

SECTION 4: REGIONAL RISK ASSESSMENT & MITIGATION STRATEGIES

REGIONAL NATURAL HAZARDS

- **Drought**
- **Severe Weather**
- **Agricultural Hazards**
- **Radon**
- **Problematic Soils**
- **Avalanche**
- **Tornado**
- **Tsunami**
- **Volcanic Activity**

Background

Each of the hazards listed in Table 3 are addressed at some level in this plan. However, drought, severe weather, radon, problematic soils, avalanche, tornado, tsunami, and volcanic risks are very difficult to analyze due to lack of data or the inability to predict destructive events in particular locations. All potential hazards were discussed in county working group meetings. Although geographic data is lacking, the more prevalent regional hazards, such as drought, severe weather, radon, and problematic soils were addressed in the mitigation strategies lists for the entire region. All 42 jurisdictions are susceptible on some level to those hazards and can mitigate effects from those hazards in similar ways.

However, avalanches, tornados, tsunamis, and volcanic activity are limited to smaller geographic areas, physiographic or climatic variation, or have not produced predictable or, in some cases, significant damage. For example, while tornados have caused substantial damage in various parts of Utah, there has not been any reoccurrence of events which merit a reliable prediction on where future events could occur. Communities were allowed, and encouraged, to include mitigation strategies for any and all hazards they felt required mitigation on some level.

Risk Assessment and Mitigation Strategy Surveys were sent to each chief elected official for all jurisdictions in the Bear River Region. Among

other questions, the surveys requested local input on the following:

- NFIP status
- Existing natural hazards
- Natural hazard events since November 2009
- List of maps, documents, or plans related to natural hazards planning
- Current zoning and ordinances related to natural hazards
- Future developments that could be affected by natural hazards
- Mitigation strategies completed since 2009
- New mitigation strategies

(See **Appendix D** for detailed survey responses).

History of Regional Natural Hazards in the Bear River Region

Residents and communities in the Bear River Region have knowingly been effected by drought and severe weather since modern settlers came to the area in the mid-1800's. Native American's and early explorers were also well award of the variation in the climate and temperature in the area and planned accordingly. One of the most famous sayings about the weather in the Rocky Mountains is, "If you don't like the weather, just wait 5-minutes!" Long-time residents of the area have experienced the variation which exists and many residents plan accordingly.

However, for others, mitigating the effects of severe weather and drought can be difficult. Educational activities and public awareness campaigns seem to help, but can always be improved. Local communities and other organizations train for emergencies and events on a regular basis.

Other natural hazards, such as avalanche, tornado, tsunami, and volcanic activity are rare, but can be mitigated on some level. Local building codes and ordinances keep most residents and structures safe, but events can be sporadic and variable.

Agricultural hazards, as addressed in this plan, relate mostly to insect infestation. The most prevalent of these is grasshopper and cricket infestation, but bark beetles, ticks, mosquitos, and termites have also been identified by the Utah Department of Agriculture and Food as threats (2015). See **Appendix J** for the statewide cricket and grasshopper infestation map and information.

The threats of Radon have not been very well known by residents and local governments until recent years. Thanks to educational activities promoted by the Bear River Health Department and others, knowledge of Radon has become more prevalent. However, while Radon levels can be relatively high in the region, they cannot be detected for each individual home or other structure unless individual tests are done following construction (See **Appendix L** for Radon risk maps and information).

Problematic soils are prevalent in the region. Hazards can not be fully determined until a local engineering and/or geotechnical study has been performed on site. Most of the larger local communities require studies to determine risk and most, if not all, local communities require contractors to utilize the International Building Code (IBC) which helps mitigate most effects. While most city engineers and other staff are familiar with the hazards problematic soils can incur, more can be done to prevent structure damage and threats to life and property.

(See **Appendix K** for regional historic severe weather events and losses to life and property)

Regional Natural Hazard Profiles

Table 7: Drought Hazard Profile

Frequency	Frequent
Severity	Severe mostly for agricultural producers
Location	Un-irrigated areas are most impacted
Seasonal Pattern	Water supply dependent on winter snowfall. Summer is when impact is realized.
Duration	As many as 10 years
Speed of Onset	Incremental with impact increasing
Probability of Future Occurrences	High

Table 8: Agricultural Hazard Profile

Frequency	Sporadic
Severity	Severe mostly for agricultural producers and gardeners
Location	Everywhere
Seasonal Pattern	Spring & early summer
Duration	Months
Speed of Onset	Days
Probability of Future Occurrences	High

