	8	3
Fire	5	7	3	12
Floods	2	5	5	7
Hailstorms	2	5	6	7
Landslides, Mud/Debris, Rockfalls	0	6	5	6
Lightning	7	4	3	11
Precipitation	4	2	6	6
Subsidence	2	2	7	4
Thunderstorms	6	4	4	10
Tornadoes	5	2	7	7
Windstorms	7	4	3	11
Winter Weather	11	3	2	14

Local capability appears to be rated lower for natural hazards that are either of low level impact on the RECs, have limited or infrequent occurrence, or are of such a nature that mitigation is difficult. These natural hazards with related low local capability included erosion and deposition, drought, earthquake, extreme heat, subsidence, and tornadoes. The impact of tornado force winds may better relate to windstorm hazards where the local capability is rated higher.

Critical Electric Infrastructure

Electric power systems have three primary elements: generation of power, transmission of power, and distribution of power.

- Generation refers the actual production of electricity at power plants that may be fueled by fossil fuels (gas, oil, or coal), nuclear energy, hydroelectric facilities, or other sources (e.g., wind, biomass).

- Transmission means high voltage systems that convey power from generating plants to local distribution systems.
- Distribution means the low voltage local systems that connect individual customers to the electric grid. Transmission and distribution systems are each controlled by a series of substations that progressively step down voltage and control the flow of electricity.

The Rural Utility Service recommends that RECs use the following criteria to assist in identifying critical facilities or business functions while performing vulnerability and risk assessment.

> *"Those facilities or business functions that if damaged or destroyed would cause significant loss of life, risk to public health, negatively impact the ability to serve a large portion of its customers for an extended period of time, have a detrimental impact on the reliability or operability of the energy grid, or impact continuity of business to the point where the repayment of RUS loan funds are jeopardized."*

Additional guidance from the North American Electric Reliability Corporation related to sustainability of the Bulk Electric System suggests that RECs consider the following as critical assets:

- Control centers and backup control centers.
- Transmission substations.
- Generation resources.
- Systems and facilities critical to system restoration, including blackstart generators and substations in the electrical path of transmission lines used for initial system restoration.
- Systems and facilities critical to automatic load shedding under a common control system capable of shedding 300 MW or more.
- Special Protection Systems.
- Any additional assets that support the reliable operation of the Bulk Electric System that the REC deems appropriate to include in its assessment.

Colorado's RECs purchase power and distribute it to their customers. Generation of power is critical as an external dependency but not for direct protection by the cooperatives. The REC focus on critical infrastructure lies largely with the transmission and distribution of power to consumers.

As shown in the following chart, RECs rated core physical electric infrastructure as the most critical to the system. However, human capital, or people necessary for successful operation of the cooperative, was also recognized as one of the most critical components of the system. The following electric infrastructure received the highest criticality ratings:

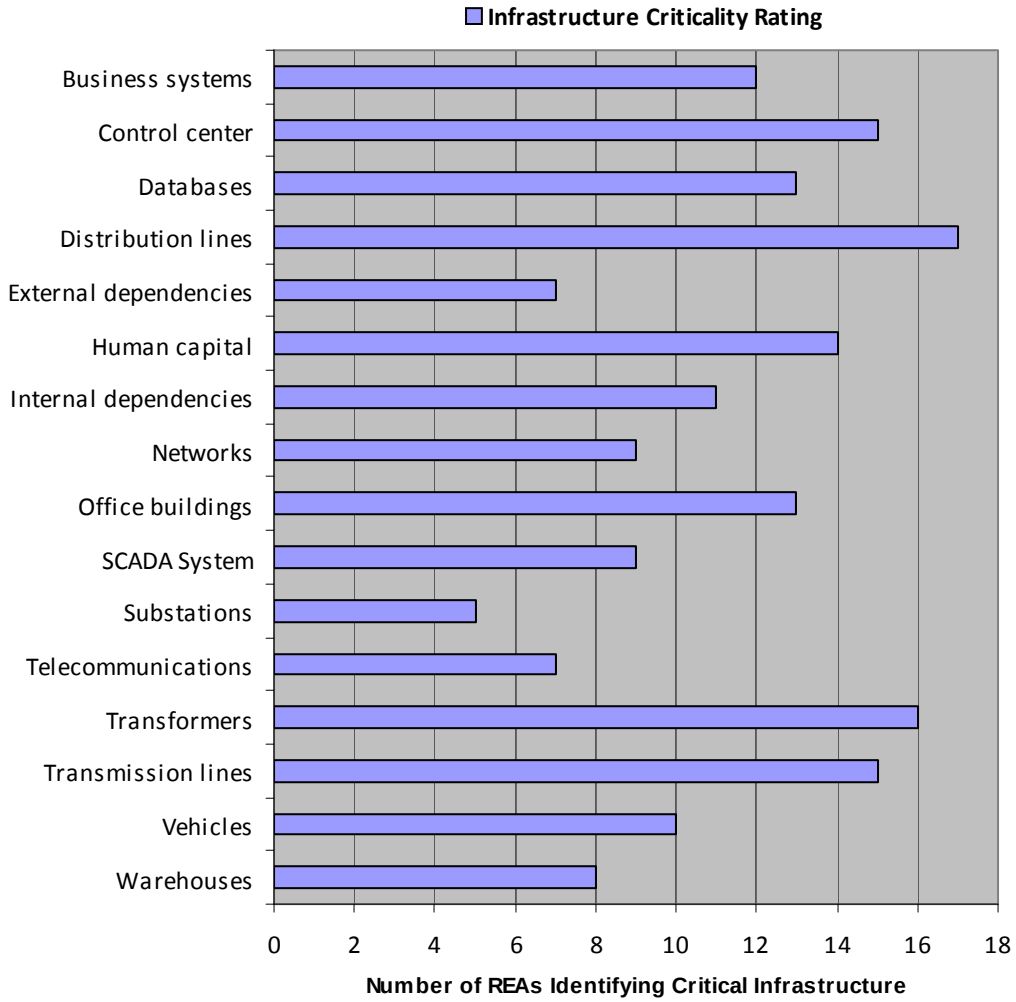
- Distribution lines
- Transformers

- Transmission lines
- Control centers
- Human capitol

Types of infrastructure rated slightly lower than the list of five above in terms of criticality appear more technological in nature. These include databases, networks, and SCADA systems, office buildings and internal dependencies. Core support assets and processes such as office buildings, vehicles, and business systems also appeared in this grouping.

COLORADO RURAL ELECTRIC COOPERATIVE
NATURAL HAZARD MITIGATION SURVEY

Question G - Please review the following list of potential critical assets to the electric infrastructure. Please rate the criticality of each type of infrastructure to the overall system: Low, Medium, High.*



*High and medium responses were consolidated to achieve total for the criticality rating of each infrastructure type.

Substations, telecommunications, and external dependencies were rated as having the lowest criticality to the overall system. Radios were also included by a survey recipient as another consideration to the system. The table below provides a more detailed breakout of the high, medium, and low ratings for electric infrastructure from REC survey responses.

COLORADO RURAL ELECTRIC COOPERATIVE
NATURAL HAZARD MITIGATION SURVEY

Question G - Please review the following list of potential critical assets to the electric infrastructure. Please rate the criticality of each type of infrastructure to the overall system: Low, Medium, High.

Natural Hazard	High	Medium	Low	High + Medium
Business systems	6	6	4	12
Control center	11	4	1	**15**
Databases	5	8	2	13
Distribution lines	15	2	0	**17**
External dependencies	4	3	7	7
Human capital	10	4	2	**14**
Internal dependencies	3	8	4	11
Networks	5	4	6	9
Office buildings	5	8	4	13
SCADA System	5	4	6	9
Substations	2	3	10	5
Telecommunications	4	3	8	7
Transformers	13	3	0	**16**
Transmission lines	10	5	1	**15**
Vehicles	7	3	6	10
Warehouses	3	5	4	8

Future Development

The expansion of critical electric infrastructure is innately tied to human development of the natural environment. As population and commerce continue to spread across the state and further reach into rural areas, RECs will be ever expanding to provide the electric service this growth demands.

Colorado's population has been growing at around 2 percent per year since 2005, translating to between 92,000 to 95,000 new residents each year. This population growth comes from a combination of natural increase in (births minus deaths totaling 40,000 persons) and net migration (55,000 persons). Colorado's net migration is strongly related

to job growth. Most of the recent and expected growth in Colorado is due to the growth in the oil and natural gas, tourism, retirees, and national/regional service industries.

Colorado is forecast to grow in population to 6.2 million by 2020 and 7.3 million by 2030. Growth in the state varies dramatically by county with some counties growing as fast as 5.9% per year and other counties losing population. Douglas County in the southern metro area is Colorado's fastest growing county reaching annual average growth rates above 6% since the mid 1990s.

The Western Slope continues to be the fastest growing region in the state with expected annual growth rates averaging 2.8% between 2005 and 2010. This is compared to the 1.9% growth rate expected statewide. The North Front Range and Central Mountains are also expected to have above average growth rates, while the Eastern Plains and San Luis Valley are expected to continue growing similar to national rate near 1%.

The State Demographer's Office in the Colorado Department of Local Affairs has developed statewide socio-economic profiles that represent 14 distinct regions, last updated in October of 2009. These profiles may be used for determining statewide future growth potential as well as that of smaller regions in relation to the geographic extent of natural hazards. The profiles provide highlights, estimates, and forecasts for the economy and job growth, income, and population and households. Included in each profile is a summary of anticipated population growth based primarily on economic factors. Further analysis and incorporation of these profiles will continue in future planning cycles.

Loss Potential

Nationally, power interruptions cost about $80 billion. Of this, the commercial and industrial sectors experience the highest dollar losses at $57 billion (73 percent) and $20 billion (25 percent) respectively. Annual costs to the residential sector are estimated at $1.5 billion, or accounting for the remaining 2 percent of total losses. Dollar losses to residential customers are difficult to capture as cost comes more from inconvenience rather than lost revenue, such as for commercial or industrial energy consumers.

Customers

To determine a relative potential cost of power outages to REC customers in Colorado compared to the United States, the largest two RECs in the state were considered to determine an average electric usage by residential, commercial, and industrial sector. When compared to the United States average, REC usage of residential electricity in Colorado was 20 percent higher, commercial usage about the same and industrial usage lower by 17 percent. This information is presented in the following table.

Colorado REC Electric Usage by Sector for IREA and United Power

Association Name	Residential	Commercial	Industrial
Intermountain REA	64%	27%	9%
United Power, Inc	49%	40%	11%
Average Colorado	56%	34%	10%
Average United States	37%	36%	27%

Source: U.S. Energy Information Administration, Colorado and United States Electricity Profile, 2008

Compared to the United States as a whole, the relative cost to Colorado REC customers during a power interruption should be lower due to the proportionately higher number of residential consumers (whom experience lowest costs per outage) and lower proportion of industrial consumers (that experience the highest costs per outage).

Critical Electric Infrastructure

The following table shows the total plant in service by REC. Plant in service represents the dollar value of the land, land rights, and infrastructure of the electric system. Although the total plant in service reflects an aggregate value greater than that of just critical assets, it provides an exposure and related potential loss if natural hazards were to cause damage.

Service interruptions and related decrease in total sales also impact and result in a cost to RECs. Electric infrastructure cost is typically recouped through the long-term sales of electricity being delivered via the system. Interruptions to service delivery result in lower total sales of electricity and longer cost recovery of infrastructure for both the association and its customers.

Colorado REC Plant in Service and Total Sales (kWh), 2009

Rural Electric Cooperative	Total Plant in Service	Total Sales (kWh)
Delta-Montrose Electric Association	$115,092,992	596,994,000
Empire Electric Association	$60,243,879	606,228,412
Grand Valley Rural Power Lines	$58,644,272	Not Reported
Gunnison County Electric Association	$33,500,000	125,400,504
Highline Electric Association	$79,134,860	455,731,702
High West Energy*	$55,263,403	16,704,723
Holy Cross Energy	$214,212,942	1,191,297,950
Intermountain Rural Electric Association	$623,691,313	2,065,066,633
K.C. Electric Association	$41,771,731	163,185,905
La Plata Electric Association	$252,098,470	1,041,107,537
Moon Lake Electric*	$130,895,260	514,947,042
Morgan County Rural Electric Association	$55,959,957	178,195,047
Mountain Parks	$80,000,000	297,433,638
Mountain View Electric Association	$238,000,000	701,878,689
Poudre Valley Rural Electric Association	$146,129,716	1,033,916,104
San Isabel Electric Association	$145,474,144	394,302,378
San Luis Valley Rural Electric Cooperative	$83,010,503	196,638,765
San Miguel Power Association	$63,809,393	Not Reported
Sangre De Cristo Electric Association	$47,289,898	103,645,103
Southeast Colorado Power Association	$84,689,178	181,515,533
Tri-County Electric Cooperative*	$170,771,755	272,097
United Power	$223,528,597	1,197,966,035
Wheatland Electric*	$266,000,000	1,101,604,000
White River Electric Association	$28,493,424	780,683,913
Y-W Electric Association	$78,083,379	296,298,716
Yampa Valley Electric Association	$108,156,099	579,667,764

Source: Governor's Energy Office, 2010 Colorado Utilities Report, 2010 Colorado Rural Electric Association Directory

*Totals reflect entire service area, only a portion of which is in Colorado

kWh = kilowatthour

Mitigation Strategy

Mitigation measures are actions taken by a REC that either eliminate or reduce the effects of the identified vulnerabilities. Consideration as to which actions are taken includes:

- Will the actions reduce the probability of an undesired event occurring?
- What is the cost of the implementing actions?
- Is there any enforcement or audit requirements?

