Part 4. Regional Data

Southeastern Region

The Southeastern Utah Association of Local Governments (SEUALG) encompasses Carbon, Emery, Grand, and San Juan Counties. The Southeastern region, known as Canyon Country, is part of the Colorado Plateau Physiographic province. This region is known for its colorful high desert plateaus and extreme elevation changes from deep river gorges to high mountain peaks.

A. Geographic and Physiographic Background

Carbon County

Carbon County is in the eastern central portion of the state, surrounded by the Book Cliff range to the north, the San Rafael Swell to the south, and the Wasatch Plateau to the west. The area topography includes both mountainous regions and desert terrain. Price City sits at an elevation of approximately 5,500 feet above sea level. Mancos shale is abundant, consisting of calcite, aragonite, marine fossils, coal, jet and carbonized plant life. The Green River Formation of the Roan Cliffs contains untapped oil shale, which is "a mixture of organic and mineral sediments that were deposited in a large lake" (Barnes 125).

Price City, incorporated in 1911, is the county seat and the largest town in Carbon County with a population of approximately 9,086. Carbon County comprises 1,479 square miles of land area and is ranked 20th in the State. In terms of arable land, the county is ranked thirteenth in the state, with 291,860 acres (Carbon County).

Emery County

Emery County is comprised of unique geography consisting of high desert plateaus, buttes, valleys, as well as mountainous regions, fertile valleys, and desert. Castle Valley is the most populated area in the county and is characterized by its high desert plateaus and buttes. Castle Dale is 5,771 feet above sea level. The highest point in Emery County, East Mountain, is 10,743 feet above sea level (Emery County). The San Rafael Swell desert is a unique geographic area within Emery County. It is distinguished by its desert canyons and occupies an area 80 miles north/south and 40 miles east/west. Emery County is bordered by Grand County and the Green River on the East, Carbon County on the North, Sanpete and Sevier Counties on the west, and Wayne County to the South (Emery County Utah). The Book Cliffs are made up of Cretaceous rocks and Mancos shale, also known as the Mesa Verde group. The Roan Cliffs are Tertiary lake deposits from the Paleocene and Eocene Epochs. The Roan Cliffs have the largest deposit of tar sand in the United States in beds 10 to 300 feet thick. The Mesa Verde escarpment as well as the Mancos shale found here provides coal for nearby power plants. The Cleveland-Lloyd Dinosaur quarry houses bones of Jurassic reptiles found in the Morrison formations; they are thought to be about 147 million years old (Chronic, Halka). The county seat is located in the population center of Castle Dale City, with a Census 2000 population of 1,657.

Grand County
Grand County has a total area of 3,694 square miles; Moab city is the most populated and most traveled to city in Grand County. Elevations range from approximately 4,000 feet above sea level in Moab to over 12,000 feet above sea level in the La Sal Mountains, just 18 miles east of Moab. The geography is diverse and is distinguished by meadows, lakes, and streams within aspen forests and mountainous regions to desert canyons of the Moab Area. Oil, gas, propane, butane, natural gas, uranium, vanadium, and copper are all found in Grand County. The Lisbon Valley hosts several salt anticlines that trap oil and gas. Petroleum products, uranium, and vanadium are drawn from these formations (Lisbon Valley also in San Juan County). Copper has been mined in nearby faults along the edge of the Lisbon Valley salt anticline (Chronic, Halka).

San Juan County
San Juan County is the largest county in the State of Utah, encompassing 7,800 square miles. The physiographic features of the area include high mountains and plateaus, desert, high desert mountains, and rugged canyons. Elevations range from 3,160 feet above sea level along the Colorado River to 13,089 feet above sea level on Mt. Paele in the La Sal Mountains. San Juan County is part of the four corners region and is bordered by Arizona on the South; Colorado on the East; Wayne, Kane and Garfield Counties on the West; and Grand County on the North. Two Indian reservations are located within the county, namely the Navajo Nation and the Ute Indian Reservation on White Mesa. San Juan County vegetation consists of Douglas fir, sub alpine forb, grassland, Engelmann spruce/ sub alpine fir, aspen, ponderosa Pine, mountain brush, pinyon-juniper, sagebrush, oak brush, and riparian types including willow, cottonwood, cacti and alder. The principle topographic geologic features include the Four Corners Platform in the east; the Paradox Salt Basin and attendant fold and fault belt in the northeast; and the Monument Upwarp with linked Comb Ridge monocline and Blanding sub-basin in the central portion and in the extreme southwest. Igneous intrusions of Tertiary age core the La Sal and Abajo mountains. The La Sal and Abajo mountains are important sources of surface water during the spring runoff (San Juan County Emergency).

