



Chapter 11

Hazards

INTRODUCTION

This Chapter of the Ellis County Comprehensive Plan contains the description of specific hazards within the planning area. Good planning would dictate the need to include such issues as Hazards within the Comprehensive Plan. The information found in this Chapter has been taken from the current Hazard Mitigation Plan written for the counties of Ellis, Graham, Ness, Norton, Phillips, Rooks, Rush, Russell, and Trego. The discussion herein will be focused on those with a land use impact and only for Ellis County and Victoria.

HAZARDS SECTION

One of the key items within the hazard mitigation plan is a risk assessment for the future. The assessment is based upon the type of hazard event and likelihood of it occurring again in the future.

The types of hazards assessed are:

- Agricultural infestation;
- Civil disorder;
- Dam and levee failure;
- Drought;
- Earthquake;
- Expansive soils;
- Extreme temperature;
- Flood;
- Hailstorm;

- Hazardous materials;
- Land subsidence;
- Landslide;
- Lightning;
- Major disease outbreak;
- Radiological;
- Soil erosion & dust;
- Terrorism/Agri-Terrorism;
- Tornado;
- Utility/Infrastructure failure;
- Wildfire;
- Windstorm, and
- Winter Storm.

HAZARD MITIGATION PLAN

The Multi-jurisdictional Hazard Mitigation Plan rates the 22 different hazards on Location, Maximum Probable Extent, Probability of Future Events, and Overall Significance.

It is critical to monitor hazards, even the ones rated as a Low Risk. The key to successfully addressing these incidents is to follow through with the Goals and Strategies developed to mitigate the issues. Successful mitigation will aid in minimizing the overall loss occurring from any hazard situation.



The following information is taken directly from the 2015 Hazard Mitigation Plan which includes Ellis County. The expectation of this section and Chapter is that information, goals and mitigation strategies will be updated in the Comprehensive Plan as new Hazard Mitigation Plans are adopted.

Based on the identification of potential hazards, each hazard is profiled to provide data concerning previous occurrences, the probability of future occurrence and the threat to the planning area. As north-northwest Kansas is generally uniform in terms of climate, topography, building characteristics, and development trends, overall hazards and vulnerability do not vary greatly across the planning area. Weather-related hazards such as drought, extreme temperatures, hail, tornados, windstorms, and winter storms affect the entire planning area. As such, one general profile will be created for these hazards. However, some hazards such as dam and levee failure, flood and landslide may have local variances and multiple profiles may be developed if the risk does not match with the entire planning area.

For each identified hazard the following information is provided:

- **Hazard Description:** a general discussion of the hazard and includes information on potential warning time, the potential duration of the event, and potential impacts;
- **Hazard Location:** the geographic extent or location of the hazard in the planning area;
- **Previous Occurrences and Extent:** information on historic incidents and their impacts;
- **Hazard Vulnerability and Impact:** discussion of the vulnerability of the region, or specific jurisdiction as appropriate, and potential impacts of identified hazards;
- **Future Development:** potential results of future development related to hazards;
- **Probability of Future Occurrence:** frequency of past events used to gauge the likelihood of future occurrences, and
- **Consequence Analysis:** analysis of the potential impacts using set criteria.

Calculated Priority Risk Index

The North-Northwest Kansas HMPC used the calculated priority risk index (CPRI) methodology to prioritize each of the identified hazards. CPRI

prioritization considers the following four elements of risk:

- Probability;
- Magnitude/Severity;
- Warning Time, and
- Duration.

The following tables provide a summary for each of the risk elements, including a rationale behind each numerical rating.

	Rating	Rating Parameters
Probability	4 Highly Likely	Event is probable within the calendar year
		Event has up to 1 in 1 year chance of occurring (1/1=100%)
		History of events is greater than 33% likely per year
	3 Likely	Event is "Highly Likely" to occur
		Event is probable within the next three years
		Event has up to 1 in 3 years chance of occurring (1/3=33%)
	2 Occasional	History of events is greater than 20% but less than or equal to 33% likely per year
		Event is "Likely" to occur
		Event is probable within the next five years
	1 Unlikely	Event has up to 1 in 5 years chance of occurring (1/5=20%)
		History of events is greater than 10% but less than or equal to 20% likely per year
		Event could "Possibly" occur
Event is possible within the next 10 years		
		Event has up to 1 in 10 years chance of occurring (1/10=10%)
		History of events is less than or equal to 10% likely per year
		Event is "Unlikely" but is possible of occurring