Actions may be prioritized by considering the level of risk reduction, cost, and/or implementation challenges. There is typically a point beyond which taking additional mitigation actions will raise costs without appreciably enhancing the protection afforded.

Goals, Objectives, and Actions

The mitigation goals, objectives, and actions are connected to the risk assessment and focus on the natural hazards most frequently affecting or damaging critical electric infrastructure or rated as having a high or medium potential to do so. In addition, these hazards are most likely to result in costs related to critical infrastructure damage or loss of service to consumers. These hazards include:

- Fire
- Lightning
- Thunderstorms
- Windstorms
- Winter Weather

Goals

During the mitigation strategy workshop held at the CREA Loss Control Seminar, three overarching mitigation goals were presented to REC representatives. General discussion ensued related to the hazard mitigation strategy with no recommendation for changing the goals being presented:

- Reduce damage to REC critical assets
- Minimize economic losses to REC members
- Enhance relationships between RECs and local emergency management

In development of the final plan, the language of these three goals was refined to the following:

Goal: Reduce the impact from natural hazards on critical infrastructure
Goal: Minimize electric service disruption and associated impacts to consumers
Goal: Enhance relationships with local public safety entities

Objectives

Mitigation objectives were developed by CDEM upon confirmation of the goals from the mitigation strategy workshop. The mitigation goals with their corresponding objectives are as follows:

Goal: Reduce the impact from natural hazards on critical infrastructure
Objective: Physically strengthen critical utility infrastructure
Objective: Pursue vegetation management strategies
Goal: Minimize electric service disruption and associated impacts to consumers
Objective: Improve communication accessibility and resiliency
Objective: Development of cooperative response / service restoration plan
Objective: Reroute lines and develop redundant systems
Goal: Enhance relationships with local public safety entities
Objective: Develop or improve lines of communication
Objective: Develop or improve partnerships

Actions

From a list of potential mitigation actions provided in the mitigation survey, RECs were asked to prioritize the ones most important in reducing the potential impacts of natural hazards and if any of these actions have been implemented. The list of possible mitigation actions was matched to objectives and associated with the five hazards identified as historically or potentially affecting or damaging critical electric infrastructure.

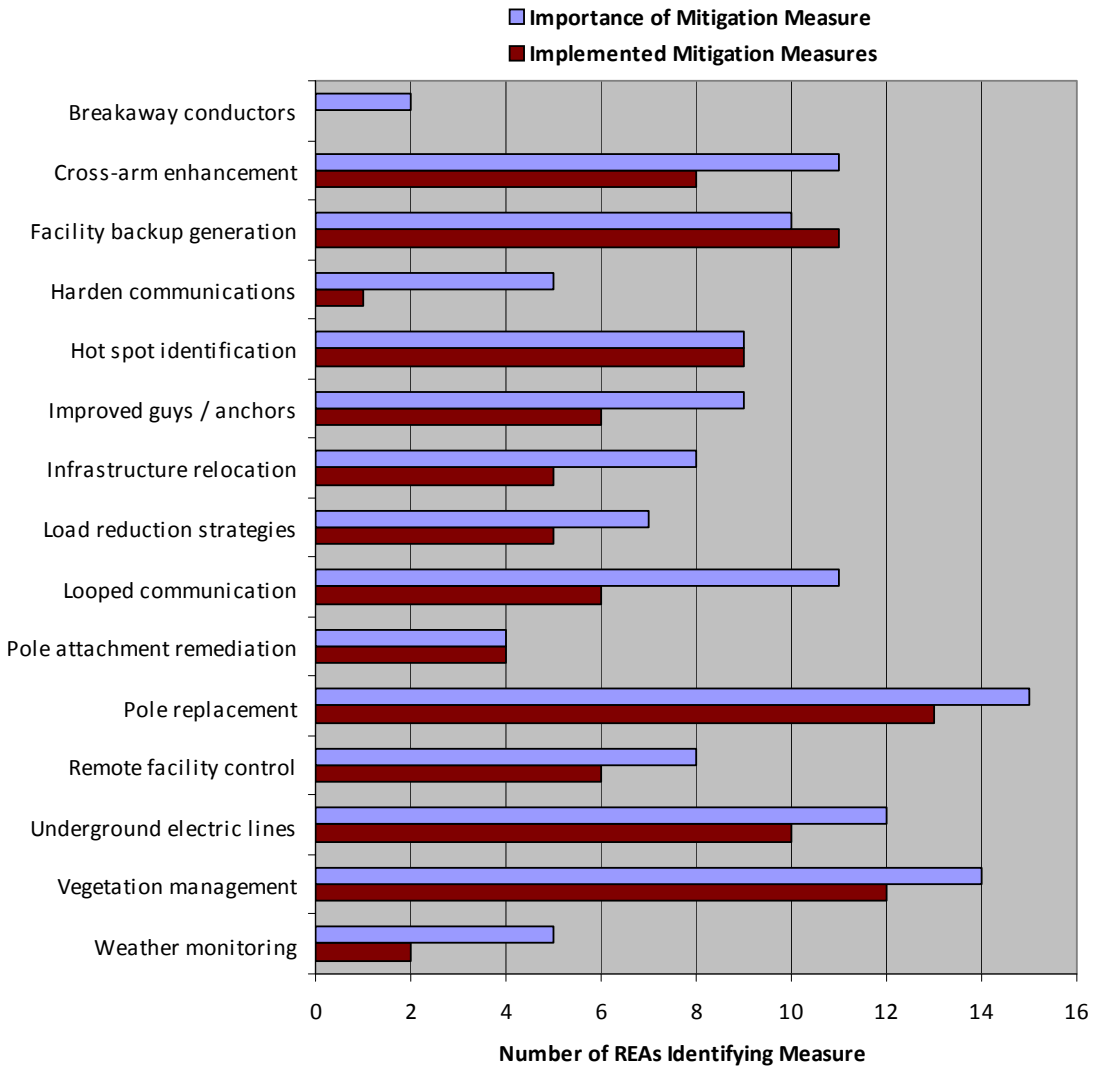
Every mitigation measure except for breakaway conductors has been implemented by at least one REC. The mitigation measures used by the greatest number of RECs are pole replacement, vegetation management, underground electric lines, facility backup

generation, and cross-arm enhancement. REC survey results related to mitigation measures is shown in the following chart.

COLORADO RURAL ELECTRIC COOPERATIVE
NATURAL HAZARD MITIGATION SURVEY

Question H - Has the rural electric cooperative taken mitigation action(s) to make critical electric infrastructure more resistant to natural hazards? If so, please indicate actions taken.

Question I - Please review the potential mitigation actions for rural electric cooperatives to reduce impacts of natural hazards on service or critical infrastructure. Please prioritize the importance of each mitigation actions: Low, Medium, or High.*



*High and medium responses were consolidated to achieve total for the potential impact of hazards.

The following table provides a detailed breakdown of REC survey results related to the importance of mitigation measures on reducing the impacts of natural hazards on critical infrastructure. Pole replacement, vegetation management, and underground electric lines were ranked as the highest priority actions. Actions with the lowest priorities were breakaway conductors, pole attachment remediation, and hardening communications.

COLORADO RURAL ELECTRIC COOPERATIVE
NATURAL HAZARD MITIGATION SURVEY

Question I - Please review the potential mitigation actions for rural electric cooperatives to reduce impacts of natural hazards on service or critical infrastructure. Please prioritize the importance of each mitigation actions: Low, Medium, or High.

Natural Hazard	High	Medium	Low	High + Medium
Breakaway conductors	0	2	10	2
Cross-arm enhancement	3	8	3	11
Facility backup generation	5	5	5	10
Harden communications	2	3	7	5
Hot spot identification	7	2	4	9
Improved guys / anchors	2	7	5	9
Infrastructure relocation	1	7	5	8
Load reduction strategies	3	4	6	7
Looped communication	5	6	3	11
Pole attachment remediation	0	4	9	4
Pole replacement	9	6	0	15
Remote facility control	4	4	6	8
Underground electric lines	4	8	3	12
Vegetation management	8	6	1	14
Weather monitoring	0	5	7	5

All actions presented in the REC Natural Hazard Mitigation Survey are included in this plan as each cooperative will be prioritizing implementation of potential mitigation actions based on their own needs and abilities.

Additional mitigation actions were included based on survey questions focused on coordination between RECs and local public safety activities. Per the survey results, there is opportunity for RECs to collect response, recovery, mitigation, or other emergency management related plans and to participate in plan development, training, and exercising. Also, being an active stakeholder is a proactive way to represent REC interests in local disaster events and to find commonalities or partnerships in pre- and post-event scenarios. Another action is related to developing pre-disaster relationships. Although this is not traditional mitigation actions, but development of relationships with

emergency management partners before disaster happens tends to improve coordination during an event.

The comprehensive table of REC mitigation goals, objectives, and actions is presented in the following table.

Colorado REC Mitigation Goals, Objectives, and Actions	**Natural Hazard**					
	All-Hazards	Fire	Lightning	Thunderstorms	Windstorms	Winter Weather
Goal: Reduce the impact from natural hazards on critical infrastructure						
Objective: Physically strengthen critical utility infrastructure						
Action - Replace cross arms with trim-line construction to reduce maintenance and repair costs				✓	✓	✓
Action - Cross bracing on H Frame Poles				✓	✓	✓
Action - Install additional poles to support transformers				✓	✓	✓
Action - Install dead-End Structures				✓	✓	✓
Action - Install guy-wires				✓	✓	✓
Action - Elevate pad-mounted transformers above Base Flood Elevation (BFE) (or Advisory BFE where applicable)	✓					
Action - Replace damaged poles with higher-rated poles of the same or different material		✓		✓	✓	✓
Action - Remove large diameter communication lines						
Action - Mid span poles (not specified by code)				✓	✓	✓
Action - Install larger poles		✓		✓	✓	✓
Action - Upgrade conductor to Wind-Motion Resistant Conductor					✓	
Action - Underground electrical lines	✓	✓	✓	✓	✓	✓
Action - Strengthen the lines and poles of distribution lines				✓	✓	✓
Action - Replace existing lines with heavier/stronger wire	✓	✓	✓	✓	✓	✓
Action - Shorter spans between poles				✓	✓	✓
Action - Infrastructure relocation		✓				✓
Action - Provide wind dampeners					✓	

Colorado REC Mitigation Goals, Objectives, and Actions	Natural Hazard					
	All-Hazards	Fire	Lightning	Thunderstorms	Windstorms	Winter Weather
Action - Work with local jurisdictions to protect against unauthorized pole attachments	✓					
Action - Conduct loss avoidance study on implemented mitigation measures to verify effectiveness and document economic returns		✓	✓	✓	✓	✓
Objective: Pursue vegetation management strategies						
Action - Negotiate with local governments to fund vegetation management programs	✓	✓	✓	✓	✓	✓
Action - Evaluate local tree ordinances for restrictions to the extent, frequency, and effectiveness of tree trimming resulting in negative impact to critical infrastructure		✓	✓	✓	✓	✓
Action - Coordinate with local governments to implement cost-effective vegetation management programs to supplement or supersede local tree ordinances		✓	✓	✓	✓	✓
Action - Coordinate with local governments to prevent planting of vegetation which will likely interfere with electric infrastructure		✓		✓	✓	✓
Action - Coordinate with local governments to enact tree-trimming ordinances that may help offset the damages of breaking tree limbs		✓		✓	✓	✓
Action - Coordinate with logging companies to reduce damage to utility lines and equipment		✓		✓	✓	✓
Goal: Minimize electric service disruption and associated impacts to consumers						
Objective: Improve communication accessibility and resiliency						
Action - Implement system to allow remote facility control	✓					
Action - Harden communications	✓					
Action - Implement load reduction strategies	✓					
Objective: Development of cooperative response / service restoration plan						
Action - Develop an REC specific vulnerability and risk assessment (VRA) using guidance from the Rural Utility Service and/or emergency management entities	✓					
Action - Develop an Emergency Restoration Plan (ERP) using guidance from the Rural Utility Service	✓					
Objective: Reroute lines and develop redundant systems						

Colorado REC Mitigation Goals, Objectives, and Actions	Natural Hazard					
	All-Hazards	Fire	Lightning	Thunderstorms	Windstorms	Winter Weather
Action - Install critical facility backup generation	✓					
Action - Provide looped distribution service or other redundancies to critical facilities	✓					
Goal: Enhance relationships with local public safety entities						
Objective: Develop or improve lines of communication						
Action - Provide local emergency management contact information to RECs	✓					
Action - Coordinate with local public safety entities on exercise participation	✓					
Action - Coordinate with emergency management to be included in emergency planning (mitigation, response, recovery, etc.) stakeholder groups	✓					
Objective: Develop or improve partnerships						
Action - Coordinate with public safety entities on identification of residential consumers with special needs	✓					
Action - Coordinate with public safety entities on the identification of critical facilities	✓					
Action - Implement system for severe weather monitoring and/or notification	✓					

Funding Sources

The mitigation actions related to the infrastructure and restoration activities of Colorado's rural electric associations are funded largely through a loan and grant program of the federal government, administered by the USDA Rural Utilities Service and by the National Rural Utilities Cooperative Finance Corporation (CFC).

RUS Grant and Loan Programs

Under the authority of the Rural Electrification Act of 1936, Rural Utilities Services (formerly REA) (RUS) of the U.S. Department of Agriculture makes direct loans and loan guarantees to electric utilities to serve customers in rural areas.