B. Geology

Rock types in the Canyon Country are composed mainly of sedimentary rocks including: sandstone, mudstone, siltstone, shale, limestone, gypsum, sand dunes, and conglomerates. The oldest sedimentary rocks date back to Paleozoic time and can be found at Monument Upwarp, the San Rafael Swell, and near the eastern border of Utah in smaller anticlines. Most of the sediment of which the rocks are comprised of was deposited during the Triassic, Jurassic, and Cretaceous periods. The Roan Plateau in the Uintah Basin contains Tertiary and Quaternary rocks. Tertiary rocks include members of the Wasatch Group, namely the North Horn Formation, Flagstaff Limestone, Colton Formation, and Green River Shale. The Abajo Mountains, the Henry (near Hanksville in Wayne County), and the Navajo Mountains (south of Lake Powell) are all laccolith mountains, created by molten rock that forced its way upward along crustal faults and horizontally along the layers of weaker compressed sedimentary strata. Igneous activity can be easily identified in the area by the volcanic necks, conduits, dikes and lava-capped plateaus (Refer to Table 4-1 “Geologic Time Scale” for explanation of geologic time.)

Moab and Lisbon Valley are salt anticlines. They are the result of glacial like sand including gypsum and potash being pushed up along faults. Gypsum and potash are less dense than the surrounding rocks and generally result in very unstable areas. Salt anticlines in this region trap upward migrating oil and gas. Oil, uranium, natural gas and some copper, potash, and gypsum are the main types of extracted resource in the southeastern area of the state. (Barnes 32-61, 91)

Table 4-1. Geologic Time Scale

Ages or Eras	Millions of Years Ago	Period		Epoch
CENOZOIC	0-1.8	QUATERNARY		Holocene
				Pleistocene
	1.8-65	TERTIARY		Pliocene
				Miocene
				Oligocene
				Eocene
				Paleocene
MESOZOIC	65-145	CRETACEOUS		Late
				Early
	145-213	JURASSIC		Late
				Middle
				Early
	213-248	TRIASSIC		Late
				Middle
				Early
PALEOZOIC	248-286	PERMIAN		Late
				Early
	286-360	CARBONIFEROUS	PENNSYLVANIAN	Late
			MISSISSIPIAN	Early
	360-410	DEVONIAN		Late
				Middle
				Early
	410-440	SILURIAN		Late
				Middle
				Early
	440-505	ORDOVICIAN		Late
				Middle
				Early
	505-544	CAMBRIAN		Late
				Middle
				Early
PRE-CAMBRIAN	544-4.5 billion years ago, time from the beginning of earth.			
Source: U. S. Geological Survey, Paleontology website: http://geology.er.usgs.gov/paleo/				

C. Climate

Southeastern Utah's climate is arid/semi-arid, characterized by cold and dry winters and warm summers at elevations less than 5,000 feet above sea level. Summer temperatures usually reach into the high 90s and winter temperatures generally are between 10 degrees to 20 degrees Fahrenheit. The average annual precipitation is approximately 10 inches but can range from 6 to 30 depending on elevation, while the average annual snowfall is about 15 inches. Frost-free days vary from 231 at the Hite Marina to 119 days at the La Sal Mountain Range.

D. Major Rivers

The main source of surface water generated in the planning area is from laccolithic mountains such as the La Sal and Abajo's. These mountains rise above the sandstone basin and create uplift and greater precipitation. The Colorado River and the two main tributaries, the Green River and San Juan River flow through the planning area southwesterly into Lake Powell. In the mid-1960s, the Glen Canyon Dam was completed impounding the Colorado River and creating Lake Powell. This dam was very controversial and the opposition helped shape policies toward the concept of water management and environmental protection (Colorado River Basin). Other major rivers in the region include the San Rafael, Green, Dolores River, and many smaller tributaries. Groundwater is withdrawn from two types of aquifers in this region, consolidated rock and unconsolidated deposits. Most of the water is utilized for irrigation. As the water demand increases with the growing population, water management will need to become more efficient. The main rivers as well as the ephemeral rivers are all subject to flooding in southeastern Utah.

E. Regional Hazards

Due to the geographic extent these hazards have not been mapped and risk assessments were unable to be compiled. Therefore all of the information for the following regional hazards is in the narrative below. The entire region is subject to these hazards with no unique risk affecting a single jurisdiction. Refer to each county section for a list of historical hazard events.