	Rating	Rating Parameters
Magnitude/Severity	4 Catastrophic	Multiple deaths
		Complete shutdown of facilities for 30 or more days
		More than 50 percent of property is severely damaged
	3 Critical	Injuries and/or illnesses result in permanent disability
		Complete shutdown of critical facilities for at least two weeks
		25-50 percent of property is severely damaged
	2 Limited	Injuries and/or illnesses do not result in permanent disability
		Complete shutdown of critical facilities for more than one week
		10-25 percent of property is severely damaged
	1 Negligible	Injuries and/or illnesses are treatable with first aid
		Minor quality of life lost
		Shutdown of critical facilities and services for 24 hours or less
Less than 10 percent of property is severely damaged		

	Rating	Rating Parameters
Warning Time	4	Less than 6 hours
	3	6-12 hours
	2	12-24 hours
	1	24+ hours

	Rating	Rating Parameters
Duration	4	More than 1 week
	3	Less than 1 week
	2	Less than 1 day
	1	Less than 6 hours

Using the rankings described in the tables above, the following weighted formula was used to determine each hazard's CPRI:

$$(Probability \times 0.45) + (Magnitude/Severity \times 0.30) + (Warning Time \times 0.15) + (Duration \times 0.10)$$

Hazards



Based on their CPRI, each hazard was assigned a planning significance category. Each planning significance category was assigned a CPRI range, with a higher score indicating greater planning criticality. The following table details planning significance CPRI ranges.

CPRI Range Planning Significance

Planning Significance	CPRI Range	
	Low CPRI	High CPRI
High	3.0	4.0
Moderate	2.0	2.9
Low	1.0	1.9

The terms high, moderate and low indicate the level of prioritization of planning effort for each hazard, and do not indicate the potential impact of a hazard occurring. Hazards rated with moderate or high planning significance were more thoroughly investigated and discussed due to the availability of data and historic occurrences, while those with a low planning significance were generally addressed due to lack of available data and historical occurrences. The following table shows previous CPRI ratings for Ellis County. Based on discussions with the HMPC, the CPRIs were reviewed and approved or modified as required.

TABLE 11.1: ELLIS COUNTY HAZARD CPRI PLANNING SIGNIFICANCE

	Ellis
Agricultural Infestation	1.60
Civil Disorder	1.45
Dam and Levee Failure	2.05
Drought	2.80
Earthquake	1.45
Expansive Soils	1.30
Extreme Temperature	1.80
Flood	3.20
Hailstorm	3.25
Hazardous Materials	1.75
Land Subsidence	1.45
Landslide	1.45
Lightning	1.45
Major Disease Outbreak	1.90
Radiological	1.75
Soil Erosion & Dust	1.75
Terrorism, Agri-Terrorism	1.75
Tornado	2.95
Utility / Infrastructure Failure	2.60
Wildfire	3.05
Windstorm	3.20
Winter Storm	3.30

Note the Table on the bottom left is only the excerpt for Ellis County. See the 2015 Hazard Mitigation Study for the surrounding counties.

Based upon the 2015 Hazard Mitigation Study's regional/county specific ratings similar to Table 11.1, the following Table calculates a regional CPRI rating for each hazard.

TABLE 11.2: REGIONAL HAZARD CPRI PLANNING SIGNIFICANCE

Hazard	Hazard CPRI Planning Significance				
	Probability	Magnitude/Severity	Warning Time	Duration	CPRI
Agricultural Infestation	1.22	1.89	1.00	4.00	1.67
Civil Disorder	1.00	1.00	4.00	1.00	1.48
Dam and Levee Failure	1.00	2.67	2.00	3.56	1.91
Drought	3.11	3.00	1.00	4.00	2.85
Earthquake	1.00	1.44	4.00	1.00	1.38
Expansive Soils	1.11	1.00	1.00	4.00	1.35
Extreme Temperature	2.00	1.33	1.33	3.00	1.80
Flood	3.00	2.67	2.22	3.00	2.78
Hailstorm	4.00	3.11	1.00	1.00	3.82
Hazardous Materials Event	1.22	1.78	4.00	1.33	1.82
Land Subsidence	1.00	1.11	1.89	4.00	1.67
Landslide	1.00	1.00	3.89	1.00	1.43
Lightning	1.11	1.00	4.00	1.00	1.50
Major Disease Outbreak	1.00	2.56	1.00	4.00	1.77
Radiological Event	1.00	1.00	4.00	4.00	1.75
Soil Erosion & Dust	2.00	1.11	1.00	4.00	1.78
Terrorism, Agri-Terrorism	1.00	2.00	4.00	1.00	1.75
Tornado	3.22	3.22	4.00	1.00	3.20
Utility / Infrastructure Failure	2.22	1.67	4.00	2.11	2.31
Wildfire	3.22	2.33	3.89	1.89	2.92
Windstorm	3.89	3.00	2.11	1.89	3.20
Winter Storm	4.00	2.67	1.78	2.78	3.30