The loans and loan guarantees finance the construction of electric distribution, transmission, and generation facilities, including system improvements and replacement

required to furnish and improve electric service in rural areas, as well as demand side management, energy conservation programs, and on-grid and off-grid renewable energy systems. Loans are made to corporations, states, territories and subdivisions and agencies such as municipalities, people's utility districts; and cooperative, nonprofit, limited-dividend, or mutual associations that provide retail electric service needs to rural areas or supply the power needs of distribution borrowers in rural areas.

Through the RUS Electric Programs, the Federal government is the majority note holder for approximately 700 electric systems borrowers in 46 states.

The National Rural Utilities Cooperative Finance Corporation (CFC)

CFC is the primary private market lender to rural electric systems. CFC's loan and credit products provide electric cooperative borrowers with long- and short-term financing and guarantees and letters of credit.

CFC's owners consist of electric cooperative distribution systems, power supply systems, statewide associations and service organizations. It serves as the sole source of financing for more than 200 electric cooperatives and supplements the credit programs of the USDA Rural Development's utilities programs.

Hazard Mitigation Assistance Program (HMA)

Funding is available for up to 75 percent of total project costs with a maximum limit of $3 million in the HMA program. Colorado typically has $500,000 available for this program and the national FEMA funding level is fifty million to one-hundred and fifty million dollars ($50M to $150M) that may be available for competitive grants on an annual basis, for projects that reduce or eliminate damages and protect people and property from natural hazards.

Hazard Mitigation Grant Program (HMGP)

The HMGP provides grants to States and local governments (including rural electric associations) to implement long-term hazard mitigation measures after a major disaster declaration. The purpose of the HMGP is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the immediate recovery from a disaster. The HMGP is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act.

Colorado's rural electric associations are eligible to apply for this funding as a sub-applicant under the CDEM. The state will have to act as the grantee with the RECs being listed as sub-grantees.

Plan Maintenance

The plan maintenance process refers to a system and schedule for RECs to participate in the process of monitoring, evaluating, and updating this mitigation plan.

Plan Monitoring and Evaluating

The process and related components laid out for plan maintenance upon finalization of the current plan and prior to the next update. CDEM, in partnership with CREA, will serve as the lead for monitoring, evaluating, and updating the plan. In addition, RECs will continue to be invited into the process as members of the planning team and are expected to provide significant input into all phases of the planning maintenance process.

The REC Mitigation Plan will be evaluated with potential updates in consideration of, but are not limited to:

- The plan maintenance schedule in the State Plan.
- If a disaster or emergency event necessitates the mitigation strategy is reassessed.
- If there is a declared disaster with a rural electric association component.
- If changes in federal or state laws related to rural electric associations.

Plan Update Process

Part of the monitoring, evaluating and updating process will be to consider the following criteria:

- Evaluate resourcing efforts for plan implementation.
- Evaluate technical, political, legal, or coordination problems that caused implementation issues.
- Consider changes in the vulnerability assessment resulting from taken actions.
- Document areas where mitigation actions were or were not effective.
- Incorporate new data or studies on hazards and risks.
- Incorporate new capabilities or changes in capabilities.
- Incorporate growth and development-related changes to inventories.
- Incorporate new action recommendations or changes in action prioritization.
- Evaluate stakeholder participation.

Upon plan maintenance resulting from a disaster or emergency, the following activities will be considered:

- Identify potential mitigation projects, particularly those eligible for mitigation grant programs if available.
- Evaluate effectiveness of existing mitigation projects.
- Reassess hazard profiles and vulnerability.

Maintenance Implementation

CDEM, in partnership with CREA, will serve as the lead for monitoring, evaluating, and updating the plan. CDEM will continue to participate in CREA's annual Loss Control Seminar to evaluate implementation of the REC Natural Hazard Mitigation Plan.

- Report on usefulness of the plan and the progress on mitigation actions.
- Discuss hazard events and observations.
- Report on how the plan has been incorporated into other planning mechanisms.
- Discuss mitigation issues and ideas via case studies and best practices.
- Recommend funding and identify multi-objective, cost-share, and other opportunities for partnerships.
- Discuss new sources for data to improve future updates.
- Make recommendations on specific updates to the plan.

As part of the evaluation, CDEM will develop and distribute a companion survey to collect and assess stakeholder input regarding plan implementation.

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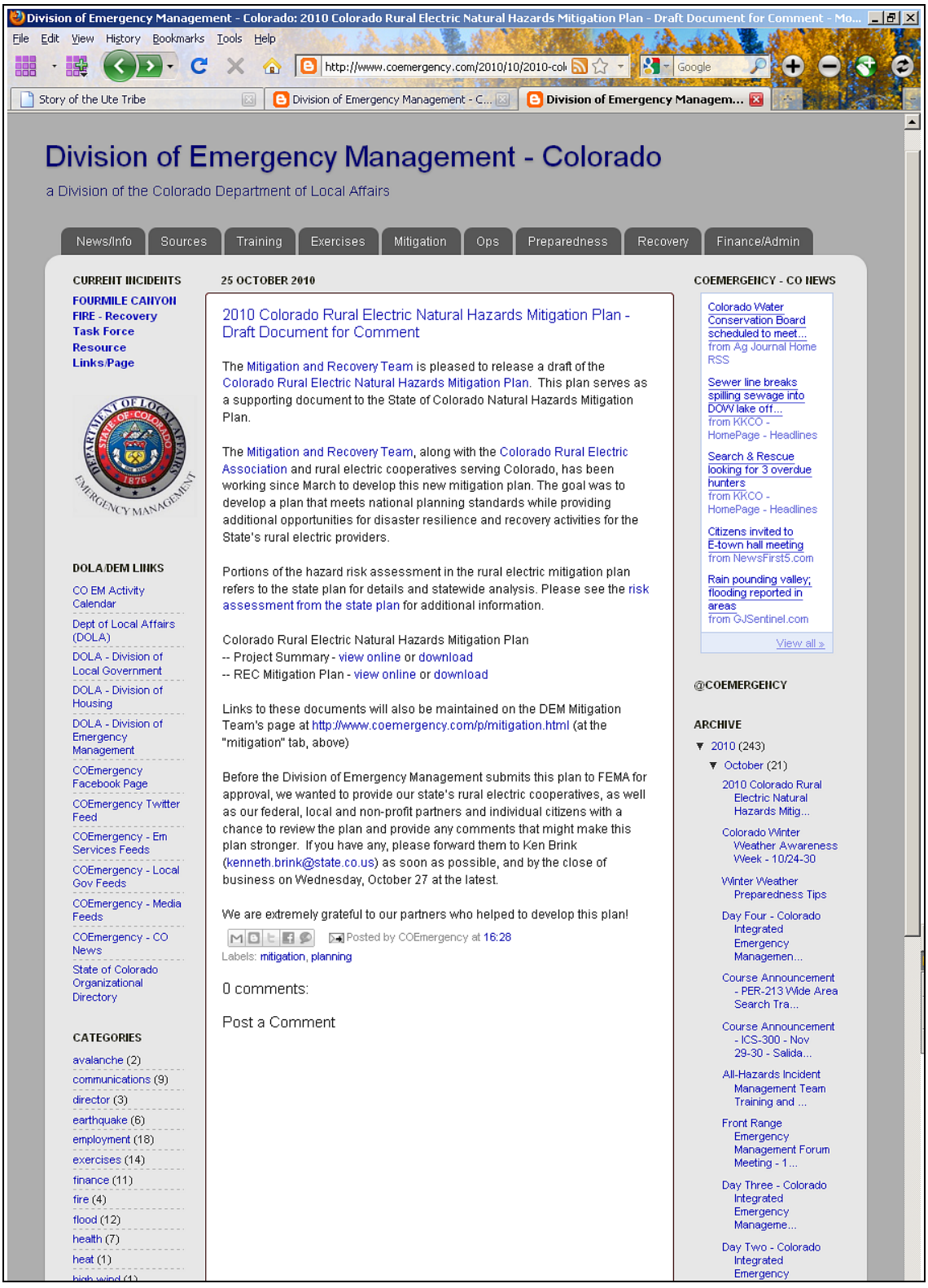
Appendix A

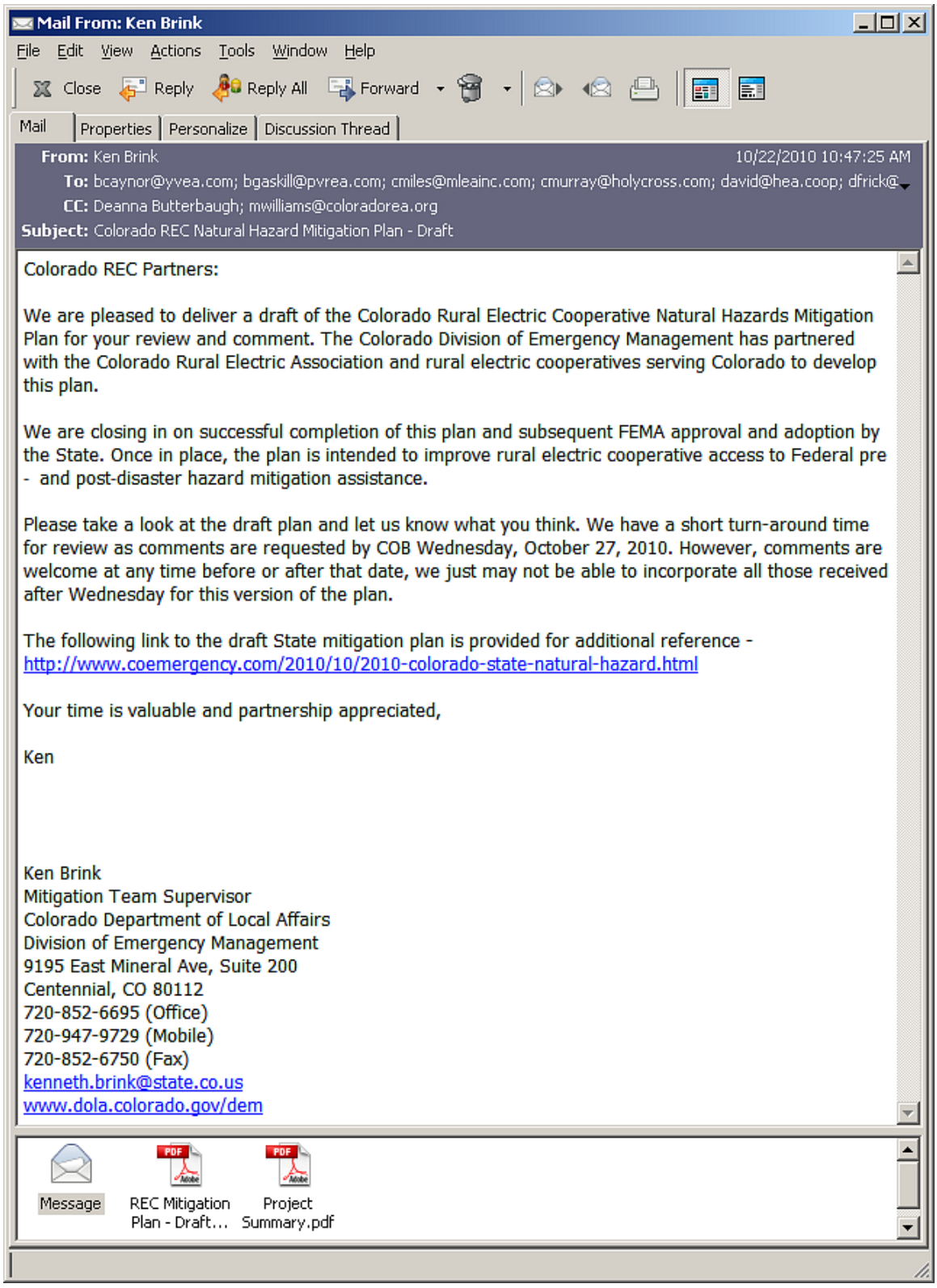
Plan Process Documentation

Table of Contents

Public Posting for Draft Review



Distribution to RECs for Draft Review



Mail From: Ken Brink

File Edit View Actions Tools Window Help

Close Reply Reply All Forward

Mail | Properties | Personalize | Discussion Thread

From: Ken Brink 10/22/2010 10:47:25 AM
To: bcaynor@yvea.com; bgaskill@pvrea.com; cmiles@mleainc.com; cmurray@holycross.com; david@hea.coop; dfrick@
CC: Deanna Butterbaugh; mwilliams@coloradorea.org
Subject: Colorado REC Natural Hazard Mitigation Plan - Draft

Colorado REC Partners:

We are pleased to deliver a draft of the Colorado Rural Electric Cooperative Natural Hazards Mitigation Plan for your review and comment. The Colorado Division of Emergency Management has partnered with the Colorado Rural Electric Association and rural electric cooperatives serving Colorado to develop this plan.

We are closing in on successful completion of this plan and subsequent FEMA approval and adoption by the State. Once in place, the plan is intended to improve rural electric cooperative access to Federal pre - and post-disaster hazard mitigation assistance.

Please take a look at the draft plan and let us know what you think. We have a short turn-around time for review as comments are requested by COB Wednesday, October 27, 2010. However, comments are welcome at any time before or after that date, we just may not be able to incorporate all those received after Wednesday for this version of the plan.