1. Severe Weather

Hazard Profile

Potential Magnitude	X	Negligible	Less than 10%
		Limited	10-25%
		Critical	25-50%
		Catastrophic	More than 50%
Probability	X	Highly Likely	
		Likely	
		Possible	
		Unlikely	
Location	Occur in very localized areas throughout the region, unable to identify exactly when and where the next event will take place.		
Seasonal Pattern or Conditions	Based on climate, elevation, and precipitation.		
Duration	Severe Weather hazards generally last hours and can last days.		
Analysis Used	National Climate Data Center, National Weather Service, Utah Avalanche Center, Utah DESHS, local input, and review of historic events and scientific records.		

Description of Location and Extent

Severe weather includes High Winds, Severe Storms (Thunderstorms, Lightning, Hailstorms, Heavy Snow or Rain, Extreme Cold), Tornado, and Avalanche.

High Winds

High winds can occur with or without the presence of another storm and are determined to be unpredictable in regards to time and place. Each of the four counties that make up Southeastern Utah has experienced high winds in the past, generally during the spring and summer months. These counties can expect regional high wind events in the future. Winds are usually strongest near the mouths of canyons and have resulted in the loss of power and the inability to heat homes and businesses. Winds in the past have damaged roofs, destroyed and knocked down large trees and fences, overturned tractor -trailers, railroad cars, and small airplanes.

Severe Storm

Severe storms can include thunderstorms, hailstorms, heavy snow or rain, and extreme cold. They are generally related to high precipitation events during the summer and winter months. Severe storms can happen anywhere in the region and the damage can be extensive especially for agriculture, farming, and transportation systems. They can also disrupt business due to power outages.

Thunderstorms

A thunderstorm is a storm made up of heavy rain or hail along with thunder and lightning resulting from strong rising air currents. Based on historical evidence thunderstorms can strike anywhere in the region mainly during the spring and summer months

Lightning

Lightning is the electric discharge accompanied by light between clouds or from a cloud to the earth. In Utah, lightning is the number one natural hazard killer. Lightning can also start wildland fires, which could be potentially fatal or disruptive.

Hailstorms
Hailstorms occur when freezing water in thunderstorm type clouds accumulates in layers around an icy core generally during the warmer months of May through September. Hail causes damage by battering crops, structures, and automobiles. When hailstorms are large (especially when combined with high winds), damage can be extensive. The risk of hailstorms is not targeted to any particular areas within the region.

Heavy Snow or Rainfall
Heavy amounts of precipitation from rain or snow can result in flash flood events. Historically, This region has been susceptible to these types of storms in the past. Major winter storms can produce five to ten times the amount of snow in the mountains than in the valley locations.

Most of the valley's development occurs on old alluvial fans from the canyon mouths. During heavy precipitation flood waters and debris will occur on these same alluvial fans, damaging residential and commercial property along with infrastructure. The associated threat with heavy snowfall is avalanches.

Extreme Cold
Sub-zero temperatures occur during most winters, however prolonged periods of extremely cold weather are infrequent. January is generally the coldest month of the year. Historically extreme cold in the region has disrupted agriculture, farming, and crops. Extreme cold also affects life, especially vulnerable are the young and elderly and animals.

Avalanche
Avalanches occur on steep slopes and therefore the mountainous areas as well as the foothills around the region are all vulnerable. Even though most avalanches occur on forested lands they affect mostly city and county dwellers. Therefore, avalanches should be given a priority in Utah due the number of historical occurrences. The money spent to respond, and recover from an avalanche in addition to the man-hours and property affected by a slide is usually on or given by the city and/ or county.

The probability of a future event is likely dependant on the amount of heavy snowfall during a given year. Most deadly avalanches occur in the backcountry away from developed areas. Avalanche control is performed regularly in developed ski areas to minimize the threat and increase awareness. The Avalanche Center was initiated as another resource for measuring risk and increasing awareness to the residents of the Southeastern region.

Tornado
Historically, atmospheric conditions have not been favorable for the development of tornadoes in Utah due to the dry climate and mountainous terrain. Utah averages about two tornados per year. Utah tornados are usually no more than 60 feet wide at the base and last up to 15 seconds. Tornadoes occur during the months of May, June, July, and August usually preceding a cold front. Utah is one of the lowest ranked nations for incidences of tornadoes with only one F2 or stronger tornado every seven years.