The 2015 Multi-jurisdictional Hazard Mitigation Plan goes into far greater detail on each of these hazards; please review Chapter 3 of the Plan for these details.

HAZARDS GOALS AND POLICIES

The following goals were established for the entire Hazard Mitigation Plan.

- Goal 1:** Reduce and/or eliminate the risk to the people and property of North-Northwest Kansas from the identified hazards in this plan.
- Goal 2:** Strive to protect all of the vulnerable populations, structures, and critical facilities in North-Northwest Kansas from the impacts of the identified hazards.
- Goal 3:** Improve public outreach initiatives to include education, awareness and partnerships with all willing entities in order to enhance understanding of the risks North-Northwest Kansas faces due to the impacts of the identified hazards.



Goal 4: Enhance communication and coordination among all agencies and between agencies and the public.

HAZARDS FUNDING SOURCES

The following funding sources are taken directly from the 2015 Multi-jurisdictional Hazard Mitigation plan.

- Hazard Mitigation Grant Program (HMGP): The HMGP assists in implementing long-term hazard mitigation measures following Presidential disaster declarations. Funding is available to implement projects in accordance with State, Tribal, and local priorities.
- Pre-Disaster Mitigation (PDM): The PDM program provides funds on an annual basis for hazard mitigation planning and the implementation of mitigation projects prior to a disaster. The goal of the PDM program is to reduce overall risk to the population and structures, while at the same time, also reducing reliance on Federal funding from actual disaster declarations.
- Flood Mitigation Assistance (FMA): FMA provides funds on an annual basis so that measures can be taken to reduce or eliminate risk of flood damage to buildings insured under the NFIP.
- Public Assistance (PA) Grant Program: The mission of FEMA's PA program is to provide assistance to State, Tribal and local governments, and certain types of Private Nonprofit organizations so that communities can quickly respond to and recover from major disasters or emergencies declared by the President. Through the PA program, FEMA provides supplemental Federal disaster grant assistance for debris removal, emergency protective measures, and the repair, replacement, or restoration of disaster-damaged, publicly owned facilities and the facilities of certain private non-profit organizations. The PA Program also encourages protection of these damaged facilities from future events by providing assistance for hazard mitigation measures during the recovery process. The Federal share of assistance is not less than 75% of the eligible cost for emergency measures and permanent restoration. The grantee (usually the State) determines how the non-Federal share (up to 25%) is split with the eligible applicants.
- Small Business Administration (SBA) Disaster Loans: The SBA provides low-interest disaster loans to homeowners, renters, businesses of all sizes, and most private nonprofit organizations. SBA disaster loans can be used to repair or replace the following items damaged or destroyed in a declared disaster: real estate, personal property, machinery and equipment, and inventory and business assets.
- The Housing and Urban Development Agency provides flexible grants to help cities, counties, and States recover from Presidentially declared disasters, especially in low-income areas, subject to availability of supplemental appropriations.
- Community Development Block Grant Program - The Community Development Block Grant (CDBG) program is a flexible program that provides communities with resources to address a wide range of unique community development needs. Beginning in 1974, the CDBG program is one of the longest continuously run programs at the Housing and Urban Development Agency. The CDBG program provides annual grants on a formula basis to 1209 general units of local government and states. HUD provides flexible grants to help cities, counties, and states recover from Presidentially declared disasters, especially in low-income areas, subject to availability of supplemental appropriations.
- Individual & Households, Other Needs Assistance (ONA) Program: The ONA program provides financial assistance to individuals or households who sustain damage or develop serious needs because of a natural or man-made disaster. The funding share is 75% federal funds and 25% state funds. The ONA program provides grants for necessary expenses and serious needs that cannot be provided for by insurance, another federal program, or other source of assistance. The current maximum



allowable amount for any one disaster to individuals or families is \$25,000. The program gives funds for disaster-related necessary expenses and serious needs, including the following categories:

- ◊ Personal property
- ◊ Transportation
- ◊ Medical and dental
- ◊ Funeral
- ◊ Essential tools
- ◊ Flood insurance
- ◊ Moving and storage

- Wildland Urban Interface (WUI) Grants: The 10-Year Comprehensive Strategy focuses on assisting people and communities in the WUI to moderate the threat of catastrophic fire through the four broad goals of improving prevention and suppression, reducing hazardous fuels, restoring fire-adapted ecosystems, and promoting community assistance. The WUI Grant may be used to apply for financial assistance towards hazardous fuels and educational projects within the four goals of: improved prevention, reduction of hazardous fuels, restoration of fire-adapted ecosystems and promotion of community assistance.



MITIGATION STRATEGIES

The following pages are key hazard mitigation strategies formulated during the study period.





Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Ellis County-1	Ellis County is committed to continued participation and compliance with the NFIP, including the education of residents and enforcement of floodplain management regulations and ordinances.	Flood	Emergency Manager	High	1,2	Staff Time	Local	Continuous	On-going, maintaining
Ellis County-2	Advertise and promote the availability of flood insurance to property owners by direct mail once a year.	Flood	Emergency Manager	High	3	Staff Time	Local, State, Federal	Continuous	On-going, maintaining
Ellis County-3	Collect educational materials on individual and family preparedness / mitigation measures for property owners.	All Hazards	Emergency Manager	High	3	\$1,000 per year	Local, State, Federal	Continuous	On-going, maintaining
Ellis County-4	Seek funding to design and construct safe rooms in public and private facilities.	Tornado, Windstorm	Emergency Manager	High	1,2	\$300,000 per safe room	Local, State, Federal	12/31/2020	On-going, lack of funds
Ellis County-5	Educate residents about driving in winter storms and handling winter-related health effects.	Winter Storms	Emergency Manager	High	1,2	Staff Time	Local, State	Continuous	On-going, no progress made, remains viable.
Ellis County-6	Promote and educate the jurisdiction's public and private sectors on potential agricultural terrorism and bio-terrorism issues that can severely impact the county and regional economies, and develop and implement plans to address these issues.	Terrorism/ Agri-Terrorism	Director County Health Department, County Extension Coordinator, Emergency Manager, Local Producers	Medium	3	\$1,500.00	Local, State, Federal	12/31/2020	On-going, no progress made, remains viable.
Ellis County-7	Coordinate county and local government mitigation efforts with REC's, encourage identification of hazards potentially affecting their infra-structure, assessment of the vulnerabilities of the infrastructure to these hazards, and identification of mitigation strategies.	Utility/ Infrastructure Failure	REC Directors, Emergency Manager	High	4	Staff Time	Local	Continuous	On-going, no progress made, remains viable.
Ellis County-8	Research and recommend appropriate building codes for the County that include wind-resistant design techniques for new construction.	Tornado, Windstorm	County Planner	High	1,2	Staff Time	Local	12/31/2020	On-going, no progress made, remains viable.
Ellis County-9	Completed Research, develop, and recommend a Comprehensive Emergency Plan for Ellis County.	Flood	Mitigation Officer, County Planner	Medium	1,2	\$10,000	Local	12/31/2020	On-going, no progress made, remains viable.
Ellis County-10	Develop a program to acquire and preserve parcels of land subject to repetitive flooding from willing and voluntary property owners.	Flood	Mitigation Officer, Emergency Manager	Medium	1,2	Dependent on fair market value	Local, State, Federal	12/31/2020	On-going, no progress made, remains viable.
Ellis County-11	On an annual basis, contact owners identified in high-risk flood areas and inform them of potential availability of assistance through the Federal Flood Mitigation Assistance (FEMA) program, in addition to other flood protection measures.	Flood	Mitigation Officer, Emergency Manager	High	3,4	Staff Time	Local, State, Federal	Continuous	On-going, no progress made, remains viable.
Ellis County-12	Identify flash-flood prone areas to consider flood reduction measures to county planners.	Flood	County Planner	High	1,2	Staff Time	Local	12/31/2020	On-going, no progress made, remains viable.