The following link to the draft State mitigation plan is provided for additional reference - http://www.coemergency.com/2010/10/2010-colorado-state-natural-hazard.html

Your time is valuable and partnership appreciated,

Ken

Ken Brink
Mitigation Team Supervisor
Colorado Department of Local Affairs
Division of Emergency Management
9195 East Mineral Ave, Suite 200
Centennial, CO 80112
720-852-6695 (Office)
720-947-9729 (Mobile)
720-852-6750 (Fax)
kenneth.brink@state.co.us
www.dola.colorado.gov/dem

Message | REC Mitigation Plan - Draft... | Project Summary.pdf

Loss Control Seminar Agenda

2010 CREA LOSS CONTROL SEMINAR
JULY 13-14, 2010
Location: Doubletree Denver North, Westminster, CO

AGENDA

TUESDAY, JULY 13, 2010 - Morning Session

8:00 - 8:15	Opening Remarks – Mike Williams
8:30 - 9:30	Eldon Humphers, Federated Insurance: Selling Safety
9:30 - 9:45	Break
9:45 – 10:45	RESAP Changes – Mike Williams
11:00 – 12:15	Kenneth Brink and Deanna Butterbaugh, Colorado Division of Emergency Management: FEMA Mitigation Opportunities
12:15 - 1:30	Lunch (provided by CREA)
	Afternoon Session
1:45 – 2:45	Shur Sales: Fall Protection Demo (hotel parking lot)
2:45 - 3:00	Break
3:00 – 4:00	Christopher Ukowich, Colorado Department of Transportation: Highway and Workzone Safety

WEDNESDAY, JULY 14, 2010 - Morning Session

8:00 - 8:15	Safety Awards – Mike Williams
8:15 – 9:15	Brent Sumner, UNCC: Update
9:15 – 9:30	Break
9:30 -10:30	Lori Nielsen, EDM International: Environmental and Biological Issues and Updates
10:30 – 10:45	Break
10:45 - 11:45	Sergeant Wayne Sanderlin, Colorado State Patrol: Utility Truck Inspections
11:45 - 12:00	Closing - Grand Prize Drawing - Must be present to win

7/2/2010

Survey Distribution to RECs

From: "Denise Ray" <dray@coloradorea.org>
To: "'Scott Ehmke'" <Scott.Ehmke@eea.coop>, "'Pat Oglesby'" <poglesby@gvp.or...
CC: "'Royce'" <retbear@bresnan.net>, "'Michael Weideman'" <mweideman@colorad...
Date: 6/23/2010 2:52 PM
Subject: FW: REA Survey and Project Brief
Attachments: Colorado REA Natural Hazard Mitigation Survey.pdf; Colorado REA Natural Hazard Mitigation Plan Brief.pdf

Attached please find a project brief and survey related to the statewide REA mitigation plan.

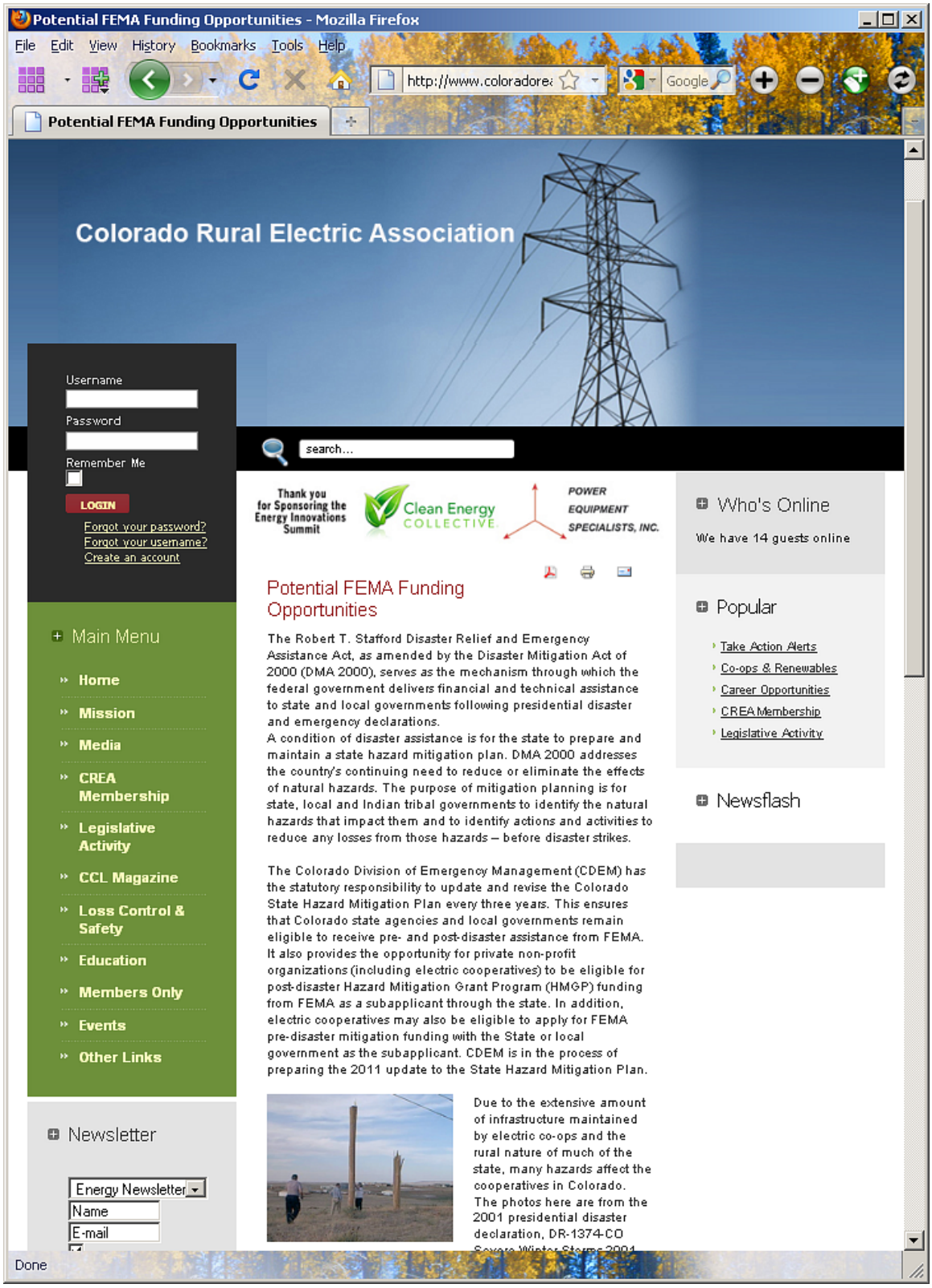
Successful completion of the survey is essential to development of the mitigation plan and an essential component of the Colorado Division of Emergency Management (CDEM) presentation at the Loss Control Seminar on July 13. Information provided in the surveys will be rolled up and presented in a state-level analysis. Any information provided in the survey and subsequently included in the July 13 presentation or mitigation plan will not identify individual organizations or persons.

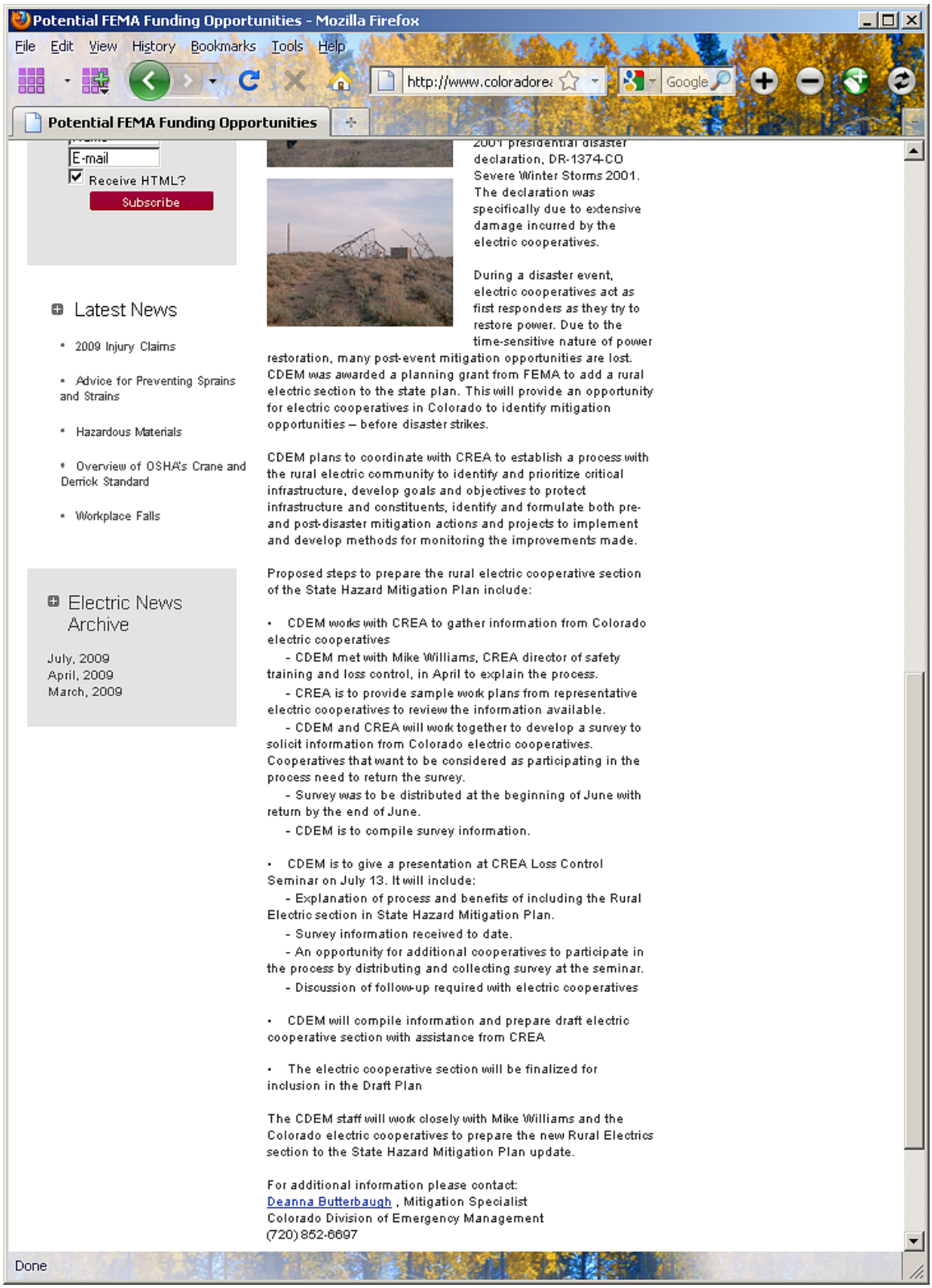
We would like the surveys to be completed by the end of the day Wednesday, June 30, 2010. For more information, please contact:

Ken Brink
Mitigation Team Supervisor
Colorado Division of Emergency Management
9195 East Mineral Ave, Suite 200
Centennial, CO 80112
720-852-6695 (Direct)
720-947-9729 (Mobile)
720-852-6750 (Fax)
kenneth.brink@state.co.us

Thank you very much for your time and assistance.

Project Brief Posting on CREA Web Page




Potential FEMA Funding Opportunities - Mozilla Firefox
File Edit View History Bookmarks Tools Help
Potential FEMA Funding Opportunities
E-mail
Receive HTML?
Subscribe
Latest News
2009 Injury Claims
Advice for Preventing Sprains and Strains
Hazardous Materials
Overview of OSHA's Crane and Derrick Standard
Workplace Falls
Electric News Archive
July, 2009
April, 2009
March, 2009
2001 presidential disaster declaration, DR-1374-CO Severe Winter Storms 2001. The declaration was specifically due to extensive damage incurred by the electric cooperatives.
During a disaster event, electric cooperatives act as first responders as they try to restore power. Due to the time-sensitive nature of power restoration, many post-event mitigation opportunities are lost. CDEM was awarded a planning grant from FEMA to add a rural electric section to the state plan. This will provide an opportunity for electric cooperatives in Colorado to identify mitigation opportunities – before disaster strikes.
CDEM plans to coordinate with CREA to establish a process with the rural electric community to identify and prioritize critical infrastructure, develop goals and objectives to protect infrastructure and constituents, identify and formulate both pre- and post-disaster mitigation actions and projects to implement and develop methods for monitoring the improvements made.
Proposed steps to prepare the rural electric cooperative section of the State Hazard Mitigation Plan include:
• CDEM works with CREA to gather information from Colorado electric cooperatives
- CDEM met with Mike Williams, CREA director of safety training and loss control, in April to explain the process.
- CREA is to provide sample work plans from representative electric cooperatives to review the information available.
- CDEM and CREA will work together to develop a survey to solicit information from Colorado electric cooperatives. Cooperatives that want to be considered as participating in the process need to return the survey.
- Survey was to be distributed at the beginning of June with return by the end of June.
- CDEM is to compile survey information.
• CDEM is to give a presentation at CREA Loss Control Seminar on July 13. It will include:
- Explanation of process and benefits of including the Rural Electric section in State Hazard Mitigation Plan.
- Survey information received to date.
- An opportunity for additional cooperatives to participate in the process by distributing and collecting survey at the seminar.
- Discussion of follow-up required with electric cooperatives
• CDEM will compile information and prepare draft electric cooperative section with assistance from CREA
• The electric cooperative section will be finalized for inclusion in the Draft Plan
The CDEM staff will work closely with Mike Williams and the Colorado electric cooperatives to prepare the new Rural Electrics section to the State Hazard Mitigation Plan update.
For additional information please contact:
Deanna Butterbaugh , Mitigation Specialist
Colorado Division of Emergency Management
(720) 852-6697
Done

Appendix B

Colorado Rural Electric Cooperative Natural Hazard Mitigation Survey

Questionnaire

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Organization: Please choose your organization... **Date:** _____

Name: _____

Please answer the following questions as they relate to the rural electric cooperative's service territory. This survey should take between 5 and 10 minutes. Your time and participation is important and appreciated.