2. Drought

Hazard Profile

Potential Magnitude		Negligible	Less than 10%
		Limited	10-25%
	X	Critical	25-50%
		Catastrophic	More than 50%
Probability		Highly Likely	
	X	Likely	
		Possible	
		Unlikely	
Location	Countywide		
Seasonal Pattern or Conditions	Summer		
Duration	Months, Years		
Analysis Used	National Weather Service, Utah Climate Center, National Geophysical Data center- Natural Hazards Database, Newspapers, Local input.		

Description of Location and Extent

Drought refers to an extended period of deficient rainfall relative to the statistical mean for a region. The entire region is currently experiencing a drought from 1999- present. Drought dramatically affects this area because of the lack of water for agriculture and industry, which limits economic activity, irrigation and culinary uses. The severity of the drought results in depletion of agriculture lands and deterioration of soils. In the Southeastern region the risk of drought is high.

Drought is not targeted to any particular area within the region and the geographic extent of drought is hard to identify or map on a local or even county level. During the making of this plan, drought related GIS layers were unavailable to complete the mapping and analysis portions of the plan. Therefore, a vulnerability analysis including types and numbers of buildings, critical facilities, and infrastructure affected by drought were unable to be determined.

The secondary threats associated with drought include infestation and wildfire, all of which the region as historically been susceptible to. For a further explanation of infestation and wildfire refer to the Part 6 Risk Assessment, Section E Hazard Description.

The Palmer Drought Severity Index developed by Wayne Palmer in the 1960's, measures drought severity using temperature and rainfall to determine dryness. The Palmer Drought Severity Index or (PDSI) has become the "semi-official" drought index as it is "standardized" to local climate and can be applied to any part of the country. The PDSI uses zero as normal and assigns a monthly numerical id between +6 and -6 with, server droughts having higher negative numbers. Thus, a moderate drought is minus 2, a sever drought minus 3, and extreme drought is minus 4. Excess rain is expressed using plus figures, with plus 2 representing moderate rainfall, etc. Figure 4-1 is a map of Utah’s climate divisions. Refer to Figure 4-2 for a complete Palmer Drought history for Southeastern Utah.