Hazards



Action Identification	Description	Hazard Addressed	Responsible Party	Overall Priority	Goal(s) Addressed	Estimated Cost	Potential Funding Source	Proposed Completion Timeframe	Current Status
Ellis County-13	Research and design an appropriate stream buffer ordinance to further protect the jurisdiction's water resources and to limit future flood damages adjacent to major waterways.	Flood	County Planner	High	1,2	Staff Time	Local	12/31/2020	On-going, no progress made, remains viable.
Ellis County-14	Conduct an inventory/survey for the emergency response services to identify any existing needs or shortfalls in terms of personnel, equipment or required resources.	All Hazards	Emergency Manager	High	1,2	Staff Time	Local, State	12/31/2020	On-going, no progress made, remains viable.
Ellis County-15	Research and recommend an ordinance/resolution to require tornado shelters for new major manufactured and/or mobile home parks with more than 10 mobile home spaces.	Tornado, Windstorm	County Planner	High	1,2	Staff Time	Local	12/31/2020	On-going, no progress made, remains viable.
Ellis County-16	Develop cross-departmental information collection capabilities, and incorporate data utilizing a GIS for purposes of conducting more detailed hazard risk assessments and for tracking permitting / land use patterns, buildings and infrastructure replacement costs, and overall structural accounting for the county.	All Hazards	GIS Coordinator, County Appraiser	Medium	4	\$10,000	Local, State, Federal	12/31/2020	On-going, lack of funds
Ellis County-17	Develop and implement a wildfire prevention/education program.	Wildfire	Fire Chief, Emergency Manager	Medium	3	\$1,500 per event	Local, State, Federal	Continuous	On-going, no progress made, remains viable.
Ellis County-18	Examine the current agreements within the county and assess the need to expand or update cooperative agreements for firefighting resources.	Wildfire	Fire Chief, Emergency Manager	High	4	Staff Time	Local	12/31/2020	On-going, no progress made, remains viable.
Ellis County-19	Create a working group to evaluate the firefighting water supply resources within the County.	Wildfire	Fire Chief, Emergency Manager	Medium	1,2,4	Staff Time	Local	12/31/2020	On-going, no progress made, remains viable.
Ellis County-20	Design and Construct a tornado shelter for people attending the Ellis County Fair and other activities at this location.	Tornado, Windstorm	Emergency Manager	Low	1,2	\$500,000	Local, State, Federal	12/31/2020	On-going, lack of funds
Ellis County-21	Provide several rural fire stations with back-up generators.	Wildfire, Utility/ Infrastructure Failure	Fire Chief, Emergency Manager	Low	1,2	\$250,000	Local, State, Federal	12/31/2020	On-going, lack of funds
Ellis County-22	Relocate Rural Fire Company No. 5 to a new location. Completed	Utility/ Infrastructure Failure	Mitigation Officer, County Planner	Low	1,2	\$1,000,000	Local, State, Federal	12/31/2020	On-going, lack of funds
Ellis County-23	Install a sprinkler system in Holy Cross Catholic Church, Our Lady Help of Christians Catholic Church, St. Anne's Church, St. Catherine's Church, and St. Francis of Assisi Church to provide fire protection.	Wildfire	Emergency Manager, Church Director	Low	1,2	\$100,000 per catholic church	Local, State, Federal	12/31/2020	On-going, lack of funds
Ellis County-24	Annually host a public "hazards workshop" in combination with local festivals, fairs, or other appropriate events.	All Hazards	Emergency Manager	High	3	\$1,000 per event	Local, State, Federal	Continuous	On-going, no progress made, remains viable.
Ellis County-25	Develop an annex to the Local Emergency Operations Plan (LEOP) for dam failure response and evacuation for the high hazard dam in Ellis County.	Dam and Levee Failure	Emergency Manager	High	1,2	Staff Time	Local, State	12/31/2020	On-going, no progress made, remains viable.
Ellis County-26	Contact the Department of Transportation and inform them of their responsibility to provide an Emergency Action Plan to the Ellis County Emergency Management Department as prescribed by the KDA-DWR, Chief Engineer.	Dam and Levee Failure	Emergency Manager	High	4	Staff Time	Local	12/31/2020	On-going, no progress made, remains viable.



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