Submit the completed survey to Ken Brink, Colorado Division of Emergency Management, at kenneth.brink@state.co.us by clicking the SUBMIT button on the last page.

A. How concerned are you that services provided by the rural electric cooperative will be interrupted or otherwise impacted by a natural hazard?

☐ Extremely concerned ☐ Somewhat concerned ☐ Not concerned

Comments: _____

B. How concerned are you with about the possibility of the rural electric cooperative critical electric infrastructure being impacted by a natural hazard?

☐ Extremely concerned ☐ Somewhat concerned ☐ Not concerned

Comments: _____

C. Has the rural electric cooperative conducted a hazard analysis and risk assessment?

☐ Within 3 years ☐ Within 5 years ☐ Older than 5 years ☐ Not completed

Comments: _____

Ken Brink
Colorado Division of Emergency Management
Mitigation Team Supervisor
Office: (720) 852-6695
BlackBerry: (720) 947-9729
kenneth.brink@state.co.us

D. Which of the following natural hazards adversely affected/damaged critical electric infrastructure in the cooperative service territory? (Choose all that apply)

- ☐ Avalanche
- ☐ Drought
- ☐ Earthquake
- ☐ Erosion and Deposition
- ☐ Expansive Soils
- ☐ Fire
- ☐ Floods
- ☐ Hailstorms
- ☐ Landslides, Mud/Debris, Rockfalls
- ☐ Lightning
- ☐ Precipitation
- ☐ Subsidence
- ☐ Extreme Heat
- ☐ Thunderstorms
- ☐ Tornados
- ☐ Windstorms
- ☐ Winter Weather
- ☐ Other _____

Comments: _____

E. What is the potential impact of natural hazards to critical electric infrastructure in the cooperative service territory? Please rate the degree of impact by hazards as follows: Low, Medium, or High. (Choose all that apply)

L	M	H		L	M	H		L	M	H	
☐	☐	☐	Avalanche	☐	☐	☐	Floods	☐	☐	☐	Extreme Heat
☐	☐	☐	Drought	☐	☐	☐	Hailstorms	☐	☐	☐	Thunderstorms
☐	☐	☐	Earthquake	☐	☐	☐	Landslides/Flows/Rockfalls	☐	☐	☐	Tornados
☐	☐	☐	Erosion / Deposition	☐	☐	☐	Lightning	☐	☐	☐	Windstorms
☐	☐	☐	Expansive Soils	☐	☐	☐	Precipitation	☐	☐	☐	Winter Weather
☐	☐	☐	Fire	☐	☐	☐	Subsidence	☐	☐	☐	Other _____

Comments: _____

F. What level of local capability exists to contend with the hazard in your cooperative service territory? Please rate the capability for each hazard as follows: Low, Medium, or High. (Choose all that apply)

L	M	H		L	M	H		L	M	H	
☐	☐	☐	Avalanche	☐	☐	☐	Floods	☐	☐	☐	Extreme Heat
☐	☐	☐	Drought	☐	☐	☐	Hailstorms	☐	☐	☐	Thunderstorms
☐	☐	☐	Earthquake	☐	☐	☐	Landslides/Flows/Rockfalls	☐	☐	☐	Tornados
☐	☐	☐	Erosion / Deposition	☐	☐	☐	Lightning	☐	☐	☐	Windstorms
☐	☐	☐	Expansive Soils	☐	☐	☐	Precipitation	☐	☐	☐	Winter Weather
☐	☐	☐	Fire	☐	☐	☐	Subsidence	☐	☐	☐	Other _____

Comments: _____

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Colorado Division of Emergency Management
Mitigation Team Supervisor
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kenneth.brink@state.co.us

G. Please review the following list of potential critical assets to the electric infrastructure. Please rate the criticality of each type of infrastructure to the overall system: Low, Medium, High.

L M H		L M H		L M H	
☐☐☐	Generators	☐☐☐	Databases	☐☐☐	Warehouses
☐☐☐	Substations	☐☐☐	Office buildings	☐☐☐	Business systems
☐☐☐	Transformers	☐☐☐	Internal dependencies	☐☐☐	Networks
☐☐☐	Transmission lines	☐☐☐	External dependencies	☐☐☐	Vehicles
☐☐☐	Distribution lines	☐☐☐	SCADA System	☐☐☐	Human capital
☐☐☐	Control center	☐☐☐	Telecommunications	☐☐☐	Other _____

Comments: _____

H. Has the rural electric cooperative taken mitigation action(s) to make critical electric infrastructure more resistant to natural hazards? If so, please indicate actions taken.

☐ Yes ☐ No

☐ Underground electric lines	☐ Facility backup generation	☐ Weather monitoring
☐ Vegetation management	☐ Harden communications	☐ Hot spot identification
☐ Looped communication	☐ Remote facility control	☐ Load reduction strategies
☐ Infrastructure relocation	☐ Pole attachment remediation	☐ Other _____
☐ Breakaway conductors	☐ Improved guys / anchors	☐ Other _____
☐ Pole replacement	☐ Cross-arm enhancement	☐ Other _____

Comments: _____

I. Please review the potential mitigation actions for rural electric cooperatives to reduce impacts of natural hazards on service or critical infrastructure. Please prioritize the importance of each mitigation actions: Low, Medium, or High.

L M H		L M H		L M H	
☐☐☐	Underground electric lines	☐☐☐	Facility backup generation	☐☐☐	Weather monitoring
☐☐☐	Vegetation management	☐☐☐	Harden communications	☐☐☐	Hot spot ID
☐☐☐	Looped communication	☐☐☐	Remote facility control	☐☐☐	Load reduction
☐☐☐	Infrastructure relocation	☐☐☐	Pole attachment remedy	☐☐☐	Other _____
☐☐☐	Breakaway conductors	☐☐☐	Improved guys / anchors	☐☐☐	Other _____
☐☐☐	Pole replacement	☐☐☐	Cross-arm enhancement	☐☐☐	Other _____

Comments: _____

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J. Has your organization been involved with local pre-disaster mitigation planning in the local jurisdiction(s) representing the cooperative service territory?

☐ Yes ☐ No ☐ Not Concerned Comments: _____

K. Has the rural electric cooperative participated in local, regional, or state-level emergency response planning?

☐ Yes ☐ No ☐ Not Concerned Comments: _____

L. Has the rural electric cooperative participated in local, regional, or state-level emergency response exercises?

☐ Yes ☐ No ☐ Not Concerned Comments: _____

M. Has the rural electric cooperative participated in local, regional, or state-level emergency response activities during actual natural hazard events?

☐ Yes ☐ No ☐ Not Concerned Comments: _____

N. Do you have a copy of the local hazard mitigation plan and/or emergency response plan from the jurisdiction(s) representing the rural electric cooperative service territory?

☐ Yes ☐ No If yes: ☐ Mitigation Plan ☐ Emergency Response Plan

Comments: _____

O. Have you worked with your local emergency management coordinator(s) in identifying or developing mitigation measures to reduce the impact of natural disasters on critical electric infrastructure?

☐ Yes ☐ No Comments: _____

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P. Which entities does your rural electric cooperative work with for disaster mitigation, preparedness, response, or recovery? (Choose all that apply)

- ☐ Law enforcement
- ☐ Public works
- ☐ Fire
- ☐ Emergency management
- ☐ Community development
- ☐ Private business
- ☐ Non-profit
- ☐ Work independently
- ☐ Other _____

Comments: _____

Q. Which entity does your rural electric cooperative work with most frequently for disaster mitigation, preparedness, response, or recovery? (Choose only one)

- ☐ Law enforcement
- ☐ Public works
- ☐ Fire
- ☐ Emergency management
- ☐ Community development
- ☐ Private business
- ☐ Non-profit
- ☐ Work independently
- ☐ Other _____

Comments: _____

R. Do you know what entity to contact regarding reducing your risks of natural hazards in the rural electric cooperative service territory?

☐ Yes ☐ No If yes, please indicate who _____

Comments: _____

S. Are there any natural hazards that the rural electric cooperative needs additional information made available for mitigation purposes? (Choose all that apply)

- ☐ Avalanche
- ☐ Drought
- ☐ Earthquake
- ☐ Erosion and Deposition
- ☐ Expansive Soils
- ☐ Fire
- ☐ Floods
- ☐ Hailstorms
- ☐ Landslides, Mud/Debris, Rockfalls
- ☐ Lightning
- ☐ Precipitation
- ☐ Subsidence
- ☐ Extreme Heat
- ☐ Thunderstorms
- ☐ Tornados
- ☐ Windstorms
- ☐ Winter Weather
- ☐ Other _____

Comments: _____

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kenneth.brink@state.co.us

T. What is the most effective method to receive information on making rural electric cooperatives more resistant to natural hazards? (Choose all that apply)

☐ Newspaper	☐ Traditional Mail	☐ Associations
☐ Internet	☐ Email	☐ Other _____
☐ Public Meetings	☐ Training Courses	☐ Other _____
☐ Telephone	☐ Fact Sheets	☐ Other _____

Comments: _____

U. Do you have suggestions for other ways that the State or local jurisdictions could make natural hazard information more available to you?

☐ Yes ☐ No Comments: _____

V. Are there any other issues regarding the reduction of risk and loss associated with natural hazards and rural electric cooperatives that you think are important?

☐ Yes ☐ No Comments: _____

W. General comments regarding the survey:

_____

How much time did you take in filling out this survey: _____

How many additional people were involved in filling out this survey: _____

Please Name _____ _____

_____ _____

SUBMIT

Ken Brink
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Appendix C

Colorado Rural Electric Cooperative Natural Hazard Mitigation Survey

Survey Roll-Up Report

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Colorado Rural Electric Cooperative
Natural Hazard Mitigation Survey

Survey Roll-Up Report

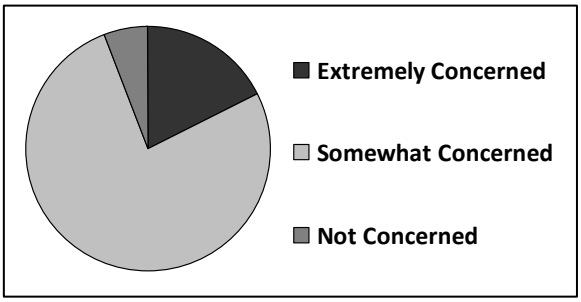
October 2010

A. How concerned are you that services provided by the rural electric cooperative will be interrupted or otherwise impacted by a natural hazard?

☐ Extremely concerned ☐ Somewhat concerned ☐ Not concerned

Comments:

Answer	Number	Percent
Extremely Concerned	3	18%
Somewhat Concerned	13	76%
Not Concerned	1	6%
Total Responses	17	100%



Comments:

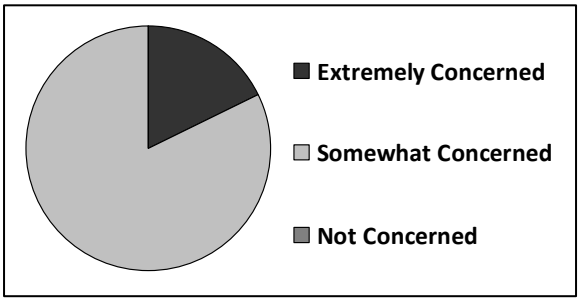
- We always have a chance of winter storms affecting us like in 2001, but you can't always build a system that will handle all weather conditions.
- The forests in Grand, Jackson, and Summit counties have been killed by the bark pine beetle infestation.
- High avalanche areas in Telluride and Silverton

B. How concerned are you with about the possibility of the rural electric cooperative critical electric infrastructure being impacted by a natural hazard?

☐ Extremely concerned ☐ Somewhat concerned ☐ Not concerned

Comments:

Answer	Number	Percent
Extremely Concerned	3	18%
Somewhat Concerned	14	82%
Not Concerned	0	0%
Total Responses	17	100%



Comments:

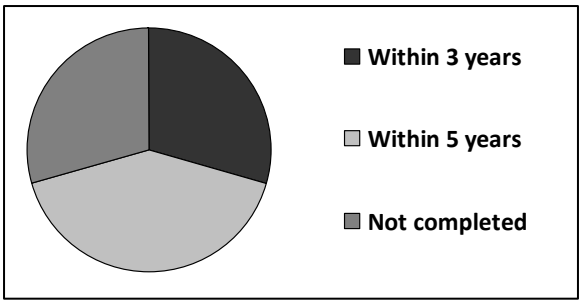
- We build our system to handle the storms we receive and we do have an emergency action plan in place.