Figure 4-1 Utah Climate Divisions

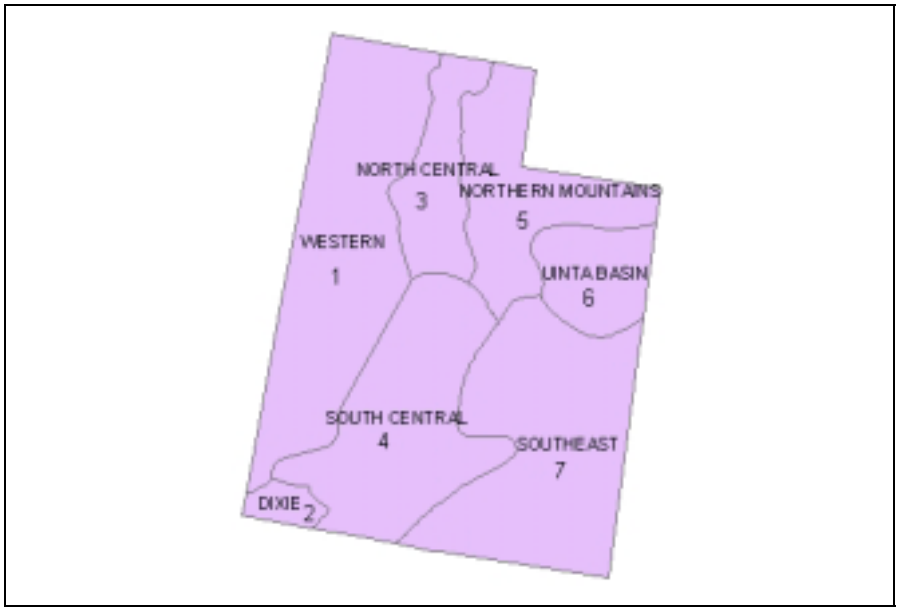
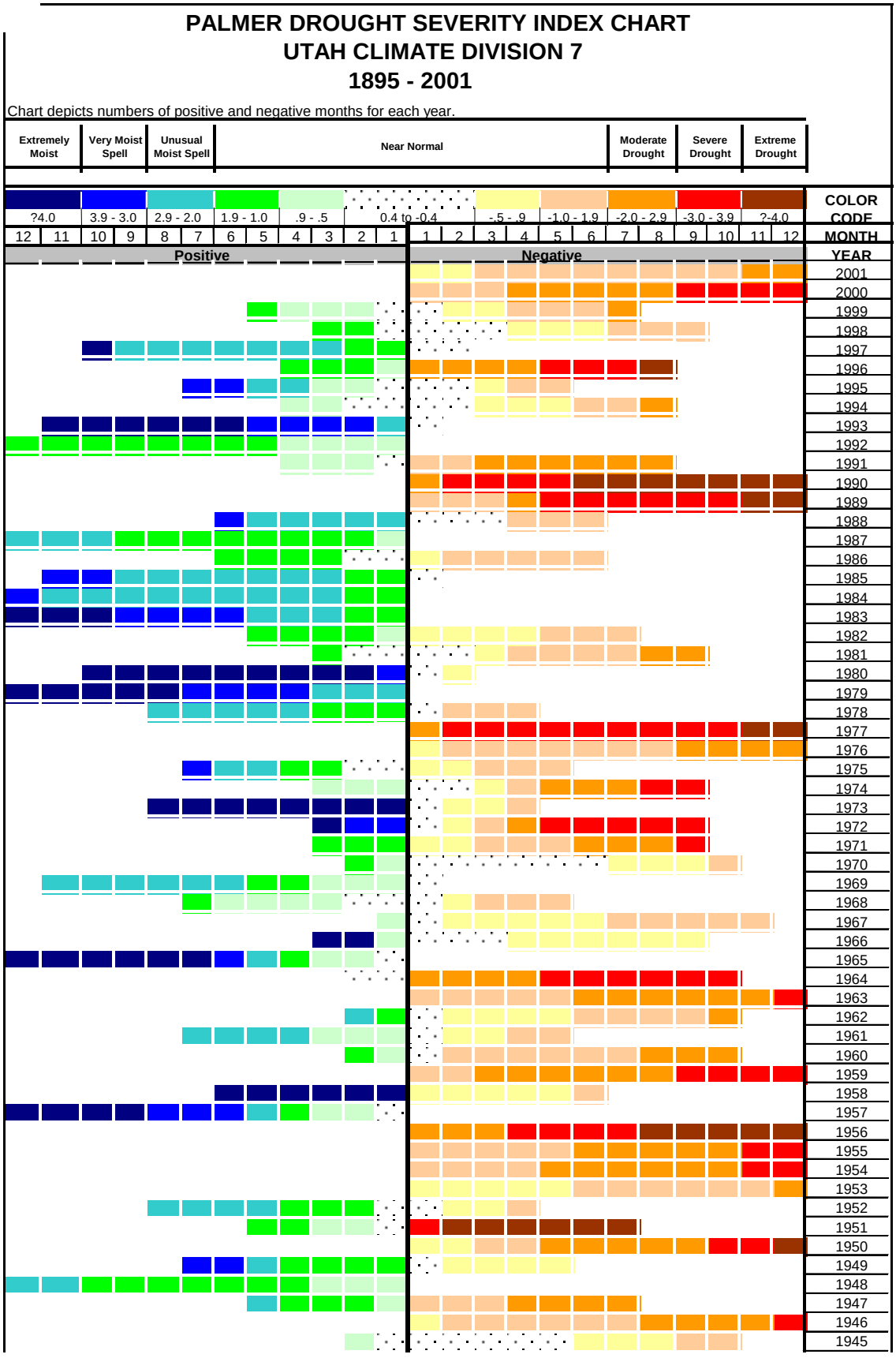
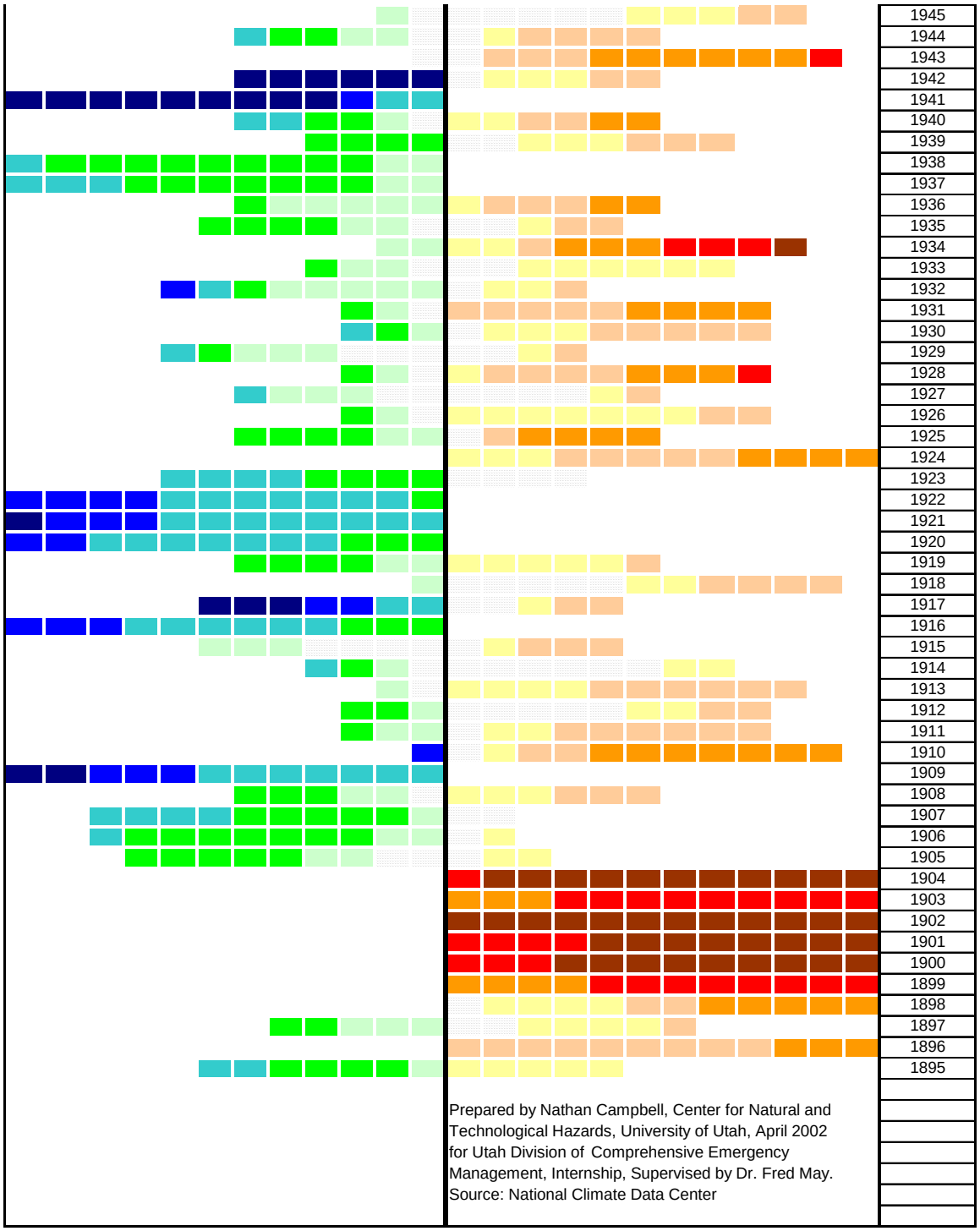