Table 9: Severe Weather

Frequency	Frequent
Severity	Severe for communities, residents, and agricultural producers
Location	Everywhere (Some areas have more inherent risk due to geographic conditions)
Seasonal Pattern	Summer severe thunderstorms/hail & wind, late spring freezing, and heavy winter storms
Duration	Days/weeks
Speed of Onset	Immediate
Probability of Future Occurrences	High

Table 10: Radon Hazard Profile

Frequency	Persistent
Severity	Potentially Severe
Location	Everywhere
Seasonal Pattern	All, higher in winter months
Duration	Always
Speed of Onset	Years for detrimental effects
Probability of Future Occurrences	High

Table 11: Problematic Soils Hazard Profile

Frequency	Always
Severity	Potentially Severe
Location	Varies
Seasonal Pattern	Spring/ high soil saturation/ following wildfire damage
Duration	Persistent
Speed of Onset	Varies but potentially hours or days
Probability of Future Occurrences	High

Vulnerability and Potential Losses

People have been living with knowledge of current regional natural hazards since settlers first came to the area. Cold, snowy winters, hot dry summers, and other sporadic severe weather events are a part of life in the Rocky Mountains. Over the past decades, science has provided beneficial data related to soils and hazards from various soil types.

Radon and problematic soils data has helped local communities understand risks and studies have provided critical information on how to mitigate their effects. While engineering and technical studies can provide information on what types of soils are evident in particular areas, it is difficult to give precise predictions. However, through education and updated local building and development regulations, most severe problems can be avoided.

Implications for Future Growth and Development

The urbanization of eastern Box Elder County, eastern Cache Valley, and near Bear Lake in Rich County, will put new demands on agricultural water rights. As development moves in on agricultural lands, water is often needed for new residential and commercial structures. In terms of competition for limited water resources, agricultural uses often lose out to those increasing urban demands. This problem is likely to get worse for agricultural users and can become particularly severe during drought periods.

In general, as population increases in the Bear River Region, risk to residents, infrastructure, and property will likely increase for all regional hazards. The more people that live in an area, the more people will likely be exposed to potential hazards by utilizing more resources, and spreading out across the landscape. In short, as more people move into the region, more people are likely to be affected by currently existing natural hazards.

Regional Hazard Mitigation Strategies

(See following pages)

BEAR RIVER REGION - COMMUNITY MITIGATION STRATEGIES										
Protecting Current Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Bear River Region	All	Protect current residents and property	County-wide emergency preparedness fair	N/A	High	2017	Counties, BRAG	Box Elder, Cache, and Rich Counties and BRAG	Minimal	BRAG, Counties, Be Ready Utah, Utah DESHS, local communities, Utah FSSL, GOPB, LEPC's, local HAM radio groups, UGS, NRCS (snow), National Weather Service, LDS Bishops Storehouse, Food Bank
Bear River Region	Severe Weather	Protect current residents and property	Public education/training including 3-5 day power outage survival emergency response (CERT), emergency shelter locations, emergency kits, back-up utilities, livestock issues, and interoperable emergency communications planning.	N/A	High	2017	Counties, Utah ESHS, BRAG, Cities, FEMA	Box Elder, Cache, and Rich Counties and BRAG	\$50,000	Counties, Utah ESHS, BRAG, Cities, FEMA, NOAA
Bear River Region	Agricultural	Protect current residents and property	Encourage crop diversity, weed and pest management, and coordination with local, State, and Federal agencies on agricultural land management and production.	N/A	Medium	2018	Utah Department of Agriculture and Food, USDA, USU Extension, USFS, BLM,	Box Elder, Cache, and Rich Counties	Minimal	Utah Department of Agriculture and Food, USDA, USU Extension, USFS, BLM,
Bear River Region	Agricultural	Protect current residents and property	Work with various agencies to plan for and mitigate economic losses associated with stock loss due to disease.	N/A	Medium	2018	Utah Department of Agriculture and Food, USDA, USU Extension	Box Elder, Cache, and Rich Counties	minimal	Utah Department of Agriculture and Food, USDA, USU Extension, US Food and Drug Administration, Center for Disease Control
Bear River Region	Agricultural	Protect current residents and property	Prepare an Emergency Services Function for County Emergency Operations Plans	N/A	Medium	2017	Local	Box Elder, Cache, and Rich Counties	Minimal	Local
Bear River Region	Agricultural	Protect current residents and property	Educate residents on crop insurance program, alternative planting and CRP programs, value of agriculture, pest control, crop diversity, urban tree planting guidelines, etc	N/A	Medium	2017	State, Local, USDA	Box Elder, Cache, and Rich Counties	Minimal	State, Local, USDA
Bear River Region	Drought	Protect current residents and property	Promote water wise landscaping practices and land use ordinances.	N/A	High	2016	Counties, Municipalities, BRAG	All jurisdictions	minimal	Counties, Municipalities, BRAG, USU Extension NRCS, Utah League of Cities and Towns, GOPB
Bear River Region	Drought	Protect current residents and property	Study feasibility of increasing current water storage capabilities.	N/A	Low	2017	Utah ESHS, BRAG	All jurisdictions	Minimal	Utah ESHS, BRAG
Bear River Region	Drought	Protect current residents and property	Encourage water conservation techniques for all land uses.	N/A	High	2018	Utah DEQ, USDA, Utah Agriculture and Food, Utah APA	All jurisdictions	minimal	Utah DEQ, USDA, Utah Agriculture and Food, Utah APA
Bear River Region	Radon	Protect current residents and property	Provide educational materials to owners of new homes and/or all residents in the local communities	N/A	High	2016	Local	All jurisdictions	Minimal	Bear River Health Department
Bear River Region	Problematic Soils	Protect current residents and property	Review and update local land use ordinances to require soils testing before new construction on suspected instable soil types.	N/A	High	2017	Local	All jurisdictions	Minimal	Utah Geological Survey, Utah APA