C. Has the rural electric cooperative conducted a hazard analysis and risk assessment?

☐ Within 3 years ☐ Within 5 years ☐ Older than 5 years ☐ Not completed

Comments:

Answer	Number	Percent
Within 3 years	5	29%
Within 5 years	7	41%
Older than 5 years	0	0%
Not completed	5	29%
Total Responses	17	100%



Comments:

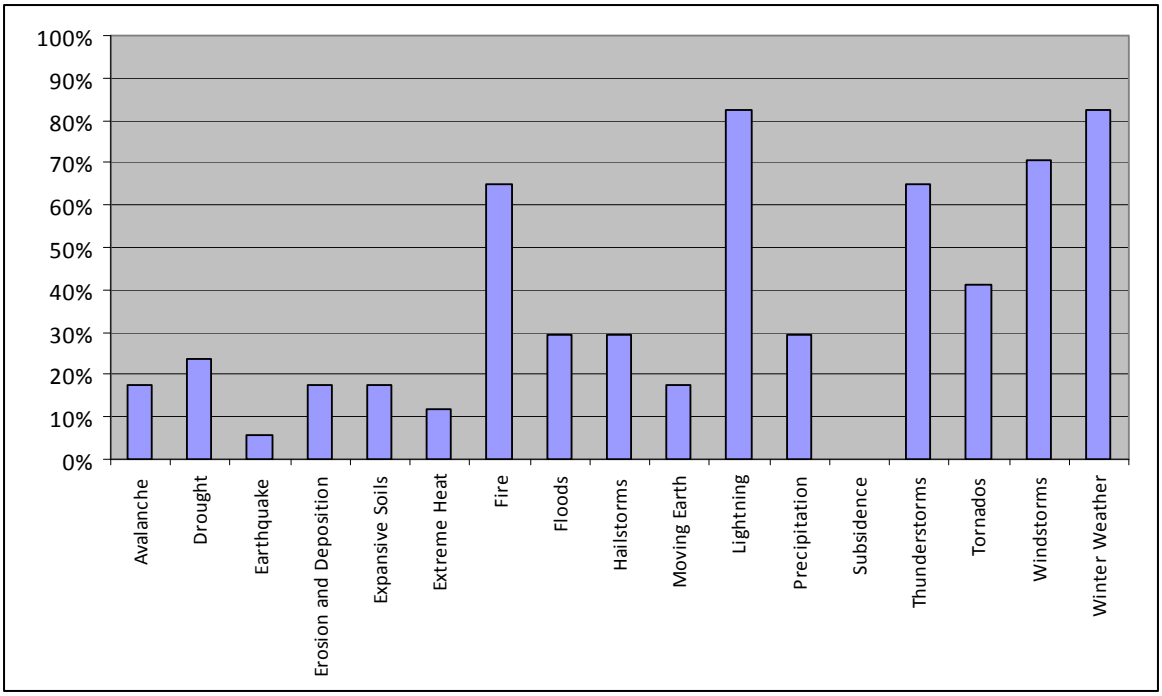
- As part of our ERP we conducted a risk assessment a couple of years ago.
- With regard to beetle kill MPE has planned and spent millions of dollars

D. Which of the following natural hazards adversely affected/damaged critical electric infrastructure in the cooperative service territory? (Choose all that apply)

☐ Avalanche	☐ Floods	☐ Extreme Heat
☐ Drought	☐ Hailstorms	☐ Thunderstorms
☐ Earthquake	☐ Landslides, Mud/Debris, Rockfalls	☐ Tornados
☐ Erosion and Deposition	☐ Lightning	☐ Windstorms
☐ Expansive Soils	☐ Precipitation	☐ Winter Weather
☐ Fire	☐ Subsidence	☐ Other

Comments:

Answer	Number	Percent	Answer	Number	Percent
Lightning	14	82%	Drought	4	24%
Winter Weather	14	82%	Avalanche	3	18%
Windstorms	12	71%	Erosion and Deposition	3	18%
Fire	11	65%	Expansive Soils	3	18%
Thunderstorms	11	65%	Moving Earth	3	18%
Tornados	7	41%	Extreme Heat	2	12%
Floods	5	29%	Earthquake	1	6%
Hailstorms	5	29%	Subsidence	0	0%
Precipitation	5	29%			



Comments:

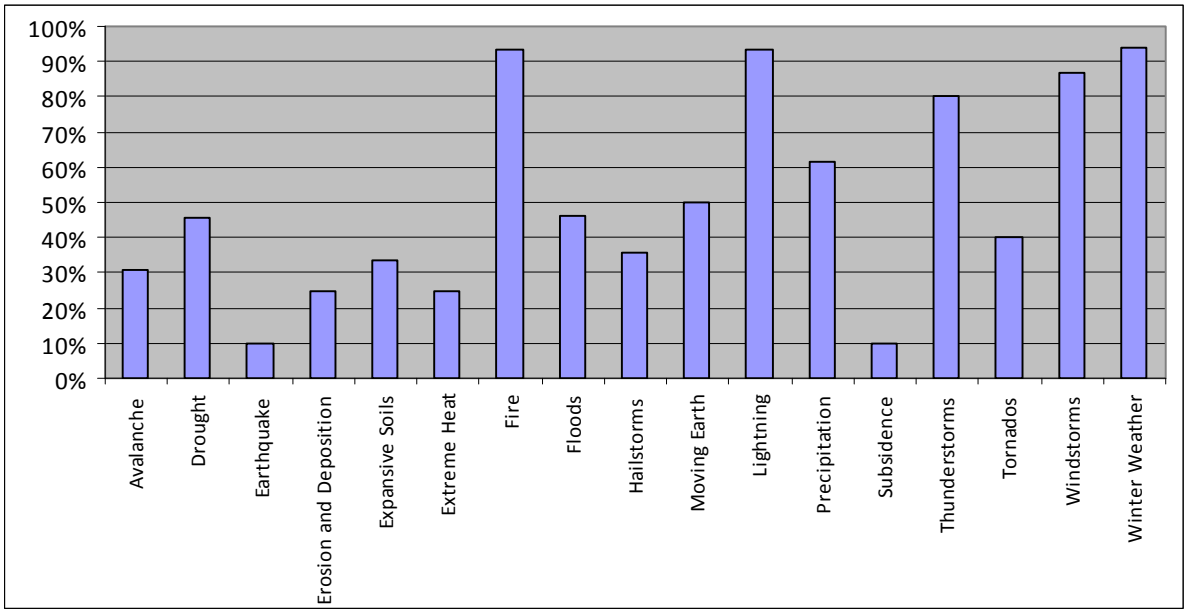
What time frame are you asking the question for? We were damaged in 1977 and 2001 but haven't experienced any damage recently.

E. What is the potential impact of natural hazards to critical electric infrastructure in the cooperative service territory? Please rate the degree of impact by hazards as follows: Low, Medium, or High. (Choose all that apply)

L M H		L M H		L M H	
☐☐☐	Avalanche	☐☐☐	Floods	☐☐☐	Extreme Heat
☐☐☐	Drought	☐☐☐	Hailstorms	☐☐☐	Thunderstorms
☐☐☐	Earthquake	☐☐☐	Landslides/Flows/Rockfalls	☐☐☐	Tornados
☐☐☐	Erosion / Deposition	☐☐☐	Lightning	☐☐☐	Windstorms
☐☐☐	Expansive Soils	☐☐☐	Precipitation	☐☐☐	Winter Weather
☐☐☐	Fire	☐☐☐	Subsidence	☐☐☐	Other

Comments:

Answer	Number			Percent		
	High	Medium	Low	High	Medium	Low
Avalanche	3	1	9	23%	8%	69%
Drought	2	3	6	18%	23%	46%
Earthquake	0	1	9	0%	8%	69%
Erosion and Deposition	0	3	9	0%	23%	69%
Expansive Soils	0	4	8	0%	31%	62%
Extreme Heat	1	2	9	8%	15%	69%
Fire	7	7	1	47%	54%	8%
Floods	1	5	7	8%	38%	54%
Hailstorms	1	4	9	7%	31%	69%
Landslides, Mud/Debris, Rockfalls	1	5	6	8%	38%	46%
Lightning	7	7	1	47%	54%	8%
Precipitation	1	7	5	8%	54%	38%
Subsidence	0	1	9	0%	8%	69%
Thunderstorms	4	8	3	27%	62%	23%
Tornados	2	4	9	13%	31%	69%
Windstorms	5	8	2	33%	62%	15%
Winter Weather	8	7	1	50%	54%	8%

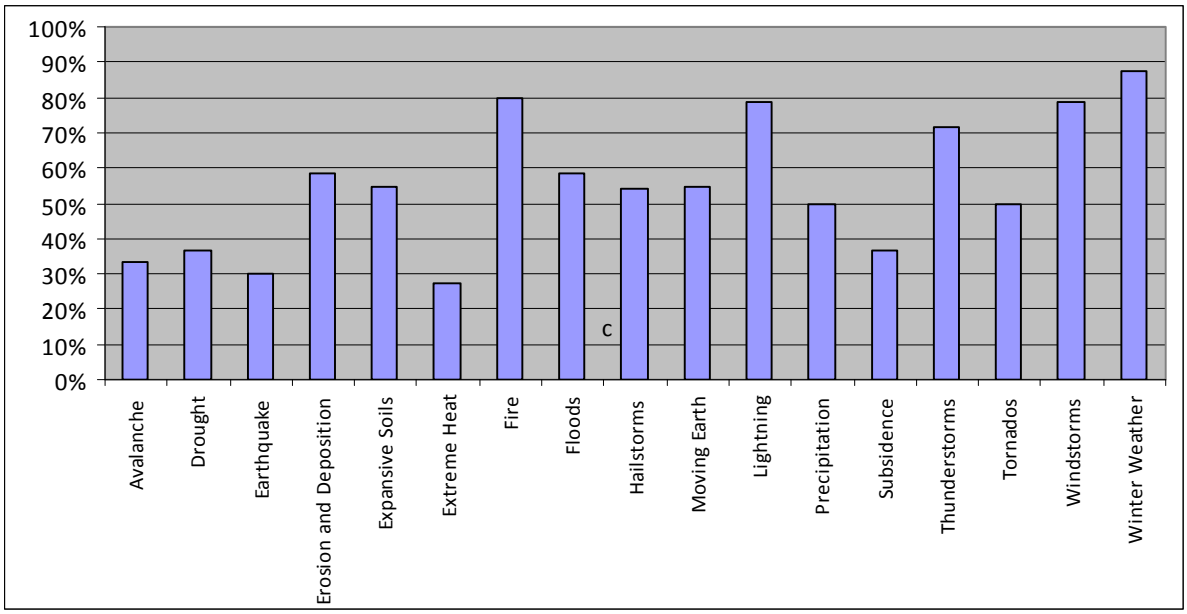


F. What level of local capability exists to contend with the hazard in your cooperative service territory? Please rate the capability for each hazard as follows: Low, Medium, or High. (Choose all that apply)

L M H		L M H		L M H	
☐☐☐	Avalanche	☐☐☐	Floods	☐☐☐	Extreme Heat
☐☐☐	Drought	☐☐☐	Hailstorms	☐☐☐	Thunderstorms
☐☐☐	Earthquake	☐☐☐	Landslides/Flows/Rockfalls	☐☐☐	Tornados
☐☐☐	Erosion / Deposition	☐☐☐	Lightning	☐☐☐	Windstorms
☐☐☐	Expansive Soils	☐☐☐	Precipitation	☐☐☐	Winter Weather
☐☐☐	Fire	☐☐☐	Subsidence	☐☐☐	Other

Comments:

Answer	Number			Percent		
	High	Medium	Low	High	Medium	Low
Avalanche	1	3	8	8%	25%	67%
Drought	0	4	7	0%	36%	64%
Earthquake	0	3	7	0%	30%	70%
Erosion and Deposition	2	5	5	17%	42%	42%
Expansive Soils	1	5	5	9%	45%	45%
Extreme Heat	1	2	8	9%	18%	73%
Fire	5	7	3	33%	47%	20%
Floods	2	5	5	17%	42%	42%
Hailstorms	2	5	6	15%	38%	46%
Landslides, Mud/Debris, Rockfalls	0	6	5	0%	55%	45%
Lightning	7	4	3	50%	29%	21%
Precipitation	4	2	6	33%	17%	50%
Subsidence	2	2	7	18%	18%	64%
Thunderstorms	6	4	4	43%	29%	29%
Tornados	5	2	7	36%	14%	50%
Windstorms	7	4	3	50%	29%	21%
Winter Weather	11	3	2	69%	19%	12%

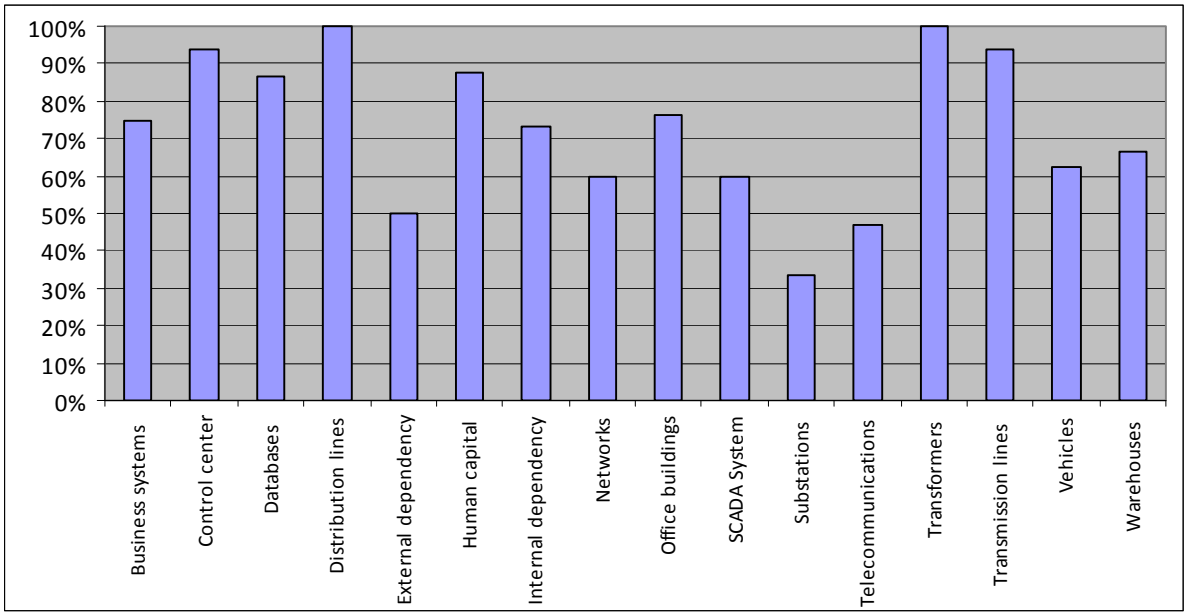


G. Please review the following list of potential critical assets to the electric infrastructure. Please rate the criticality of each type of infrastructure to the overall system: Low, Medium, High.