Figure 4-2 Climate Division Number 7 Southeast

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Prepared by Nathan Campbell, Center for Natural and Technological Hazards, University of Utah, April 2002 for Utah Division of Comprehensive Emergency Management, Internship, Supervised by Dr. Fred May.
Source: National Climate Data Center

3. Earthquake

Potential Magnitude		Negligible	Less than 10%
		Limited	10-25%
	X	Critical	25-50%
		Catastrophic	More than 50%
Probability		Highly Likely	
	X	Likely	
		Possible	
		Unlikely	
Location	Seismic clustering. Ground shaking can be felt throughout the entire region. Surface fault rupture can be felt in areas of known historic fault zones. Liquefaction can be expected in areas of high to moderate liquefaction potential. See maps in Section H.		
Seasonal Pattern or Conditions	Seasonal Pattern: There is no seasonal pattern for earthquakes, they can occur at any time of the year or day during no, any, or all weather conditions. Conditions: Liquefaction Potential within high ground water table. Soil that is comprised of old lakebed sediments. Historic movement along faults.		
Duration	Actual ground shaking will be under one minute, aftershocks can occur for weeks or even months.		
Analysis Used	Review of hazard analysis plans and other information provided by the University of Utah Seismograph Station, UGS, USGS, DESHS, AGRC.		