BEAR RIVER REGION - COMMUNITY MITIGATION STRATEGIES										
Protecting Future Residents and Property										
Jurisdiction	Hazard	Goal	Action	Action (For NFIP Compliance, if Applicable)	Priority (High, Medium, Low)	Time-frame (Year)	Potential Funding Sources	Responsible Entity	Estimated Cost	Resources
Bear River Region	All	Protect future residents and property	County-wide emergency preparedness fair	N/A	High	2017	Counties, BRAG	Box Elder, Cache, and Rich Counties and BRAG	Minimal	BRAG, Counties, Be Ready Utah, Utah DESHS, local communities, Utah FSSL, GOPB, LEPC's, local HAM radio groups, UGS, NRCS (snow), National Weather Service, LDS Bishops Storehouse, Food Bank
Bear River Region	Severe Weather	Protect future residents and property	Discuss planning needs on the county and city levels to coordinate land use regulations regarding Severe Weather events and response. This would be intended to prevent damages from extreme weather trigger events and incorporate severe weather into current response plans.	N/A	Medium	2017	Counties, Municipalities, BRAG	All jurisdictions	Minimal	Counties, Municipalities, BRAG, Utah ESHS, Army Corp., Be Ready Utah, FSSL, LEPC, NOAA, NRCS
Bear River Region	Agricultural	Protect future residents and property	Encourage crop diversity, weed and pest management, and coordination with local, State, and Federal agencies on agricultural land management and production.	N/A	Medium	2018	Utah Department of Agriculture and Food, USDA, USU Extension, USFS, BLM.	Box Elder, Cache, and Rich Counties	Minimal	Utah Department of Agriculture and Food, USDA, USU Extension, USFS, BLM.
Bear River Region	Agricultural	Protect future residents and property	Work with various agencies to plan for and mitigate economic losses associated with stock loss due to disease.	N/A	Medium	2018	Utah Department of Agriculture and Food, USDA, USU Extension	Box Elder, Cache, and Rich Counties	minimal	Utah Department of Agriculture and Food, USDA, USU Extension, US Food and Drug Administration, Center for Disease Control
Bear River Region	Agricultural	Protect future residents and property	Educate residents on crop insurance program, alternative planting and CRP programs, value of agriculture, pest control, crop diversity, urban tree planting guidelines, etc	N/A	Medium	2017	State, Local, USDA	Box Elder, Cache, and Rich Counties	Minimal	State, Local, USDA
Bear River Region	Drought	Protect future residents and property	Discuss purchasing agricultural water rights for culinary water on a county and local level	N/A	High	2018	County, Local	All jurisdictions	Minimal	County, Local
Bear River Region	Drought	Protect future residents and property	Study feasibility of increasing current water storage capabilities	N/A	Low	2017	Utah ESHS, BRAG	All jurisdictions	Minimal	Utah ESHS, BRAG
Bear River Region	Drought	Protect future residents and property	Encourage water conservation techniques for all land uses.	N/A	High	2018	Utah DEQ, USDA, Utah Agriculture and Food, Utah APA	All jurisdictions	minimal	Utah DEQ, USDA, Utah Agriculture and Food, Utah APA
Bear River Region	Radon	Protect future residents and property	Provide educational materials to owners of new homes and/or all residents in the local communities	N/A	High	2016	Local	All jurisdictions	Minimal	Bear River Health Department
Bear River Region	Problematic Soils	Protect future residents and property	Review and update local land use ordinances to require soils testing before new construction on suspected instable soil types.	N/A	High	2017	Local	All jurisdictions	Minimal	Utah Geological Survey, Utah APA