L M H		L M H		L M H	
☐☐☐	Generators	☐☐☐	Databases	☐☐☐	Warehouses
☐☐☐	Substations	☐☐☐	Office buildings	☐☐☐	Business systems
☐☐☐	Transformers	☐☐☐	Internal dependencies	☐☐☐	Networks
☐☐☐	Transmission lines	☐☐☐	External dependencies	☐☐☐	Vehicles
☐☐☐	Distribution lines	☐☐☐	SCADA System	☐☐☐	Human capital
☐☐☐	Control center	☐☐☐	Telecommunications	☐☐☐	Other Radio

Comments:

Answer	Number			Percent		
	High	Medium	Low	High	Medium	Low
Business systems	6	6	4	38%	38%	25%
Control center	11	4	1	69%	25%	6%
Databases	5	8	2	33%	53%	13%
Distribution lines	15	2	0	88%	12%	0%
External dependencies	4	3	7	29%	21%	50%
Human capital	10	4	2	63%	25%	13%
Internal dependencies	3	8	4	20%	53%	27%
Networks	5	4	6	33%	27%	40%
Office buildings	5	8	4	29%	47%	24%
SCADA System	5	4	6	33%	27%	40%
Substations	2	3	10	13%	20%	67%
Telecommunications	4	3	8	27%	20%	53%
Transformers	13	3	0	81%	19%	0%
Transmission lines	10	5	1	63%	31%	6%
Vehicles	7	3	6	44%	19%	38%
Warehouses	3	5	4	25%	42%	33%



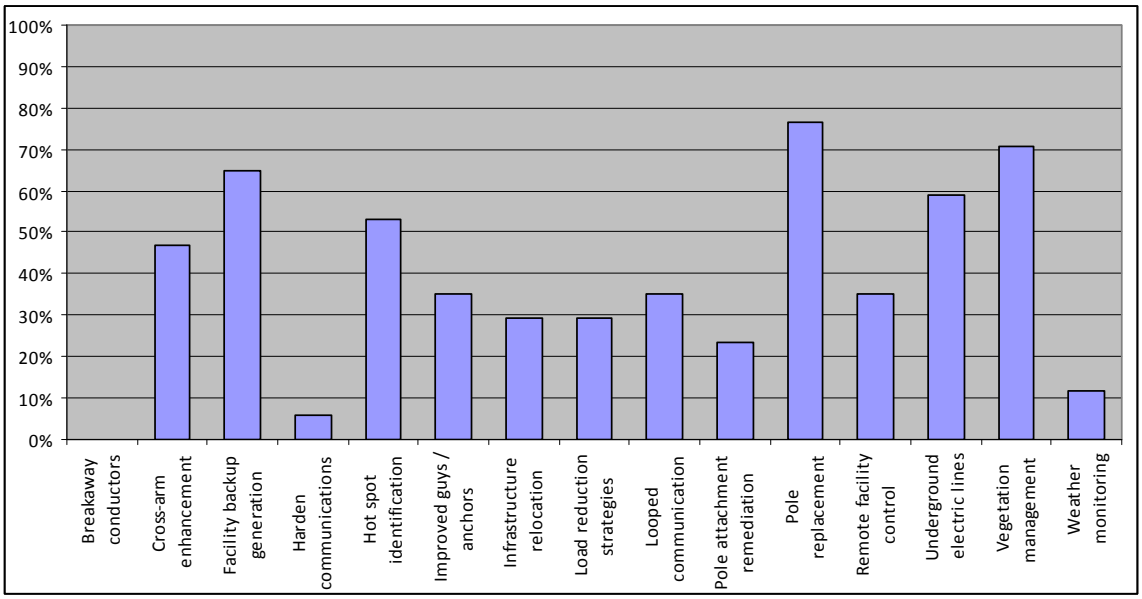
H. Has the rural electric cooperative taken mitigation action(s) to make critical electric infrastructure more resistant to natural hazards? If so, please indicate actions taken.

☐ Yes ☐ No

☐ Underground electric lines	☐ Facility backup generation	☐ Weather monitoring
☐ Vegetation management	☐ Harden communications	☐ Hot spot identification
☐ Looped communication	☐ Remote facility control	☐ Load reduction strategies
☐ Infrastructure relocation	☐ Pole attachment remediation	☐ Other
☐ Breakaway conductors	☐ Improved guys / anchors	☐ Other
☐ Pole replacement	☐ Cross-arm enhancement	☐ Other

Comments:

Answer	Number	Percent	Answer	Number	Percent
Pole replacement	13	76%	Remote facility control	6	35%
Vegetation management	12	71%	Infrastructure relocation	5	29%
Facility backup generation	11	65%	Load reduction strategies	5	29%
Underground electric lines	10	59%	Pole attachment remediation	4	24%
Hot spot identification	9	53%	Weather monitoring	2	12%
Cross-arm enhancement	8	47%	Harden communications	1	6%
Improved guys / anchors	6	35%	Breakaway conductors	0	0%
Looped communication	6	35%	Remote facility control	6	35%



Comments:

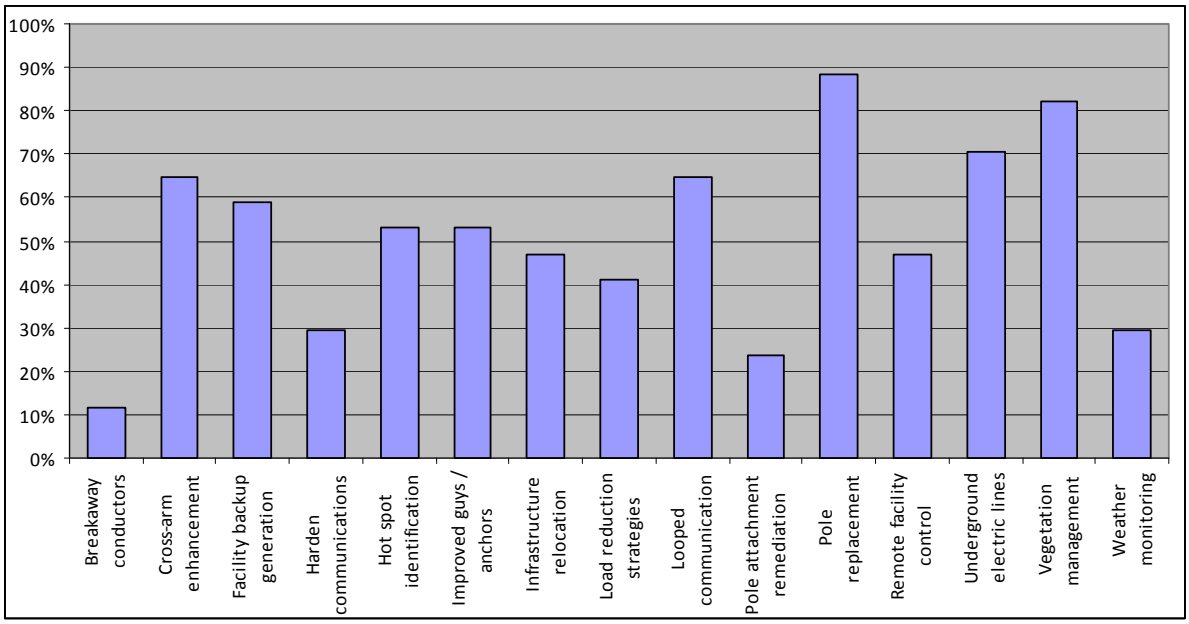
- Engineer our system to fit our needs and help our system stay up during storms.
- Raptor protection
- Armor rod & storm ties better protect conductors from damage during ice storms

I. Please review the potential mitigation actions for rural electric cooperatives to reduce impacts of natural hazards on service or critical infrastructure. Please prioritize the importance of each mitigation actions: Low, Medium, or High.

L M H		L M H		L M H	
☐☐☐	Underground electric lines	☐☐☐	Facility backup generation	☐☐☐	Weather monitoring
☐☐☐	Vegetation management	☐☐☐	Harden communications	☐☐☐	Hot spot ID
☐☐☐	Looped communication	☐☐☐	Remote facility control	☐☐☐	Load reduction
☐☐☐	Infrastructure relocation	☐☐☐	Pole attachment remedy	☐☐☐	Other: Armor Rod
☐☐☐	Breakaway conductors	☐☐☐	Improved guys / anchors	☐☐☐	Other:
☐☐☐	Pole replacement	☐☐☐	Cross-arm enhancement	☐☐☐	Other:

Comments:

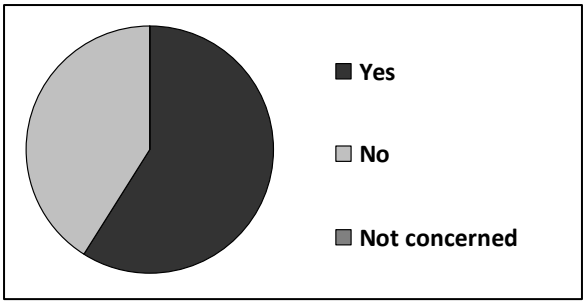
Answer	Number			Percent		
	High	Medium	Low	High	Medium	Low
Breakaway conductors	0	2	10	0%	17%	83%
Cross-arm enhancement	3	8	3	21%	57%	21%
Facility backup generation	5	5	5	33%	33%	33%
Harden communications	2	3	7	17%	25%	58%
Hot spot identification	7	2	4	54%	15%	31%
Improved guys / anchors	2	7	5	14%	50%	36%
Infrastructure relocation	1	7	5	8%	54%	38%
Load reduction strategies	3	4	6	23%	31%	46%
Looped communication	5	6	3	36%	43%	21%
Pole attachment remediation	0	4	9	0%	31%	69%
Pole replacement	9	6	0	60%	40%	0%
Remote facility control	4	4	6	29%	29%	43%
Underground electric lines	4	8	3	27%	53%	20%
Vegetation management	8	6	1	53%	40%	7%
Weather monitoring	0	5	7	0%	42%	58%



J. Has your organization been involved with local pre-disaster mitigation planning in the local jurisdiction(s) representing the cooperative service territory?

☐ Yes ☐ No ☐ Not Concerned Comments:

Answer	Number	Percent
Yes	10	59%
No	7	41%
Not Concerned	0	0%
Total Responses	17	100%



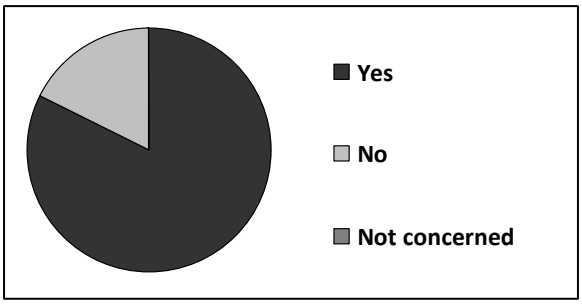
Comments:

- Have not been invited to their meetings if they are actually held.
- We do safety demonstrations
- Only internally

K. Has the rural electric cooperative participated in local, regional, or state-level emergency response planning?

☐ Yes ☐ No ☐ Not Concerned Comments:

Answer	Number	Percent
Yes	14	82%
No	3	18%
Not Concerned	0	0%
Total Responses	17	100%



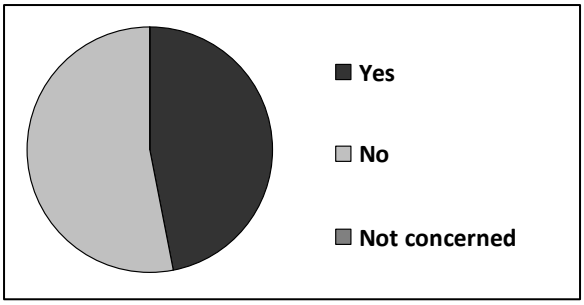
Comments:

- Only through CREA and our disaster action plan. Association conducts annual exercises to make sure our ERP fits our needs.
- We do safety demonstrations
- Only internally

L. Has the rural electric cooperative participated in local, regional, or state-level emergency response exercises?

☐ Yes ☐ No ☐ Not Concerned Comments:

Answer	Number	Percent
Yes	8	47%
No	9	53%
Not Concerned	0	0%
Total Responses	17	100%



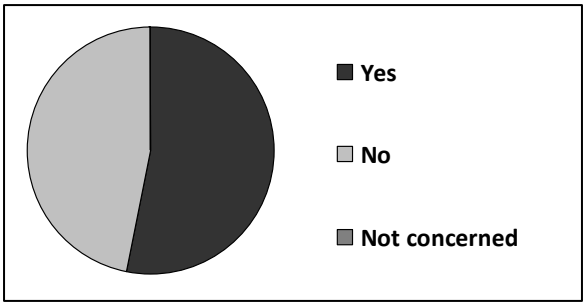
Comments:

- Haven't been invited to any. Conduct our own exercises annually.

M. Has the rural electric cooperative participated in local, regional, or state-level emergency response activities during actual natural hazard events?