Description of Location and Extent

The Southeastern region's earthquake threat from the Intermountain Seismic Belt and other crustal rock strain release areas is minimal, with a limited risk due to the large areas of undeveloped lands and smaller number of faults. During historic time the largest recorded earthquake has not reached above 5.3 on the Richter magnitude scale, yet geologic investigation has determined much larger events have happened in the recent geologic past and could happen in the future. These events are associated with numerous faults, which exhibit signs of prior movement during the quaternary time period or last 1.6 million years: These faults are listed below:

- Little Delores River
- Ryan Creek fault zone
- Granite Creek fault zone
- Sinbad Valley Graben
- Paradox Valley
- Pleasant Valley
- Joes Valley fault zone (<15,000 years)
- Southern Joes Valley fault zone
- Price River
- Ten Mile Graben
- Salt and Cache Valleys faults
- Sand Flat Graben
- Moab and Spanish Valley
- Castle Valley
- Fisher Valley
- Needles fault zone (<15,000 years)
- Lockhart fault
- Lisbon Valley Fault zone
- Pine Ridge
- Shay Graben
- Bright Angel fault system

Seismic clustering is evident throughout most of the region and is mainly associated with underground mining, most of the recorded earthquake activity is coal mining related.

Risk assessments were completed for part of the region and can be found below under each county heading.

Building Damage by Count
Building damage is classified by HAZUS MH in five damage states: none, slight, moderate, extensive and complete. The Building Damage Tables list the number buildings by occupancy, which are estimated to have moderate to complete levels of damage.

Debris Removal
The Debris Removal table's show how much debris would be generated by the earthquake and how many loads it would take to remove the debris, based on 25 tons per load. One truck can likely haul one load per hour. A second debris removal issue is landfill space. Fifty thousand tons (50,000) at a weight to volume ratio of one ton per cubic yard would cover more than ten acres to a depth of three feet.

Fire Following
The Great San Francisco Earthquake of 1906 illustrated the hazard a city could face from fire following an earthquake. Multiple ignitions and broken water mains conspired to make firefighting nearly impossible. HAZUS uses the estimated building damages, loss of transportation infrastructure and estimated winds to calculate the estimated area that would be burned following an earthquake. The fire tables provide estimates of ignitions, people at risk and the building stock exposed to fires following an earthquake. These numbers were derived from a HAZUS MH run based on a probabilistic 2500-year event with a magnitude 7.0 running the soils portion of the model.

A. Carbon County

The active coalfields near East Carbon/ Sunnyside, Hiawatha/ Wattis, Castlegate, and Soldier Canyon all affect the earthquake seismicity due to the underground coal extraction methods, creating numerous small earthquakes. The following tables generated using HAZUS MH demonstrate numbers of at risk for of people and property damaged in an earthquake.

Vulnerability Assessment

Table 4-1 Casualties

Casualties	Nighttime –Minor	3
	Nighttime –Major	0
	Nighttime -Fatalities	0
	Daytime –Minor	90
	Daytime –Major	3
	Daytime- Fatalities	6
	Commute –Minor	63
	Commute –Major	2
	Commute-Fatalities	3

Table 4-2 Building Damage by Count with Moderate to Complete Damage

Category	Number of Structures
Residential	765
Commercial	38
Industrial	0
Totals	2,952*

***Includes all building categories with moderate to complete damage

Table 4-3 Critical Facilities

Classification	Total	Least Moderate Damage >50%	Complete Damage > 50%	Functionality > 50% at day 1
Hospitals	1	0	0	0
Schools	14	0	0	2
EOC's	0	0	0	0
Police Stations	5	0	0	1
Fire Stations	4	0	0	1

Table 4-4 Debris Generated (thousands of tons)/Loads to Remove Debris

Debris Generated	108
Loads (25 tons per load)	4,320

Table 4-5 Fire Following Event, Population Exposed, and Building Stock Exposed

Ignitions	2
People Displaced	12
Value Exposed (thousands $)	752

B. Emery County

Most of the earthquake activity in Emery County is located northwest of Orangeville and Castle Dale. None of these seismic clusters registered above a 3.0 on the Richter scale. Fault Zones are located along the western border of the county as well as in the northeastern half of the county. The Joe's Valley Fault is still active and has shown surface movement within the past 10,000 years. It has the potential of producing an earthquake with a Richter magnitude between 6.5 and 7.5, and causing damage to communities just east of the fault. A significant number of the recorded earthquakes in the county are associated with mining activities. The largest recorded earthquakes were 5.3 and 4.4,on the Richter scale, recorded on August 14 and 18th 1988 respectively. Both earthquakes were located in the southwestern area of Buckhorn Flat.