☐ Yes ☐ No ☐ Not Concerned Comments:

Answer	Number	Percent
Yes	9	53%
No	8	47%
Not Concerned	0	0%
Total Responses	17	100%



Comments:

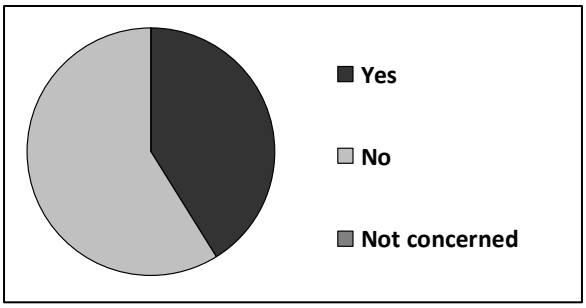
- Only through CREA disaster aid plan, we have helped coops in Colorado, Kansas and Nebraska.
- Outage restoration, fire, landslides

N. Do you have a copy of the local hazard mitigation plan and/or emergency response plan from the jurisdiction(s) representing the rural electric cooperative service territory?

☐ Yes ☐ No If yes: ☐ Mitigation Plan ☐ Emergency Response Plan

Comments:

Answer	Number	Percent
Yes	7	41%
No	10	59%
Total Responses	17	100%
Mitigation Plan	0	NA
Emergency Ops Plan	1	NA



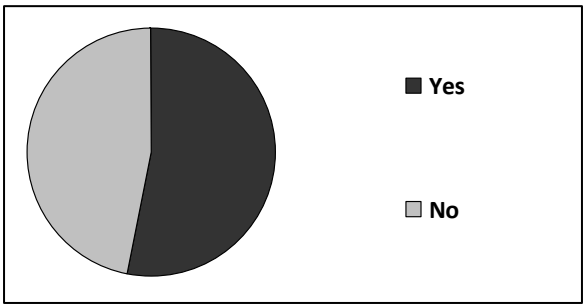
Comments:

- I didn't know such a plan existed for the 9 counties we serve.
- Pitkin and Garfield County

O. Have you worked with your local emergency management coordinator(s) in identifying or developing mitigation measures to reduce the impact of natural disasters on critical electric infrastructure?

☐ Yes ☐ No Comments:

Answer	Number	Percent
Yes	9	53%
No	8	47%
Total Responses	17	100%



Comments:

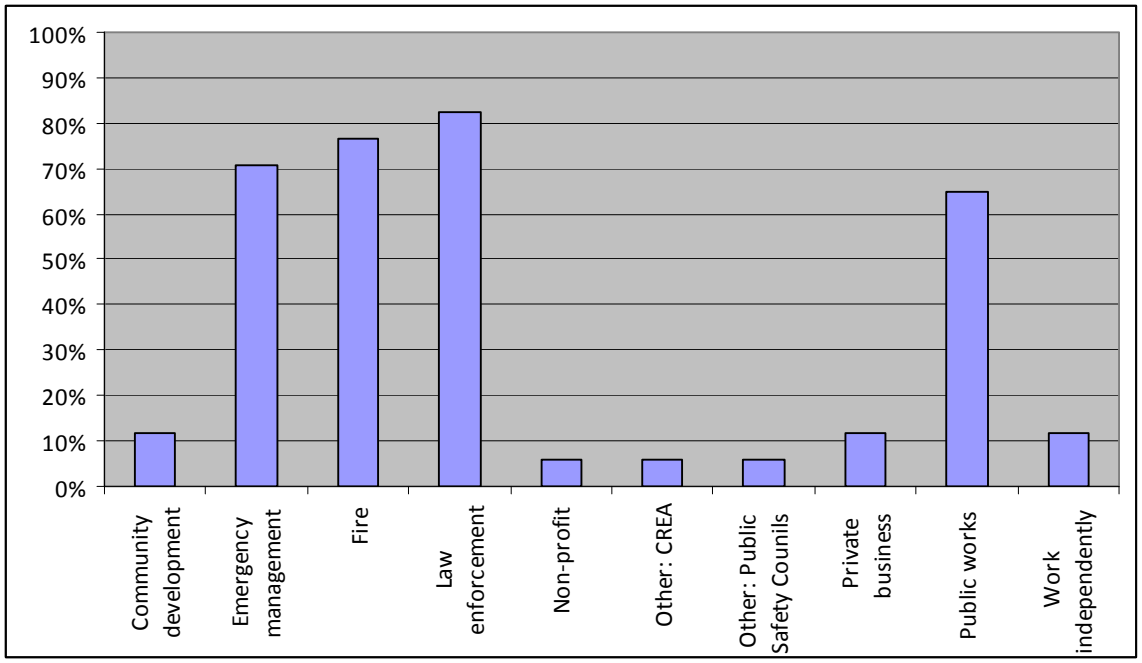
- Haven't been asked to help.

P. Which entities does your rural electric cooperative work with for disaster mitigation, preparedness, response, or recovery? (Choose all that apply)

- ☐ Law enforcement
- ☐ Public works
- ☐ Fire
- ☐ Emergency management
- ☐ Community development
- ☐ Private business
- ☐ Non-profit
- ☐ Work independently
- ☐ Other

Comments:

Answer	Number	Percent
Law enforcement	14	82%
Public works	11	65%
Fire	13	76%
Emergency management	12	71%
Community development	2	12%
Private business	2	12%
Non-profit	1	6%
Work independently	2	12%
Other: CREA	1	6%
Other: Public Safety Councils	1	6%

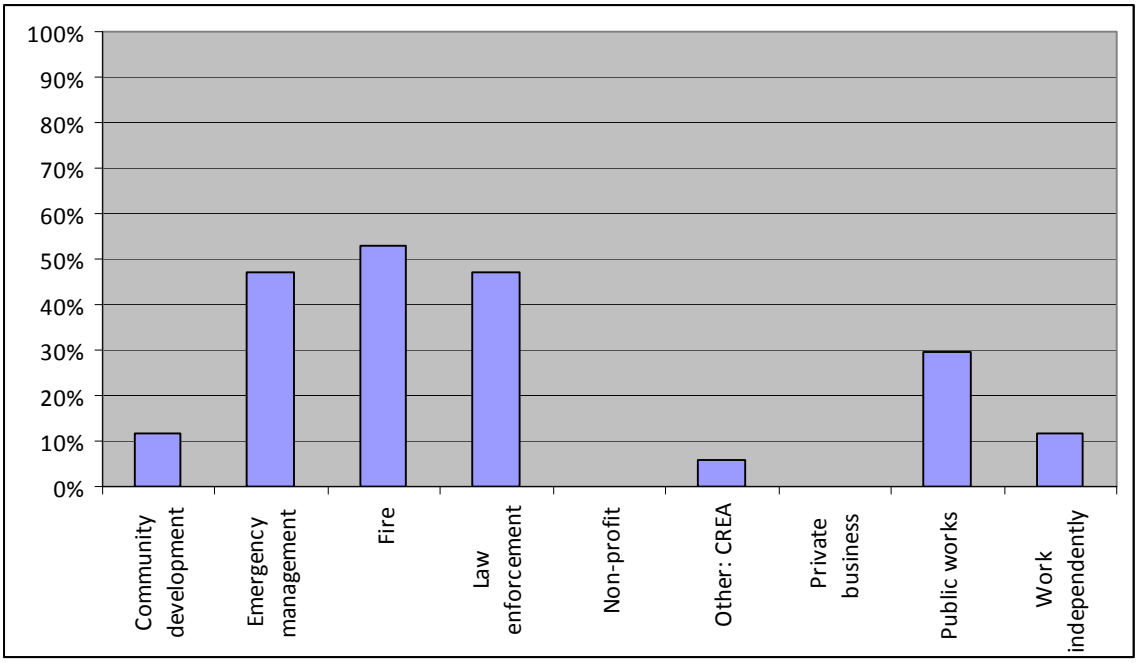


Q. Which entity does your rural electric cooperative work with most frequently for disaster mitigation, preparedness, response, or recovery? (Choose only one)

- ☐ Law enforcement
- ☐ Public works
- ☐ Fire
- ☐ Emergency management
- ☐ Community development
- ☐ Private business
- ☐ Non-profit
- ☐ Work independently
- ☐ Other

Comments:

Answer	Number	Percent
Fire	9	53%
Law enforcement	8	47%
Emergency management	8	47%
Public works	5	29%
Community development	2	12%
Work independently	2	12%
Other: CREA	1	6%
Private business	0	0%
Non-profit	0	0%

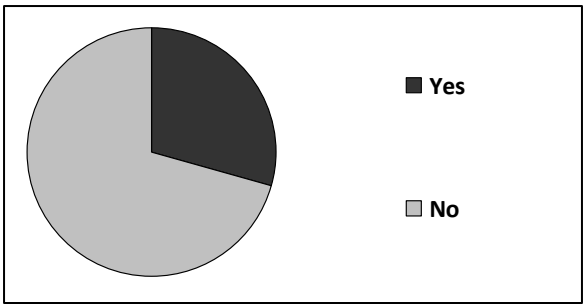


R. Do you know what entity to contact regarding reducing your risks of natural hazards in the rural electric cooperative service territory?

☐ Yes ☐ No If yes, please indicate who

Comments:

Answer	Number	Percent
Yes	8	47%
No	9	53%



Comments:

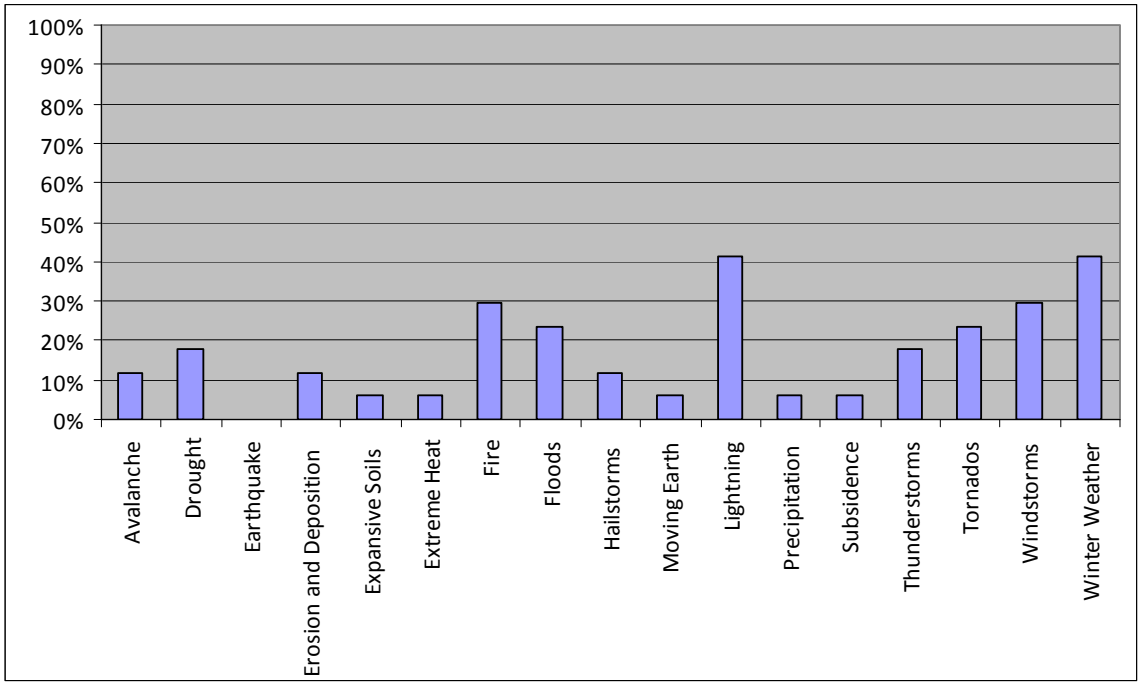
- County Emergency Manager
- I don't know of any entities that know anything about electric facilities except ourselves and the entities that we are involved with. Who do you have that could tell us how to conduct our business and engineer and build our systems?
- Public Safety Council
- Those listed in ERP.
- Local utility is normally in a better position to determine these issues rather than some agency.

S. Are there any natural hazards that the rural electric cooperative needs additional information made available for mitigation purposes? (Choose all that apply)

☐ Avalanche	☐ Floods	☐ Extreme Heat
☐ Drought	☐ Hailstorms	☐ Thunderstorms
☐ Earthquake	☐ Landslides, Mud/Debris, Rockfalls	☐ Tornados
☐ Erosion and Deposition	☐ Lightning	☐ Windstorms
☐ Expansive Soils	☐ Precipitation	☐ Winter Weather
☐ Fire	☐ Subsidence	☐ Other Dam Failure

Comments:

Answer	Number	Percent	Answer	Number	Percent
Lightning	7	41%	Erosion and Deposition	2	12%
Winter Weather	7	41%	Hailstorms	2	12%
Fire	5	29%	Expansive Soils	1	6%
Windstorms	5	29%	Earth Movement	1	6%
Floods	4	24%	Precipitation	1	6%
Tornados	4	24%	Subsidence	1	6%
Drought	3	18%	Extreme Heat	1	6%
Thunderstorms	3	18%	Earthquake	0	0%
Avalanche	2	12%			



T. What is the most effective method to receive information on making rural electric cooperatives more resistant to natural hazards? (Choose all that apply)

☐ Newspaper	☐ Traditional Mail	☐ Associations
☐ Internet	☐ Email	☐ Other
☐ Public Meetings	☐ Training Courses	☐ Other
☐ Telephone	☐ Fact Sheets	☐ Other

Comments:

Answer	Number	Percent
Email	10	59%
Associations	7	41%
Internet	5	29%
Public Meetings	5	29%
Newspaper	3	18%
Traditional Mail	3	18%
Training Courses	3	18%
Fact Sheets	3	18%
Telephone	1	6%
Other: ICS Training	1	6%