Vulnerability Assessment

Table 4-6 Casualties

Casualties	Nighttime –Minor	83
	Nighttime –Major	2
	Nighttime -Fatalities	3
	Daytime –Minor	78
	Daytime –Major	3
	Daytime- Fatalities	5
	Commute –Minor	69
	Commute –Major	2
	Commute-Fatalities	4

Table 4-7 Building Damage by Count with Moderate to Complete Damage

Category	Number of Structures
Residential	677
Commercial	23
Industrial	2
Totals	1,970*

*****Includes all building categories with moderate to complete damage

Table 4-8 Critical Facilities

Classification	Total	Least Moderate Damage >50%	Complete Damage > 50%	Functionality > 50% at day 1
Hospitals	0	0	0	0
Schools	10	1	0	1
EOC's	0	0	0	0
Police Stations	4	0	0	2
Fire Stations	7	2	0	1

Table 4-9 Debris Generated (thousands of tons)/Loads to Remove Debris

Debris Generated	65
Loads (25 tons per load)	2,600

Table 4-10 Fire Following Event, Population Exposed, and Building Stock Exposed

Ignitions	1
People Displaced	0
Value Exposed (mill. $)	0

C. Grand County

The following faults within Grand County showing signs of movement during the quaternary period: Fisher Valley, Ryan Creek, Granite Creek, Sinbad Valley Graben, Ten Mile Graben, Salt and Cache Valleys, Moab Fault and Spanish Valley, Castle Valley,

Vulnerability Assessment

Table 4-11 Casualties

Casualties	Nighttime –Minor	1
	Nighttime –Major	0
	Nighttime -Fatalities	0
	Daytime –Minor	9
	Daytime –Major	0
	Daytime- Fatalities	0
	Commute –Minor	6
	Commute –Major	0
	Commute-Fatalities	0

Buildings/Structures

Table 4-12 Building Damage by Count with Moderate to Complete Damage

Category	Number of Structures
Residential	431
Commercial	8
Industrial	0
Totals	661*

*****Includes all building categories with moderate to complete damage

Table 4-13 Critical Facilities

Classification	Total	Least Moderate Damage >50%	Complete Damage > 50%	Functionality > 50% at day 1
Hospitals	1	0	0	1
Schools	6	0	0	6
EOC's	0	0	0	0
Police Stations	2	0	0	2
Fire Stations	3	0	0	3

Table 4-14 Debris Generated (thousands of tons)/Loads to Remove Debris

Debris Generated	14
Loads (25 tons per load)	560

Table 4-15 Fire Following Event, Population Exposed, and Building Stock Exposed
No post-quake fire population or building stock has been identified.

D. San Juan County

There have been 28 recorded earthquakes in the County larger than 2.0 with 8 of them larger than 3.0 in the last 40 years. The largest earthquake was a 3.37 on May 13 1993 near Monticello.

San Juan County is made up of the following active faults along the northwestern boundary of the County: Needles Fault Zone, Bright Angel Fault Zone, Lisbon Valley Fault Zone, Lockhart Fault, Pine Ridge Fault, Moab Fault, and the Spanish Valley Fault. The Needles Fault Zone is a Holocene fault that runs from the confluence of the Green and Colorado Rivers and continues downstream to Gypsum Canyon. Holocene faults are known to be active and can generate an earthquake at any time. The Bright Angel Fault system extends from Mt. Holmes and the Mt. Ellsworth area southeast to Red Rock Plateau southwest to Navajo Mountain. The Lisbon Valley Fault Zone runs southeast from La Sal Junction. The Lockhart Fault cuts across Lockhart Canyon. The Pine Ridge Faults are east of La Sal. The Moab and Spanish Valley Faults run southeast into Moab. These faults are considered to be Quaternary and still are capable of generating earthquakes but the chances are significantly less.

Vulnerability Assessment

Table 4-16 Casualties

Casualties	Nighttime –Minor	8
	Nighttime –Major	0
	Nighttime -Fatalities	0
	Daytime –Minor	6
	Daytime –Major	0
	Daytime- Fatalities	0
	Commute –Minor	6
	Commute –Major	0
	Commute-Fatalities	0

Table 4-17 Building Damage by Count with Moderate to Complete Damage

Category	Number of Structures
Residential	223
Commercial	4
Industrial	0
Totals	427*

*****Includes all building categories with moderate to complete damage

Table 4-18 Critical Facilities

Classification	**Total**	**Least Moderate Damage >50%**	**Complete Damage > 50%**	**Functionality > 50% at day 1**
Hospitals	0	0	0	0
Schools	15	0	0	15
EOC's	0	0	0	0
Police Stations	6	0	0	6
Fire Stations	2	0	0	2

Table 4-19 Debris Generated (thousands of tons)/Loads to Remove Debris

Debris Generated	8
Loads (25 tons per load)	320

Table 4-20 Fire Following Event, Population Exposed, and Building Stock Exposed
No post-quake fire population or building stock has been identified.